PYRAMID LAKE PAIUTE TRIBE

Washoe County Regional Hazard Mitigation Plan 2015

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TABLE OF CONTENTS

Tables

Figures

Appendices

Annexes

AAGR	average annual growth rate
AML	Abandoned Mine Lands
ARES	Amateur Radio Emergency Service
BLM	United States Bureau of Land Management
CDC	Center for Disease Control
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIA	Central Intelligence Agency
Cities	City of Reno and City of Sparks
County	Washoe County
DHS	Department of Homeland Security
DEM	Nevada Division of Emergency Management - Homeland Security
DMA 2000	Disaster Mitigation Act of 2000
DOT	United States Department of Transportation
EAS	Emergency Alert System
EHS	Extremely Hazardous Substance
EMPG	Emergency Management Planning Grant
EOC	Emergency Operation Center
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
GIS	Geographic Information System
GR	General Rural Regulatory Zone
HAZUS-MH	(abbreviation for HAZards United States) is a geographic information system-based natural hazard loss estimation software package developed and freely distributed by FEMA
HDR	High Density Rural Regulatory Zone
HDS	High Density Suburban Zone
HDU	High Density Urban Regulatory Zone
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HUD	United States Department of Housing and Urban Development
LDR	Low Density Rural Regulatory Zone
LDS	Low Density Suburban Regulatory Zone

LDU	Low Density Urban Regulatory Zone
LEPC	Local Emergency Planning Committee
M	Magnitude
MDR	Medium Density Rural Regulatory Zone
MDS	Medium Density Suburban Regulatory Zone
MDU	Medium Density Urban Regulatory Zone
MMI	Modified Mercalli Intensity
mph	miles per hour
NBMG	Nevada Bureau of Mines & Geology
NDEM	Nevada Division of Emergency Management
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry
NDOT	Nevada Department of Transportation
NERMP	Nevada Earthquake Risk Mitigation Plan
NFIP	National Flood Insurance Program
NRC	National Response Center
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
Planning Committee	Washoe County Regional Hazard Mitigation Planning Committee
POC	Point of Contact
RAMQC	Radioactive Material in Quantities of Concern
RFC	Repetitive Flood Claims
RHMP	Regional Hazard Mitigation Plan
SERC	State Emergency Response Commission
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SR	State Route
SRL	Severe Repetitive Loss
RSIC	Reno-Sparks Indian Colony
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
State	State of Nevada
SUP	Special Use Permits
TOD	Transit Oriented Development
TMRP	Truckee Meadows Regional Plan
TMSA	Truckee Meadows Service Area
TRFMA	Truckee River Flood Management Authority

TRFP	Truckee River Flood Control Project
UNR	University of Nevada, Reno
URM	Unreinforced Masonry Buildings
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
VOAD	Voluntary Organizations Active in Disaster
WMD	Weapons of Mass Destruction

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Across the United States, natural and human-caused disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The toll on families and individuals can be immense and damaged businesses cannot contribute to the economy. The time, money and effort required to respond and recover from these emergencies or disasters divert public resources and attention from other important programs and problems. Washoe County (the County), the City of Reno, City of Sparks, Reno-Sparks Indian Colony (RSIC), Pyramid Lake Paiute Tribe (PLPT), Truckee River Flood Management Authority (TRFMA), and the State of Nevada (State), recognize the consequences of disasters and the need to reduce the impacts of natural and human-caused hazards.

The elected and appointed officials of the County, the City of Reno, City of Sparks, RSIC, PLPT, and TRFMA also know that with careful selection, mitigation actions in the form of projects and programs can become long-term, cost effective means for reducing the impact of natural and human-caused hazards. Applying this knowledge, the Washoe County Regional Hazard Mitigation Planning Committee (Planning Committee) prepared the *Washoe County Regional Hazard Mitigation Plan*. With the support of various County and City officials, the State, and the United State Department of Homeland Security (DHS)/Federal Emergency Management Agency (FEMA), this plan is the result of several months' worth of work to create a hazard mitigation plan (HMP) that will guide the Counties toward greater disaster resistance in full harmony with the character and needs of the community and region.

People and property in the County are at risk from a variety of hazards that have the potential for causing widespread loss of life and damage to property, infrastructure, and the environment. The purpose of hazard mitigation is to implement actions that eliminate the risk from hazards, or reduce the severity of the effects of hazards on people and property. Mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation encourages long-term reduction of hazard vulnerability. The goal of mitigation is to save lives and reduce property damage. Mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability and minimize community disruption. Preparedness, response, and recovery measures support the concept of mitigation and may directly support identified mitigation actions.

The *Washoe County Regional Hazard Mitigation Plan* has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S.C. 5165, enacted under Sec. 104 the Disaster Mitigation Act of 2000 (DMA 2000), Public Law 106-390 of October 30, 2000. This plan identifies hazard mitigation actions intended to eliminate or reduce the effects of future disasters throughout the County.

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This section provides an overview of the Disaster Mitigation Act of 2000 (DMA 2000; Public Law 106-390), the adoption of the *Washoe County Regional Hazard Mitigation Plan* (RHMP) by the local governing body, and supporting documentation for the adoption.

1.1 DISASTER MITIGATION ACT OF 2000

The DMA 2000 was passed by Congress to emphasize the need for mitigation planning to reduce vulnerability to natural and human-caused hazards. The DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act; 42 United States Code [USC] 5121-5206 [2008]) by repealing the act's previous Mitigation Planning section (409) and replacing it with a new Mitigation Planning section (322). In addition, Section 322 provides the legal basis for the FEMA's mitigation plan requirements for mitigation grant assistance.

To implement the DMA 2000 planning requirements, the FEMA published an Interim Final Rule in the *Federal Register* on February 26, 2002. This rule (44 Code of Federal Regulations [CFR] Part 201) established the mitigation planning requirements for states, tribes, and local communities. The planning requirements are described in detail in Section 2 and identified in their appropriate sections throughout this Plan. In addition, a crosswalk documenting compliance with 44 CFR is included as **Appendix E**.

1.2 ADOPTION BY THE LOCAL GOVERNING BODY AND SUPPORTING DOCUMENT

The requirements for the adoption of a HMP by the local governing body, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PREREQUISITES

Adoption by the Local Governing Body

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

Element

Has the local governing body adopted the plan?

Is supporting documentation, such as a resolution, included?

Source: FEMA, March 2008.

The County, the City of Reno, City of Sparks, RSIC, PLPT, and TRFMA, Nevada, are the jurisdictions represented in this RHMP. There are no other political subdivisions within the County. The RHMP meets the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000.

Each local participant's governing body has adopted this RHMP by resolution. The signed resolutions are provided in **Appendix A**.

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This section provides an overview of the RHMP. This includes a review of the purpose and authority of the RHMP and a description of the document.

2.1 PLAN PURPOSE AND AUTHORITY

The DMA 2000, also referred to as the 2000 Stafford Act amendments, was approved by Congress on October 10, 2000. On October 30, 2000, the President signed the bill into law, creating Public Law 106-390. The purposes of the DMA 2000 are to amend the Stafford Act, establish a national program for pre-disaster mitigation, and streamline administration of disaster relief.

The RHMP meets the requirements of the DMA 2000, which calls for all communities to prepare hazard mitigation plans. By preparing this RHMP, the County, the City of Reno, City of Sparks, RSIC, Pyramid Lake Paiute Tribe, and TRFMA are eligible to receive Federal mitigation funding after disasters and to apply for mitigation grants before disasters strike. This RHMP starts an ongoing process to evaluate the risks different types of hazards pose to the County, and to engage the County, Cities and the local participants in dialogue to identify the steps that are most important in reducing these risks. This constant focus on planning for disasters will make the County, Cities, and local participants, including their residents, property, infrastructure, and the environment, much safer.

The local hazard mitigation planning requirements encourage agencies at all levels, local residents, businesses, and the non-profit sector to participate in the mitigation planning and implementation process. This broad public participation enables the development of mitigation actions that are supported by these various stakeholders and reflect the needs of the entire community.

States are required to coordinate with local governments in the formation of hazard mitigation strategies, and the local strategies combined with initiatives at the state level form the basis for the State Mitigation Plan. The information contained in HMP's helps states to identify technical assistance needs and prioritize project funding. Furthermore, as communities prepare their plans, states can continually improve the level of detail and comprehensiveness of statewide risk assessments.

For FEMA's Pre-Disaster Mitigation (PDM) grant program and Hazard Mitigation Grant Program (HMGP), a local jurisdiction must have an approved HMP to be eligible for PDM and HMGP funding for a presidentially declared disaster after November 1, 2004. Plans approved, any time after November 1, 2004, will allow communities to be eligible to receive PDM and HMGP project grants.

Adoption by the local governing body demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in the HMP. Adoption legitimizes the updated HMP and authorizes responsible agencies to execute their responsibilities. The resolutions adopting this RHMP are included in **Appendix A**.

2.2 STAFFORD ACT GRANT PROGRAMS

The following grant programs require a State, tribe, or local entity to have a FEMA-approved State or Local Mitigation Plan.

Hazard Mitigation Grant Program (HMGP): HMGP provides grants to State, tribes, and local entities to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property as a result of natural disasters and to enable mitigation measures to be implemented during the immediate recovery from disaster. Projects must provide a long-term solution to a problem: for example, elevating a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. The program may provide a State or tribe with up to 20 percent of the total disaster grants awarded by FEMA. The cost-share for this grant is 75/25 percent (Federal/non-Federal).

Pre-Disaster Mitigation (PDM) Program: PDM provides funds to State, tribes, and local entities, including universities, for hazard-mitigation planning and the implementation of mitigation projects before a disaster event. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM project's potential savings must be more than the cost of implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. Congress appropriates the total amount of PDM funding available on an annual basis. The cost-share for this grant is 75/25 percent (Federal/non-Federal).

Flood Mitigation Assistance (FMA): The FMA program provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program (NFIP). FMA provides up to 75% Federal funding for a mitigation activity grant and/or up to 90% Federal funding for a mitigation activity grant containing a repetitive loss strategy.

Repetitive Flood Claims (RFC): The RFC program provides funds on an annual basis to reduce the risk of flood damage to individual properties insured under the NFIP that have had one or more claim payments for flood damages. RFC provides up to 100% Federal funding for eligible projects in communities that qualify for the program.

Severe Repetitive Loss (SRL): The SRL program provides funds on an annual basis to reduce the risk of flood damage to residential structures insured under the NFIP that have had one or more claim payments for flood damages. SRL provides up to 75% Federal funding for eligible projects in communities that qualify for the program.

2.3 PLAN ORGANIZATION

The remainder of this RHMP consists of the following sections.

- *Section 3 - Community Description*

Section 3 provides a general history and background of the County, Cities and local participants, and historical trends for population, demographic and economic conditions that have shaped the area. Trends in land use and development are also discussed.

- *Section 4 - Planning Process*

Section 4 describes the planning process. Specifically, this section describes the plan development process and identifies key stakeholders, including members of the Planning Committee. This section also includes a description of the meetings held as part of the planning process (relevant documents are attached as **Appendix D**, Planning Team Meetings). In addition, this section documents public outreach activities (attached as **Appendix C**, Public Information) and discusses the review and incorporation of relevant plans, reports, and other appropriate information.

- *Section 5 - Risk Assessment*

Section 5 describes the process through which the Planning Committee identified and compiled relevant data on all potential natural hazards that threaten the County and the immediately surrounding area. Information collected includes historical data on natural hazard events that have occurred in and around the County and how these events impacted residents and their property.

The descriptions of natural hazards that could affect the County are based on historical occurrences and best available data from agencies such as FEMA, the U.S. Geological Survey (USGS), and the National Weather Service (NWS). Detailed hazard profiles include information on the frequency, magnitude, location, and impact of each hazard as well as probabilities for future hazard events.

- *Section 6 – Vulnerability Analysis*

Section 6 identifies potentially vulnerable assets such as people, housing units, critical facilities, infrastructure and lifelines, hazardous materials facilities, and commercial facilities. These data were compiled by assessing the potential impacts from each hazard using Geographical Information System (GIS) and FEMA's natural hazards loss estimation model, Hazards United States (HAZUS-MH). The resulting information identifies the full range of hazards that the County could face and potential social impacts, damages, and economic losses.

- *Section 7 - Capability Assessment*

Although not required by the DMA 2000, Section 7 provides an overview of the County, Cities and local participants' resources in the following areas for addressing hazard mitigation activities:

- Legal and regulatory resources
- Administrative and technical: The staff, personnel, and department resources available to expedite the actions identified in the mitigation strategy
- Fiscal: The financial resources to implement the mitigation strategy

- ***Section 8- Goals, Objectives & Actions - Mitigation Strategy***

As Section 8 describes, the Planning Committee developed a list of mitigation goals, objectives, and actions based upon the findings of the risk assessment and the capability assessment. Based upon these goals, the Planning Committee reviewed and prioritized a comprehensive range of appropriate mitigation actions to address the risks facing the community. Such measures include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities.

- ***Section 9 - Plan Maintenance Process***

Section 9 describes the Planning Committee's formal plan maintenance process to ensure that the RHMP remains an active and applicable document. The process includes monitoring, evaluating, and updating the RHMP; implementation through existing planning mechanisms; and continued public involvement.

- ***Section 10 - References***

Section 10 lists the reference materials used to prepare this RHMP.

- ***Appendices***

The appendices include the Adoption Resolution, Maps, Planning Committee Meetings, and Public Involvement, and Maintenance Tools.

The *Washoe County Regional Hazard Mitigation Plan* (RHMP) is a multi-jurisdictional plan that geographically covers the entire area within the County's jurisdictional boundaries (thereinafter referred to as the planning area). The following communities participated in the planning process and are seeking approval of the plan update:

- Washoe County
- City of Reno
- City of Sparks
- Pyramid Lake Paiute Tribe
- Reno-Sparks Indian Colony
- Truckee River Flood Management Authority

This section describes the history, location, and geography of the County, Cities, and local participants, as well as government, demographic information, and current land use and development trends.

3.1 WASHOE COUNTY

Location, Geography, and History

Washoe County is located along the eastern slopes of the Carson Range of the Sierra Nevada Mountains in western Nevada. The county covers an area of 6,600 square miles in the northwest section of the State bordering California and Oregon. Washoe County has a population of approximately 432,324; the vast majority of which resides in the southern half of the county. Regional access to the County is provided via Interstate 80 (1-80), which runs east-west through the County, as well as US 395, I-580, Nevada SR 445, Nevada SR 446, and Nevada SR 447. Washoe County includes the incorporated communities of Reno and Sparks. This document also profiles the PLPT and the RSIC in their respective annexes, as well as the TRFMA. The County is illustrated in **Figure B-1** in **Appendix B**.

The name "Washoe" was applied to most of the country now embraced within the boundaries of what is now known as the State of Nevada. It was the wish and opinion of some of the members of the Constitutional Convention held in Carson City, that the proposed State should be known as "Washoe." A majority, however, thought differently, hence the name "Nevada." But it is a fact that formerly people in California and other States knew and referred to the great Comstock and surrounding country as the "Washoe Mining District." This was especially true during the years1859-1861. Notwithstanding, Congress in March, 1861, created a new Territory and called it "Nevada." This action by Congress practically settled the name and those favoring "Washoe" made their last effort in 1863. When the Territory was organized by the Territorial Legislature of November, 1861, among its first acts it divided the territory into nine counties.

Washoe County was created in 1861 as one of the original nine counties of the Nevada Territory. It is named after the Washoe people who originally inhabited the area. It was consolidated with Roop County in 1864. Washoe City was the first county seat in 1861 and was replaced by Reno in 1871. This county takes its name from the aboriginal tribe who inhabited the strip of country extending along the base of the Sierra Mountains, from the head of Carson River to the Truckee. The section embraces a series of valleys, of which Carson, Eagle, Pleasant, Steamboat and the Truckee are the principal ones, and including the adjacent mountains, which is still the home of this people.

Because of the generally arid climate only about six percent of the 110,000 square miles of land is under cultivation. Irrigation is maintained in the cultivated areas by impounding the water from melting snow. The Sierra Nevada snowpack provides water for the valleys of Walker, Carson, Truckee, and Fallon. Mining is the other basic industry in Nevada. The State ranks high in the amount and value of minerals it produces each year, principally manganese, tungsten, mercury, copper, silver, gold, lead, and zinc.

According to the U.S. Census Bureau, the County has a total area of 6,551 square miles (16,968 km^2), of which, 6,342 square miles (16,426 km^2) of it is land and 209 square miles (541 km^2) of it is water, 3.19% of the total area. There are two incorporated cities within the county: Reno, and Sparks.

The mean annual temperatures are about 50° F. In Washoe County, the summers are short and hot, but the winters are only moderately cold. Long periods of extremely cold weather are rare, primarily because the mountains east and north of the County act as a barrier to the intensely cold continental arctic air masses. However, on occasion, a cold air mass spills over these barriers and produces prolonged cold waves.

There is strong surface heating during the day and rapid nighttime cooling because of the dry air, resulting in wide daily ranges in temperature. Even after the hottest days, the nights are usually cool. The average range between the highest and the lowest daily temperatures is about 30 to 35 degrees. Daily ranges are larger in summer than the winter. Extreme temperatures have ranged from 120° F to 50° below zero.

Washoe County lies on the eastern, lee side of the Sierra Nevada Range, a massive mountain barrier that markedly influences the climate of the County. One of the greatest contrasts in precipitation found within a short distance in the United States occurs between the western slopes of the Sierras in California and the valleys just to the east of this range. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation takes place and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the County but throughout the State, with the result that the lowlands of Nevada are largely desert or steppes.

Government

Below please see Washoe County key officials and departments.

Washoe County - Key Officials

County Commissioner Seat 1	Assessor	District Attorney
County Commissioner Seat 2	Clerk	Incline Village Constable
County Commissioner Seat 3	Recorder	Public Administrator
County Commissioner Seat 4	Sheriff	County Manager
County Commissioner Seat 5	Treasurer	

Washoe County Departments

Administrative Enforcement	Emergency Management and Homeland Security	Recorder's Office
Alternate Public Defender	Finance/Controller	Reno Justice Court
Animal Services	Geographic Information Systems	Senior Services
Assessor's Office	Green Team	Sheriff's Office
Citizen Involvement	Health	Social Services
Clerk's Office	Human Resources	Sparks Justice Court
Community Services	Incline Village Justice Court	Technology Services
Building and Safety	Juvenile Services	Treasurer's Office
Planning and Development	Law Library	Truckee Meadows Fire Protection District
Public Works	Library	
Regional Parks and Open Space	Manager's Office	Truckee River Flood Project
Utilities	Medical Examiner and Coroner's Office	Votes, Registrar of
Cooperative Extension	Northern Nevada Regional Intelligence Center	Water Resources
District Attorney	Public Guardian	
District Court		

Washoe County Districts

Washoe County Health District	Gerlach General Improvement District	Palomino Valley General Improvement District
Truckee Meadows Fire Protection District	Grand View Terrace General Improvement District	Sun Valley General Improvement District
North Lake Tahoe Fire Protection District	Incline Village General Improvement District	Verdi TV District

Demographics

According to the 2010 Housing Element for Washoe County, the County experienced rapid growth throughout the second half of the twentieth century and into the twenty-first century. The county grew the fastest between 1950 and 1960, increasing from 32,497 to 84,743, when the average annual growth rate (AAGR) was almost 26 percent. Between April 2000 and July 2013, Washoe County's population grew from 339,486 to 432,324 residents–an average annual growth rate (AAGR) of 2.0 percent.

Table 3-1 shows a breakdown of the population growth in Washoe County's incorporated cities. As shown in the table, growth in the cities of Reno and Sparks outpaced the unincorporated portions of the County. Reno was the faster growing city in the County, with a population increase from 180,480 residents in 2000 to 232,243 residents in 2013 – a 2.1 percent AAGR.

Table 3-1: Washoe County Population Growth

Area	2000	2014	Absolute Change	% Change
Reno	180,480	235,371	54,891	30.4%
Sparks	66,346	92,396	26,050	39.3%
Incorporated County	***246,826***	***327,767***	**80,941**	**32.8%**
Unincorporated County	***92,660***	***109,030***	**16,370**	**17.7%**
County Total	**339,486**	**436,797**	**97,311**	**28.7%**

Source: Nevada Department of Taxation and NV State Demographer

According to the Washoe County Consensus Forecast 2014 - 2034, the industries that employed the highest percentages of Washoe County's labor force in 2012 were trade, transportation and utilities (21.7%); leisure and hospitality (18.1%); and government (15.2%), and professional and business services (13.6%). Washoe County had an average unemployment rate of 7.4 percent from January to December of 2014, slightly lower than the 7.7 percent rate in Nevada as a whole. This is a significant decrease from the peak of 14.6 percent in Washoe County in November 2010.

The 2013 U.S. Census American Community Survey estimated the population of Washoe County is 425,495. Select demographic, social, and economic characteristics for Washoe County from the 2009-2013 American Community Survey are shown in **Table 3-2** and **3-3** below.

Table 3-2: Washoe County – Demographics and Social Characteristics

Characteristic	%
Gender/Age	
Male (%)	50.4
Female (%)	49.6
Under 5 Years (%)	6.4
65 years and Over (%)	12.8
Race/Ethnicity	
White alone (%)	65.6
Black or African American alone (%)	2.2
American Indian and Alaska Native alone (%)	1.4
Asian alone (%)	5.2
Hispanic or Latino (of any race) (%)	22.6
Native Hawaiian and Other Pacific Islander alone	0.6
Two or more races	2.4
Other	
Average Household Size	2.61
High School Graduate or Higher (%)	86.9

Source: U.S. Census Bureau, www.census.gov

Table 3-3: Washoe County – Economic Characteristics

Characteristic	
Families below Poverty Level	10.6%
Individuals below Poverty Level	15.%
Median Home Value	$203,300
Median Household Income	$53,040
Per Capita Income	$28,670
Population in Labor Force	337,985

Source: U.S. Census Bureau, www.census.gov/

Land Use and Development Trends

The estimated population of Washoe County for July 1, 2013 was 432,324, representing nearly a five-fold increase from just under 84,743 people in 1960. **Table 3-4**and **3-5** illustrate the pace of population growth in Washoe County for the County overall dating back to 1960 along with more recent population trends for each jurisdiction.

Table 3-4: Washoe County Population Growth 1960-2014

Period	1960	1970	1980	1990	2000	2010	2014
Total	84,743	121,068	193,623	254,667	339,486	421,407	436,797
Change		36,325	72,555	61,044	84,819	81,921	15,390
Percent Change from Previous Period		42.86%	59.93%	31.53%	33.31%	24.13%	3.65%
Average Annual Growth Rate (AAGR, from previous period)		4.29%	5.99%	3.15%	3.33%	2.41%	0.37%

Source: Nevada Department of Taxation and NV State Demographer

Table 3-5: Population Growth for Jurisdictions in Washoe County, 2004-2014

City	2010	2011	2012	2013	2014	Increase 2010-2014
Reno	217,282	222,801	229,859	232,243	235,371	7.79%
Sparks	92,331	92,302	90,214	91,551	92,396	0.07%
Unincorporated	111,794	106,490	107,631	108,530	109,030	-2.55%
County Total	421,407	421,593	427,704	432,324	436,797	3.56%

Source: Nevada Department of Taxation, Nevada State Demographer

In recent years, housing construction has declined significantly due to a historic economic downturn and over building that resulted in surplus housing inventory. In addition, historically high rates of foreclosure exacerbated the surplus of available housing stock. Because population growth is typically driven by a combination of economic growth and housing construction, the population of the region also declined and/or stagnated during the 2009 to 2012 timeframe. Recently, however, the region has shown signs of increasing housing and population growth fueled by absorption of surplus housing inventory (including foreclosed units), new multi-family construction, and an improving economy.

Current Status and Past Development Summary

- As of October 2014, Washoe County had a total estimated population of 436,797.
- 109,029 individuals, or 25 percent, of Washoe County's residents live in the unincorporated portion of the County while 327,767 persons, or 75 percent, reside in the incorporated areas of Reno and Sparks.
- Of the residents in the incorporated area, the City of Reno has a total estimated population of 235,371 (53.8 percent of total county population) and Sparks has a total estimated population of 92,396 (21.1 percent of total county population). Therefore, approximately 72% of the incorporated population lives in Reno and 28% in Sparks.
- Since 2004, 87.3 percent of the housing unit growth and 87.8 percent of the population growth has occurred in the incorporated areas of Washoe County.

Table 3-6 shows the population projections for the County as a whole through 2030.

Table 3-6: Population Projections for Washoe County, 2000-2030

	2000	2010	2020	2030
Population	339,486	421,407	484,304	559,843
Percent Change	--	24.1%	14.9%	15.6%
Average Annual Increase (%)	--	2.4%	1.5%	1.6%
Population Increase Per Decade	--	81,921	62,897	75,539
Average Annual Increase (Number)	--	8,192	6,290	7,554
Cumulative Population Increase	--	81,921	144,818	220,357

Source: Nevada State Demographer

3.2 CITY OF RENO

Location, Geography, and History

Reno is the county seat. Reno is the largest city in northern Nevada. The City, located in the southern part of the County, is nestled on the eastern slope of the Sierra Nevada Mountains in an area called the Truckee Meadows. Recreational activities (especially skiing and golfing) in the nearby area and legalized gambling make the city a major resort. The city is a trade center for an area devoted to mining, farming, and ranching, and produces packaged meat, flour, and building materials. Major attractions include the Fleischmann Planetarium, which is on the campus of the University of Nevada, Reno; the National Bowling Stadium; and the National Automobile Museum. Annual events include the Nevada State Fair, the National Championship Air Races, and Hot August Nights.

The City of Reno is characterized by a unique and attractive landscape. However, the potential impact of natural hazards associated with the terrain make the environment and population vulnerable to natural disaster situations.

In 1859, Charles Fuller built a log bridge across the Truckee River and charged a fee to those who passed over it on their way to Virginia City and the gold recently discovered there. Fuller also provided gold-seekers with a place to rest, purchase a meal, and exchange information with other prospectors. In 1861, Myron Lake purchased Fuller's bridge and with the money from the tolls, bought more land and constructed a gristmill, livery stable, and kiln. When the Central Pacific Railroad reached Nevada from Sacramento in 1868, Lake made sure that his crossing was included in its path by deeding a portion of his land to Charles Crocker (an organizer of the Central Pacific Railroad Company), who promised to build a depot at Lake's Crossing. On May 13, 1868, the town site of Reno (named after Civil War General Jesse Reno) was officially established. Lake's remaining land was divided into lots and auctioned off to businessmen and homebuilders.

At the turn of the century, Nevada Senator Francis Newlands played a prominent role in the passage of the Reclamation Act of 1902. The Newlands Reclamation Project diverted Truckee River water to farmland east of Reno, prompting the growth of the town of Fallon. Because Nevada's economy was tied to the mining industry and its inevitable ups and downs, the state had to find other means of economic support during the down times. Reno earned the title "Sin City"

because it hosted several legal brothels, was the scene of illegal underground gambling, and offered quick and easy divorces.

Government

Below please see City of Reno key officials and departments.

City of Reno - Key Officials

City Council Member, Ward 1	City Council Member, Ward 5
City Council Member, Ward 2	City Council Member, At-Large
City Council Member, Ward 3	Mayor
City Council Member, Ward 4	

City of Reno Departments

City Attorney	Communication & Technology	Office of Management & Budget
City Clerk	Economic Development/ Redevelopment Agency	Parks, Recreation & Community Services
City Manager's Office	Finance	Police
Civil Service Commission	Fire Department	Public Works
Community Development Department	Human Resources	Reno Municipal Court

Demographics

The 2013 U.S. Census American Community Survey estimated the population of the City of Reno is 233,294. Select demographic and social characteristics for the City of Reno from the 2009-2013 American Community Survey are shown in the tables below.

Table 3-7: City of Reno – Change in Population, 2000-2013

2000 Population	2013 Population Estimate	Estimated Percent Change 2000-2013	2000 # of Housing Units	2008 Estimated # of Housing Units	Estimated Percent Change 2000-2008
180,480	233,294	22.64%	79,543	102,582	22.46%

Source: U.S. Census Bureau, Nevada Housing Division, Washoe County

Table 3-8: City of Reno – Demographics and Social Characteristics

Characteristic	%
Gender/Age	
Male (%)	51.0
Female (%),	49.0
Under 5 Years (%)	6.7
65 years and Over (%)	12.1
Race/Ethnicity	
White alone (%)	61.8
Black or African American alone (%)	2.8
American Indian and Alaska Native alone (%)	0.8
Asian alone (%)	6.3
Hispanic or Latino (of any race) (%), 2010	25.0
Native Hawaiian and Other Pacific Islander alone	0.7
Two or more races	2.6
Other	
Average Household Size	2.47
High School Graduate or Higher (%)	85.7

Source: U.S. Census Bureau, www.census.gov

According to the 2009-2013 American Community Survey, the industries that employed the highest percentages of Reno's labor force were educational, health, and social services (19.7%); arts, entertainment, recreation, accommodation and food services (18.1%); and professional, scientific, and management, and administrative and waste management services (12.2%). Select economic characteristics for Reno from the Census are shown in **Table 3-9** below.

Table 3-9: City of Reno – Economic Characteristics

Characteristic	
Families below Poverty Level, 2013	13.6%
Individuals below Poverty Level, 2009-2013	18.6%
Median Home Value, 2009-2013	$202,100
Median Household Income, 2009-2013	$46,770
Per Capita Income, 2009-2013	$26,472
Population in Labor Force, 2013	122,431

Source: U.S. Census Bureau, www.census.gov/

Land Use and Development Trends

The City of Reno is the largest and fastest growing urban area in the Washoe County planning area. Based on Census data, the City of Reno grew from approximately 95,700 people in 1980 to 180,500 people in 2000. This represents an average annual growth of slightly more than 4,200 people annually. The City of Reno share of total County population has been relatively stable during this time with about 55% over this 20 year period. The number of housing units in the city increased 22.46% between 2000 and 2008. Its population grew 22.64% in 13 years, and according to the *Washoe County Population Consensus Forecast 2008-2030,* is projected to be 339,543 by 2030.

The only natural resource constraints that would affect this growth are availability of developable land and water supply. The first constraint can be removed by expanding the amount of land available for development in the City of Reno. This has been achieved through expansions of Reno's share of the Truckee Meadows Service Area and by increasing the density of development on the remaining vacant, underutilized, and redeveloped land, particularly in the TOD's and Regional Centers.

The Reno portion of the Truckee Meadows Service Area (TMSA) is defined in the Regional Plan as areas within which municipal services and infrastructure will be provided. The City TMSA boundary is synonymous with its Sphere of Influence boundary and is the specific area in which the City can expand its corporate limits. Based on this information, and with its aggressive infill policy, the City is projected to have an increase in population from an estimated 220,600 in 2007 to 339,500 in 2030 at the required average minimum densities of 4 people per acre.

The second constraint can be removed by developing new sources of water supply, particularly in the Lemmon Valley Hydrographic Basin. There are currently efforts underway to do so. Hence, the population forecast is not constrained; it accommodates a continuation of current market trends identified in the consensus forecast.

The valuation of building permits issued by the City of Reno within the last 10 years ranges from $1.03 billion in 2004, to $4.2 million in 2013. The average annual valuation for this period is $635 million. Building permit valuation includes both residential and non-residential new construction and remodeling. For calendar year 2014, the estimated permit valuation will be $662 million.

The number of new residential housing units built (both single and multi-family) within the last 10 years ranges from 3,042 in 2004 to 316 in 2009. The average annual number for this period is 1,186. For calendar year 2009, the estimated number is 887. Please see **Appendix B**, **Figure B-2** for the City of Reno Land Use Map.

3.3 CITY OF SPARKS

Location, Geography, and History

The City of Sparks is northeast of Reno, NV, and southwest of Pyramid Lake in the Truckee Meadows. The City sits between the Carson and Virginia Mountain Ranges at an elevation of nearly 4,500 feet. The City is bisected by Interstate 80.

When Southern Pacific succeeded Central Pacific as the new owner of the main line across Northern Nevada, one of the first decisions made was to straighten the road and cut a few miles off the distance. The new route bypassed Wadsworth, which for 40 years had ruled the roundhouse and maintenance shops of Central Pacific. Southern Pacific made a startling offer to its Wadsworth employees - a tract of land would be laid out next to the roundhouse, and the railroad would give everyone clear deed to a lot 50' X 140' in size. To add to the miracle, the railroad offered to pack up every house in Wadsworth and ship it to the new town, free of charge. Sometime during the summer of 1903 a drawing was held - the employees names in one hat, lot numbers in another – matching one of the sixty-seven available lots to their new owners, at a price of $1 per lot. Sparks was born.

The City temporarily held the names East Reno, New Wadsworth and Harriman, but that did not suit the independent spirit of the new citizenry, and in 1904 was officially named the City of Sparks to honor then current Governor John Sparks. In 1905 Sparks became an incorporated city.

Government

Below please see City of Sparks' key officials and departments.

City of Sparks - Key Officials

City Council Member, Ward 1	City Council Member, Ward 4
City Council Member, Ward 2	City Council Member, Ward 5
City Council Member, Ward 3	Mayor

City of Sparks Departments

Mayor/City Council	City Manager's Office	Financial Services
City Clerk's Office	Community Services	Human Resources
Fire Department	City Attorney's Office	Municipal Court
Parks & Recreation	Customer Service	Police Department

Demographics

The 2013 U.S. Census American Community Survey estimated the population of the City of Sparks is 93,282. The City of Sparks reports the 2014 population at 92,396. Select demographic

and social characteristics for the City of Sparks from the 2009-2013 American Community Survey are shown in the tables below.

Table 3-10: City of Sparks – Change in Population, 2000-2013

2000 Population	2013 Population Estimate	Estimated Percent Change 2000-2013	2000 # of Housing Units	2008 Estimated # of Housing Units	Estimated Percent Change 2000-2008
66,346	93,282	28.80%	24,601	36,455	32.52%

Source: U.S. Census Bureau, City of Sparks

Table 3-11: City of Sparks – Demographics and Social Characteristics

Characteristic	%
Gender/Age	
Male (%)	49.1
Female (%)	50.9
Under 5 Years (%)	7.5
65 years and Over (%)	12.5
Race/Ethnicity (one race)	
White (%)	60.4
Black or African American (%)	2.0
American Indian and Alaska Native (%)	1.1
Asian (%)	6.0
Hispanic or Latino (of any race) (%), 2010	27.2
Native Hawaiian and Other Pacific Islander alone	0.7
Two or more races	2.6
Other	
Average Household Size	2.65
High School Graduate or Higher (%)	85.40

Source: U.S. Census Bureau, www.census.gov

According to the 2009-2013 American Community Survey, the industries that employed the highest percentages of Sparks' labor force were educational, health, and social services (18.6%); arts, entertainment, recreation, accommodation and food services (16.4%); and retail trade (12.5%). Select economic characteristics for Sparks from the Census are shown in **Table 3-12** below.

Table 3-12: City of Sparks – Economic Characteristics

Characteristic	
Families below Poverty Level, 2013	10.10%
Individuals below Poverty Level, 2009-2013	13.10%
Median Home Value, 2009-2013	$177,400
Median Household Income, 2009-2013	$52,581
Per Capita Income, 2009-2013	$25,540
Population in Labor Force, 2013	48,975

Source: U.S. Census Bureau, www.census.gov/

Land Use and Development Trends

The City of Sparks is the second largest urban area in Washoe County, behind the City of Reno. Sparks' population increased 28.8% in 13 years. The number of housing units in the city increased 43.7% between 2000 and 2007. According to the *Washoe County Consensus Forecast 2008-2030*, is projected to be 126,982 by 2034. The *City of Sparks Master Plan* shows a possible population of 116,058 by 2034.

This future growth is planned at an overall minimum density of 4 persons per acre, however, it is expected that the developable areas within the future service areas will occur at significantly higher densities. It is also expected that certain areas within the current population center will experience significant intensification of use. The City plans on both its future service areas and infill areas to develop in a sustainable, mixed-use manner based upon principles which are compatible with the regions arid climate. This growth will require effective master planning to serve the newly developed areas, as well as to mitigate any potential impact upon the services of the current population centers. **Appendix B**, **Figure B-3** shows the City of Sparks future land use plans.

In order to meet the anticipated needs of the City of Sparks, an annexation program was prepared in compliance with Chapters 268 and 278 of the Nevada Revised Statutes. The program identifies areas in "Sphere of Influence" of the City of Sparks as shown in the Truckee Meadows Regional Plan to be considered for annexation to the City within the seven-year period from 2008 to 2015. This program identifies areas proposed for annexation and review of these annexation areas in light of the factors to be considered in the Truckee Meadows Regional Plan.

All unincorporated areas contiguous to the City are eligible for annexation under NRS 268.670 upon application of 100% if the property owners of the subject area. Areas within the City's Sphere of Influence area also eligible for annexation under the processes laid out in NRS 268.610 through 268.668 which are governed in part by 268.670.

3.4 RENO-SPARKS INDIAN COLONY

Location, Geography, and History

The RSIC is a federally recognized Indian Tribe located near Reno and Sparks, Nevada. The reservation lands consist of the original twenty-eight acre residential Colony, located in downtown Reno, 82 acres of commercial property and a 1,960-acre Hungry Valley reservation, located approximately 20 miles north of the downtown Colony, in a more rural setting.

The RSIC is a federally recognized Indian Tribe organized under the provisions of the Indian Reorganization Act of 1934. The constitution was adopted in 1936 by the residents of the Colony. A Chairman and eight-member Tribal Council is elected to serve as the governing body and to act in accordance with the provisions of the newly adopted constitution. The constitution gives the Tribal Council authority and responsibility to raise revenues, incur expenses, enter into contracts, borrow money, administer funds, purchase land, and provide services for the general welfare and benefit of the Colony members.

The Colony is a growing organization employing approximately two hundred people, and is progressively taking steps to provide for the needs of the people while, at the same time, maintaining tribal culture and protecting sovereignty.

Government

Please see Reno-Sparks Indian Colony key officials and departments.

Reno-Sparks Indian Colony - Key Officials

Tribal Council Chairman	Tribal Council Member 3 Treasurer	Tribal Council Member 6
Tribal Council Member 1 Vice-Chairman	Tribal Council Member 4	Tribal Council Member 7
Tribal Council Member 2 Secretary	Tribal Council Member 5	Tribal Council Member 8

Reno-Sparks Indian Colony Departments

Administration Front Office	Environmental Program	Planning
Archives	Fund Development	Recreation
Business Enterprises and Economic Development	Finance	Records
Court Services	Housing	Reno Sparks Tribal Health Center
Cultural Resources	Human Resources	Senior Program
Education	Human Services	Tribal Government
Emergency Services	Information Technology	Tax and Revenue
Enrollment	Public Works	

Demographics

The Reno-Sparks Indian Colony is comprised of three Great Basin Tribes: the Paiute, Shoshone, and Washoe. It is unique in that it occupies both an urban setting and a rural land base. The Colony's Reno Community, with 490 residents, is located between the cities of Reno and Sparks along a four block stretch next to a freeway. The Colony's Hungry Valley community, with 591 residents, is located 20 miles away. It consists of two tribal housing developments, a community center, emergency services, childcare, a cemetery, and pow-wow grounds. It covers 1,960 acres adjacent to BLM land. There are no commercial enterprises located in the valley. All the surrounding roads are dirt, except those paved in the housing area and going to the Community Center.

The RSIC hired the independent firm of Tribal Data Resources in 1997 to conduct a Tribal Census. That Census showed a total of 1,081 residents (485 in the Colony, 596 in Hungry Valley). For the 467 households on the reservation, there is an average of 2.18 persons per household. The Tribal resident and service area (on or near Colony) population profile in 1997 is shown in **Table 3-13**.

Table 3-13: Reno-Sparks Indian Colony Age Distribution

Age	0-5	6-12	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-49	50-54	55-59	60+	TOTAL
# of persons	133	192	72	91	75	87	95	88	84	41	32	18	73	1,081

Source: Reno-Sparks Indian Colony

The 2009-2013 U.S. Census American Community Survey estimated the population of the Reno-Sparks Indian Colony is 1,059. Select demographic characteristics for the Reno-Sparks Indian Colony from the 2009-2013 American Community Survey are shown in **Table 3-14** below.

Table 3-14: Reno-Sparks Indian Colony – Demographics

Characteristic	%
Gender/Age	
Male (%)	53.2
Female (%)	46.8
Under 5 Years (%)	7.1
65 years and Over (%)	6.8
Race/Ethnicity	
White alone (%)	4.1
Black or African American alone (%)	0.0
American Indian and Alaska Native alone (%)	88.6
Asian alone (%)	0.0
Hispanic or Latino (of any race) (%)	4.8
Native Hawaiian and Other Pacific Islander alone	0.1
Two or more races	2.5

Source: U.S. Census Bureau, www.census.gov

Land Use and Development Trends

Approximately 205 RSIC members live near the Colony due to lack of housing on Tribal lands, but receive services and participate in Tribal programs, activities, and resources. The Tribe deemed them eligible for services at the Tribal Clinic, education programs, social services, and other tribally funded programs such as the Seniors Program. Most members temporarily residing off Colony lands are on the waiting list for housing that becomes available on the reservation occasionally. Indians from other tribes residing on the reservation also receive governmental and tribal services as community residents.

The primary source of revenue is derived from the five Smoke shops scattered throughout Washoe Valley, on trust lands, and therefore under tribal jurisdiction. The Colony also leases land to commercial sector businesses in order to garner tribal sales and excise taxes.

The Colony's Economic Development Department has tentatively scheduled the following construction projects on Colony lands:

- Commercial nursery and other commercial buildings on the Colony's 24-acre site in Spanish Springs
- Redevelopment of a 6-acre site that is contiguous and to the east of the Walmart located on East 2nd Street in Reno.
- 21,500 square foot Northern Nevada Transitional Housing Center for the Nevada Department of Corrections on the southeast corner of Kietzke Lane and East Second Street.

3.5 PYRAMID LAKE PAIUTE TRIBE

Location, Geography, and History

The Pyramid Lake Paiute Tribes' Reservation is located thirty five miles northeast of Reno, in a remote desert area. The reservation contains about 475,000 acres, of which approximately 112,000 acres cover the surface of a terminal desert lake, Pyramid Lake. Pyramid Lake is one of the most valuable assets of the Tribe and is entirely enclosed within the boundaries of the reservation. Pyramid Lake is approximately 15 miles long and 11 miles wide. The lake measures 350 feet at its deepest point.

The reservation land was first set aside for the Northern Paiute by request of the Bureau of Indian Affairs in 1859. The reservation was not surveyed until 1865. The status of the reservation was very uncertain until President Ulysses S. Grant affirmed its existence by executive order on March 23, 1874. At that time the creation of reservations by the executive branch was novel - most previous reservations were created by treaty or congressional legislation. Subsequent court decisions have affirmed the validity of reservations created by the executive branch, and have set the establishment date for the Pyramid Lake Reservation at 1859, not 1874. This earlier date is important both with regards to the priority date of tribal water rights, and the status of non-tribal claims to land within the reservation. The tribe has fought a long series of legal battles on both these issues.

Government

Please see Pyramid Lake Paiute Tribe key officials and departments.

Pyramid Lake Paiute Tribe - Key Officials

Tribal Council Member 1, Chairman	Tribal Council Member 5	Tribal Council Member 9
Tribal Council Member 2, Vice-Chairman	Tribal Council Member 6	Tribal Council Member 10
Tribal Council Member 3	Tribal Council Member 7	Tribal Council Secretary
Tribal Council Member 4	Tribal Council Member 8	Tribal Treasurer

Pyramid Lake Paiute Tribe Departments

Tribal Council	Health Services	PLPT Newspaper
Administration	Higher Education	Public Utilities
Child Care	Housing Authority	Realty
Appropriations	Human Resources	PL Rangers
Broadband Technology Opportunities Program	Johnson O'Malley Program	Pyramid Lake High School
Contracts & Grants	Judicial Services	Sacred Visions Pow-Wow
Economic Development	Law Enforcement	Social Services
Enrollment Services	Library	Sumunumu
Environmental Department	Maintenance	Tax Department
Events	Museum	Technology Services
Filming & Photography	Natchez	Water Resources Department
Finance Department	Numaga Senior Center	Water Quality Program
Fisheries	Parks & Recreation	Victim Services

Demographics

The estimated 2007 population of the PLPT is 1,714. 45% of the population resides in Wadsworth, Nevada; and 15% of the population resides in Sutcliffe, Nevada. The PLPT has approximately 2,253 enrolled members. The membership statistic is an approximate number as this total changes from month to month based on membership approvals and other action taken by the Tribal Council. The majority of enrolled Tribal members reside on the reservation; approximately 12% of this membership resides in other areas throughout the Western United States. The PLPT has a 56% employment rate and a 44% unemployment rate. The majority of the reservation resident population is young, comprised of individuals under age thirty-five (35) years. The median age is twenty-two (22) years.

Much of the economy on the Pyramid Lake Reservation is centered on fishing and recreational activities at Pyramid Lake. In addition to permit fees for fishing, day use and overnight camping, the Tribe also receives lease revenue, and tax revenue. Several Tribal members belong

to the Pyramid Lake Cattleman's Cooperative Association and the Association utilizes the reservation desert open range to operate and manage the individual cattle herds.

Table 3-15 illustrates how the PLPT has grown in terms of population between 1993 and 2009.

Table 3-15: Pyramid Lake Paiute Tribe—Change in Population, 2000-2007

1993 Population	2007 Population Estimate	2009-2013 American Community Survey	Estimated Percent Change 1993-2009
1,603	1,714	1,619	1

Source: Pyramid Lake Paiute Tribe; U.S. Census

The 2009-2013 U.S. Census American Community Survey estimated the population of the Pyramid Lake Paiute Tribe is 1,619. Select demographic characteristics for The Pyramid Lake Paiute Tribe from the 2009-2013 American Community Survey are shown in **Table 3-16** below.

Table 3-16: Pyramid Lake Paiute Tribe – Demographics and Social Characteristics

Characteristic	%
Gender/Age	
Male (%)	50.3
Female (%)	49.7
Under 5 Years (%)	9.8
65 years and Over (%)	11.9
Race/Ethnicity	
White alone (%)	19.5
Black or African American alone (%)	0.0
American Indian and Alaska Native alone (%)	62.6
Asian alone (%)	0.6
Hispanic or Latino (of any race) (%)	7.4
Native Hawaiian and Other Pacific Islander alone	8.0
Two or more races	2.0

Source: U.S. Census Bureau, www.census.gov

Land Use and Development Trends

The tribe is in the process of developing an economic development plan that will expand commercial businesses into the Wadsworth area. They are in the early stages of replacing all sewer lines in the Wadsworth area to accommodate this anticipated commercial growth. The water lines have been replaced and updated to better serve the community. The Wadsworth area sits in a low area that has experienced flooding in years past. The 1997 flood sent a large amount of water down the river which runs through the Wadsworth community causing extensive flooding in the Wadsworth area. A mitigation plan has to be developed and then completed to protect this community in the future.

Pyramid Lake Reservation is the largest reservation in the State of Nevada with 475,000 acres constituting 742.2 square miles of land. Wildland fires are common on the reservation and continue to become more frequent and larger. Fire protection is another mitigation issue that has to have a plan and then be executed to reduce the increasing wild land fire threat. As more people discover Pyramid Lake for recreational use, this threat will continue to increase while resources and manpower continue to decrease.

3.6 TRUCKEE RIVER FLOOD MANAGEMENT AUTHORITY

Location, Geography, and History

The mission of the TRFMA is to reduce the impact of flooding in the Truckee Meadows, restore the Truckee River ecosystem, and improve recreational opportunities by managing the development and implementation of the Truckee River Flood Control.

The Truckee River Flood Project (TRFP) is a joint effort between the cities of Reno and Sparks, the County, the US Army Corps of Engineers (USACE) and numerous stakeholders. Early on the TRFP developed an action plan that provided a forum for residents, businesses, community leaders, regulatory agencies and government officials to conduct an analysis of flooding issues and evaluate possible solutions.

The general area includes approximately 60 miles of the Truckee River beginning just upstream of Reno, passing through Sparks and the Truckee Meadows, and ending at the river's terminus, Pyramid Lake. Because of the size of the land area and the number of river miles, the project area was divided into four general reaches: Verdi Reach, Downtown Reno Reach, Truckee Meadows Reach, and Lower Truckee River Reach.

The Truckee Meadows area is subject to severe flooding from the Truckee River and its primary tributary, Steamboat Creek. Detailed information was documented of major floods that occurred in the 20th century. Floods in the magnitude of 20,000 cubic feet per second (cfs) were recorded in 1950, 1955 and 1963. Estimated damages, based on prices and conditions at the time of the flood, were approximately $1.7 million for the event in 1963. The most recent flood events occurred in February 1986, January 1997 and December 2005 (with damages in the millions).

The 1997 event is the event of record for the Truckee River, a flood that caused over $700 million (1997 prices) in reported flood-related damages in the Truckee Meadows. Most of these damages occurred in the industrial areas of the cities of Sparks and Reno and at the Reno-Tahoe International Airport. The significant increase in damages from 1963 to 1997 is primarily a result of development of damageable properties in the floodplain and conversion of agricultural lands to a highly developed industrial complex over the last forty years.

Government

Below please see below TRFMA key officials and departments.

Truckee River Flood Management Authority - Key Officials

Director 1, Washoe County	Director 5, City of Sparks
Director 2, Washoe County	Director 6, City of Sparks
Director 3, City of Reno	Executive Director
Director 4, City of Reno	General Counsel

Truckee River Flood Management Authority

Management Services	Natural Resources & Monitoring
Engineering	Real Estate

Demographics

The cities of Reno and Sparks are located in the Truckee Meadows region of Northern Nevada along the Truckee River. The Reno/Sparks region is a major center for west coast tourism associated with the area's casinos and outdoor recreation opportunities. The area's industrial complex includes distribution, warehousing, and light manufacturing.

Land Use and Development Trends

The TRFMA has several priorities for providing flood protection to the region with the implementation of the TRFP; the City of Sparks industrial area, which contributes to nearly 25,000 jobs and supports several major industrial businesses an commerce, the City of Reno downtown corridor which is a tourism destination, recreation location, arts and culture district and also provides jobs for the community; flood protection to the Reno-Tahoe International Airport and surrounding areas throughout the Truckee Meadows. The TRFMA is supportive of the passage of the USACE 50-year Flood Control Plan with the intention that the Truckee River 100-year Flood Control Plan with be approved by congress in place of the 50-year plan. According to the General Reevaluation Report the federal funding for a 50-year plan, is approximately $180 million which leaves the remaining funds, approximately $100 million, to be obtained from local sources in order to provide for the 100-year plan. Amendments submitted and included in Water Resources Development Act of 2013.

This section provides an overview of the planning process; identifies Planning Committee's members, and key stakeholders; documents public outreach efforts; and summarizes the review and incorporation of existing plans, studies, and reports used in the development of this RHMP. Additional information regarding the Planning Committees and public outreach efforts is provided in **Appendices C** and **D**.

The requirements for the planning process, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Planning Process

Documentation of the Planning Process
Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

1. An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
2. An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and nonprofit interests to be involved in the planning process; and
3. Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.
Element

- Does the new or updated plan provide a narrative description of the process followed to prepare the plan?
- Does the new or updated plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan Committee, provided information, reviewed drafts, etc.?)
- Does the new or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)
- Does the new or updated plan indicate that an opportunity was given for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the updated plan document how the planning team reviewed and analyzed each section of the plan?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?
- Does the updated plan indicate for each section whether or not it was revised as part of the update process?

Source: FEMA, March 2008.

4.1 OVERVIEW OF PLANNING PROCESS

The County, Cities, RSIC, PLPT, and TRFMA assisted by R.O. Anderson Engineering, Inc., and the State Hazard Mitigation Officer prepared this RHMP. The first step in the planning update process was to establish a Planning Committee composed of existing County, City and local participant agencies. Aaron Kenneston of Washoe County's Emergency Management and Homeland Security served as the primary Point of Contact (POC) for the County, Cities, local participants and the public.

Once the Planning Committee was formed, the following five-step planning process took place during the 15-month period from August 2014 to November 2015.

- **Organize resources:** The Planning Committee identified resources, including County and City staff, agencies, and local community members, which could provide technical expertise and historical information needed in the development of the RHMP.
- **Assess risks:** The Planning Committee identified the hazards specific to the County, and developed the risk assessment for the nine identified hazards. The Planning Committee reviewed the risk assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.
- **Assess capabilities:** The Planning Committee reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards.
- **Develop a mitigation strategy:** After reviewing the risks posed by each hazard, the Planning Committee worked to develop a comprehensive range of potential mitigation goals, objectives, and actions. Subsequently, the Planning Committee identified and prioritized the actions to be implemented.
- **Monitor progress:** The Planning Committee developed an implementation process to ensure the success of an ongoing program to minimize hazard impacts to the County.

The following table provides details on each section of the plan and what changed during the update.

Table 4-1: Plan Outline and Update Effort

Plan Section	Update Effort	What Changed
Section 1 – Official Record of Adoption	Minor Revision	Move from Section 5 to Section 1. A discussion of the Stafford Act was added.
Section 2 – Background	Minor Revisions	Move from Section 1 to Section 2. A discussion of Stafford Act Grant Programs was added.
Section 3 – Community Description	Moderate Revisions	Move from Section 1 and Annexes. This section was updated to include new land use maps, updated demographics, and updated development trends. Annexes were kept for the Reno-Sparks Indian Colony and Pyramid lake Paiute Tribe; however, the information contained in the Annexes was also incorporated into each appropriate section of the RHMP.
Section 4 – Planning Process	Minor Revisions	Move from Section 2 and Appendix B. Updated to include planning process.
Section 5 – Hazard Analysis	Major Revisions	Move from Section 3 to Section 5. The individual hazard sections were reformatted. New data was incorporated from hazard subcommittee reviews. Maps and hazard history were updated. All sections had major revisions, except energy emergency which only had minor revisions.
Section 6 – Vulnerability Analysis	Major Revisions	Move from Section 3 to Section 6. A new analysis of residential, non-residential and critical facilities was performed using most current GIS and Assessor's office data. Maps and methodology was updated.

Section 7 – Capability Assessment	Moderate Revisions	Move from Section 3 to Section 7. Add legal and regulatory, administrative, and technical, and financial capabilities for Truckee River Flood Management Authority. Reviewed for all participating jurisdictions and updated any changes.
Section 8 – Mitigation Strategy	Moderate Revisions	Move from Section 4 to Section 8. The goals and actions from 2010 were reviewed and progress was included in Appendix F. Goals and actions for the update were modified and new actions listed.
Section 9 – Plan Maintenance	Minor Revisions	Move from Section 6 to Section 9. Planning forms were included in Appendix E to help with the maintenance process.
Section 10 – Reference	Major Revisions	Move from Appendices to Section 10. Updated to include materials referenced for this update.

4.2 HAZARD MITIGATION PLANNING COMMITTEE

4.2.1 Formation of the Planning Committees

As previously noted, the planning process began in August 2014. Aaron Kenneston, Washoe County's Emergency Management and Homeland Security, formed the advisory body, known as the Planning Committee, utilizing staff from the Local Emergency Planning Committee (LEPC), relevant County and City agencies and community organizations. The Planning Committee members are listed in **Table 4-2**. The Planning Committee meetings are described in section 4.2.2. Meeting agendas and handouts are provided in **Appendix C**.

The County and all participating jurisdictions were adeptly represented in the regional planning effort by team members who perform multiple functions within the local jurisdiction. In most cases one or more representatives for each jurisdiction attended the RHMP meetings. Additionally, representatives from the City of Reno, City of Sparks, RSIC, PLPT and TRFMA reported back to their local jurisdictions and worked within their local government structures to collect data, identify mitigation actions and implementation strategies, and review and provide data on plan drafts.

Table 4-2: Hazard Mitigation Planning Committee

Name	Department	Participation
Washoe County		
Chair: Aaron Kenneston, Emergency Manager	Emergency Management and Homeland Security	Chair of the Committee, chaired meetings, provided evaluation and information on the following sections, hazard profile, vulnerability analysis, risk assessment, mitigation strategies, plan maintenance, provided public outreach. Attended meetings, reviewed drafts and provided input.
Tom McKnight	Regional Emergency Operations Center	Provided hazard information, mitigation strategy. Attended meetings, reviewed drafts and provided input, particularly regarding drought, flood, volcano, civil disorder, and energy emergency.

Cathy Ludwig	Emergency Management	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Liz Paulsen	Emergency Management	Attended meetings, reviewed drafts and provided input.
Kimble Corbridge	Floodplain Manager Community Services Department	Provided hazard information, mitigation strategy. Attended meetings, reviewed drafts and provided input, particularly regarding avalanche, drought, earthquake, floods and severe storms.
Bob Webb	Community Development	Provided information on hazard profile; update community profile. Attended meetings, reviewed drafts and provided input particularly regarding avalanche, drought, earthquake, and floods.
Eric Crump	Parks & Open Space	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Adam Searcy	Roads	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding flood and severe storm.
Gary Beekman	Geographic Information Systems	Attended meetings, provided GIS support.
Kobe Harkins	Geographic Information Systems	Attended meetings, provided GIS support.
Gary Zaepfel	Technology Services – GIS	Attended meetings, assisted with mapping and vulnerability assessment.
Marsha Cardinal	Technology Services – GIS	Attended meetings, assisted with mapping and vulnerability assessment.
Russ Pedersen	Sheriff's Office	Attended meetings, reviewed drafts and provided input.
Jerry Cassio	Sheriff's Office	Attended meetings, reviewed drafts and provided input.
Karen Jessop	Medical Examiner's Office	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Nicole Franklin	Medical Examiner's Office	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding infectious disease.
Charles Moore	Truckee Meadow's Fire Protection District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding wildland fire.
Amy Ray	Truckee Meadow's Fire Protection District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding wildland fire.
Tim Leighton	Truckee Meadow's Fire Protection District	Attended meetings, reviewed drafts and provided input.
Chris Ketring	Truckee Meadow's Fire Protection District	Attended meetings, reviewed drafts and provided input.
Vahid Behmaram	Community Services Department	Provided information on hazard profile. Reviewed drafts and provided input.
David Solaro	Community Services Department	Attended meetings, reviewed drafts and provided input.
Nancy Leuenhagen	Community Relations Department	Attended meetings, reviewed drafts and provided input.
Paul McArthur	Risk Management	Attended meetings, reviewed drafts and provided input.

Celeste Wallick	Risk Management	Attended meetings, reviewed drafts and provided input.
City of Reno		
Tim Spencer, Emergency Manager	Fire Department	Provided hazard information, mitigation strategy. Attended meetings, reviewed drafts and provided input.
Nate Parker	Police Department	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding civil disorder and terrorism/weapons of mass destruction.
Mark Katre	Police Department	Attended meetings, reviewed drafts and provided input.
Kerri Lanza	Public Works	Provided hazard information, vulnerability and mitigation strategies. Attended meetings, reviewed drafts and provided input.
William Gall	Public Works	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Marnell Heinz	Public Works	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Joseph Coudriet	Public Works	Attended meetings, reviewed drafts and provided input particularly on flood mitigation projects.
Kyle West	Safety & Training Manager	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding earthquake, flood, volcano, transportation of radiological materials and waste, and terrorism/weapons of mass destruction.
City of Sparks		
Brian Allen	Police Department	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Andy Koski	Fire Department	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding wildland fire.
Tom Garrison	Sparks Fire Department	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding hazardous materials and transportation of radiological materials and waste.
Chris Syverson	Human Resources	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding biological infection and civil disorder.
Tracy Domingues	Parks Department	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding biological infection.
Reno-Sparks Indian Colony		
Dave Hunkup	Emergency Manager	Provided information on hazard profile and Reno-Sparks Indian Colony Annex. Attended meetings, reviewed drafts and provided input particularly regarding earthquake, energy emergency, flood, severe storms, volcano, and wildland fire.
Pyramid Lake Paiute Tribe		

Don Pelt	Emergency Manager	Provided information on hazard profile and Pyramid Lake Paiute Tribe Annex Attended meetings, reviewed drafts and provided input.
Cassandra Darrough	Emergency Management Services	Attended meetings, reviewed drafts and provided input.
Donna Noel	Natural Resource Director	Attended meetings, reviewed drafts and provided input, particularly regarding vulnerability assessment.
Bonnie Akaka-Smith	Interim Environmental Director	Attended meetings, reviewed drafts and provided input, particularly regarding vulnerability assessment.
Truckee River Flood Management Authority		
Ed Evans	Senior Hydrogeologist	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding earthquake, flood, and volcano.
Danielle Henderson	Natural Resource Manager	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Regional Partners		
Mike Ferrari, Mt Rose Ski Patrol	Mt Rose Ski Tahoe	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Debbie Tanaka, State Hazard Mitigation Officer	Nevada Division of Emergency Management	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Karen Johnson, Mitigation Specialist	Nevada Division of Emergency Management	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Rick Martin	Nevada Division of Emergency Management	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Connor Long	Nevada Division of Emergency Management	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Steve Williams, CPM – Maintenance Manager	Nevada Division of Transportation District II	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Ryan Sommers	North Lake Tahoe Fire Protection District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding avalanche and wildland fire.
John Dollar	Incline Village General Improvement District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding avalanche and earthquake.
Jeff Whitesides	Washoe County Health District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Sara Dinga	Washoe County Health District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding biological infection and terrorism/weapons of mass destruction.
Cara Argall	Washoe County Health District	Attended meetings, reviewed drafts and provided input.
Randall Lorenz Public Information Officer, WCARES / Communications Unit Leader	ARES/CERT/SMART MRC	Attended meetings, reviewed drafts and provided input.

Chris Smallcomb	National Weather Service	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding drought, floods and severe storms.
Ron Hood	Washoe County School District	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding earthquake, floods, severe storms, volcano, biological infection, civil disorder, and energy emergency.
Brian Taylor	Regional Emergency Medical Services Authority	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding terrorism/weapons of mass destruction.
Robert Dorsey	Northern Nevada Regional Intelligence Center	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Dick Penniman	Snowbridge Associates	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding avalanche and severe storms.
Rob Reeder	Regional Transportation Authority	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly regarding earthquake, severe storms, hazardous materials, and terrorism/weapons of mass destruction.
John Dunn	SMART	Attended meetings, reviewed drafts and provided input.
Bob Miller WCARES Emergency Coordinator / AuxComm	ARES	Attended meetings, reviewed drafts and provided input.
Ernie Miller	SMART	Attended meetings, reviewed drafts and provided input.
Jim Reagan	NV Energy	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
John Enloe	Truckee Meadows Water Authority	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
John Erwin	Truckee Meadows Water Authority	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input.
Chris Cenac	Truckee Meadows Water Authority	Attended meetings, reviewed drafts and provided input.
Jack Byrom	Truckee Meadows Water Authority	Attended meetings, reviewed drafts and provided input.
Michelle Brim, DVM	Nevada Veterinary Medical Association/ Lakeside Animal Hospital	Attended meetings, reviewed drafts and provided input.
Kelly Boyd	American Red Cross	Attended meetings, reviewed drafts and provided input.
Jim Henrickson	Washoe County School District	Attended meetings, reviewed drafts and provided input.
Scott Alquist	Truckee Meadows Community College	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly on transportation of radiological materials and waste.

Dave Drew		Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly on transportation of radiological materials and waste.
Jon Bakkedahl	Nevada Division of Public and Behavioral Health	Provided information on hazard profile. Attended meetings, reviewed drafts and provided input particularly on transportation of radiological materials and waste.
Consultant		
Stephanie Hicks, AICP, CFM	R.O. Anderson Engineering, Inc.	Worked with County Emergency Manager to establish framework and organization for development of the plan. Facilitated meetings, led research efforts to identify, document and profile all hazards, coordinated with GIS for vulnerability assessment; compiled drafts and final plan.
Marie Hulse, P.L.A., CPESC	R.O. Anderson Engineering, Inc.	Worked with County Emergency Manager to establish framework and organization for development of the plan. Facilitated meetings, led research efforts to identify, document and profile all hazards, coordinated with GIS for vulnerability assessment; compiled drafts and final plan.
Shaker Gorla, P.E., CFM	R.O. Anderson Engineering, Inc.	Attended meeting, reviewed drafts and provided input particularly regarding flood.

4.2.2 Participants

Washoe County

- Building and Safety Department
- Community Development
- Community Relations
- Emergency Management and Homeland Security
- Engineering
- Geographic Information Systems
- Medical Examiner's Office
- Parks & Open Department
- Public Works
- Roads
- Sheriff's Office
- Sierra Fire Protection District
- Technology Services
- Truckee Meadows Fire Protection District

Participating Cities/Tribes

- City of Reno
- City of Sparks

- Pyramid Lake Paiute Tribe
- Reno-Sparks Indian Colony

Other Government and Stakeholder Representatives

- American Red Cross
- Associated General Contractors
- Incline Village General Improvement District
- Mt Rose Ski Tahoe
- National Weather Service
- Nevada Bureau of Mines and Geology
- Nevada Broadcasters Association-Emergency Alert System
- Nevada Division of Emergency Management
- Nevada Division of Transportation
- Nevada Energy
- North Lake Tahoe Fire Protection District
- Northern Nevada Regional Intelligence Center
- Regional Emergency Management Services Authority
- Regional Transportation Commission
- Snow Bridge Associates
- Truckee Meadows Water Authority
- Truckee River Flood Project
- Washoe County Amateur Radio Emergency Service
- Washoe County Community Emergency Response Team
- Washoe County Health District
- Washoe County School District
- University of Nevada, Reno

Each jurisdiction also utilized the support of many other support staff in order to collect and provide requested data and to conduct timely reviews of the draft documents. Note that the above list of Planning Committee members also includes several other government and stakeholder representatives that contributed to the planning process.

4.2.3 Planning Committee Meetings

- *August 2014*

During the RHMP Update kick-off meeting, the Planning Committee discussed the objectives of the DMA 2000, the hazard mitigation planning process, the public outreach process, and the steps involved in developing the RHMP and achieving the County's goals. The planning process was discussed including the purpose of the plan.

- *October 2014*

The Planning Committee reviewed the Incorporation of Existing Plans/Study Table to identify all the plans/studies available (as shown in section 4.4). The 19 potential hazards from the original Nevada State HMP were reviewed (Section 5) and modifications to the County hazards list were discussed. The hazard profiling worksheet for hazard prioritization was completed. The exercise identified and ranked the specific hazards that the Planning Committee wanted to address in the HMP.

The Planning Committee also discussed public involvement in the RHMP update. In September, an email was sent to neighboring communities inviting their participation in the RHMP update. Additionally, a press release was sent out in October to notify the public. The Committee discussed future public workshops as well as a public questionnaire.

Hazard subcommittees were formed for review and validation of each of the hazard profiles and mitigation action items.

- *December 2014*

Hazard subcommittees met in a workshop to review and edit hazard profiles. R.O. Anderson coordinated with the County GIS to gather data for updated hazard mapping.

- *January 2015*

R.O. Anderson continued coordination with subcommittee members to prepare draft edits for the avalanche, drought, earthquake, flood, infectious disease, volcano, and wildland fire hazard profiles. As information was gathered, additions were made to the developing plan. R.O. Anderson worked with Planning Committee members to update community profiles. Sections 1 through 4 were drafted. Additionally, GIS began collecting data for the vulnerability analysis to include population, building inventory, and critical facilities and infrastructure.

- *February 2015*

Planning Committee met and reviewed the outcome of the hazard profiling worksheet and finalized the priority of hazards. The Planning Committee reviewed and provided input for the avalanche, drought, earthquake, flood, infectious disease, volcano, and wildland fire hazard profiles. Additionally, the Planning Committee reviewed the preliminary draft of Sections 1 through 4, and GIS mapping of the hazards

- *March*

The consultant continued to develop hazard profiles based on data and input from the Planning Committee. The consultant coordinated with subcommittee members to prepare draft edits for severe weather, civil disorder/criminal acts, energy emergency, hazardous materials, transportation of radiological materials and waste, and terrorism/weapons of mass destruction hazard profiles. The consultant worked with Washoe County GIS to develop the vulnerability analysis.

- *April 2015*

The Planning Committee Meeting was held to review draft edits for civil disorder/criminal acts, energy emergency, hazardous materials, transportation of radiological materials and waste, and terrorism/weapons of mass destruction hazard profiles. Additionally, the Planning Committee reviewed the preliminary vulnerability analysis, updated mitigation goals and actions, and reviewed the public awareness questionnaire. The consultant continued to revise the plan based on comments and feedback from the Planning Committee.

- *May 2015*

The consultant continued to revise the plan Sections 1-6 based on comments and feedback from the Planning Committee. The consultant worked with Planning Committee members to prepare Sections 7-10 including mitigation strategies, capabilities assessment, and plan maintenance for review and discussion at the next Committee Meeting. The consultant also worked on revisions provided by Reno-Sparks Indian Colony and the Pyramid Lake Paiute Tribe for the Tribal Annexes. STAPLE+E evaluation forms were emailed out to Committee members. Additionally, the consultant worked to finalize the public awareness questionnaire and create an online version for the public to respond via the internet.

- *June 2015*

Planning Committee Meeting was held to review capabilities, mitigation strategies, and monitoring plan. STAPLE+E evaluation forms were returned by Committee members and results compiled for prioritization of mitigation actions. Planning Committee reviewed draft plan to date and the consultant continued to revise the plan based on feedback and comments. Final analysis was completed on vulnerability assessment. Public workshop dates were set and presentation for public workshops was drafted. The consultant continued to work with Tribal representatives on the Tribal annexes. The Washoe County Emergency Manager and the consultant met with members of the PLPT to discuss critical facilities and infrastructure, the vulnerability analysis and mitigation actions. One public workshop was held for the business community.

- *July 2015*

Final draft was presented to Planning Committee. Planning Committee Meeting was held to review draft plan and prepare for public workshops. Four public workshops were held, one in the City of Reno, City of Sparks, Verdi and at the Reno-Sparks Indian Colony Health Center. The questionnaire was distributed at the public workshops and a media release notified of the online survey.

- *August 2015*

Final edits based on public outreach were completed. RHMP was submitted to DEM for review. Final revisions were made based on DEM review. Finalize draft of RHMP was provided to DEM for submittal to FEMA.

- *September – November 2015*

Following FEMA review, plan was finalized and presented to County Commissioners and local jurisdictions for adoption. Resolutions were forwarded to FEMA for final approval.

See **Appendix D** for a list of attendees, meeting handouts and minutes.

During the planning process, the Planning Committee communicated through face-to-face meetings, email, telephone conversations, and a file transfer protocol (ftp) website. Draft documents were posted on the Washoe County Emergency Management website so that the public and Planning Committee members could easily access and review them. The Planning Committee met formally six times during the planning period (August 20, 2014-July 1, 2015) at the Washoe County EOC in Reno. In addition, the Planning Committee members met numerous times over the course of the planning period in focused working groups to identify, develop and provide information in support of plan development.

4.3 PARTICIPATION AND PUBLIC INVOLVEMENT

Early discussions with the Planning Committee established the initial plan for public involvement. At the kick-off meeting, the Planning Committee discussed options for public involvement and agreed to an approach using established public information mechanisms and resources within the community. Public involvement activities included press releases, the collection of public and stakeholder comments, website postings at http://www.co.washoe.nv.us/em/, and public meetings on the draft plan. Five public meetings were held prior to finalizing the plan. Questionnaires were provided at each of the public meetings as well as online. Additionally, the press release advised that the questionnaire was also available online for those unable to attend the meeting.

A press release was posted on October 7, 2014, to advise of the initial planning endeavor. Media advisories as well as social media were used to advise of the public workshops. Additionally, the public workshop schedule was posted on the Washoe County Emergency Management website. The press release and website posting can be found in **Appendix C**. Over 50 people attended the public workshops and 22 responses to the public questionnaires were received.

Where appropriate, stakeholder comments were incorporated into the final plan, including the sections that address mitigation goals and strategies. Information on all outreach activities are on file with the Washoe County Emergency Manager. The plan is available online on the County website: http://www.co.washoe.nv.us/em/. Due to the multi-jurisdictional nature of this plan update, the public outreach activities described here were conducted with approval from and on behalf of all jurisdictions participating in this plan.

Early in the planning process, the Planning Committee determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their landowner status in the County, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the Planning Committee:

- American Red Cross
- Associated General Contractors
- Carson City Emergency Management
- Incline Village General Improvement District
- Mt Rose Ski Tahoe
- National Weather Service
- Nevada Bureau of Mines and Geology

- Nevada Broadcasters Association-Emergency Alert System
- Nevada Division of Emergency Management
- Nevada Department of Transportation
- Nevada Energy
- North Lake Tahoe Fire Protection District
- Northern Nevada Regional Intelligence Center
- Regional Emergency Management Services Authority
- Regional Transportation Commission
- Snow Bridge Associates
- Storey County Emergency Management
- Truckee Meadows Water Authority
- Truckee River Flood Project
- Washoe County Health District
- Washoe County School District
- University of Nevada, Reno

The Planning Committee also used technical data, reports, and studies from the following agencies and groups:

- CALTopo
- Citizens Homeland Security Council
- Kinder Morgan
- National Oceanic and Atmospheric Administration
- National Register of Historic Places
- National Weather Service
- Natural Resource Conservation Service (formerly the Soil Conservation Service)
- Nevada Department of Agriculture
- Nevada Department of Transportation
- Nevada Division of Water Planning
- Nevada State Agriculture Labs
- Nevada State Emergency Response Commission
- Northern Nevada Counter Terrorism Center
- Paiute Pipeline
- State of Nevada Energy Office
- Sierra Pacific Power Company
- Tuscarora Gas Transmission Company
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Union Pacific Railroad
- University of Nevada Reno

Section 10 References provides a detailed list of references used in the preparation of this plan update.

Several opportunities were provided for the groups listed above to participate in the planning process. At the beginning of the planning process, invitations were extended to these groups to actively participate on the Planning Committee. Specific participants from these groups are detailed in **Appendix D**. Others assisted in the process by providing data directly as requested or through data contained on their websites or as maintained by their offices. Further as part of the public outreach process, all groups were invited to attend the public meetings and to review and comment on the plan prior to submittal to Nevada Division of Emergency Management - Homeland Security (NDEM) and FEMA.

4.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

Coordination with other community planning efforts is also paramount to the success of this plan. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. The County uses a variety of comprehensive planning mechanisms, such as master plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans, studies, reports, and initiatives compiled from the planning area as well as other relevant data from neighboring communities and other jurisdictions.

During the planning process, the Planning Committee reviewed and incorporated information from existing plans, studies, reports, and technical reports into the HMP. A synopsis of the sources used follows.

- ***City of Reno All Hazards Mitigation Plan****:* Provides information on all hazards to be addressed in this RHMP.
- ***City of Sparks Multi-Hazard Mitigation Plan****:* Provides information on all hazards to be addressed in this RHMP.
- ***City of Sparks, Flood Response Action Plan (2011)****:* Provides information on flood hazards in the City of Sparks.
- ***City of Sparks, Earthquake Action Plan (2012)****:* Provides information on earthquake hazards in the City of Sparks.
- ***Hungry Valley Community Wildfire Protection Plan (2006)***: Includes findings and recommendations for mitigating the threat to property from wildland fires.
- ***Landslide-Induced Flooding at Ophir Creek, Washoe County, Western Nevada, May 3, 2015:*** Provides history of landslide events at Slide Mountain.
- ***Nevada Hazardous Materials Emergency Response Plan****:* Provides information regarding hazardous materials incidents.
- ***Regional Floodplain Management Strategy (2003)****:* Revises and updates information on the existence and severity of flood hazards in Washoe County, Nevada.

- ***Reno-Sparks Indian Colony All Hazards Mitigation Plan**:* Provides information on all hazards to be addressed in this RHMP.
- ***State of Nevada Drought Response Plan (2012):*** This plan provides information on the drought hazard and recommendations on planning for droughts.
- ***State of Nevada Enhanced Hazard Mitigation Plan (2013)**:* This plan, prepared by NDEM, was used to ensure that the County's HMP was consistent with the State's Plan.
- ***State Maintained Highways of Nevada (January 2012)**:* This report provides descriptions and Maps of Highways by County.
- ***Truckee Meadows Regional Drainage Manual (2009)**:* Provides information on the analysis, planning, and design of flood control and drainage projects.
- ***Truckee River Flood Plan – The Living River (2011)**:* Includes findings and recommendations for flood mitigation projects along the Truckee River.
- ***Truckee River Flood Warning Plan (2013)**:* Regional plan which identifies flood hazards in Washoe County and mitigation actions.
- ***Washoe County Avalanche Hazard Study (1993)**:* Provides analysis, reporting and mapping information of the snow avalanche paths in the Third Creek, Crystal Bay and Sand Harbor areas of Washoe County.
- ***Washoe County Emergency Preparedness Guide**:* Provides information on all hazards to be addressed in this RHMP.
- ***Washoe County Emergency Public Warning and Public Information Plan**:* Provides information on all hazards to be addressed in this RHMP.
- ***Washoe County Fire Plan (2005)**:* Includes findings and recommendations for mitigating the threat to property from wildland fires.
- ***Washoe County Health District Medical Countermeasures Distribution and Dispensing Plan (2014):*** Provides information on infectious disease in Washoe County.
- ***Washoe County Health District Pandemic Influenza Plan**:* Provides an overview of the potential threat of pandemic influenza in Washoe County.
- ***Washoe County Master Plan (2010)**:* Provides information regarding history and geography, demographics, land use, and public utilities.
- ***Washoe County Multi-Hazard Mitigation Plan (2005):*** Provides information on all hazards to be addressed in this RHMP.
- ***Washoe County Multi-Hazard Mitigation Plan (2010)**:* The update to the 2005 plan, this document provides an overview of hazards and risks, and mitigation action items which will be evaluated through the RHMP update process.
- ***Washoe County, Nevada Hazardous Materials Report: A Countywide Analysis of Fixed Facilities and Hazardous Materials in Transit (2013):*** Includes data and analysis of hazardous materials in transit and fixed facilities in Washoe County.

- ***Washoe County Regional Resiliency Study (2014)***: This plan provides information on climate variability concerns in the region and potential mitigation measures.

The following FEMA guides were also consulted for general information on the HMP process:

- ***How-To Guide #1: Getting Started: Building Support For Mitigation Planning*** **(FEMA 2002c)**
- ***How-To Guide #2: Understanding Your Risks – Identifying Hazards and Estimating Loss Potential*** **(FEMA 2001)**
- ***How-To Guide #3: Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies*** **(FEMA 2003a)**
- ***How-To Guide #4: Bringing the Plan to Life: Implementing the Hazard Mitigation Plan*** **(FEMA 2003b)**

A complete list of the sources consulted is provided in Reference, Section 10.

A hazard analysis includes the identification and screening of each hazard and subsequent profiling of each hazard. Hazard identification is the process of recognizing the natural and human-caused events that threaten an area. Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude. Human-caused hazards result from human activity and include technological hazards and terrorism. Technological hazards are generally accidental or result from events with unintended consequences, for example, an accidental hazardous materials release. Terrorism is defined as the calculated use of violence or threat of violence to attain goals that are political, religious, or ideological in nature.

Even though a particular hazard may not have occurred in recent history in the study area, all hazards that may potentially affect the study area are included in the screening process. The hazards that are unlikely to occur or for which the risk of damage is accepted as being very low, are eliminated from consideration.

All identified hazards will be profiled by describing hazards in terms of their nature, history, magnitude, frequency, location, and probability. Hazards are identified through the collection of historical and anecdotal information, review of existing plans and studies, and preparation of hazard maps of the study area. Hazard maps are used to determine the geographic extent of the hazards and define the approximate boundaries of the areas at risk.

5.1 HAZARD IDENTIFICATION AND SCREENING

The requirements for hazard identification, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Hazard Identification and Risk Assessment

Identifying Hazards

§201.6(c)(2)(i): [The risk assessment shall include a] description of the type of all natural hazards that can affect the jurisdiction.

Element

- Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)?
- Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction?
- Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction?
- Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods?

Source: FEMA, March 2008.

The first step of the hazard analysis is the identification and screening of hazards, as shown in **Table 5-1**. During the second RHMP meeting, the Planning Committee reviewed the State's identified hazards from the *State of Nevada Enhanced Hazard Mitigation Plan* as well as the previous *Washoe County Multi-Hazard Mitigation Plan* and identified 13 possible hazards (8 natural hazards and 5 human-caused hazards).

Table 5-1: Identification and Screening of Hazards

State of Nevada Listed Hazard Types	Should It Be Profiled?	Explanation
Avalanche	Yes	Washoe County has the highest avalanche risk in the State.
Drought	Yes	Statewide drought declarations were issued in 2002, 2004, 2009, 2012, and 2013.
Earthquake	Yes	The State of Nevada is one of the three most seismically active states in the U.S., and Washoe County is located in one of the most seismically active areas in the State.
Epidemic	Yes	Previous outbreaks have occurred in Washoe County.
Expansive Soils	No	No recent or historic events have occurred.
Flood (Including Dam/Levee Failure)	Yes	There have been 28 flooding events in Washoe County from 1995-2014.
Hail & Thunderstorm	Yes	Washoe County is susceptible to thunderstorms and hail.
Hazardous Material Event	Yes	The County has several facilities that handle or process hazardous materials. Hazmat travels through the County on several highways.
Heat Extreme	Yes	This hazard has affected Washoe County.
Infestation	No	No recent or historic events have occurred.
Landslide	Yes	Washoe County has experienced landslides.
Land Subsidence	No	No recent or historic events have occurred.
Severe Winter Storm and Extreme Snowfall	Yes	Previous occurrences of winter storms include snow storms, heavy precipitation events, thunderstorms, and lightening.
Tsunami/Seiche	Yes	No occurrences in recent years, but evidence from deposits indicate a tsunami or seiche occurred in Lake Tahoe approximately 7,000 years ago.
Tornado	Yes	Washoe County has a history of minor tornadoes.
Volcano	Yes	Although outside of Washoe County, Lassen Peak and Mono Lake Craters are both within 100 miles of the County.
WMD / Terrorism	Yes	Due to the sensitivity of this hazard, while the risk will be identified, it will not be discussed further in the vulnerability analysis or mitigation strategies.
Wildland Fire	Yes	The terrain, vegetation, and weather conditions in the region are favorable for the ignition and rapid spread of wildland fires.
Windstorm	Yes	Washoe County has a history of wind storms.

In addition to the above hazards listed in the *State of Nevada Enhanced Hazard Mitigation Plan*, the Planning Committee also included civil disorder, energy emergency, and nuclear waste transport as manmade hazards. The Planning Committee renamed epidemic as infectious disease. The landslide hazard was combined with avalanche. The flood hazard includes 100 and 500-year events, localized flood, and dam/levee failure. The severe storms hazard includes extreme heat, hailstorms, severe winter storm, tornado, and windstorm.

Assigning Vulnerability Ratings

During the Planning Committee meeting, the members were tasked to prioritize the hazards by their total impact in the community. An exercise requiring the committee to complete a form which tabulated their ratings of each hazard was accomplished. The exercise formula took into account the historical occurrence of each respective hazard, the potential area of impact when the disaster does occur, and the magnitude. Please see **Table 5-2** below for scoring criteria.

It is important to note that hazards of the same magnitude and the same frequency can occur in similar sized areas; however, the overall impact to the areas would be different because of population densities and property values in the areas impacted.

Table 5-2: Vulnerability Ratings Rubric

		Frequency	Magnitude/Severity	Warning Time	Duration
Lowest	1	1000+ years	1-5% Damaged; No deaths; Local	> 48 hrs	1 - 3 Days
	2	100 -1000 years	5-15%; No deaths; City/Community	24 to 48 hrs	4 - 7 Days
	3	10 -100 years	15-30%; < 5 Deaths; County	12 to 24 hrs	8 - 14 Days
	4	5 -10 years	30-50%; > 5 Deaths; State	6 to12 hrs	15 - 20 Days
Highest	5	0 - 5 years	50+%; Significant Deaths; Region IX	< 6 hrs	20+ Days

The Committee referenced historical records and data provided in the *2010 Washoe County Multi-Hazard Mitigation Plan*, as well as knowledge of events that have occurred since the 2010 plan and any events that triggered federal and/or state disaster declarations. The Committee calculated scores for magnitude, economic and frequency based on historical frequencies and / or projected probabilities of the hazards identified.

Upon obtaining total scores for each hazard, the team utilized the scores to analyze and prioritize the hazards to focus upon during the profiling, vulnerability assessment and mitigation strategy. Tables 5-3 through 5-8 provide a summary of the hazards scoring results of both the members present at the meeting and those that supplied feedback via e-mail after the meeting.

The Planning Committee determined that 13 hazards pose a threat to the County. Natural hazards include: avalanche, drought, earthquakes, floods, infectious disease, severe storms, volcano, and wildfire. Human-caused hazards include: civil disorder, energy emergency, hazardous materials, nuclear waste transport, and terrorism/WMD/acts of violence.

Hazard ranking by jurisdiction is illustrated in **Tables 5-3** through **5-8** below.

Table 5-3: Washoe County Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Wildland Fire Severe Storms	Flood Infectious Disease	Avalanche Drought Civil Disorder Energy Emergency Hazardous Materials Terrorism/WMD/Acts of Violence	Volcano Nuclear Waste Transport

Table 5-4: City of Reno Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Wildland Fire	Terrorism/WMD/Acts of Violence	Avalanche Drought Flood Biological Infection Energy Emergency	Infectious Disease Severe Storms Volcano Civil Disorder Hazardous Materials Nuclear Waste Transport

Table 5-5: City of Sparks Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Wildland Fire Hazardous Materials Nuclear Waste Transport	Infectious Disease Terrorism/WMD/Acts of Violence	Avalanche Drought Flood Energy Emergency	Severe Storms Volcano Civil Disorder

Table 5-6: Reno-Sparks Indian Colony Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Flood Earthquake Wildland Fire	Volcano	Hazardous Materials	Avalanche Drought Infectious Disease Severe Storms Civil Disorder Energy Emergency Nuclear Waste Transport Terrorism/WMD/ Acts of Violence

Table 5-7: Pyramid Lake Paiute Tribe Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Drought Earthquake Flood Wildland Fire	Infectious Disease Energy Emergency Nuclear Waste Transport Terrorism/WMD/Acts of Violence	Hazardous Materials Severe Storms	Avalanche Volcano Civil Disorder

Table 5-8: Truckee River Flood Management Authority Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Terrorism/WMD/Acts of Violence		Avalanche Flood Infectious Disease Civil Disorder Hazardous Materials	Drought Severe Storms Wildland Fire Energy Emergency Nuclear Waste Transport

Further discussion through the hazard subcommittees refined the hazard rankings into three levels: low, medium or high risk. Flood, although originally ranked as moderate, was elevated to a high risk. Civil disorder and acts of violence were combined into criminal acts. Seiche was moved from the flood hazard to the earthquake hazard. The severe storm hazard was renamed severe weather. Nuclear waste transport was renamed as transportation of radiological materials and waste. **Table 5-9** below, represents the overall planning area's hazards.

The Planning Committee then discussed the results of the ranking and through Committee deliberation agreed that earthquake, flood, and wildland fires are considered high hazards. Avalanche, criminal acts, drought, infectious disease, hazardous materials, transportation of

radiological materials and waste, and severe weather are considered moderate hazards. Energy emergency, terrorism/WMD, and volcano are considered low hazards.

High and moderate ranked hazards will be carried through to the Risk Assessment and will be addresses in the Mitigation Strategy. Those hazards with a "low" rating will have a Hazard Profile developed/updated but will not be carried through to the Risk Assessment or Mitigation Strategy, as currently and historically, those hazards have occurred in unpopulated areas having little to no impact, measurable magnitude, or feasible mitigation actions. The "low" ranked hazards will be profiled for reference in order to monitor the possible future impact of these hazards. The Washoe County hazard rating results generally correspond to the *State of Nevada Enhanced Hazard Mitigation Plan.* Similarly the State ranks earthquake, flood, and wildfire as high risk. Conversely, the RHMP considers avalanche and infectious disease as moderate risk, while the State considers them as low risk. The RHMP also includes three hazards not directly identified in the State Plan: transportation of radiological materials and waste (although discussed under hazardous materials), criminal acts, and energy emergency.

The remaining hazards excluded through the screening process were considered to pose no threat to life and property in the County due to the low likelihood of occurrence or the low probability that life and property would be significantly affected. Should the risks from these hazards increase in the future, the HMP can be updated to incorporate a vulnerability analyses for these hazards.

Table 5-9: Washoe County RHMP Hazard Ranking

High Risk	Moderate Risk	Low Risk
Earthquake Wildfire Flood	Avalanche Criminal Acts Drought Infectious Disease Hazardous Materials Transportation of Radiological Materials and Waste Severe Weather	Energy Emergency Terrorism/WMD Volcano

5.2 HAZARD PROFILE

The requirements for hazard profile, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Risk Assessment – Profiling Hazards

Profiling Hazards

Requirement §201.6(c)(2)(i): [The risk assessment **shall** include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.

Element

Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan?

Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan?

Does the plan provide information on **previous occurrences** of each hazard addressed in the plan?

Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?

Source: FEMA, March 2008.

The specific hazards selected by the Planning Committee for profiling have been examined in a methodical manner based on the following factors:

- Nature
- History
- Location of future events
- Extent of future events
- Probability of future events

Each hazard was reviewed for climate change. To the extent each hazard was affected, climate change considerations were incorporated in the *Location, Extent, and Probability of Future Events* section of each hazard profile.

The hazards profiled for the County are presented in Sections 5.2 Natural Hazards and 5.3 Human-Caused Hazards in alphabetical order. The order of presentation does not signify the level of importance or risk.

5.3 NATURAL HAZARDS

5.3.1 Avalanche

Planning Significance:	
Avalanche	Moderate
Landslide	Low

5.3.1.1 Nature

Snow avalanches are complex natural phenomena involving the interaction of weather, terrain and the mountain snowpack. Slab avalanches are the most destructive type of avalanche. They occur when a weak layer or interface allows cohesive, overlying layers of snow to break loose and slide down a steep slope. As gravity causes the original slab to accelerate additional snow is entrained below causing the avalanche to gain mass. Depending on the mass, density, and speed of the avalanche, enough destructive force to damage or destroy wood-frame structures can be generated. Slab avalanches can be triggered by the additional weight of 1) wind-deposited snow; 2) cornice fall; 3) smaller loose-snow avalanches; and/or 4) human activity. Over 90% of slab avalanches initiate on slopes between 30 degrees and 45 degrees; fully 50% of slab avalanches initiate on slopes between 35 degrees and 40 degrees. Leeward, wind-loaded slopes near the ridge tops are most likely to produce slab avalanches during and immediately following periods of heavy snowfall. Steep, east-facing slopes are most likely to produce wet-snow avalanches as solar radiation increases in the spring months. Dense trees may act to anchor the snowpack in the starting zones of avalanche slopes. Trees or other vegetation further down the slope, however, will not significantly affect the speed or direction of moving avalanche debris. The vast majority of avalanches occur during or immediately following winter storms between the months of December and March.

The slopes of the Carson Range in Washoe County contain extensive avalanche terrain. The majority of these avalanche areas only affect backcountry travelers. The slopes above Crystal Bay and the Third Creek drainage avalanche frequently and directly threaten homes and roads. Other slopes in the Lake Tahoe Basin along Highways 431 and 28 have been identified as avalanche areas, but have yet to produce observed activity (See **Figure B-4** in **Appendix B**). Avalanche slopes that affect Highway 431 to the east of the summit are regularly controlled by NDOT and the Mount Rose-Ski Tahoe mountain resort. In advance of and throughout the duration of large storms, Washoe County Emergency Management will issue avalanche advisories to occupants and road crews in the Crystal Bay and Third Creek areas depending on the degree of public risk (See **Figures B-5 and B-6** in **Appendix B**). Avalanche advisories are issued via the Emergency Alert System (EAS) or using a "reverse 911" call system. A three stage system, the Washoe County Avalanche Call Out, has been devised to alert people within potential avalanche area of imminent hazards which might require caution or evacuations.

5.3.1.2 History

Historically, avalanches occur within the County between the months of December and March, following snowstorms. Such past avalanche occurrences include the following:

- Seven (7) injuries and two (2) deaths were reported after an avalanche occurred in a closed area near Mount Rose ski area in 1972.
- A severe avalanche occurred in February 1986 in the Third Creek Area.
- An avalanche occurred on December 1997 on Mount Rose Highway from an explosive trigger in the Beehive area of the Chutes. The highway was closed for the trigger event. The only damages were to two vehicles belonging to employees of the resort who arrived earlier that morning and drove into the debris pile while trying to leave. (Source: NOAA National Data Center 10/30/2014 & Mike Ferrari Mount Rose Ski Patrol 01/25/2015)
- An avalanche fatality occurred in December 2002 at the Mount Rose Ski Resort in the Chute area which was closed at that time and not part of the developed ski area.
- Avalanche advisories were issued in March 2006 for Crystal Bay Subdivision and Third Creek area.
- A resort employee was injured during avalanche mitigation efforts in the Chutes area of Mount Rose ski area in 2007.

5.3.1.3 Location, Extent, and Probability of Future Events

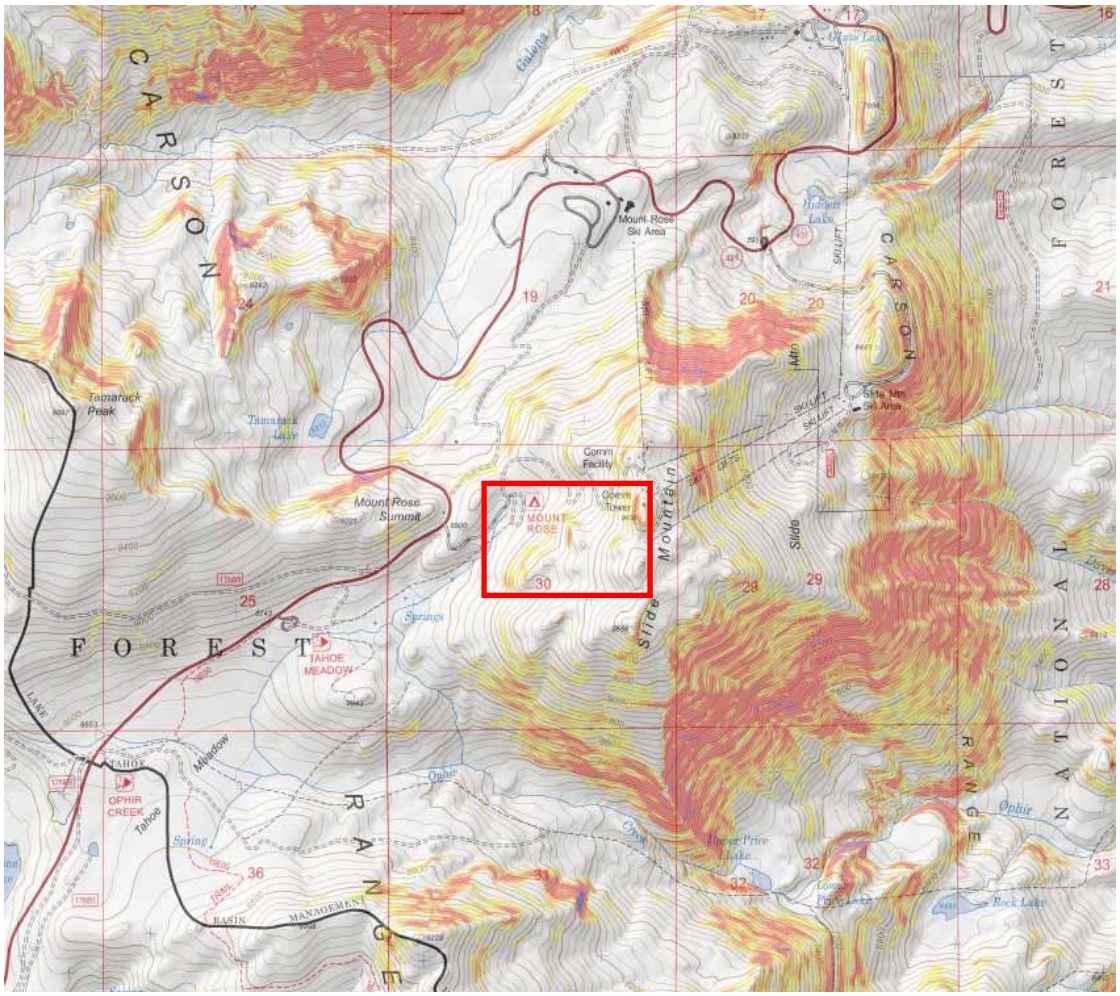
Location:

The Avalanche Hazard Study, prepared for the County in 1993, identified the following five high hazard avalanche areas (areas where avalanche could damage standard wood frame structures and/or busy automobiles):

- The Third Creek Drainage is located on the southern slope below Rose Knob Peak and Mud Lake. During the field study conducted, the following two large starting zones were identified in this area, each of which is capable of accumulating large amounts of snow and producing large destructive avalanches that can run long distances.
- From an elevation of 9,600 feet, the Rose Knob Peak avalanche path fall a vertical distance of 2,460 feet to elevation 7,140 feet at State Highway 431. Slope angles range from 35 degrees near the top to 4 degrees just above the highway. The average slope angle from the top of the study slope to the Highway is 18 degrees. The top 280 feet is a large, open, southwest-facing bowl with an average slope angle of 33 degrees and its ground surface is mostly loose scree and talus.
- From an elevation of 9,140 feet, the Mud Lake avalanche path falls 2,000 feet to elevation 7,140 feet also at State Highway 431. Slope angles range from as much as 40 degrees near the top to 4 degrees just above the Highway. The top 1,140 feet consists of 3 shallow, open southwest facing drainages. Ground surfaces there are mostly loose scree which will not anchor the snowpack even in shallow snow.
- The southeast-facing slope at the Third Creek drainage, northwest of the end of Jennifer Street is steep enough to produce avalanches and may receive heavy amounts of snowfall. While large amounts of snow can be expected to accumulate on this slope when storm winds are from a westerly direction, storm winds from a more southerly direction can be expected to scour much of this slope above elevation 7,840 feet. From an elevation of 8,280 feet, the study slope falls a vertical distance of 915 feet to elevation 7,320 feet at the Third Creek drainage. Slope angles range from 37 degrees near the top to near 0 degrees at Jennifer

Street. The average slope angle from the top of the study slope down to the Third Creek drainage area is 21 degrees. **Figure 5-1** below shows the primary avalanche chutes in the Tahoe Basin.

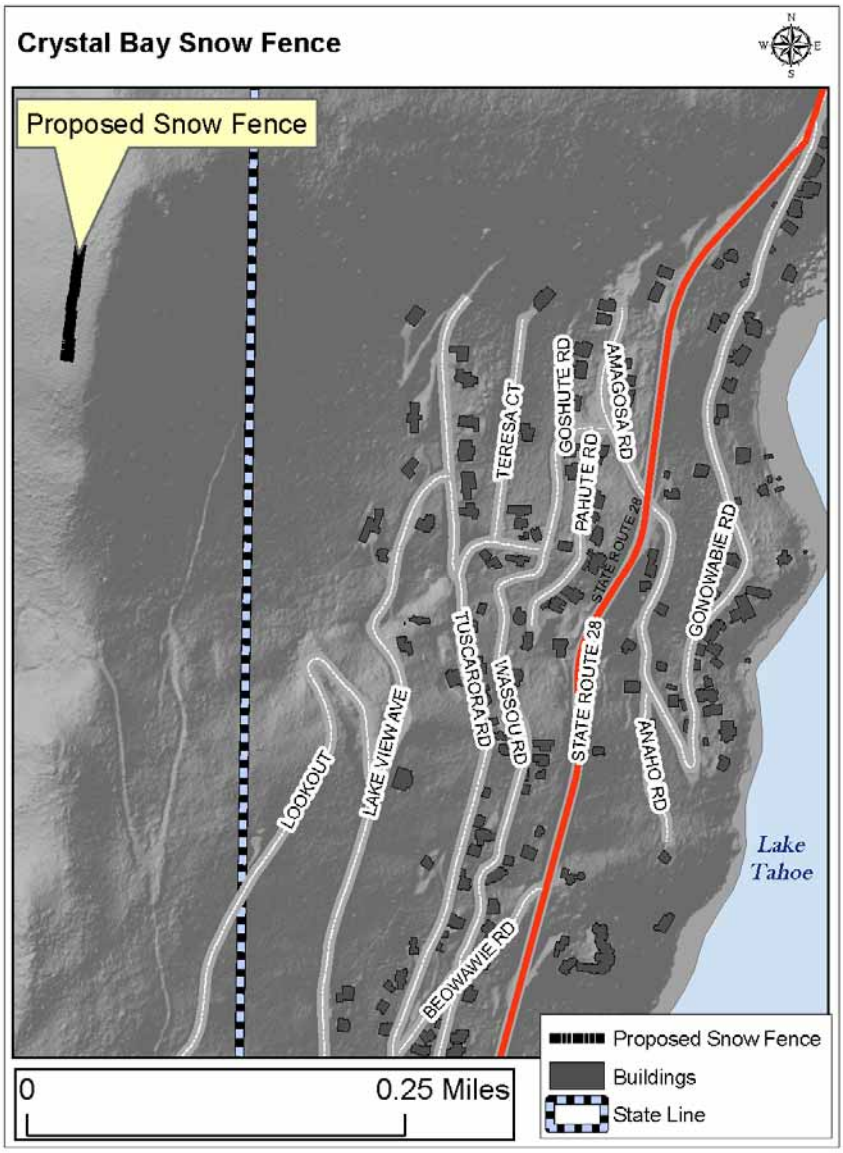
Figure 5-1: Relief Map of Mount Rose Ski Area



Source: CalTopo.com 01/30/2015

- The Mount Rose Ski Area is located on the eastern slope of the Carson Range of the Sierra Nevada Mountains contain several slopes which are prone to avalanches. The Chutes, including Beehive, consist of 40-55 degree slopes over 1000 feet long on a north facing slope. **Figure 5-1** above shows a relief map of the Mount Rose ski area.
- The west-facing slope east of Sand Harbor is steep enough to produce avalanches and may receive heavy amounts of snowfall. While large amounts of snow can be expected to accumulate on this slope when storm winds are from a southerly direction, storm winds from a more westerly direction can be expected to scour much of this slope. From an elevation of 8,160 feet, the study slope falls a vertical distance of 1,910 feet to elevation 7,250 feet near the lake level. Slope angles range from 37 degrees near the tope to near 0 degrees at the lake. The average slope angle from the top of the study slope down to the lake level is 21 degrees. The top 1,170 feet has an average slope of 30 degrees and its ground surface is mostly loose sand with some low brush and scattered trees.

Figure 5-2: Proposed Snow Fence above Crystal Bay



Source: Sierra Avalanche Center – Randall Osterhuber

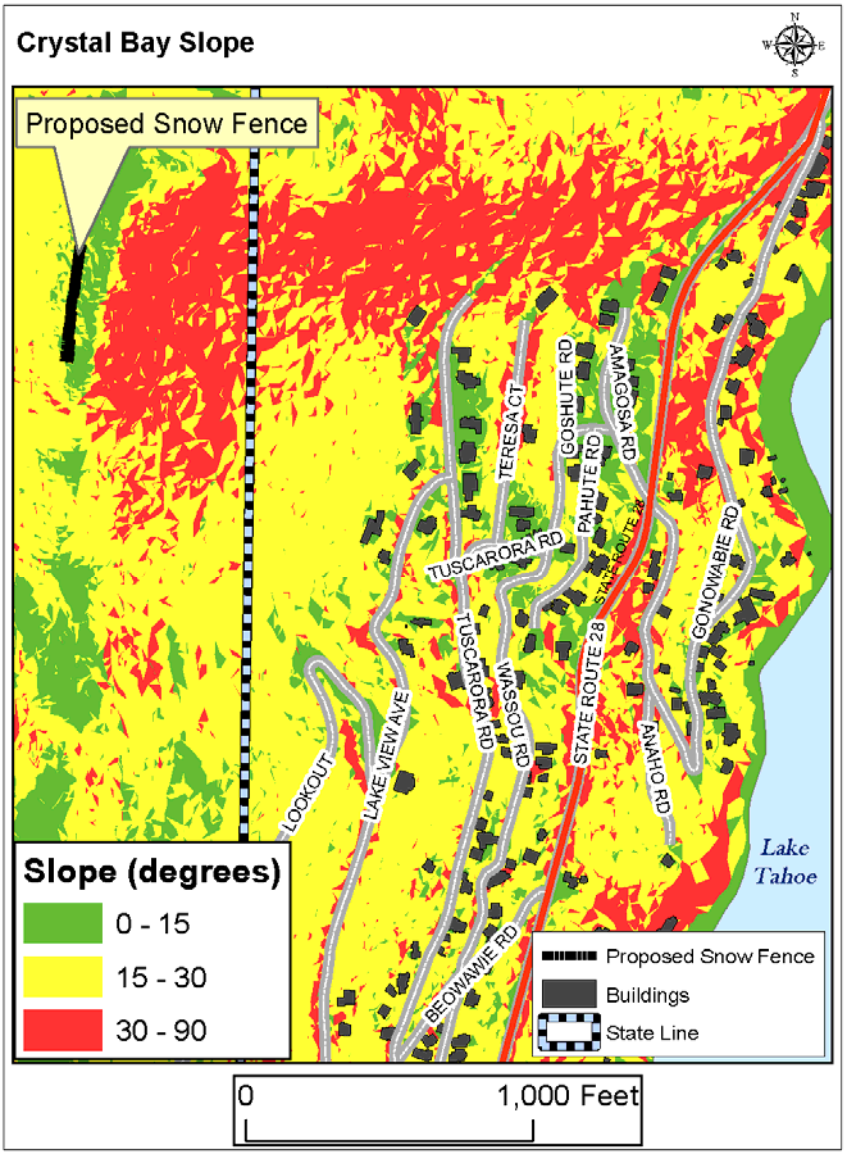
- The Crystal Bay avalanche path is located on the southeastern slope of Peak 7,350. During the field study several small starting zones were identified in this area, such as the one seen in **Figure 5-1**, which are capable of accumulating large amounts of snow and producing large destructive avalanches that can run long distances. From an elevation of 6,320 feet, the larger southern portion of the slope has a vertical drop of 1,100 feet to elevation 6,220 feet at Lake Tahoe. The average slope angle from the top of the study slope to the edge of the Lake is 23 degrees. **Figure 5-2** above shows the proposed mitigation measures above the Crystal Bay Avalanche chute.

Figure 5-3: Image of Cornice above Crystal Bay

Source: Sierra Avalanche Center – Randall Osterhuber

The geographic extent of potential avalanches is relatively small, less than 10 percent of the planning area. Secondary impacts such as blocked roads can affect larger areas and cause detours. Avalanche risk is highest in the steep, mountainous areas of the Carson Range of the Sierra Nevada in southwestern Washoe County. Incline Village and Crystal Bay are commonly under avalanche advisory during the winter. **Figure 5-4** below illustrates the extents of the 30 degree to 90 degree slopes (shown in red) which comprises the Crystal Bay Avalanche Chute. Mitigation measures have been proposed in the form of a snow fence to reduce the potential future avalanche occurrence. Based on information from the Sierra Avalanche Center, the Mount Rose and Rose Knobb Peak areas receive avalanche advisories more often than any other region of the county.

Figure 5-4: Existing Slope Analysis Crystal Bay Avalanche Chute



Source: Washoe County GIS

Extent:

The overall magnitude and severity of avalanche impacts are considered Very Low throughout the entirety of Washoe County. However, avalanche impacts in the Incline Village/Crystal Bay area and the areas along Mount Rose Highway at elevations above Galena Park are considered Moderate. Typical avalanche affects can be handled by the deployment of State, County and local resources (e.g., Incline Village General Improvement District and North Lake Tahoe Fire Protection District). Search and Rescue efforts are supported by local volunteers organized through the County Sheriff's Office. Road clearing is generally provided via State or County resources. The duration of avalanche affects is usually less than three days and the economic impact is typically contained to the immediate community affected or to the regional/local transportation network.

However, considering a worst case scenario, an avalanche might require State, County and local level support to respond, can impact critical facilities, and can disrupt services for 4 to 7 days.

Probability of Future Events:

The State of Nevada Hazard Mitigation Plan reports that Washoe County has the highest avalanche risk in the state. Due to the steep mountainous terrain, high elevations, and winter snows common on the eastern slopes of the Sierra Nevada range, minor avalanches with negligible impact occur on an annual or semi-annual basis in Washoe County. More severe avalanches that cause injuries, damage property or impact roadways occur less frequently.

The probability of future severe avalanche events that impact public safety, property or infrastructure is considered Medium, with roughly a 14 percent chance of occurrence in a given year. This indicates that high risk avalanches typically occur less than once in 10 to once in 100 years in Washoe County. Specific avalanche probability is monitored by the Sierra Avalanche Center, which provides forecast data to the Lake Tahoe-Sierra region at the following website: http://sierraavalanchecenter.org/index.html.

Planning Significance:

Avalanches are a naturally occurring phenomenon and effective mitigation efforts can be based on structural and planning methods. Based on assessments of geographic area affected, frequency, magnitude and severity, overall planning significance is considered **Moderate.**

Landslide

5.3.1.4 Nature

Landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas.

Landslides often accompany other natural hazard events, such as floods, wildfires, or earthquakes. Landslides can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, and can cause injuries and death.

5.3.1.5 History

Evidence of past landslides can be found throughout the County. Such events frequently follow other natural event occurrences, such as earthquakes and intense rainstorms. A sample of past landslide examples include the following:

- According to the U.S. Geological Survey, the Slide Mountain landscape shows abundant evidence of a long and continuous record of landsliding, especially large-scale rockfall avalanching. Although specific dates are unknown, investigation has revealed evidence of at

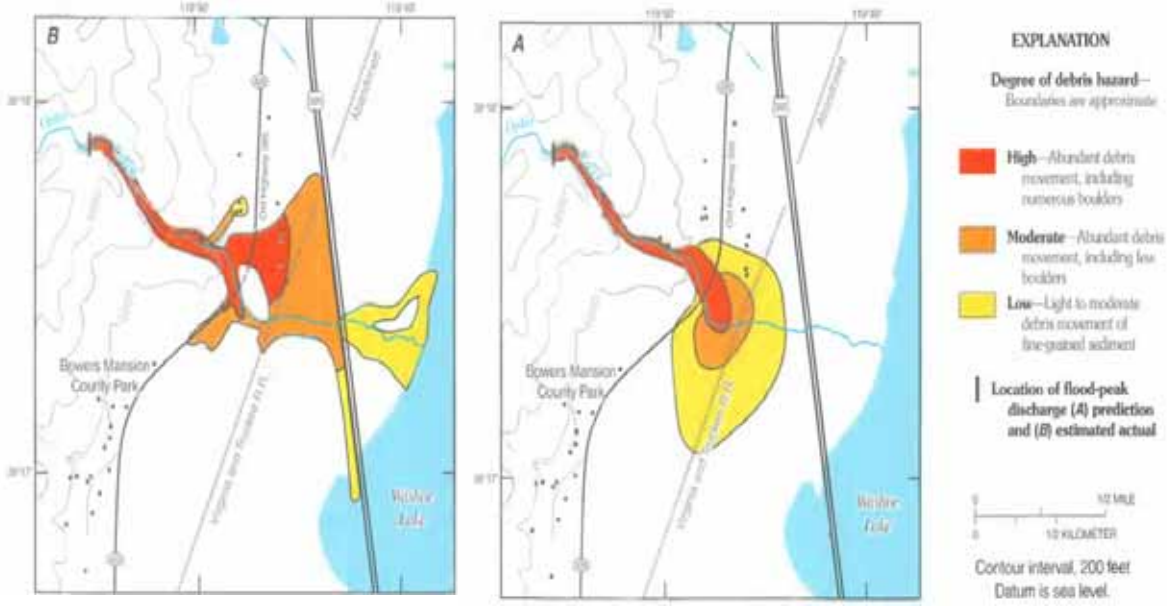
least nine rockfall-avalanche and debris-flow (landslide) deposits extending from the large main scar downgradient along the axis of Ophir Creek.

- A landslide-induced flood occurred at Ophir Creek on the eastern slope of Slide Mountain in Washoe Valley on May 30, 1983. The rapidly-moving flow emerged from a canyon and killed one person, injured several others, damaged 11 homes, and caused the evacuation of 5,000 people. The unusual hydraulics were the result of unseasonably hot weather which accelerated an abnormally heavy snowpack. Highway 395 and Freeway 395 were both closed. **Figure 5-5** is a photograph showing the Slide Mountain landslide engulfing a residential home. **Figure 5-6** demonstrates the degree of the debris hazards from the landslide event.

Figure 5-5: Slide Mountain Photograph

Source: Unknown

Figure 5-6: Degree of Debris Hazards



Source: USGS Landslide-Induced Flooding at Ophir Creek Report, by Glancy, Patrick

- A rock slide set off by a Friday night quake (April 25, 2008) was blamed for causing a 125-foot breach in a wooden flume that carried water to one of the two water treatment plants in Reno. (Source: NY Times 4-27-08)

5.3.1.6 Location, Extent, and Probability of Future Events

Location:

Landslide hazard areas include foothill and mountain areas where fractured and steep slopes are present. These areas in Washoe County include the Sierra Nevada Mountains foothills just southwest of Reno, the Virginia Mountains along the western side of Pyramid Lake, the Pah Rah Range just south of Pyramid Lake, and the Carson Range of the Sierra Nevada in southern Washoe County near Lake Tahoe. There is also potential for small slides and slumping along the steep banks of rivers and creeks. Areas where steep slopes are present are not generally heavily populated, and most are located in federal or state lands.

Extent:

The overall magnitude and potential severity of impacts from a landslide is considered **Low**. Less severe landslide events could be handled at the State or County level, disrupt services for 4 to 7 days, and have minor economic impacts on a communitywide scale.

Considering a worst case scenario, a landslide event could require State or County level support, could impact critical facilities and disrupt services for 8 to 14 days, and have countywide economic impacts.

Probability of Future Events:

Based on the frequency of landslide occurrences in Washoe County, probability of future landslide events is High, with a 10 to 20 percent chance of occurrence in a given year.

Planning Significance:

Landslides are triggered by naturally occurring phenomenon. Effective mitigation efforts are based on planning methods. Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **Low.**

5.3.2 Drought

Planning Significance:	Moderate

5.3.2.1 Nature

Drought cycles consisting of successive years of low-precipitation are a normal, recurrent phenomenon across the Great Basin. It differs from most other natural hazard events by its slow onset, gradual impact, and duration. With no defined starting period and limited long-range predictability, drought is a "creeping hazard" that will be recognized as a hazard only after the drought is well underway. Drought occurrence involves many factors, but in Washoe County is generally caused by successive years of inadequate winter precipitation resulting in insufficient natural supplies to meet local demands. **Figure 5-7** below illustrates the effects three dry years had on Lake Tahoe's ability to sustain its tributaries when water levels fell below the natural rim thereby cutting off water to the Truckee River from the Lake. It is critical to note that the region depends almost exclusively on winter snowpack and rainfall for its water supply. Rains from summer thunderstorms do little to recharge reservoirs and ground water tables.

Figure 5-7: Inflow Channel from Lake Tahoe to the Truckee River at Tahoe City, CA (November 2014)

Source: Scott McGuire, National Weather Service – Reno

With its semiarid conditions, drought is a natural occurrence with limited long-range predictability in Nevada. Defining when a drought begins is a function of the drought's impacts to water storage, supply systems and users. Washoe County consists of many separate hydrographic basins. Each basin receives differing amounts of annual groundwater recharge (i.e., in-basin water storage) based on annual precipitation. Water users in these basins who depend upon groundwater include both residential and non-residential uses such as agriculture,

mining, industrial and commercial. Drought conditions which impact one hydrographic basin may not extend to other, nearby basins. The impacts of drought conditions within a hydrographic basin can be influenced by the underlying geology of the basin.

A significant number of Washoe County water users depend upon surface water supply as their primary source of water. These water users also include both residential and non-residential uses. The primary surface water source for the Truckee Meadows area is the Truckee River and its tributaries, while Lake Tahoe provides surface water needed for the Incline Village/Crystal Bay area. Truckee River surface water serves as a primary water source for the Truckee Meadows Water Authority (TMWA) to serve several hydrographic basins adjacent to the Truckee Meadows basins. Drought conditions impact surface water primarily when upstream water storage is diminished and not able to provide water supply for water users. Water suppliers such as TMWA may be required to depend more upon groundwater supplies to supplement diminishing surface water supplies during drought conditions in order to meet their water supply demands. Other diverters of the Truckee River are impacted by reduced surface water availability when lower priority water right users may be "turned off" from their surface water supply.

Hydrologic conditions constituting a drought for water users in one location in the Great Basin may not constitute a drought for water users elsewhere, or for water users that have a different water supply. Individual water suppliers may use criteria, such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler, to define their water supply conditions. The drought issue is further compounded by water rights specific to a state or region. Water is a commodity possessed under a variety of legal doctrines.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in Washoe County are those related to water intensive activities such as agriculture, wildfire protection, municipal, industrial and commercial usage, tourism and recreation. A reduction of regional electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and reduce the soils ability to absorb water, potentially making an area more susceptible to flooding. An ongoing drought can impact the health of existing vegetation which may also leave an area more prone to beetle kill and associated wildfires. Drought impacts increase with the length of a drought, as annual carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

For the Truckee River, water stored in upstream reservoirs is used to maintain flow rates at the Floriston, California gauge site and to carry over water supplies from plentiful water producing years for use in years when precipitation is low. Floriston rates (the court-ordered flow rates of the Truckee River at the California-Nevada border) dictate minimum river flow at which traditional users (irrigators, power producers, and municipal and industrial producers, and municipal and industrial purveyors) meet their water requirements. If adequate storage is not available to augment low-flows, downstream users must curtail their water use. The summer low-flow period, which coincides with the peak-use period, requires water stored in Boca Reservoir and Lake Tahoe to be released into the Truckee River in order to maintain Floriston rates. TMWA has privately owned water reserves held in Donner and Independence Lakes, which are not accountable to Floriston rates but are released by TMWA use during drought periods.

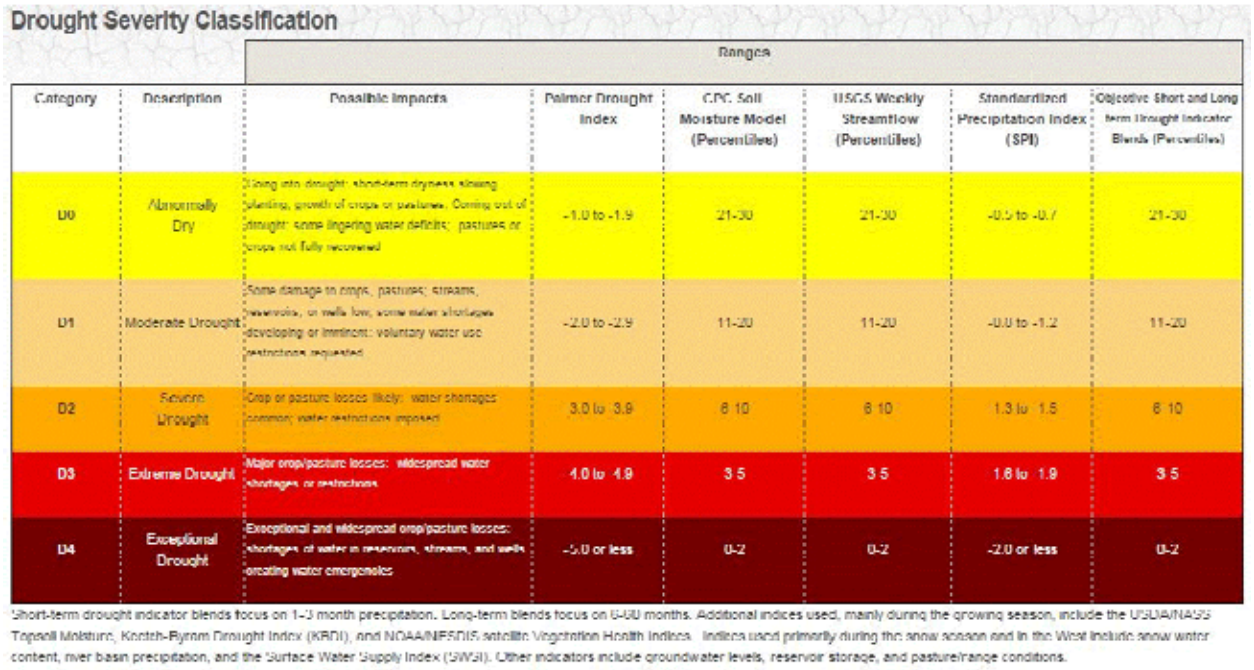
The most critical period for water supply in the region is late summer and early autumn. If a drought exists, it is during these months that the Truckee River will have low flows, and water supplies may have to be augmented with groundwater supply sources and privately owned stored water. In a severe drought, low flows may occur during the early summer. An extreme example - in the summer of 1992, during a particularly long drought, the Truckee River dried up east of Reno.

Unlike surface water from reservoirs and rivers, groundwater moves very slowly. Years may pass before a particular year's snowmelt recharges an aquifer and reaches a water well on the valley floor. Consequently, a drought-related decline in the water table may have been caused by a drought many years earlier. The impacts on the groundwater system from a drought are difficult to determine accurately and are even more difficult to predict; however, long-term monitoring of precipitation, stream flow and water table elevations has shown that drought-related impacts are measurable and significant. For example, in 2003 the State Engineer estimated that in the Mount Rose Fan aquifer, drought conditions resulted in 10 feet of water table decline over the prior 3 years (State Engineer, 2003, written communication to Washoe County Department of Water Resources).

Every resident of the region using water for domestic purposes relies on groundwater supplies to some degree. TMWA wells typically supply between 15 and 20 percent of annual, net water production. Those wells provide water to meet summer peak demands. During extremely dry years when Truckee River water is not plentiful between June and October, TMWA relies even more heavily on its wells to meet summer and fall peak demands. In addition to its retail customers, TMWA provides wholesale water to Sun Valley General Improvement District (SVGID), whose only source of water is TMWA. Other water purveyors in the region rely exclusively on groundwater to meet customer demands. All domestic well owners are solely dependent on groundwater to meet their domestic water needs.

The US Drought Monitor (USDM) produced weekly since 2000 can be used to visualize trends in drought over the region. Per the USDM website, “U.S. Drought Monitor maps come out every Thursday morning at 8:30 eastern time, based on data through 7 a.m. the preceding Tuesday. The map is based on measurements of climatic, hydrologic and soil conditions as well as reported impacts and observations from more than 350 contributors around the country.” The Palmer Drought Severity Index (PDSI) is one of the index values used in determining the USDM status (**Figure 5-8**). More information on PDSI can be found http://www.drought.gov/drought/content/products-current-drought-and-monitoring-drought-indicators/palmer-drought-severity-index.

Figure 5-8: US Drought Monitor Drought Severity Levels



Drought Severity Classification

Category	Description	Possible Impacts	Ranges: Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short and Long-term Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0-2	0-2	-2.0 or less	0-2

Short-term drought indicator blends focus on 1-3 month precipitation. Long-term blends focus on 6-60 months. Additional indices used, mainly during the growing season, include the USDA/NASS Topsoil Moisture, Keetch-Byram Drought Index (KBDI), and NOAA/NESDIS satellite Vegetation Health Indices. Indices used primarily during the snow season and in the West include snow water content, river basin precipitation, and the Surface Water Supply Index (SWSI). Other indicators include groundwater levels, reservoir storage, and pasture/range conditions.

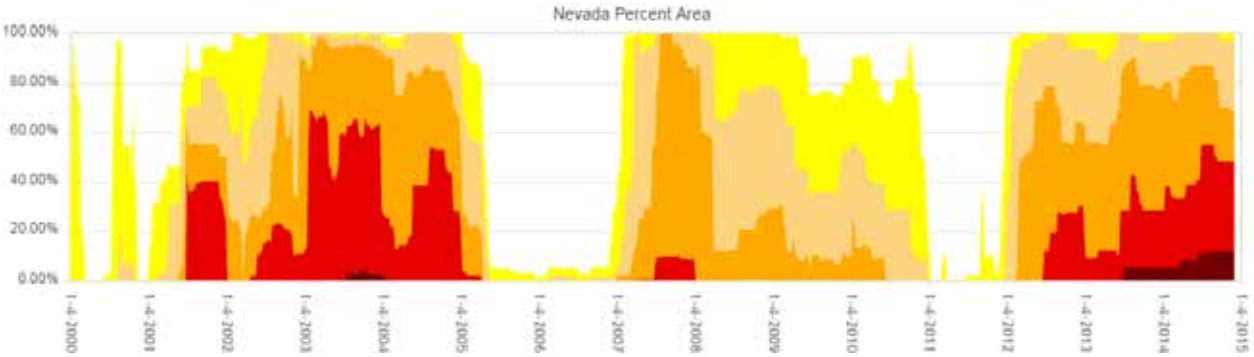
Source: US Drought Monitor

5.3.2.2 History

Washoe County is part of Nevada's Northwestern Climate Division. According to historical drought data from the National Climatic Data Center (NCDC), the Northwestern division observed 150 months from 1895—2014 rated as Severe Drought (D2 or higher in **Figure 5-8**). PDSI readings for the Northwestern Climate Division indicated Severe Drought (-3.0 or lower PDSI) in 10.4% of reporting periods from 1895-2014, a recurrence interval of approximately every 9 years. Clearly – drought is a part of life in Washoe County.

According to information from the USDM, Nevada has suffered from several periods of drought since 2000, as seen in **Figure 5-9**. During these same periods Washoe County has suffered drought as well. Since 2000, more often than not, the state has been subject to drought and often severe or worse drought. Two pronounced but relatively brief wet periods are noted, from 2005-06 and 2010-11, where the region saw particularly wet/snowy winters including one major flood in December 2005. This is a clear example of the variable climate in Washoe County.

Figure 5-9: Nevada Drought Level by Year 2000-2015

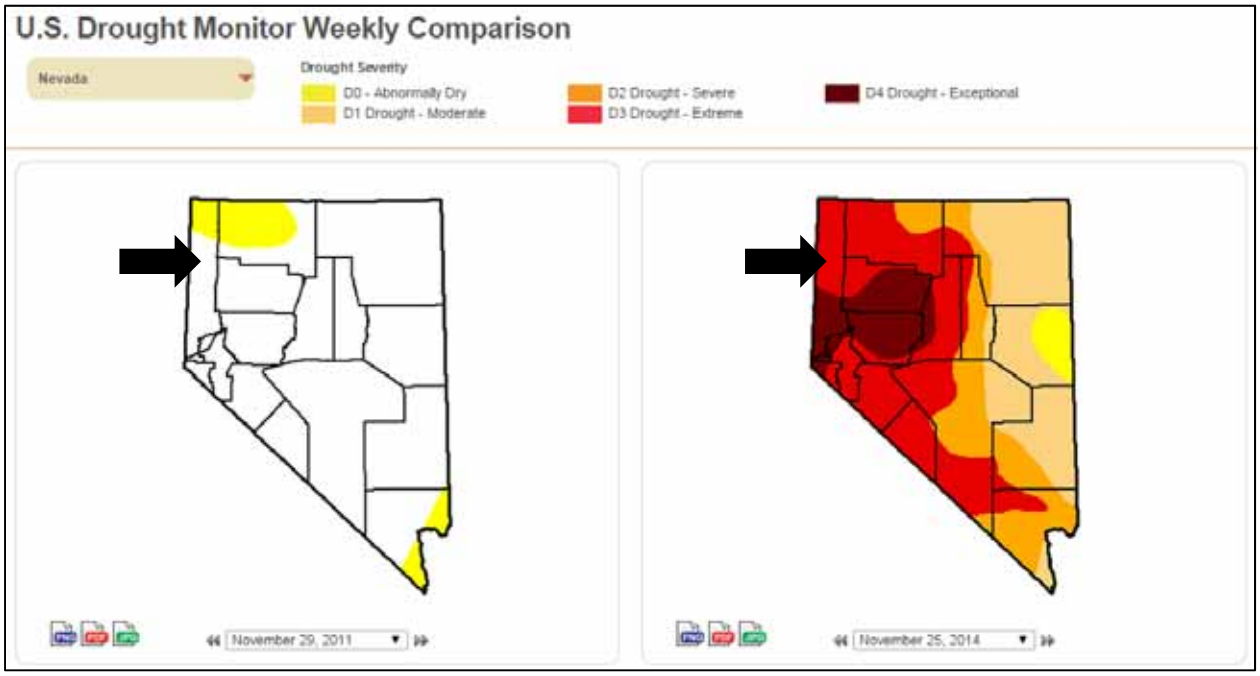


Source: US Drought Monitor

Time series showing the percent of Nevada under certain levels of drought as established in the weekly US Drought Monitor. The color shading here corresponds to that shown in **Figure 5-9**.

As seen in **Figure 5-9** the most recent ongoing drought started during the winter of 2011-12, the first of three winters with below average snowpack in the Sierra and western Nevada. The winter of 2013-14 was exceptionally dry resulting in the highest classification of drought, Exceptional Drought, in the USDM. As of this writing, the winter of 2014-15 has also been dry with snowpack levels below 50% of average for mid-January in the Truckee River basin. Barring significant precipitation in February and March, this raises the likelihood of continued Exceptional Drought throughout Washoe County this coming year.

Figure 5-10: US Drought Monitor for Nevada November 2011 vs. November 2014



Source: US Drought Monitor

The dramatic increase in coverage and severity of drought can be seen, especially in Washoe County (noted by the black arrow in **Figure 5-10**) and western Nevada. County outlines in thin black lines.

5.3.2.3 Location, Extent, and Probability of Future Events

Location:

Drought affects broad regions and can include any portion of Washoe County. Historically, the southern section of the County has had a lower frequency of drought than the central and northern sections, due to extensive stored water in reservoirs in the Truckee River basin. However in the ongoing drought the opposite is true, due to exceptionally low snowpack in the Truckee River basin during the winters of 2013-14 and 2014-15. Slightly better snowpack levels have been observed in northern Washoe County as of January 2015, though still below normal.

Extent:

The overall magnitude and potential severity of impacts of drought is considered **Moderate** in Washoe County. Typical events are handled at the regional level by all jurisdictions and by both public (e.g., TMWA) and private water suppliers, and can have economic impacts on the county as well as the state. Disruption of services is highly variable: in urban areas with municipal water systems and reservoir storage, disruption may be quite minimal during a typical few-year drought. In that same drought, however, disruption of water supplies to rural and agricultural communities in Washoe County may be considerable as those areas depend more on ground water which can be depleted quickly in drought conditions.

Considering a worst case scenario a decade-long drought can require federal support, impact critical facilities, and disrupt water services to both urban and rural populations, and have national economic impacts. The length or nature of disruption is variable ranging from the cessation of all agricultural production to severe water restrictions in urban communities.

Probability of Future Events:

Drought is one of the least predictable hazards. The current state of seasonal weather prediction science is such that it is nearly impossible to predict well in advance the beginning or the ending of droughts with meaningful confidence levels. With that said, periods of drought have regularly occurred in the recent history of Washoe County and Nevada, and as such drought can be expected to occur with some regularity in the future.

The exact definition of a "major drought" is somewhat subjective, but according to the historical drought data reports there have been 19 major droughts in past 119 years. The most recent major drought is ongoing. This indicates a 16% chance of occurring in any given year. Based on this assessment the probability of a future major drought event is considered **High**, with a 10 to 20 percent chance of occurrence in any given year.

Climate Change:

As described in the *Washoe County Regional Resiliency Study* (May 2014), there is an expectation that the effects of climate change will result in rising snow levels. The rising snow levels will result in a large fraction of winter precipitation falling as rain instead of snow. As a result of the predicted changing precipitation source, maintaining, enlarging and creating additional reservoirs will become even more important for storing water supply.

Planning Significance:

Drought is a naturally occurring phenomenon, though it can be made worse by human activity. Effective mitigation efforts can be based on both structural and planning methods. Climate change is predicted to alter critical historic precipitation patterns in the Sierra by concentrating storms in the winter months making future spring, summer, and fall months longer and drier as stated in the *Washoe County Regional Resiliency Study*. This concentration of precipitation could increase our reliance on significant water storage facilities, such as reservoirs, to provide the necessary water supply for sustained human and wildlife use through the drier portions of the year. Based on assessments of geographic area affected, frequency, magnitude and severity, the overall planning significance of the hazard is considered **Moderate**.

5.3.3 Earthquake

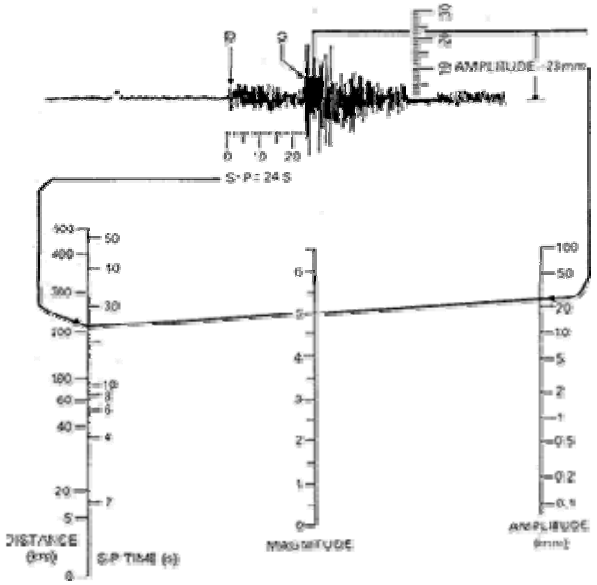
Planning Significance:	High

5.3.3.1 Nature

An earthquake is sudden motion or trembling of the ground caused by shifting tectonic plates. Earthquakes are potentially catastrophic, capable of causing multiple fatalities and major structural and infrastructure damage including disruption of utilities, communications, and transportation systems. Secondary affects can include landslides, seiches, liquefaction, fires, and dam failure. Earthquakes occur very abruptly, with little or no warning time. However, seismic monitoring in certain cases can detect increases in geologic and seismic activity that precedes an earthquake event. The duration of earthquakes ranges from a few seconds to a few minutes. Aftershocks can recur over hours, weeks, or months; usually with diminishing frequency and intensity.

There are many methods of measuring the power of an earthquake. The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included for the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Figure 5-11: Richter Scale



Source: USGS

The velocity, acceleration and amplitude (displacement) are examples of aspects of ground motion that can be directly measured. Earthquake magnitude or intensity scales calculate their results according to formulaic expressions or ratios of these direct observations. The amount of energy released during an earthquake is commonly expressed on the moment magnitude scale and is a measure of energy released from the fault or epicenter as recorded on seismographs. Use of the moment magnitude scale has largely replaced the use of the Richter scale. Another measure of earthquake magnitude is intensity. Intensity is an expression of the amount of shaking at any given location on the surface as felt by humans and defined by the Modified Mercalli Intensity Scale. It is typically the greatest cause of losses to structures during earthquakes, and is determined by many factors including distance from epicenter and soil types. **Table 5-10: Modified Mercalli Intensity (MMI) Scale**, features abbreviated descriptions of the 12 levels of intensity of the Modified Mercalli Intensity Scale.

Table 5-10: Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

5.3.3.2 History

Previous earthquake data in Washoe County was extracted from the Nevada Seismological Laboratory online archives. Previous earthquake occurrences will be highlighted in the following three lists: 1) Earthquake Occurrences, magnitude 5 or higher, 1852-2014, including date and magnitude; 2) Earthquake Occurrences, all significant events, 2004-2014, including detailed description of occurrence; 3) Description of earthquake swarms in 2003-2014.

Previous Earthquake Occurrences, >M5, Washoe County 1852-2014

- May 30, 1868: M6.0
- December 27, 1869: M6.7
- July 10, 1877: M5.0
- June 3, 1887: M5.5
- November 18, 1894: M5.5
- February 18, 1914: M6.0
- April 24, 1914: M6.4
- April 27, 1914: M5.0
- May 25, 1937: M5.0
- June 18, 1937: M5.3
- May 9, 1942: M5.1
- December 3, 1942: M5.9
- December 29,1948: M6.0
- May 9, 1952: M5.1
- September 26, 1953: M5.5
- September 26, 1959: M5.3
- May 25, 2008: M5.0

Previous Earthquake Occurrences, >M4.5, and Earthquake Swarms: Washoe County 2004-2014

- Volcanic magma (molten rock) migrating about 20 miles below the surface of the Sierra Nevada mountains caused a swarm of about 1,600 small earthquakes in late 2003 and early 2004. The 20 mile depth is about twice as deep as earthquakes caused by faults in the region measured during the last 30 years.
- June 3, 2004: A M4.5 earthquake was recorded Thursday, at 1:54 AM on June 3, 2004, in the Reno - Lake Tahoe region, Nevada and California. It was located approximately 6 miles (10 km) north of Kings Beach (and the north shore of Lake Tahoe), and nearly on the Nevada - California state line with a preliminary depth of 8.6 kilometers (~ 5 miles). Five minor foreshocks were located, with the largest being a (preliminary) M2.7 foreshock at 1:25 AM. A large number of aftershocks were recorded. The largest so far was at 4:16 AM (preliminary M1.5). The earthquake was felt as light to weak shaking throughout the Reno and Lake Tahoe region.
- June 26, 2004: A M4.8 earthquake occurred about 10 km north of Lake Tahoe at 11:46 AM Sunday June 26th at a depth of 12 km. This event follows an M4.5 event in June of 2004.
- June 26, 2005: A M5.0 earthquake was recorded Sunday, at 11:45 AM on June 26, 2005, in the Reno - Lake Tahoe region, Nevada and California. It was located approximately 8 miles (12 km) east of Truckee, California, and close to the Nevada – California state line, with a preliminary depth of 13.2 kilometers (~ 6.6 miles). This earthquake occurred in an active area, with a M4.5 earthquake recorded on June 3, 2004. The earthquake was felt widely throughout the Reno and Lake Tahoe region.

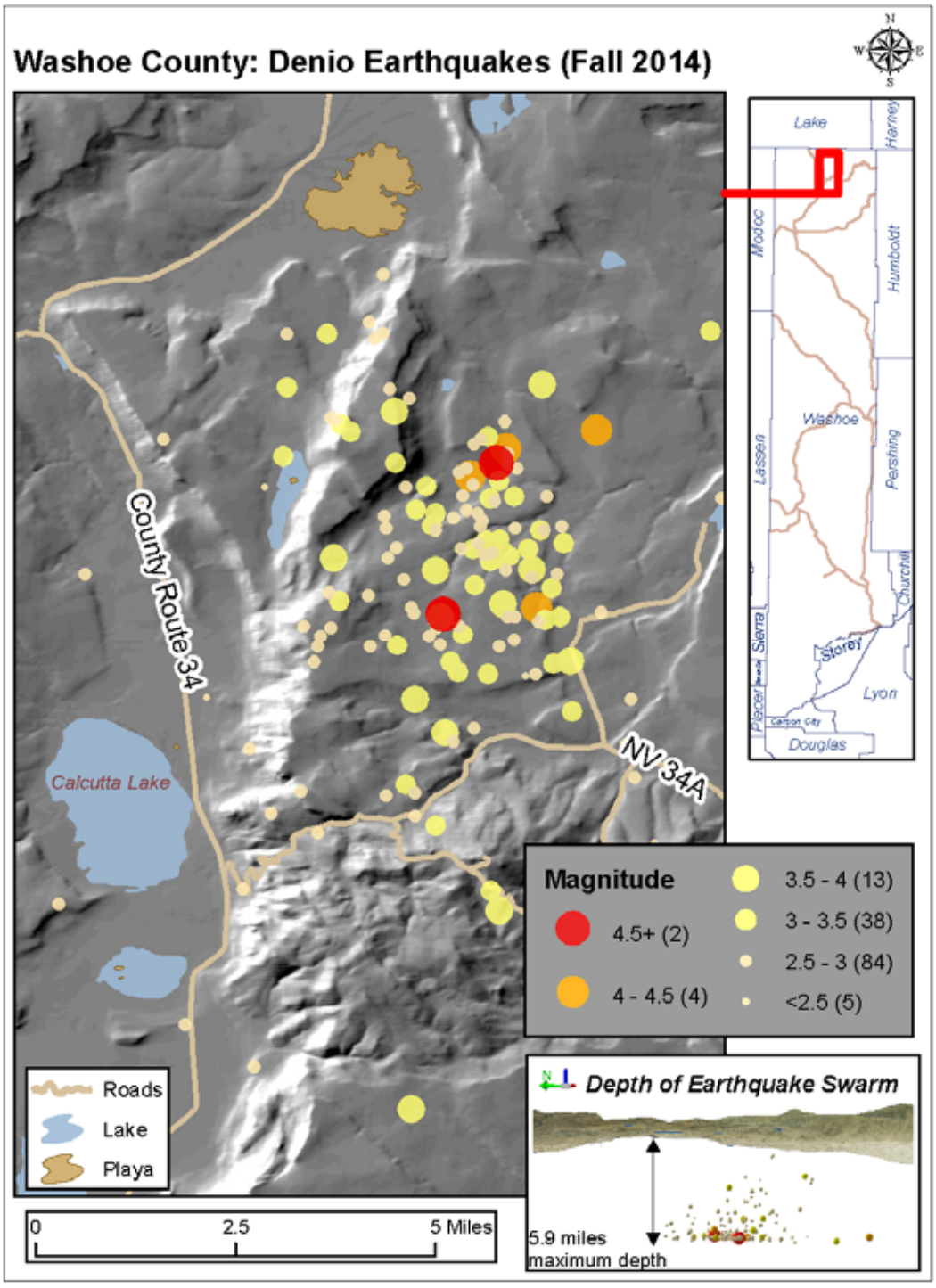
- February 28, 2008: A period of earthquake activity began in the area northwest of Reno. Though the sequence included hundreds of events, the peak events during this series have included the following earthquake activity:
  - March 8- M3.0
  - March 13- M3.1
  - April 24- M4.1 and M4.2
  - April 25- M4.7
- April 15, 2008: Following a M3.4 in the Mogul-Somerset area of West Reno at 7:59 AM, the Nevada Seismological Laboratory has located four additional earthquakes greater than M3 in the Mogul-Somerset area sequence that occurred between 2:26 and 2:47 PM. These events are part of a continuing series of earthquakes that began on Thursday February 28, 2008 in the West Reno area. These most recent M3 earthquakes and the M3.4 earthquake earlier on April 15, 2008, were followed by numerous aftershocks.
- April 25, 2008: The quake had a preliminary reading of 4.7 and is the latest of hundreds of earthquakes that have swarmed the northwest Reno during the Mogul-Somersett swarm. It caused approximately $2 million in damage.
- May 7, 2008: A M3.8 earthquake occurred at 10:55, about 1.8 miles northeast of Mogul and 5 miles northwest of Reno, Nevada. This earthquake was about a mile east of the main trend of seismicity in Mogul, in a small cluster active up until this time only at small magnitudes. The magnitude of this earthquake event was consistent with aftershock activity from the M4.7 event of April 25th.
- June 8, 2008: Three earthquakes larger than M3 occurred within the on-going West Reno Mogul-Somersett area sequence within 12 hours. The largest of these was M3.9 at 10:55 AM, June 8, 2008 (depth: 0.9 miles). The M3.9 earthquake was preceded by a M3.2 event at 03:13 AM (depth: 1.6 miles) and by a M3.6 earthquake at 10:53 AM (depth: 1.0 miles). These two M3.5+ earthquakes occurred north of the Somersett subdivision in a cluster of seismicity NE of the main trend of most prior activity of the Mogul-Somersett sequence. These are the largest earthquakes in the zone of seismicity NE of Mogul. As with prior earthquakes of this size in the West Reno area, these events have been followed by numerous aftershocks. These earthquakes were felt throughout most of the Reno metropolitan area.
- July 2014: A series of hundreds of M3.0 occurred and are ongoing through January 2015 in Northwestern Nevada near Denio. This unusual sequence included several events larger than a magnitude 4.5, though earthquakes are continuing to date. These events are felt in Eastern California, Southern Oregon and in Northern Nevada. The region is rural so very little damage has been reported.

Earthquake Swarms

Since February of 2008, more than 600 earthquakes of magnitude greater than 1.0 have been recorded in the nearby Reno, Nevada area. The most powerful, a M4.7, hit Reno on April 25, 2008 causing minor damage locally. It is unknown to what extent these or other earthquakes occurring outside of the planning area were felt by Washoe County residents. Historically, Reno has been near the epicenter of at least 6 events since the 1850s (**Figure 5-13**). The absence of large events in the region is atypical and should not be expected to be the norm for the area.

Figure 5-12 below, shows earthquake activity located in northern Washoe County beginning in July 2014. This sequence contains hundreds of events over M3.0, along with several over M4.5. Events from this sequence are tectonic, caused by motion between crustal blocks, rather than volcanic (such as the 2005 North Tahoe swarm).

Figure 5-12: 2014 Denio Earthquake Swarm



Source: Washoe County GIS

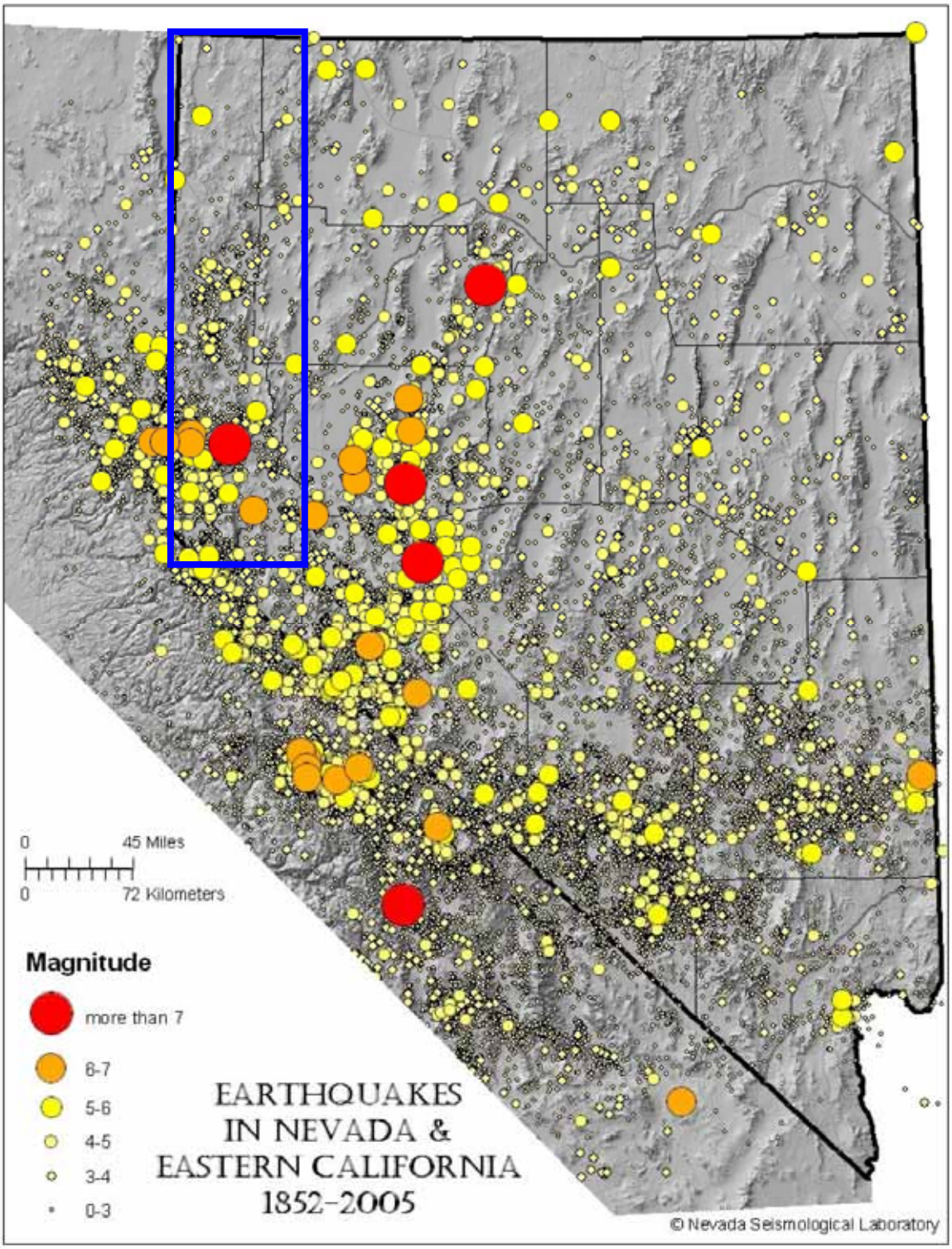
5.3.3.3 Location, Extent, and Probability of Future Events

Location:

The State of Nevada is the third most seismically active states in the U.S. and Washoe County is located in one the most seismically active areas in Nevada. Overall, any area of the County is susceptible to noticeable effects of earthquakes. **Figure B-8**, in the **Appendix B**, identifies the major fault lines in the planning area. The most hazardous fault zones in Washoe County are the Mount Rose fault zone, West Tahoe fault and Pyramid Lake fault. Additionally, dozens of smaller faults are located in developed areas throughout the county. Fault zones within the Earth's crust are the result of shear motion between tectonic plates and are the causal locations of most earthquakes.

The location of seismic activity in the State of Nevada from 1852-2005 is indicated in **Figure 5-13: Earthquake Activity in Nevada, 1852-2005.** Southern Washoe County, near Reno, Sparks and north of Lake Tahoe, has higher probabilities of occurrence and more severe potential impacts due to population densities.

Figure 5-13: Earthquake Activity in Nevada, 1852-2005



Source: Nevada Seismological Laboratory
Note: Blue rectangle indicates approximate location of Washoe County

Extent:

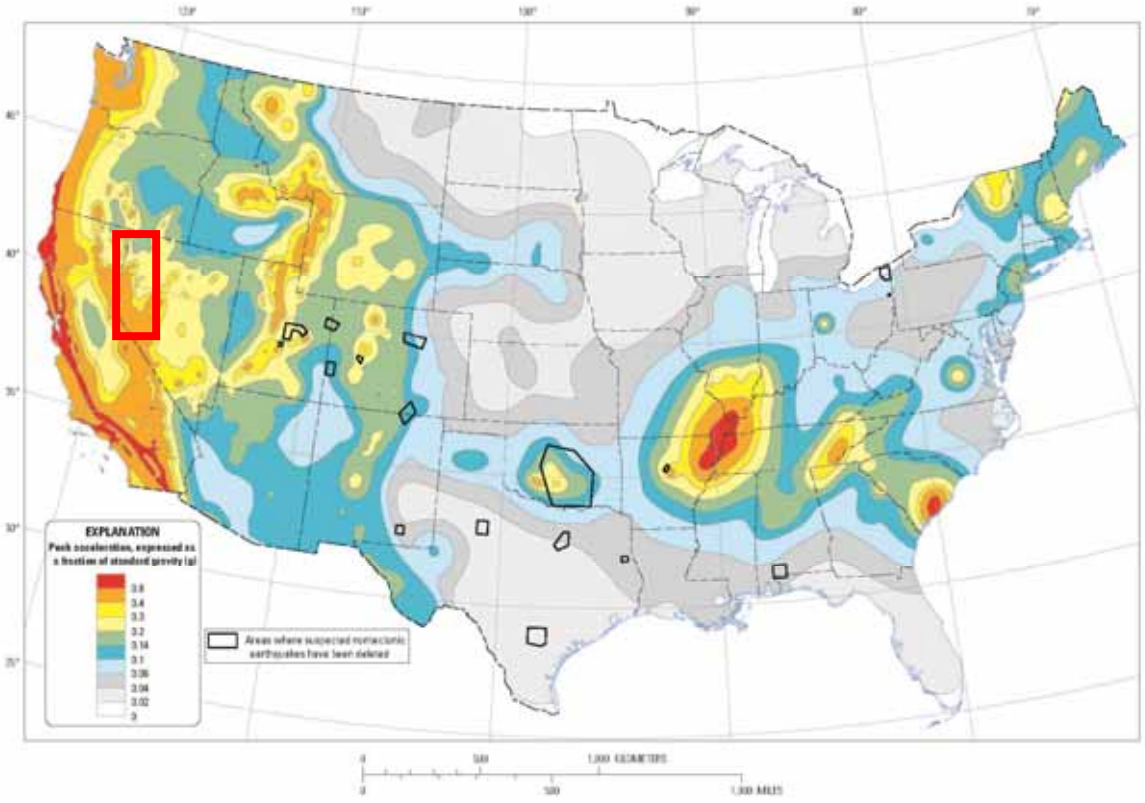
The overall magnitude and potential severity of impacts of earthquakes is considered **High** in Washoe County; events are handled at the county level, disrupt services for 1 to 3 days, and their economic impacts affect a city or community.

Considering a worst case scenario, earthquakes can require federal support, can impact critical facilities and disrupt services for more than 20 days, and have national economic impacts.

Probability of Future Events:

Figure 5-14: Peak Ground Acceleration (%g) with Two Percent (2%) Probability of Exceedance in 50 Years maps the potential intensity of earthquakes in Nevada at a common degree of probability. For this map, probability is given at two percent probability of exceedance in 50 years. This recurrence interval for an event with this probability is 2500 years. The region of Washoe County with the highest predicted peak acceleration is centered on the Reno/Carson City metropolitan area. The peak ground acceleration range at this probability for the City of Reno is 80-120 percent gravity.

Figure 5-14: Peak Ground Acceleration (%g) with Two Percent (2%) Probability of Exceedance in 50 Years



Two-percent probability of exceedance in 50 years map of peak ground acceleration

Source: USGS, http://earthquake.usgs.gov/regional/states/nevada/hazards.php
Note: Red rectangle indicates approximate location of planning area.

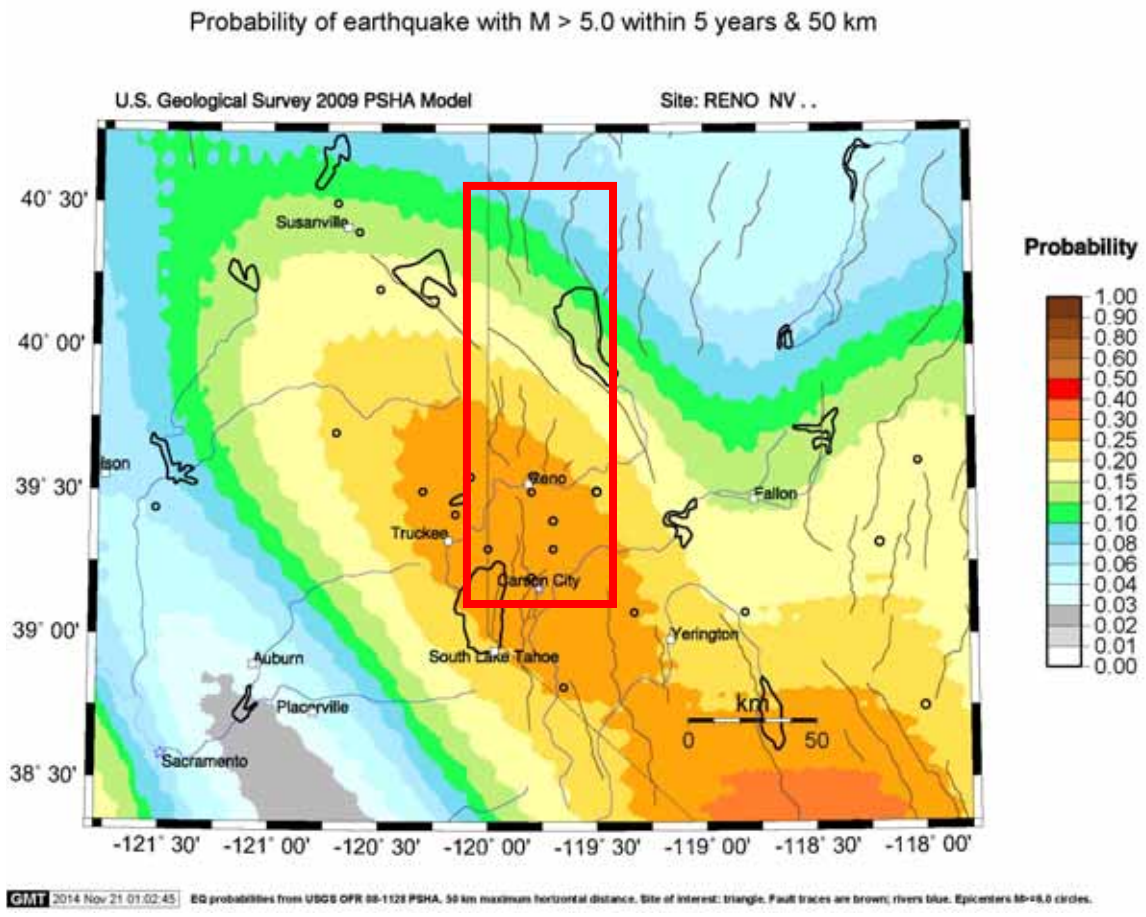
According to the previous lists of earthquake occurrences in Washoe County, 16 earthquakes with a magnitude >5 have occurred in the last 156 years. Based on these numbers, the probability of future occurrence can be estimated at 10%; this means that there is roughly a 10% chance of an earthquake with magnitude >5 to occur every year. The overall probability of future occurrence of an earthquake measuring 5.0 magnitude or higher is considered **Medium**, with an estimated 1 to 10 percent chance of occurrence in a given year.

Planning Significance:

An earthquake is a naturally occurring phenomenon. Effective mitigation efforts can be based on both structural and planning methods. County rankings in the Nevada State Hazard Mitigation Plan show Washoe County having the second highest vulnerability to earthquakes in the state.

Based on assessments of geographic area affected, frequency and magnitude, overall planning significance is considered Moderate/High. Overall vulnerability is low in non-urban areas and significantly higher in urban areas, due to the concentrations of people and property in urban areas.

Figure 5-15: Earthquake Probability with M > 5.0 within 5 years & 50 km



Source: USGS, http://earthquake.usgs.gov/regional/states/nevada/hazards.php
Note: Red rectangle indicates approximate location of planning area.

Seiche

5.3.3.4 Nature

U.S. Army Corps of Engineers defines seiche as:

- A standing wave oscillation of an enclosed waterbody that continues, pendulum fashion, after the cessation of the originating force, which may have been either seismic or atmospheric.
- An oscillation of a fluid body in response to a disturbing force having the same frequency as the natural frequency of the fluid system. Tides are now considered to be seiches induced primarily by the periodic forces caused by the Sun and Moon.
- In the Great Lakes area, any sudden rise in the water of a harbor or a lake whether or not it is oscillatory (although inaccurate in a strict sense, this usage is well established in the Great Lakes area).

Seiches can be generated when the water is subject to changes in wind or atmospheric pressure gradients or, in the case of semi-enclosed basins, by the oscillation of adjacent connected water bodies having a periodicity close to that of the seiche or of one of its harmonics. Other, less frequent causes of seiches include heavy precipitation over a portion of the lake, flood discharge from rivers, seismic disturbances, submarine mudslides or slumps, and tides. The most dramatic seiches have been observed after earthquakes.

Another way seiches start is when land tilts or drops as a result of fault rupture or other seismic activity. Computer modeling by a group at the University of Nevada at Reno that is working with a Japanese tsunami expert showed ruptures along either fault could lift or drop the bottom the lake and possibly generate a tsunami. The tsunami in turn could trigger seiche waves within seconds that could crisscross the lake, and reach heights of 30 feet or more and persist for hours.

5.3.3.5 History

There have been no occurrences of major seiche activity at Lake Tahoe in recent years. University of Nevada geologists have found deposits that extend for 10 miles along the McKinney Bay shore from Sunnyside through Tahoma. These deposits indicate a tsunami or seiche with 30-foot-high waves occurred approximately 7,000 years ago.

Research performed by the Scripps Institute of Oceanography using acoustic trenching to research the lake's topography indicates that McKinney Bay was formed when a massive landslide slipped into Lake Tahoe which likely caused major seiche activity at that time. Research from the University of Nevada shows evidence of a massive landslide that tumbled from Homewood on the Nevada side.

Recent occurrences of potential causal factors include a M4.9 earthquake near Incline Village in 1998.

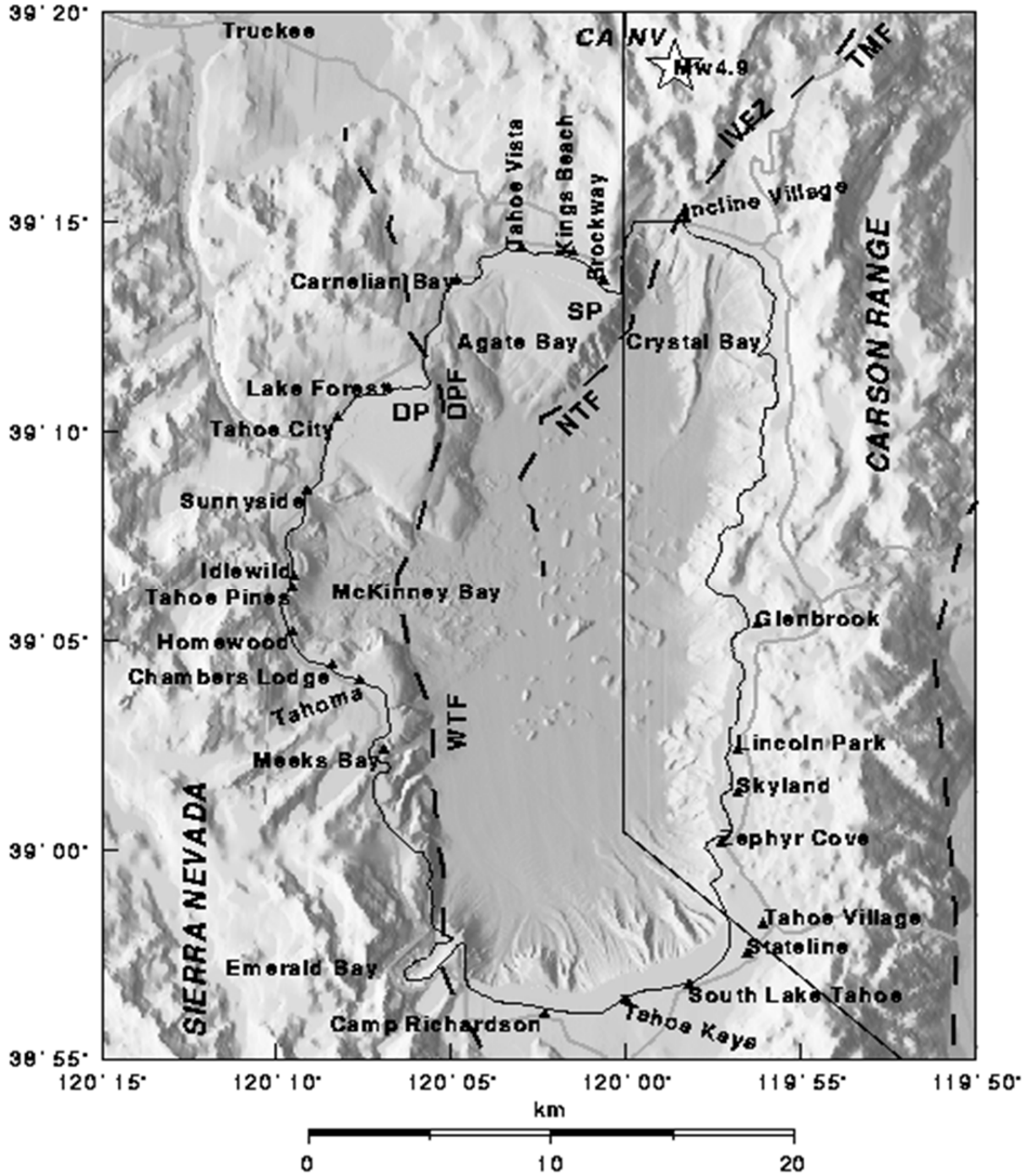
5.3.3.6 Location, Extent and Probability of Future Events

Location:

Locations with the highest probability of impact are shore areas of Lake Tahoe from 0 to 30 feet above mean lake water level. Japanese scientist, Kenji Satake has done computer models that suggest largest waves of a seiche event could hit Sugar Pine Point, Rubicon Point, and the

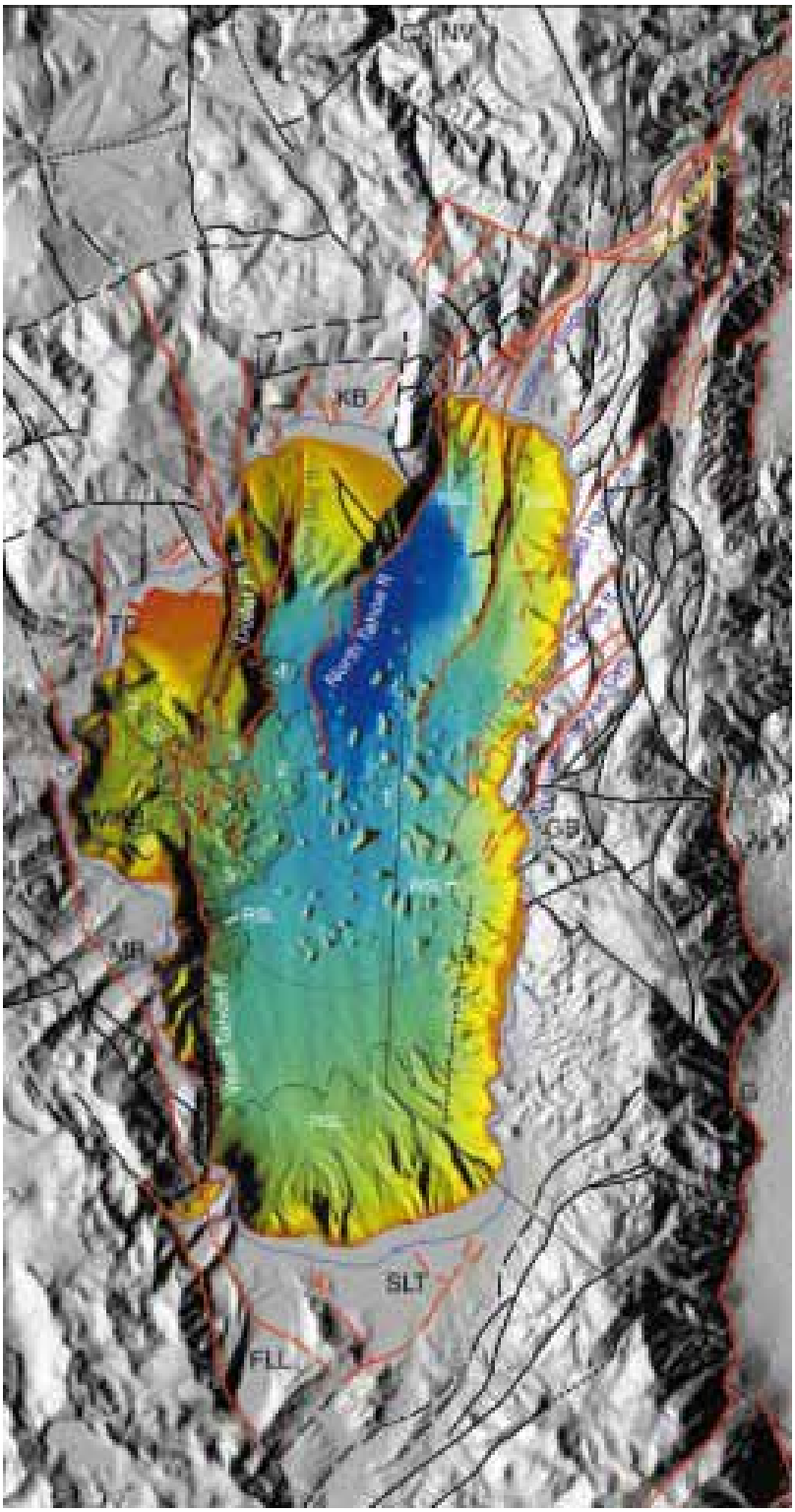
casinos in South Lake Tahoe**. Figure 5-16** and **Figure 5-17** below show city locations, Lake Tahoe basin topography; and lake bathymetry, and fault locations, respectively.

Figure 5-16: Lake Tahoe Basin Topography



Source: The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

Figure 5-17: Lake Tahoe Bathymetry and Fault Locations



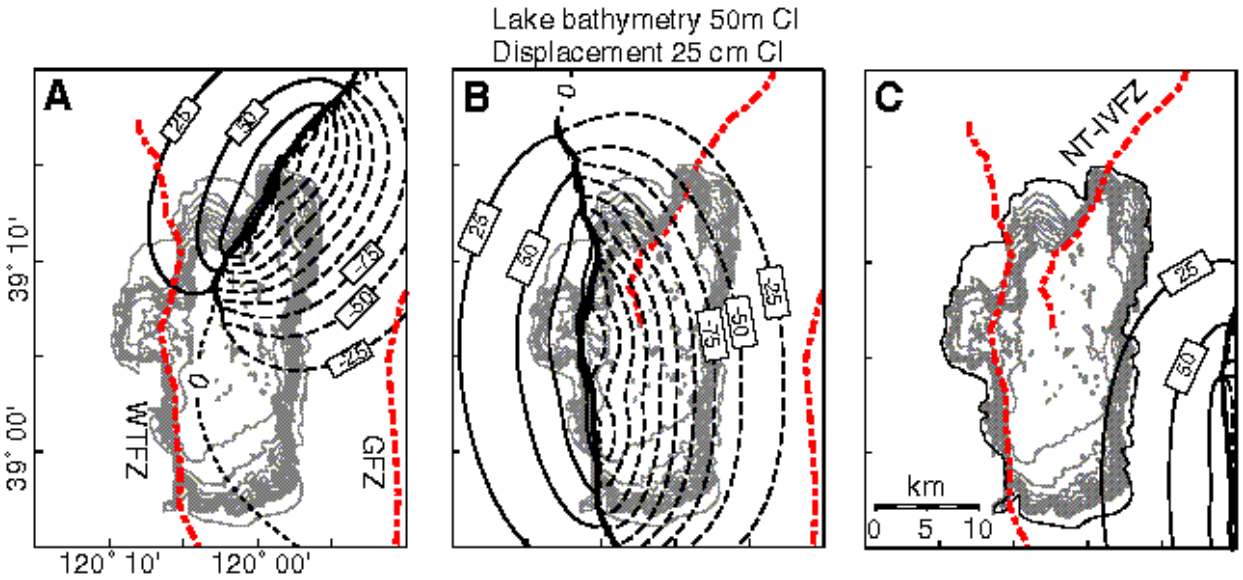
Source: University of Nevada Seismic Laboratory, (Schweickert); USGS

Research from the University of Nevada estimates that an earthquake must be at least a M6.5 to cause a damaging seiche at Lake Tahoe. The two faults directly underneath the lake are considered capable of generating M7.1 earthquakes. Computer models of seiche activity at Lake Tahoe prepared by the University of Nevada research team estimate that waves as high as 30 feet could strike the shore. These projections suggest largest waves might hit Sugar Pine Point, Rubicon Point and the casinos in South Lake Tahoe.

In the event of a M7 earthquake occurring on either of two major faults under the lake, the lake bottom could drop as much as 4 meters. Water supported by the lake floor could drop a corresponding distance and generate waves that heavily impact the shoreline.

Figure 5-18, below shows three potential vertical displacement (uplift or subsidence) scenarios that could be caused by M7+ earthquakes along the three discrete fault systems in the Lake Tahoe region.

Figure 5-18: Contours of Vertical Component Ground and Lake Bottom Displacements



Source: The Potential Hazard from Tsunami and Seiche Waves Generated by Future Large Earthquakes within the Lake Tahoe Basin, California-Nevada, 1999-2000; Gene A. Ichinose, Kenji Satake, John G. Anderson, Rich A. Schweickert, and Mary M. Lahren; Nevada Seismological Laboratory; University of Nevada; (University of Nevada 2000 study)

Note: contour of vertical component ground and lake bottom displacement for scenarios "A", "B" and "C". The dashed contours represent subsidence and solid uplift. The contour interval is 25 cm and only the first few contours are labeled. The thick dash-dotted lines are the three fault traces used in the scenarios: North Tahoe-Include Village fault zone (NT-IVFZ), West Tahoe-Dollar Point fault zone (WTF) and Genoa fault zone (GFZ). All of the scenarios are Mw 7+ normal faulting earthquake with a maximum slip of 4 meters tapered to zero at the ends of the fault with a trapezoid function.

Scenario A represents an earthquake event along the North Tahoe-Incline Village Fault Zone (NT-IVFZ). This scenario projects significant subsidence (0.5-4.0 meters) to the east of the fault in the vicinity of Incline Village and across Crystal Bay and moderate uplift (0.25-1.0 meter) to the west and away from the lake. Shoreline areas near the fault rupture would be inundated due to permanent ground subsidence. Other shoreline areas would be temporarily inundated by tsunami and seiche waves. Seiche wave heights could exceed 3 meters within shallow bays and shores between Incline Village and Carnelian Bay, and exceed 6 meters at some locations in the South Lake area.

Scenario B represents an earthquake event along the West Tahoe-Dollar Point Fault Zone (WTFZ). This scenario projects significant subsidence (0.5-4.0 meters) across the lake bottom to the east of the fault and moderate uplift (0.25-1.0 meter) to the west across McKinney Bay and away from the lake. Scenario B projects a similar pattern of seiche wave heights as Scenario A except that wave heights in some areas could be as high as 10 meters.

Scenario C represents an earthquake event along the Genoa Fault Zone (GFZ) 7-10 miles east of the lake shore. This scenario projects minor to moderate uplift (0.25-0.75 meter) to the southwest of the lake. Scenario C produces waves with average heights of 0.5 meters, indicating that magnitude 7 earthquakes along faults outside of the lake are not likely to create a large seiche event.

Extent:

The overall magnitude and potential severity of impacts from a seiche is considered **Medium** in Washoe County. Less severe seiche events could be handled at the city level, disrupt services for 1 to 3 days, and have minor economic impacts on a countywide scale.

Considering a worst case scenario, a seiche event could require state level support, could impact critical facilities and disrupt services for 4 to 7 days, and have statewide economic impacts.

Probability of Future Events:

Based on the frequency of seiche occurrences in Lake Tahoe, probability of future flooding events is **Very Low**, with less than 0.1 percent chance of occurrence in a given year.

Planning Significance:

Seiches are triggered by naturally occurring phenomenon. Effective mitigation efforts are based on planning methods. Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **Low.**

5.3.4 Flood

Planning Significance:	
100 and 500 –year Events	High
Flash Flood	High
Dam/Levee Failure	High

5.3.4.1 Nature

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Certain health hazards are also common to flood events. Standing water and wet materials in structures can become breeding grounds for microorganisms such as bacteria, mold and viruses. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts.

This section will be broken into the following 3 flooding subcategories: **100 and 500-year event**, **flash flooding** and **dam/levee failure** flooding. Each of these hazards will be profiled separately with the following criteria: area affected magnitude, frequency, and planning significance. Previous occurrences of 100-year flood and flash flooding are included in **Table 14;** the similarities and cross-over between 100-year and flash flooding lends itself to keeping previous occurrences table together. Previous occurrences of dam/levee failure are also included in that section. It is important to note that each of the types of flooding can result in a 100-year event, 500-year event or a flash flood. For example, a flash flood can reach the level of the 100-year flood event in a limited area, or a 100-year event can create the 'nuisance flooding' typical of a flash flood.

100-year Floods generally occur as a result of two types of storm events: 1) heavy, prolonged rainfall on top of a deep snowpack in the Sierra, 2) heavy, prolonged rainfall that spills-over into the normally rain-shadowed Reno/Sparks area. Sometimes it's a hybrid of the two types. 100-year floods occur in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. Truckee River flooding, in particular, has been of primary concern to the Reno/Sparks metropolitan area for decades. Intense storms can overwhelm the local waterways as well as the integrity of flood control structures. The warning time associated with slow rise floods assists in life and property protection. The 100-year flood is defined as a flood that has a 1% chance of being equaled or exceeded in any single year. The onset and duration of such a flood may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation, both in intensity and distribution, soil moisture content, seasonal variation in vegetation, pre-existing snow depth, and water-resistance of the surface areas due to urbanization. The **500-year flood** is a larger event; it is defined as a flood that has a 0.2% chance of being equaled or exceeded in any single year.

The Truckee River is associated with a history of flooding in the Truckee Meadows. According to the Regional Water Planning Commission's Regional Floodplain Management Strategy, a major flood has occurred on the average of once every decade during this century. Because of the rapid population growth in Washoe County, the damage from each flood to property and

disruption of lives and the local economy has increased dramatically. Future floods threaten to cause even greater damage.

Realizing that effective flood damage reduction requires coordinated and cooperative efforts, the Truckee River Flood Management Project was established as a joint effort between the cities of Reno and Sparks, Washoe County, the U.S. Army Corps of Engineers, and numerous stakeholders. Their mission is to reduce the impact of flooding in the Truckee Meadows, restore the Truckee River ecosystem, and improve recreational opportunities by managing the development and implementation of the Truckee River Flood Control.

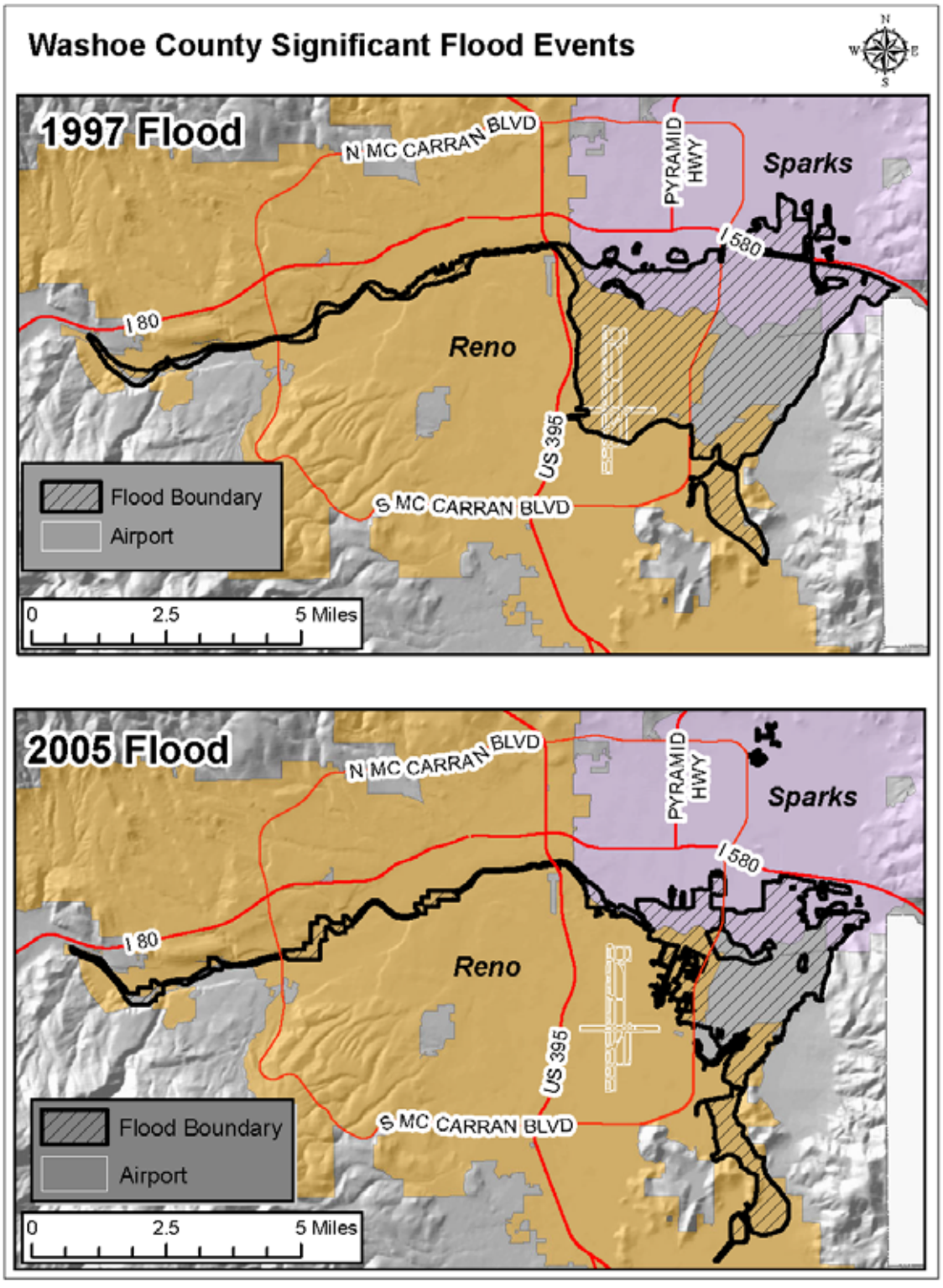
Flash Flooding describes a flood of great volume and short duration. Flash floods often fall short of a 100 or 500-year flood, and generally create impacts associated with storm-water runoff. In contrast to riverine flooding, this type of flood usually results from a heavy rainfall on a relatively small drainage area, and usually occurs in the spring and summer from thunderstorms. It is important to note that even in drought, scattered summer thunderstorms can bring excessive rainfall and flash flooding, particularly near wildfire burn scars that enhance water runoff. These kinds of floods produce debris flows, large amounts of water runoff laden with burn debris and mud. This has been seen in Washoe County, such as near Reno after the Hawken Fire of 2007. Urban flood events result as land loses its ability to absorb rainfall as it is converted from fields or woodlands to roads, buildings, and parking lots. Urbanization increases runoff two to six times over what would occur on undeveloped terrain. During periods of urban flooding, streets can become swift moving rivers. Flash floods often require immediate evacuation within the hour.

Also of concern are flooding on Truckee River tributaries, alluvial fan flooding, sheet flooding, and lake/playa flooding. As a flash flood rushes out of a confined canyon at the top of a fan, it's contained for a short distance in a single high-velocity channel. This channel, like the ravine upstream, is a high hazard flood zone, threatening lives and structures in its path. In areas where the channel is not deeply entrenched, it can become clogged with debris not far below the apex, and cut a new path on the convex surface of the fan. This makes alluvial fan flooding much less predictable than valley bottom flooding. Where canyons are close together, their fans tend to merge. These fans are sometimes hard to recognize because they're not always cone shaped. Sheet flooding is the broad, relatively unconfined down slope movement of water across sloping terrain that results from many sources, including intense rainfall and/or snowmelt, overflow from a channel that crosses a drainage divide, and overflow from a perched channel onto deltas or plains of lower elevation. Generally, it enters a channel or drainage system that intersects its flow, but occasionally it dissipates before reaching a channel. Sheet runoff is typical in areas of low topographic relief and poorly established drainage systems. Lake and playa flooding is due to water levels that gradually increase over a period of time, maybe even years. Elevated groundwater levels may also be a consideration in these areas, with the potential to negatively impact the operation of septic tanks and cause the premature failure of roadbed materials.

The ultimate cause of flooding is almost always attributed to excessive rainfall, either in the flood area or upstream reaches of the watershed. Though most winter storms bring snow to elevations above 6,000 feet, a series of unusually warm storms called Atmospheric Rivers or Pineapple Express occasionally dumps rain at much higher elevations, sometimes up to 9,000 feet. The January 1997 floods (details to follow in Previous Occurrences section) were caused by several of these warm storms, producing prolonged and excessive rain onto a heavy snow pack. On the other hand the December 2005 floods (later detailed) were primarily caused by prolonged and excessive spillover rain into the normally rain-shadowed Reno/Sparks area,

impacting both the Truckee River and Steamboat Creek drainages. Other causes of major river floods include dam or levee failure, downstream conditions such as channel restriction, blockages of waterways and/or high flow of a confluence stream that can result in what is known as backwater flooding. **Figure 5-19** below illustrates the extents of the 1997 and 2005 flood on the County.

Figure 5-19: Washoe County Significant Flood Events



Source: Washoe County GIS

The onset of flooding varies depending on the cause and type, with flash flooding and dam/levee failure inundation occurring typically with little or no warning time, whereas flooding caused by long periods of excessive rainfall tend to have longer durations but more gradual onset. The duration of flood conditions is generally less than one week, but in exceptional cases can extend significantly longer.

Watershed Geography

Washoe County sits along the eastern slopes of the Sierra Nevada Mountains in western Nevada. It is important to identify and describe the watersheds as part of a flooding profile, as they are the geographic unit of area that drains to a common waterway, such as a stream, or lake. The county crosses 15 watersheds. The most important of the watersheds, from south to north, are Lake Tahoe, Truckee, Pyramid-Winnemucca Lakes, Smoke Creek Desert, Lower Quinn, Massacre Lake, and Thousand-Virgin (along the northern Oregon Boarder).

The Lake Tahoe Watershed is among the most significant watersheds, as it hosts the headwaters of the Truckee River, a major river that drains the high Serra Nevada south of Lake Tahoe, emptying into Pyramid Lake in the Great Basin. It flows generally northwest through the mountains to Truckee, California, then turns sharply to the east and flows into Nevada, through the Truckee Watershed, past Reno and Sparks and along the northern end of the Carson Range. At Fernley it turns north, flowing along the east side of the Pah Rah Range in the Pyramid-Winnemucca Lakes Watershed, and entering the southern end of Pyramid Lake.

North of the Truckee River Basin and Pyramid Lake are the Smoke Creek Desert, Lower Quinn, Massacre Lake and Thousand-Virgin Watersheds. This region hosts a desert climate and its physical geography is of low lying mountains and small lakes, some dry. Northern Washoe County is along the western edge of Black Rock Desert. There is very little population in northern Washoe County as compared to the southern half of the county.

5.3.4.2 History

This section describes previous occurrences of the 100 and 500-year events, flash floods and one levee failure event.

According to data from the National Climatic Data Center (NCDC), there were 23 flooding events in Washoe County from 1950-2014. The most severe flood over this period was in 1997, resulting in two fatalities and 50 injuries when the Truckee River overflowed its banks on New Year's Day. On New Year's Eve 2005 another severe flooding event impacted the planning area, causing over $6 million in estimated damages. **Table 5-11**, below outlines previous occurrences of flooding in Washoe County during this time.

Heavy precipitation is the primary cause of flooding in Washoe County. The events listed in **Table 5-11** resulted in over 650 million dollars in physical damage.

Table 5-11: Previous Flooding Occurrences, Washoe County 1995-2014

Location or County	Date	Type	Estimated Damage ($)*
Washoe County	1/10/1995	Flash Flood	Not reported
Multi-County Region	6/6/1995	Flood	$ 200,000
West-Central Nevada	6/18/1995	Flood	Not reported
Northwest Nevada	7/1/1995	Flood	$ 1,000
Multi-County Region	8/22/1995	Flash Flood	$ 1,000
Multi-County Region	1/1/1997	Flood	$ 640,000,000
Reno	1/25/1997	Flood	Not reported
Sparks	9/5/1998	Flood	Not reported
Reno	9/5/1998	Flood	Not reported
Sparks	7/31/1999	Flood	Not reported
Southwest Portion	6/21/2002	Flash Flood	$ 10,000,000
Reno-Tahoe Int'l Airport	8/2/2002	Flood	Not reported
Southeast Portion	7/23/2003	Flash Flood	Not reported
South Central Portion	8/2/2003	Flash Flood	Not reported
Southeast Portion	8/4/2003	Flash Flood	Not reported
Reno	7/21/2004	Flash Flood	Not reported
Sparks	6/24/2005	Flash Flood	Not reported
Sparks	7/21/2005	Flash Flood	$ 5,000
Reno-Tahoe Int'l Airport	7/29/2005	Flash Flood	Not reported
Multi-County Region	12/31/2005-1/1/2006	Flood	$ 6,223,000
Lockwood	7/21/2006	Flash Flood	Not reported
Lockwood	6/2/2007	Flash Flood	$ 10,000
Black Springs	7/14/2008	Flash Flood	$ 5,000
Palomino Valley	7/21/2008	Flash Flood	$ 20,000
Sutcliffe	6/6/2011	Flood	Not reported
Gerlach	6/10/2013	Flash Flood	$ 10,000
Nixon	6/10/2013	Flash Flood	$ 500,000
Reno-Tahoe Int'l Airport	7/20/2014	Flash Flood	Not reported
Totals:			$ 656,975,000

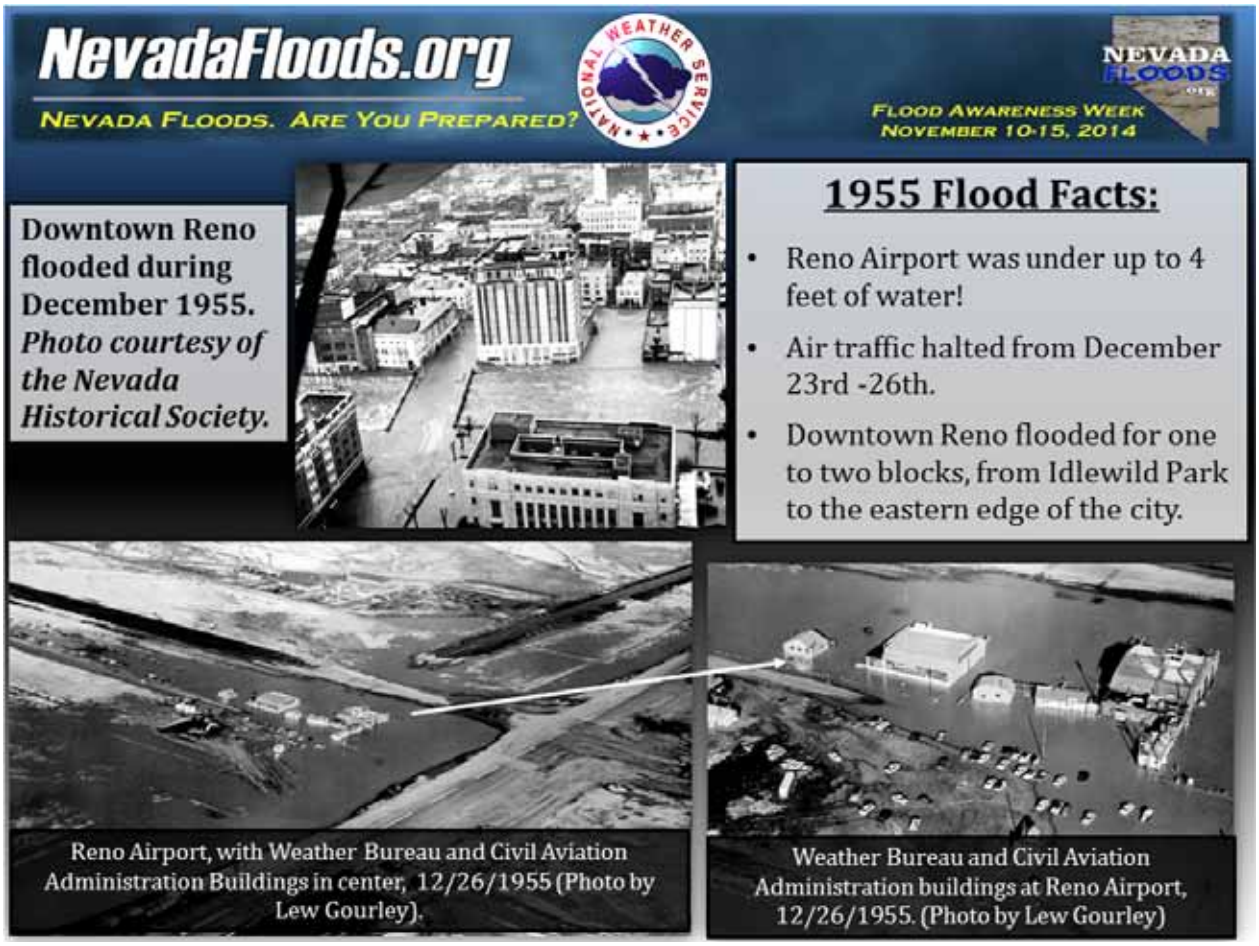
Source: National Climatic Data Center, http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms
Notes: Dates of flooding events are approximate and may indicate multiple occurrences for a single period of flooding. Estimated Damage may reflect totals for multiple counties.

The following details on selected flood events were provided by the NCDC, the Regional Water Planning Commission, and the *State of Nevada Enhanced Hazard Mitigation Plan*.

Flooding Event Summaries:

- **July 1869**: A cloudburst flood resulted from a heavy thunderstorm. Intense rain accompanied by hail resulted in flooding two feet deep from Browns School to Huffaker School in the southern Truckee Meadows.
- **August 15, 1878**: Torrential rain (a "monster cloudburst") fell for 3 hours on watersheds southwest of Reno. Thomas Creek turned into a raging torrent 400 feet wide and three feet deep, gouging its channel to bedrock in many locations.
- **March 16-20, 1907- Multi-County Region:** A series of snow and rain events caused rapid snow melt to flood The Truckee, Carson and Walker River systems. The flooding event "severely damaged" the Electric Light Company Bridge in Reno.
- **July 18-26, 1913**: An almost daily occurrence of thunderstorms produced flooding from canyons draining into the Truckee River west of Reno. The most severely affected streams were Hunter Creek and Alum Creek. Galena and Browns Creek poured a "solid sheet of water" into Pleasant Valley. An automobile mired on the highway was buried under a 30-foot thick deposit of flood debris.
- **July 1927- Multi-County Region**: A 2 inch per hour rainfall event resulted in the failure of the Grass Lake Irrigation Reservoir. This failure caused widespread downstream flooding.
- **November 13-December 8, 1950- Multi-County Region:** Unseasonably high temperatures along with rain events mixed with the rapid melting existing snow pack in the Sierra Nevada caused a large discharge of flood water to invade urban areas of Reno and Sparks along with agricultural lands throughout eastern Truckee Meadows. 2.2 million dollars were estimated in Reno area damages and 2 deaths were reported for all of the affected areas.
- **July 29, 1952- Pleasant Valley**: Floodwater from Galena Creek inundated hayfields in Pleasant Valley and deposited a thick layer of silt and sediment, damaging or destroying most of the baled hay in the fields. Highway 395 was blocked, and miles of fence and irrigation ditches were destroyed.
- **December 1955:** The December 1955 flood resulted from a period of heavy rain in the Sierra and western Nevada from December 21st through the 23rd that followed a week of heavy snows in the Sierra. Melted precipitation amounted to 10-20 inches in the headwaters of many river basins. Snow levels rose above 9000 feet and produced an additional 15 inches of snow melt. The flood of 1955 ranks as the greatest flood on record in the Truckee River Basin in terms of the flow of water through the rivers. A sample of the effects of this flood event can be seen in **Figure 5-20** below.

Figure 5-20: Images from the December 1955 Truckee River Flood in Reno/Sparks



Source: NevadaFloods.org (Nevada Flood Awareness Week website)

- **December, 1955- Multi-County Region**: A late December rain storm produced 13 inches of snow melting rain to flood the Reno/Sparks area. Flooding reached beyond the areas along the Truckee River. Damaged were estimated at almost 4 million dollars along with one fatality.
- **July 20, 1956- Multi-County Region**: A wall of water, reportedly 10 feet high, rushed down Galena Creek, washing several cars off the Mount Rose Highway. Peak flow on the stream gage at Galena Creek near Steamboat was recorded as 4,730 cubic feet per second (cfs). A mother and two children tragically perished in this flood. A fourth victim died while trying to rescue the family. The same convective storm that deluged Galena Creek dumped heavy rains on Peavine Mountain, causing the most disastrous flood ever seen on the mountain's barren south slopes. The waters ravaged homes, yards and streets in northwest Reno, and flooded business establishments in the northwest part of downtown Reno.
- **January 28 – February 1, 1963- Multi-County Region:** 13 inches of precipitation fell at the end of January. Water flooded 20 square blocks of downtown Reno with up to 4 feet of water along with the Reno Tahoe International Airport. The damages for all of the areas affected by the storm estimated at 3.3 million.

- **December 21-23 1964- Multi-County Region:** Rain on snow events during this period caused widespread flooding in the Truckee and Carson River Basins. Estimated damages totaled 2.2 million.
- **August 15, 1965- Multi-County Region**: An intense summer thunderstorm caused significant flooding in the southwest drainages. Extensive development of homes in lower Galena Creek in Pleasant Valley suffered flood damage from the middle to lower portions of the valley. Highway 395 in Pleasant Valley was closed to traffic for three hours by a 300-foot wide, 5-foot tall wall of water, mud, rocks and debris. A 2,000 foot stretch of the Mount Rose Highway was also blocked by flood debris. Whites Creek produced flood flows that reached a peak of 2,280 cfs, and the flow at Galena Creek near Steamboat peaked at 3,670 cfs. The storm that caused this flood was also responsible for disastrous flooding in Incline Village.
- **July 16, 1971- Hidden Valley**: A flash flood occurring in the east foothills of Hidden Valley caused considerable property damage, but no injuries.
- **May 30, 1983- Ophir Creek, Washoe Valley**: A Slide Mountain landslide fell into Upper Price Lake sending 22 acre feet of water and debris into a crowded campground in the Washoe Valley, killing 1 person, injuring several people, destroying or damaging 5 houses and burying US Highway 395 in debris.
- **February 1986- Multi-County Region**: A 10 day rain event producing up to 30 inches of precipitation in the higher elevations of the Sierra Nevada's caused widespread flooding in the Truckee Meadows and Carson River Basin. Flooding caused the closing of most of the Truckee River bridges in downtown Reno. A combined damage estimate was 12.7 million dollars.
- **January 10, 1995- Washoe County:** State Highway 446 along the west side of Pyramid Lake was washed out due to heavy rainfall.
- **August 22, 1995- Greater Lake Tahoe Area:** Moist unstable air combined with strong afternoon heating to trigger thunderstorms across the Silver State. Strong storms in Elko County dumped 1.23 inches of rain in Clover Valley. Other storms over Mineral, Douglas and Washoe counties produced about an inch of rain in a half hour period. The heavy rains lead to running water over several streets. Across extreme southern Nevada, minor flash flooding in west Las Vegas flooded streets and filled the Oakey detention basin to a depth of five feet. Thunderstorm winds damaged a roof and downed large tree limbs.
- **December 30, 1996-January 1, 1997- Washoe County:** This flood ranks as the most devastating flood on record for the Walker, Carson, Truckee and Susan River Basins to date. Precipitation in December 1996 reached near record levels with many locations receiving 3-5 times their normal precipitation. Much of this fell as snow, followed by a series of warm, wet storms in early January 1997. Snow levels rose as high as 12,000 feet, resulting in the melting of much of the very heavy snow pack below 7000 feet.

  Devastation was immense in Washoe County due to the concentration of businesses and homes along the Truckee River. Damage to 1,420 businesses and homes in the city of Reno was estimated at $200 million. Four major casinos had to close during the climax of the flood. Damages to the Reno Hilton were estimated at $15 million. Damage to parks and recreational facilities along the Truckee River in Washoe County was estimated at $3.2 million. There was extensive damage to the east-west runway and the terminal building of

the Reno-Tahoe International Airport with cost of damage estimated at $32 million. The Sparks industrial park was flooded by six feet of water in some places. Damage to homes and businesses in the city of Sparks was estimated at $300 million. One death occurred in Sparks when a 53 year old man was swept into the Truckee River while driving. Three mudslides closed Highway 43l (Mount Rose Highway) between the Mount Rose Ski area and the 8,9ll foot summit for several days. Interstate 80 near the California border was smothered by a mudslide, closing the area to commuters for a period of time on January 2nd. A part of the westbound lane of Interstate 80 in Sparks was closed for several days when flood waters eroded the south wall of the nearby Helm's Gravel Pit. Heavy flooding on the south side of the interstate forced water to flow in the opposite direction and into the Helm's Gravel Pit, eroding the banks of the pit to a depth exceeding one hundred feet. This caused the nearby westbound lane to collapse. Cost to repair the interstate was near $2.5 million. Finally, U.S. Highway 395 in Washoe Valley was covered by water for two days, closing the main link between Reno and Carson City. Total damage to the Federal Highway System in Washoe County alone was about $5 million. Overall damage to the Federal Highway System in the state of Nevada was estimated over $13 million for this severe flooding event. **Figure 5-21** below shows images of the destruction which occurred during the 1996-1997 event.

Figure 5-21: Images from the January 1997 Truckee River Flood in Reno/Sparks.

Source: NevadaFloods.org (Nevada Flood Awareness Week website)

- **September 5, 1998- Sparks:** 30 minute rainfall resulting in 8 inches of water flowing through Sparks Rib Cook-Off booths along Pyramid Way and Victorian Square. Minor flooding also reported along Rock Blvd, also in Sparks.
- **September 5, 1998- Reno**: 10 minute rainfall in SW Reno: 0.20 inches due to thunderstorm resulting in minor street flooding and ponding on roads.
- **July 31, 1999- Sparks**: Off-duty NWS hydrologist reported heavy rain from thunderstorms caused street flooding in Sparks with water rising over bumpers on cars and up to businesses along the streets. Several streets temporarily closed. No damage or injuries reported.
- **June 21, 2002- Spanish Springs**: Flash flooding struck the Spanish Springs area when an estimated 2 inches of rain fell between 6:20 p.m. and 7:20 p.m. Most flooding occurred on the west side of Spanish Springs valley where heavy rain fell on hills left nearly barren from a recent wildfire. Water nearly two feet deep flooded streets and yards. Landscaping, sidewalks and streets were damaged by floodwaters and debris. Over one-half million dollars in damage occurred at the new Spanish Springs High School where classrooms, hallways, offices, two gymnasiums and an athletic field were damaged by flooding and mud. Total cost of damage was estimated at $1 million.
- **August 2, 2002- Multi County Regional**: Urban Flood near Reno-Tahoe International Airport with monsoonal flow and ample moisture left over from the previous day's storms, several clusters of thunderstorms formed over the region. The most notable cells moved slowly across northern Lyon County, Storey County, and southern Washoe County during the afternoon and early evening hours. At 4:15 pm, the Lyon County Sheriff's Office reported a flash flood with 1 foot of standing water and mud on highway 50 between Dayton and Stagecoach, NV. Just a few minutes later at 4:19 pm, a cluster of storms a little farther north dropped 3/4 inch hail in the northwest section of Reno. The storms continued to redevelop over the next few hours, causing another flood with 1 foot of standing water, this time near the Reno-Tahoe International Airport on Terminal Way between Mill and Plumb St. This was reported by a spotter at 5:05 pm. Heavy downpours from another cluster of storms caused flash flooding in the Virginia City Highlands between 5:00 and 6:00 pm. In just 20 minutes, 1.23 inches of rain fell, washing out roads and delaying the transport of fire equipment.
- **July 23, 2003- Washoe Valley**: Heavy thunderstorm rains cause mud and debris to flow across Eastlake Boulevard in Washoe Valley.
- **August 2, 2003- Spanish Springs**: Nearly three-quarters of an inch of rain fell in the Spanish Springs area in 15 minutes. Minor flash flooding was reported in the area including mud and water across roadways and drainage ditches running full.
- **August 4, 2003- Southeast Washoe County**: The Nevada Highway Patrol reported that a mud and debris flow due to very heavy thunderstorm rain closed Interstate 80 for a time near Derby Dam (between mile markers 33 and 35).
- **July 21, 2004- Palomino Valley**: Flash flooding occurred in Palomino Valley, north of Reno. The main flooding was along Whiskey Springs, Amy, Chieftain, and Pasture View Roads.
- **June 24, 2005- Sparks**: A flash flood in the Sparks and Spanish Springs area was caused by very heavy rainfall. In a period of two hours 1.57 inches of rain fell in Sparks, causing flash

flooding on Sparks Blvd. and at the intersection of Springland Drive and Baring Blvd. in Sparks.

- **July 21, 2005- Sparks**: Heavy rainfall caused flash flooding in the Spanish Springs area of Sparks. A total of 1.19 inches of rain was recorded at the weather observing station at Spanish Springs High School during a period of 30 to 40 minutes. Muddy water and small rocks flowed down streets above Vista Blvd. in Sparks. Cost of damage was estimated at $5,000.
- **July 29, 2005- Reno-Tahoe International Airport**: Flash flooding in Double Diamond area of south Reno. A foot of water covered Terminal Way near the Reno-Tahoe International Airport.
- **December 31, 2005-January 1, 2006 - Northern Nevada Flood:** This flood affected northern Nevada and was declared as Presidential Declaration 1629. Several incidents caused by heavy rain on snow contributed to the damage. One incident was the failure of a levee along Steamboat Creek causing the flooding of the University of Nevada - Reno agricultural farm in east Reno. Around 1,800 animals were evacuated to higher ground, but 344 sheep drowned in the floodwaters. This event also included riverine flooding from the Truckee River in the Industrial Area in east Sparks, with an estimated 900 business reporting damage. Greg Street was impassable in many locations. Some areas near Glendale Avenue were covered with four feet of floodwater. A health hazard was created when raw sewage contaminated floodwaters in the Spice Island Drive area of Sparks. In downtown Reno all bridges across the Truckee River were closed. More flooding also occurred at the base of Mount Rose Highway at its intersection with U.S. Highway 395. The Toll Road area near Steamboat was flooded, and Nevada Highway 341 (Geiger Grade) was closed. The rain-saturated soil caused trees to topple onto power lines in Incline Village. Sierra Pacific Power Company reported that around 3,000 people were without power on December 31st. Cost of damage was estimated at $6.2 million. Flooding continued across western Nevada into early January. However, rivers and streams reached flood stage and then started to recede on January 1st. The entire Truckee River was below flood stage by the evening of the 1st.
- **April 2006- Nixon and Wadsworth:** A localized flood occurred in the Nixon and Wadsworth area causing flooding of homes on the lower plain area and damage to roads and power poles. FEMA arrived on site for property damage evaluation after the Pyramid Lake Paiute Tribe had requested financial aid for damage to their roads and homes.
- **July 21, 2006- Lockwood:** Heavy rainfall caused flash flooding along Interstate 80 between Lockwood and Reno. Nevada Highway Patrol reported 2 feet of standing water on the interstate with only one lane open for traffic.
- **June 2, 2007- Lockwood:** Very heavy rainfall caused flash flooding in the Lockwood area. A Washoe County official reported 8 inches of standing water on roads near Exit 22 on Interstate 80. At other locations in the area up to a foot of water was running across roads. A fire department chief described areas of water as small lakes. Very heavy rainfall caused standing water and flash flooding across portions of far western Nevada. Property and crop damage was estimated at $10,000.
- **February 2008- Nixon:** A flash flood occurred near the Nixon, Nevada Highway 447, in the area of the court and the post office. The flood damaged the northbound lane of the highway

and washed weeds and brush into an irrigation canal, plugging an important culvert along the road. Water entered the courthouse and caused damage to its floor.

- **July 14, 2008- Black Springs:** Heavy rainfall caused flash flooding in Stead. A cooperative weather observer reported that approximately an inch of rain fell between 3 and 4 pm in Stead. Streets were closed due to water and mud on the roads. A skate park and crawl spaces in homes were also flooded. Thunderstorms with locally heavy rainfall occurred across the region. Some areas of flash flooding were reported.
- **July 21, 2008- Palomino Valley:** A National Weather Service hydrologist reported flash flooding across Palomino Valley north of Reno. Approximately 0.75 to 1.50 inches of rain fell over the area between 4 and 5 pm. Over 1 mile of Wilcox Ranch Road south of Basque Oven Road was washed out with much debris covering the road. Some area fences were damaged. Small hail accumulated 2 to 3 inches deep before it was washed away by the heavy rain. Strong supercell thunderstorms produced tornadoes, large hail, and heavy rainfall across western Nevada.
- **June 6, 2011- Sutcliffe:** A rainfall event produced 1 to 1.5 inches of precipitation along the western portions of Nevada. Up to 1 foot of water were reported to inundate local roads.
- **June 10, 2013- Washoe County:** A series of thunderstorms brought heavy rains and high winds to areas of Washoe County. The Spanish Springs area reported street flooding which contributed to the deposit of 1-2 feet deep hail drifts in yards. Highway 447 between Nixon and Gerlach was temporarily closed due to the flood event.
- **July 20, 2014- Reno-Tahoe International Airport:** A series of slow moving intense thunderstorms which resulted in a rapid increase of water near the Reno-Tahoe International Airport. Buildings in the area were threatened by the rising water, and vehicles near the Meadowood Mall were impacted by the high water level.

5.3.4.3 Location, Extent and Probability of Future Events

Location:

The geographic location of flooding is concentrated in the floodway and floodplain of the Truckee River and its tributaries. The Truckee River headwaters are comprised of the Lake Tahoe Basin. The river drains part of the high Sierra Nevada and empties into Pyramid Lake. It is the sole outlet of Lake Tahoe. **Figure B-10 Washoe County Flood Hazard Areas** in **Appendix B**, shows locations of the primary waterways in the planning area and their associated flood hazard areas.

Flash flooding is usually associated with development and urbanization as well as inadequate storm drainage systems. The majority of Washoe County population and urbanization sits in the southern portion of the county, in the Cities of Reno and Sparks and along the I-80 and Hwy 395 corridors. Results of the concentrated development were heavily felt during the 2005 flood events.

Areas affected by alluvial fan flooding and flash flooding include Hidden Valley, Jumbo Grade, Stormy Canyon, Virginia Foothills, Whites Creek and Galena Creek. Some of the most valuable properties in southern Washoe County are constructed in the potential path of alluvial fan flooding in these areas. Where structures have been constructed to provide protection in these areas, they are not adequate to protect against the alluvial fan flooding hazard.

Extent:

The overall magnitude and potential severity of impacts of flooding is considered **High** in Washoe County. More typical flooding events are handled at the county level; disrupt services for 4 to 7 days, and economic impacts are felt at the county level.

The overall magnitude and potential severity of impacts of flash flooding is considered **High** in Washoe County. More typical flooding events are handled at the county level; disrupt services for 4 to 7 days, and economic impacts are felt at the county level.

Probability of Future Events:

According to the magnitude and frequency of the flood events recorded in the NCDC data, the probability of future events is **Very High**, with greater than 36 percent chance of occurrence in any given year. The current state of predictive science allows for a greater heads-up on major river floods than even just 5 or 10 years ago. The large atmospheric river storms that often create floods can be tracked across the Pacific Ocean 5-8 days in advance, with more detailed river forecasts up to 2-4 days in advance. It should be noted that uncertainties in snow level forecasts remain one of the biggest flood prediction challenges and are often of low confidence until 12-24 hours ahead of the storm.

According to NCDC data, there have been roughly 14 occurrences of flash and storm-water floods in a 12 year period of time. This indicates that the probability of future events is **Very High**, with greater than 117 percent chance of occurrence in any given year. The prediction of weather patterns favorable for flash flooding has advanced in recent years, such that a general heads-up can be given 1-3 days in advance. However, due to the localized nature of thunderstorms that create flash floods, the current predictability of specific flash floods is limited to about 15-45 minutes of warning, but is sometimes zero.

Climate Change:

The Washoe County Resiliency Study states that increased warming increases the capacity of the atmosphere to hold moisture, which leads to more water vapor in the atmosphere. Individual storms supplied with increased moisture might produce more intense precipitation events. Further warmer conditions between summer thunderstorms can additionally dry and compact the soil, making it more impervious to heavy rain, increasing the rate of the runoff during flash floods.

Planning Significance:

Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **High.** Washoe County, the City of Reno, and the City of Sparks all have flood response action plans in place.

Dam/Levee Failure

5.3.4.4 Nature

Dam failures involve unintended releases or surges of impounded water resulting in downstream flooding. The high-velocity, debris-laden wall of water released from dam failures results in the potential for human casualties, economic loss, lifeline disruption and environmental damage. Dam failures may involve either the total collapse of a dam, or other hazardous situations such as damaged spillways, overtopping from prolonged rainfall, or unintended consequences from

normal operations. Structural deficiencies from poor initial design or construction, lack of maintenance or repair, or gradual weakening from aging are factors that may also contribute to this hazard. Severe storms with unusually high amounts of rainfall within a drainage basin, earthquakes, or landslides may cause or increase the severity of dam failure.

Levees can fail in a number of ways. The most frequent (and dangerous) form of levee failure is a breach. A levee breaches when a part of the levee actually breaks away, leaving a large opening for water to flood the land protected by the levee. A breach can be a sudden or gradual failure that is caused either by surface erosion or by a subsurface failure of the levee. Similar to dam failure, a levee breach can cause human casualties, economic loss, lifeline disruption and environmental damage. Sometimes levees are said to fail when water overtops the crest of the levee. Levee overtopping can be caused when flood waters simply exceed the lowest crest of the levee system or if high winds begin to generate significant swells in the river water to bring waves crashing over the levee. Overtopping can lead to significant landside erosion of the levee or even be the mechanism for complete breach. Properly built levees are armored or reinforced with rocks or concrete to prevent erosion and failure.

5.3.4.5 History

On December 31, 2005, a levee along Steamboat Creek failed and flooded the University of Nevada - Reno agricultural farm in east Reno. See **Table 5-11 Previous Flooding Occurrences, Washoe County 1950-2014**, and the subsequent event description for more detail. This is the only known event in recent history.

5.3.4.6 Location, Extent and Probability of Future Events

Table 5-12, lists the 39 high hazard dams which pose a potential threat to Washoe County.

Table 5-12: Washoe County High Hazard Dams

Dam Name	Jurisdiction
Asamera Effluent Storage Dam	Storey
Boca	Nevada
Damonte Ranch Detention Pond #4	Washoe
Damonte Ranch Flood Control Diversion	Washoe
Damonte Ranch Flood Detention Basin	Washoe
Damonte Ranch Wetlands Detention Basin	Washoe
D'andrea Ranch Hole #6 Pond	Washoe
Dant Blvd Detention	Washoe
East Wash Diversion	Washoe
Greil Dam	Washoe
Herman Dam	Washoe
Highland Reservoir	Washoe

Dam Name	Jurisdiction
Home Ranch Canyon Dam	Washoe
Hunter Creek Reservoir	Washoe
Incline Lake Dam	Washoe
Marlette Lake Dam	Washoe
Martis	Nevada
Mill Creek No 1	Washoe
Mill Creek No 2	Washoe
North Spanish Springs Flood Detention Facility	Washoe
North Spanish Springs Flood Sediment Basin	Washoe
North Virginia Detention	Washoe
Northgate Golf Course Dam	Washoe
Pagni Dam	Washoe
Peavine Creek Lower Dam	Washoe
Peavine Creek Upper Dam	Washoe
Prosser	Nevada
Rancho Haven Dam #1	Washoe
Sevier Lake	Washoe
Somersett Detention Pond #13	Washoe
Somersett Detention Pond #14	Washoe
Spanish Springs Stormwater Detention Facility	Washoe
Stampede	Sierra
Sun Valley Detention Dam	Washoe
Verdi Meadows Wastewater Disposal Dam	Washoe
Washoe Lake Dam	Washoe
West Wash Dam	Washoe
Wheeler Reservoir Dam	Washoe
Wilcox Canyon Dam #1	Washoe

Source: Washoe County GIS

Hazard designations for dams are assigned based on downstream hazard potential in the event of a dam failure. A high hazard designation is assigned to a dam if there is reasonable potential for loss of life and/or extreme economic loss. A significant hazard designation is assigned to a dam if there is a low potential for loss of life but an appreciable economic loss. Lastly, a low hazard designation is assigned to a dam if there is small potential for loss of life and the economic loss is minor or confined entirely to the dam owner's own property. These hazard designations are initially determined at the time dam design plans are reviewed, however, hazard designations can and do change as downstream conditions alter as a result of development. The hazard designation is not dependent on the type of dam and in no way reflects the safety or condition of the dam. In Nevada, dam inundation maps are required for dams categorized under high and significant hazard. Inundation maps for the dams in the planning area that are rated as high and significant are available upon request and cannot be included in this plan due to the planning area's internal policies.

The Boca, Prosser, and Stampede Dams are located along the Truckee River in California to the southwest of Reno. Although located outside the planning area, failure of any of these dams could result in significant downstream loss of life, property damage and environmental impacts through the City of Reno and surrounding populated areas.

Extent:

In the event of a dam or levee failure, the overall magnitude and potential severity of impacts of flooding is considered **High**, as the state would likely be involved, critical facilities and/or services would likely be lost for 15 to 20 days, and the entire state would be economically affected by the event. Future iterations of this multi-hazard mitigation plan will address the magnitude and impact for this hazard in more detail.

Probability of Future Events:

The probability of future events is **Very Low**; Washoe County has only experienced the one aforementioned levee failure in close to 60 years of recorded history.

Planning Significance:

Dam/levee failure is considered to have **High** planning significance. The hazard itself is difficult to quantify because dams could fail from earthquakes, excessive rainstorms, landslides, or human-induced factors. However the consequences can be severe on a local level.

5.3.5 Infectious Disease

Planning Significance:	Moderate

5.3.5.1 Nature

The Mayo Clinic defines infectious diseases as disorders caused by organisms — such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They're normally harmless or even helpful, but under certain conditions, some organisms may cause disease. Some infectious diseases can be passed from person to person; some are transmitted by bites from insects or animals, and others are acquired by ingesting contaminated food or water or being exposed to organisms in the environment.

Infectious diseases are a continuing threat to all people, regardless of age, gender, lifestyle, ethnic background or socioeconomic status. They cause illness, suffering and even death, and place an enormous financial burden on society. Joshua Lederberg, Nobel laureate once commented "We live in evolutionary competition with microbes – bacteria and viruses. There is no guarantee that we will be the survivors." Although some communicable diseases have been controlled by modern advances, new ones are constantly emerging.

The World Health Organization (WHO) monitors infectious disease conditions and their migration on a global level. In the United States, monitoring of infectious diseases is handled by the Centers for Disease Control and Prevention (CDC). On a statewide level, the Nevada Division of Public and Behavioral Health (DPBH) is the lead agency for the monitoring of infectious diseases. The Washoe County Health District (WCHD) is the lead local agency responsible for prevention, control and treatment of infectious disease within the planning area. Due to the large number of tourists and travelers passing through Washoe County, highly contagious diseases can be easily spread from and to nearby communities. The Washoe County Health District's Communicable Disease Team works in conjunction with the following prevention and control programs: tuberculosis (TB), foodborne illness, sexually transmitted disease (STD), HIV/AIDS, vaccine preventable diseases and vector-borne diseases, and conducts disease surveillance in an effort to:

- Protect the health of the public
- Determine the extent of morbidity within the community
- Evaluate the risk of transmission; and
- Intervene rapidly when appropriate.

Nevada Administrative Code Chapter 441A1 identifies diseases of public health significance that must be reported to the WCHD. Persons required to report include health care providers and directors of hospitals, diagnostic laboratories, schools, child care facilities, correctional facilities, permitted food establishments and others. In general, each report is investigated to characterize the illness, collect demographic information about the case, identify possible sources of the infection and take steps necessary to minimize the risk of further disease transmission. Data are collected, maintained and analyzed at the program level.

5.3.5.2 History

The WCHD relies on healthcare providers, laboratories, and others to report the occurrence of reportable diseases. Without such data, trends cannot be accurately monitored, unusual occurrences of diseases (such as outbreaks) might not be detected or appropriately investigated, and the effectiveness of control and prevention activities cannot be easily evaluated.

For a list of reportable diseases, visit the Washoe County Health District's website via the following link: http://www.washoecounty.us/repository/files/4/Reporting-Chart-2014-10-13.pdf.

While a great number of communicable disease reports are received annually, compilation of communicable disease surveillance data in Washoe County is recognized to have the following limitations:

- For most diseases, reported cases represent a fraction of the true number. This is because many patients with mild disease do not seek medical care. Even if they do, the health care provider may not order a test to identify the causative agent.
- Health care providers may fail to report a case as required by law. For example, CDC estimates that there are as many as 1 million persons in the US who may be sick due to salmonellosis; however, only approximately 50,000 cases of salmonellosis are reported each year in the United States, which represents only 5% of the estimated level of illness.
- Reported cases represent a skewed sample of the total. Severe illnesses are more likely to be reported than milder ones. Health care providers may be more likely to report contagious diseases like TB than vector-borne diseases like Lyme disease.
- Epidemics of disease or media coverage of a particular disease can greatly increase testing and reporting rates.
- With these limitations in mind, surveillance data are valuable in a variety of ways. Analysis of disease incidence by various demographic variables is useful for identifying segments of the population that may be at higher risk of illness allowing public health officials to target prevention and control measures in ways that will have maximum impact. Further, analysis of surveillance data allows for identification of disease trends and may help to detect disease outbreaks or epidemics.

Some previous occurrences of infectious diseases as a human health hazard in Washoe County are listed below:

2009 – H1N1: As a result of the 2009 H1N1 influenza pandemic, the Washoe County Health District activated their Incident Command System and opened points of dispensing (PODs) in 2010.

2013 – Hepatitis A: The Washoe County Health District participated in multi-state disease investigations and disease control activities related to the Costco Hepatitis A associated frozen berry outbreak. The Health District activated its Incident Command System to manage public calls and prophylaxis of individuals who reported consuming the contaminated product.

2014 – Ebola: While no Ebola cases have been confirmed in Washoe County, Nevada, the international Ebola outbreak has increased infectious disease preparedness efforts among multiple agencies in Washoe County. The Washoe County Health District activated its Incident Command System to manage preparedness and planning efforts.

Table 5-13 below provides a list of some of the reportable infectious diseases, and the number of cases of each disease in Washoe County over the past ten years. Following **Table 5-13** are definitions for a sampling of the infectious diseases listed in the table. For a case definition and clinical description of all diseases, please visit the CDC's National Notifiable Diseases Surveillance System website at http://wwwn.cdc.gov/NNDSS/script/ConditionList.aspx?Type=0&Yr=2013.

Table 5-13: Number of Cases of Notifiable Infectious Diseases, 2005-2014, Washoe County

#	Disease	Year									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	AIDS	37	23	31	23	25	9	15	21	22	21
2	Amebiasis	1	2	0	2	0	2	1	2	1	0
3	Anisakiasis	-	-	1	-	0	0	0	0	0	0
4	Babesiosis	-	1	-	-	-	-	-	-	-	-
5	Botulism, foodborne	-	2	-	-	-	-	-	-	-	-
6	Botulism, infant	1	0	0	0	1	0	1	0	0	1
7	Brucellosis	-	-	1	0	0	0	0	0	0	0
8	Campylobacter	36	29	48	37	34	63	41	36	47	44
9	Chlamydia	1202	1276	1520	1340	1243	1426	1478	1603	1675	1849
10	Chikungunya	-	-	-	-	-	-	-	-	-	1
11	Coccidiodides	1	2	3	5	1	1	4	3	4	4
12	Cryptosporidium	6	6	13	7	14	8	11	6	8	10
13	Dengue Fever	2	0	1	0	0	0	1	1	1	0
14	E. coli 0157:H7	3	6	1	0	5	1	1	1	4	1
15	EHEC/STEC	4	3	4	6	9	6	4	3	8	13
16	Ehrlichiosis	-	1	0	0	0	0	0	0	0	0
17	Encephalitis (not otherwise specified)	-	-	2	1	2	1	0	2	0	0
18	Encephalitis, primary	0	0	0	1	0	0	0	0	0	0
19	Giardiasis	27	31	33	25	22	34	19	21	15	12
20	Gonorrhea	318	235	202	213	131	98	213	235	364	509
21	Group A Strep, Invasive	-	-	1	0	1	0	0	0	0	1
22	Group B Strep, Invasive	-	-	-	1	0	-	0	1	1	1
23	Hansen's Disease	1	0	0	0	1	0	0	1	0	0
24	Hantavirus Pulmonary Syndrome	0	1	0	0	0	0	0	0	0	0
25	Hepatitis A	5	4	4	1	3	4	0	2	4	1
26	Hepatitis B	13	5	7	6	4	6	7	6	3	2
27	Hepatitis C	3	2	3	5	4	3	6	6	5	3
28	Hepatitis E	0	0	0	0	0	0	0	0	0	1
29	HIV not AIDS	22	28	29	21	25	21	25	20	26	27

#	Disease	Year									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
30	Hemolytic Uremic Syndrome	0	1	0	1	0	1	0	0	1	0
31	Influenza A	61	66	173	303	2245	102	360	530	758	774
32	Influenza B	11	49	12	316	201	17	261	85	296	156
33	Influenza Type Unk	118	57	116	208	113	13	53	42	60	30
34	Invasive H. flu (not type B)	1	1	4	1	1	1	2	1	2	5
35	Japanese Encephalitis	-	-	-	-	-	1	0	0	0	0
36	Legionellosis	0	1	0	0	1	2	3	0	0	1
37	Listeriosis	2	2	0	0	1	0	1	0	1	0
38	Lyme	1	2	6	8	3	1	1	2	3	0
39	Lyme, Probable	-	-	-	-	3	0	0	0	0	1
40	Lyme, Suspect	-	-	-	1	1	0	0	0	0	0
41	Malaria	1	0	3	1	0	2	2	2	0	2
42	Meningitis Bac Other	7	3	3	1	2	1	0	1	0	4
43	Meningitis Viral	24	27	27	13	13	14	14	10	10	14
44	Meningococcal	5	4	3	3	3	4	3	0	0	0
45	Mumps	0	1	1	3	0	2	1	1	3	0
46	Mumps, Suspect	-	-	-	3	2	0	0	4	5	4
47	Pertussis (confirmed)	14	9	3	6	1	2	2	4	10	29
48	Pertussis (probable)	1	10	4	1	4	9	12	13	12	27
49	Plague-Bubonic	-	1	0	0	0	0	0	0	0	0
50	Invasive Pneumococcal Disease	4	1	40	50	47	44	53	41	57	50
51	Q Fever	0	0	1	0	1	0	0	0	0	0
52	Rabies (Bat)	8	2	3	9	9	4	6	7	2	5
53	Relapsing Fever	2	0	0	1	0	0	1	0	0	1
54	Rocky Mountain Spotted Fever, Probable	-	-	-	-	-	-	2	0	1	0
55	Rotavirus	95	141	50	115	80	13	37	16	20	21
56	RSV	238	310	275	290	278	320	297	206	428	305
57	Salmonellosis	32	36	42	38	45	63	16	27	32	34
58	Shigellosis	10	6	5	5	3	3	1	7	2	5
59	Streptococcal Toxic Shock Syndrome	-	-	1	0	1	0	0	0	1	0
60	Syphilis, early latent	-	-	-	-	-	-	-	5	12	18
61	Syphilis, early, late latent, disease unk.	29	24	13	18	23	13	15	-	-	-
62	Syphilis, LL,DU.	-	-	-	-	-	-	-	14	26	25
63	Syphilis, Neuro	0	0	0	0	0	1	5	2	1	1
64	Syphilis, Pri. & Sec.	5	5	4	4	2	2	8	15	33	36

#	Disease	Year									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
65	Tuberculosis	16	11	6	10	15	12	8	8	9	7
66	Tetanus	-	-	-	-	1	-	-	-	0	0
67	Toxic Shock Syndrome, Staph	-	1	0	0	0	0	0	0	0	0
68	Tularemia	-	-	0	1	0	1	0	0	0	0
69	Tularemia (probable)	-	1	-	-	-	-	-	-	-	-
70	Typhoid Fever	1	0	0	0	3	1	0	0	1	0
71	Vibrio parahaemolyticus	1	0	1	2	-	-	-	-	-	-
72	Vibriosis	-	-	-	-	1	0	2	2	1	1
73	West Nile Fever	1	10	1	0	0	1	-	-	-	-
74	West Nile Non-neuroinvasive	-	-	-	-	-	-	1	0	1	0
75	West Nile Neuroinvasive	0	7	0	0	0	0	0	0	0	1
76	Yersiniosis	1	1	0	0	0	1	2	2	1	0
Total		2371	2447	2701	3106	4628	2334	2995	3017	3977	4058

Source: Washoe County Health District

Definitions of Selected Infectious Reportable Diseases

Again, for a case definition and clinical description of all diseases, please visit the CDC's National Notifiable Diseases Surveillance System website at http://wwwn.cdc.gov/NNDSS/script/ConditionList.aspx?Type=0&Yr=2013.

Campylobacter - Campylobacter is the most common bacterial cause of diarrheal illness in the United States. Campylobacteriosis usually occurs in single, sporadic cases, but it can also occur in outbreaks. Campylobacteriosis is most commonly associated with handling raw poultry or eating raw or undercooked poultry.

Chlamydia - Chlamydia trachomatis is the most frequently reported infectious disease in the United States. Pelvic inflammatory disease (PID) caused by Chlamydia is a major cause of infertility, ectopic pregnancy, and chronic pelvic pain. Pregnant women with Chlamydia can transmit the infection to their infants during delivery, causing neonatal ophthalmia and pneumonia.

Cryptosporidium - Cryptosporidiosis is a diarrheal disease transmitted via the fecal/oral route and is caused by the parasite, Cryptosporidium parvum. It is found in the intestines of humans and animals and is passed in the stool into the environment. The parasite is protected by an outer shell, survives outside the body for long periods of time, and is very resistant to chlorine disinfection. During the past two decades, Cryptosporidium has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. Cryptosporidium is found in every region of the United States and throughout the world.

Ebola Virus Disease – Ebola Virus Disease, previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the Ebola virus strains. Ebola can cause disease in humans and non-human primates (monkeys, gorillas, and chimpanzees). The natural reservoir host of Ebola virus remains unknown. However, researchers believe the virus is

animal-borne and that bats are the most likely reservoir. Four of the five virus strains occur in an animal native to Africa.

Giardiasis - Giardiasis is a diarrheal illness transmitted via the fecal/oral route and caused by a one-celled parasite, Giardia lamblia. Giardia lives in the intestines of people and animals. The parasite is passed in the stool of an infected person or animal. It is protected by an outer shell that allows it to survive outside the body and in the environment for long periods of time. Giardia is found in every region of the United States and throughout the world. During the past two decades, Giardia has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. It is also easily transmitted person-to-person and is a common cause of diarrhea in child care settings.

Hansen's Disease - Hansen's Disease (aka Leprosy) is a chronic bacterial disease of the skin, peripheral nerves and upper airway caused by Mycobacterium leprae.

Hepatitis - "Hepatitis" is a general term for inflammatory conditions of the liver. It is characterized by jaundice, hepatomegaly, anorexia, abdominal and gastric discomfort, abnormal liver function, clay-colored stools and dark urine. It may be mild and brief, or severe, fulminate and life threatening. Hepatitis may be caused by: bacterial or viral infection, parasitic infestation, alcohol and/or drug abuse, chemical or biological toxins or transfusion of incompatible blood.

Influenza Pandemic (example: H1N1) – An influenza pandemic can occur when a non-human (novel) influenza virus gains the ability for efficient and sustained human-to-human transmission and then spreads globally. H1N1 was first detected in people in the United States in April 2009. This virus was a unique combination of influenza virus genes never previously identified in either animals or people.

Listeriosis - Listeriosis is a serious infection caused by eating food contaminated with the bacterium Listeria monocytogenes. In the United States, an estimated 2,500 persons become seriously ill with listeriosis each year. Approximately 20% of these infections are fatal.

Malaria - Malaria is caused by infection with any of four species of the protozoan parasite Plasmodium (i.e., P. falciparum, P. vivax, P. ovale, P. malariae). The Plasmodium parasite is transmitted by the bite of an infected Anopheline mosquito. Until the 1940s, malaria was endemic in the United States. Anopheles mosquitoes are present in the Truckee Meadows, although most likely not in dense enough numbers for the transmission of malaria.

Plague - Plague, caused by the bacterium *Yersinia pestis*, is endemic in most of the western United States. It is associated with rodents and their fleas. When outbreaks occur in rodent populations, many rodents die and their fleas look for blood meals elsewhere. People living in or visiting areas where there has been a rodent "die off" (epizootic) are at increased risk for contracting plague. Humans usually become infected from being bitten by infected rodent fleas.

Rabies - Rabies in humans is a rare occurrence in the United States with an average of less than 5 cases per year. Worldwide, an estimated 30,000 to 50,000 deaths are due to rabies each year. In the U.S., rabies in domestic animals such as dogs, cats and cattle has declined dramatically since the 1950s. This decrease is mainly due to rabies vaccination programs and stray animal control by animal control agencies.

Relapsing Fever - Relapsing fever is caused by several species of spirochetes in the genus Borrelia. In tick-borne relapsing fever (TBRF) the pathogen is transmitted to humans via ticks in the family Argasidae. Rodents are the reservoirs for relapsing fever in North America. Locally, TBRF is caused by Borrelia hermsii and is seen occasionally in the Lake Tahoe basin. The tick

vector is Ornithodoros hermsi. Outbreaks occur occasionally in limited areas of the western U.S. and Canada. Relapsing fever is reportable in Nevada but not nationally.

RSV - Respiratory syncytial virus (RSV) is the most common cause of bronchiolitis and pneumonia among infants and children. Most children will have serologic evidence of RSV infection by 2 years of age. RSV also causes repeated infections throughout life, usually associated with moderate to severe cold-like symptoms. Severe lower respiratory tract disease may occur at any age, especially among the elderly or among those with compromised cardiac, pulmonary or immune systems. In temperate climates, RSV infections usually occur during annual community outbreaks, and often last four to six months during the late fall, winter or early spring months. The timing and severity of outbreaks in a community vary from year to year.

Salmonellosis - Salmonellosis is a bacterial infection that is transmitted among people and/or animals via the fecal-oral route. Although foods of animal origin are one source of Salmonella, transmission through fresh produce and direct contact has been increasingly recognized. Salmonellosis is one of the most frequently reported foodborne illnesses in the United States. Over 40,000 cases of salmonellosis are reported nationally every year.

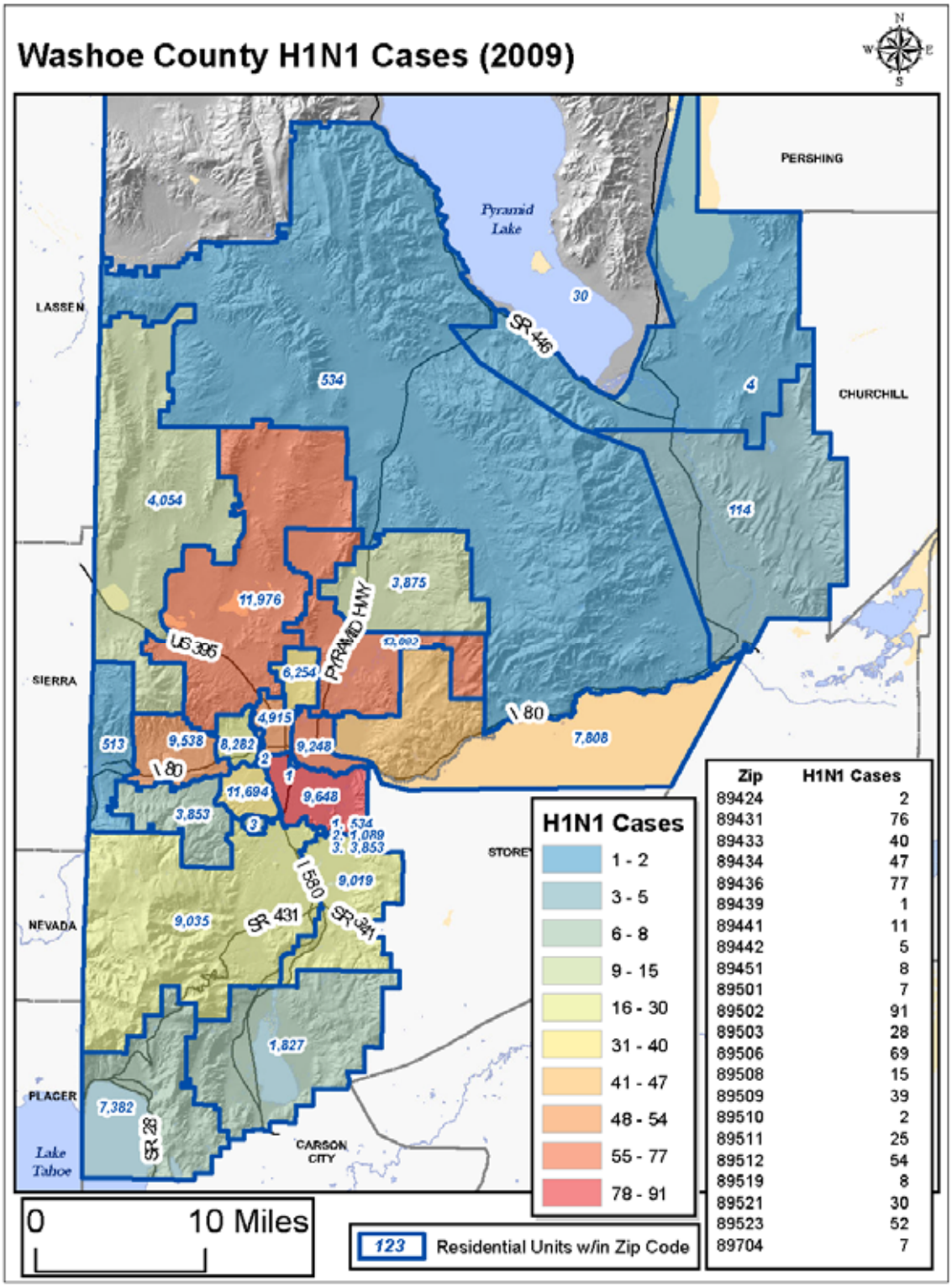
5.3.5.3 Location, Extent, and Probability of Future Events

Location:

Infectious diseases spread by humans, and vector-borne infectious diseases can occur in both urban and non-urban areas. However, infectious diseases that are spread by humans, such as influenza, are typically more prevalent in urban areas, particularly in cities that host large numbers of tourists and travelers. Vector-borne infectious diseases, such as West Nile Virus, are typically more prevalent in non-urban areas where humans would encounter the vector. **Figure 5-22** shows the geographic distribution of H1N1 incidents in Washoe County for laboratory confirmed H1N1 cases. Because only laboratory confirmed cases of H1N1 are shown in the map below, statistical significance of occurrence of the virus cannot be determined by zip code. However, the map does provide a picture of those zip codes that were most likely hardest hit by the pandemic.

Determining statistical significance of influenza for a particular year, or when trying to compare data for more than one year, is difficult due to a number of variables. Some variables include: the percentage of people who receive influenza vaccine within Washoe County changes from year to year; not all providers confirm an influenza diagnosis via a lab test; healthcare professionals may not report all suspected or confirmed cases of influenza to the Washoe County Health District; the number of cases can be dependent upon the severity of the flu for any given year; and, effectiveness of the vaccine can differ from year to year.

Figure 5-22: H1N1, Washoe County



Source: Washoe County GIS

Extent:

The overall magnitude and potential severity of impacts of human health hazard is considered **Moderate** in Washoe County. Typical biological infection outbreaks are handled at the city or county level, disrupt services for up to two weeks, and economic impacts can be felt at the county level.

In addition to the obvious threat to public health and safety, an infectious disease outbreak within the planning area of Washoe County is capable of overwhelming local response and treatment capabilities. Both actual and potential infectious disease outbreaks in recent years have reinforced our knowledge in this area.

Probability of Future Events:

Human health hazards involving either limited or extensive outbreaks occur annually in Washoe County. The severity of these biological infection occurrences is highly variable. Monitoring and containing these occurrences requires the constant vigilance of County and State public health authorities.

Based on recurrence interval of previous human health events and definitions set forth in the risk assessment methodology, probability of future occurrence is **Very High**.

Climate Change:

According to the Regional Resilience Study, temperature dependencies are seen in correlations between disease rates and weather variations over weeks, months or years and in close geographic associations between key climate variables and the distributions of important vector-borne diseases. These temperature dependencies can impact both humans and livestock. Temperature has also been found to affect food-borne infectious diseases.

Planning Significance:

Biological infections are a naturally occurring phenomenon but the severity of outbreaks is often determined by human actions. Effective mitigation efforts are based on planning methods. Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **Moderate.**

5.3.6 Severe Weather

Planning Significance	
Extreme Heat	Moderate
Hailstorms	Low
Severe Seasonal Storms	Moderate
Tornados	Low
Windstorms	Moderate

5.3.6.1 Nature

Severe weather related events pose some measure of risk to public safety, property or infrastructure and/or disrupt transportation or commerce. Included in this definition are **extreme heat**, **hailstorms**, **severe seasonal storms** (including thunderstorms, snow storms, extreme cold temperatures), **tornados**, and **windstorms**.

Extreme Heat

Extreme heat can have severe impacts on human health and mortality, natural ecosystems, and agriculture and other economic sectors. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 to 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. According to the NWS, among natural hazards, only the cold of winter – not lightning, hurricanes, tornadoes, floods, or earthquakes – takes a greater toll. Extreme cold temperatures are discussed in the Severe Winter Storms hazard description.

Extreme heat pushes the human body and the environment beyond its limits. Evaporation is slowed and the body must work extra hard to maintain a normal temperature. Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

Conditions that can induce heat-related illness include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."

Hailstorms

A hailstorm precipitates chunks of ice and usually occurs during thunderstorms. Hailstones usually consist mostly of water ice and measure between 5 and 150 millimeters in diameter. Hail forms in strong thunderstorm clouds, particularly those with intense updrafts, high liquid water content, great vertical extent, large water droplets, and where a good portion of the cloud layer is below freezing 0°C (32°F).

Seasonal Storms

Winter storms can bring heavy rain or snow, high winds, extreme cold, and ice storms. In Nevada, winter storms begin with cyclonic weather systems in the North Pacific Ocean or the Aleutian Islands that can cause massive low-pressure storm systems to sweep across the western states. Winter storms plunge southward from artic regions and drop heavy amounts of snow and ice. The severity of winter storms is generally minor. However, a heavy accumulation of ice can create hazardous conditions. A large winter storm event can also cause exceptionally high rainfall that persists for days, resulting in heavy flooding. Extreme cold temperatures often accompany severe winter storms in Washoe County.

Thunderstorms are formed from a combination of moisture, rapidly rising warm air, and a force capable of lifting air, such as warm and cold fronts or a mountain. A thunderstorm can produce lightning, thunder, and rainfall that may also lead to the formation of tornados, hail, downbursts, and micro-bursts of wind. Thunderstorms may occur singly, in clusters, or in lines. As a result, it is possible for several thunderstorms to affect one location in the course of a few hours. A tornado can be defined as a rapidly rotating column of air extending from the base of a thunderstorm to the ground.

Lightning occurs when the rising and descending motion of air within clouds produces a separation of positively and negatively charged particles. This separation produces an enormous electrical potential both within the cloud and between the cloud and the ground. Lightning results as the energy between the positive and negative charge areas is discharged. As the lightning channel moves through the atmosphere, heat is generated by the electrical discharge to the order of 20,000 degrees (three times the temperature of the sun). This heat compresses the surrounding clear air, producing a shock wave that decays to an acoustic wave as it moves away from the lightning channel, resulting in thunder.

Tornadoes

A tornado is a violent, rotating column of air which is in contact with both the surface of the earth and a cumulonimbus cloud. Tornadoes come in many sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a cloud of debris. Most tornadoes have wind speeds between 40 mph and 110 mph, are approximately 250 feet across, and travel a few miles before dissipating. Some attain wind speeds of more than 300 mph, stretch more than a mile across, and stay on the ground for dozens of miles.

Windstorms

A windstorm is a severe weather condition that is sometimes indicated by high winds with little or no rain. High winds can also accompany thunderstorms and can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Winds greater than 40 to 60 mph are generally considered high. Winds that exceed 100 mph, and can overturn mobile homes, tear roofs off of houses, topple trees, snap power lines, shatter windows, and sandblast paint from cars. Other associated hazards include utility outages, arcing power lines, debris blocking streets and dust storms.

Windstorms can often increase the wildland fire potential of an area; see Section 5.3.8 Wildfire profile for a description of red flag warnings associated with high winds.

5.3.6.2 History

The following summary of information was derived from NOAA's National Climatic Data Center, as well as the 2013 Nevada Enhanced Hazard Mitigation Plan. Data for the 2013 Nevada Hazard Mitigation Plan was provided by the Nevada Climate Office and derived from the National Climate Data Center's website under the direction of Dr. Jeff Underwood.

Extreme Heat

Daytime maximum temperatures were analyzed to determine the threat heat can pose. The number of days that reached or exceeded 100° from 1984 through 2014 were also calculated. Within Washoe County four representative stations were selected; Reno-Tahoe International Airport, Stead, Sutcliffe, and Gerlach. The average in Washoe County ranges from zero per year at higher elevation sites such as Incline Village to 6 in the Black Rock Desert at Gerlach. A summary of four key stations follows:

- Reno-Tahoe International Airport = 4 days/year on average, maximum 12 in 2013
- Stead = 1 day/year on average, maximum 7 in 2013
- Sutcliffe = 1 day /year on average, maximum 2 in 2005
- Gerlach = 6 days/year on average, maximum 23 in 2009

Heatwaves of three consecutive days or longer are not uncommon in Washoe County. Based on data for Reno since 1893, there have been 37 heatwaves of 3 days or longer where high temperatures were equal to or exceeded 100°F. The longest took place in 2005, lasting 10 days through July 21.

Hailstorms

The NOAA National Climatic Data Center has records of 26 large hail events in Washoe County since 1950. These events have recorded hail from 0.75 inches to 1.75 inches. There have not been any deaths or injuries associated with these recorded hail events or any reportable damages.

Seasonal Storms

Thunderstorm

The NOAA National Climatic Data Center has records of 41 thunderstorm events in Washoe County since 1950. These events included one death and two injuries and a total of $16,000 in reportable damages.

The 2013 Nevada Enhanced Hazard Mitigation Plan reports that within Washoe County there are two weather stations available that reported thunderstorm events during the time frame of 1943 - 2006. The reporting stations were Reno AP and Stead AFB, with Reno being the only one to have a complete record for the entire time span. These events were recorded hourly, so some days could have several readings for thunderstorm activity. A summary of the two stations events by type break down as follows:

- Dry Thunderstorms – 679
- Thunderstorms w/o Hail – 514
- Normal Thunderstorms – 27

- Heavy Thunderstorms w/o Hail – 3
- Total Hourly recordings - 1223

The majority of these observations were made at the Reno AP station. These numbers equate to nearly 20 thunderstorms per year, with roughly 56% being reported as dry thunderstorms which are a great concern for fire ignition.

Figure 5-23: Thunderstorm over Incline (June 4, 2013)

Source: Chris Smallcomb, National Weather Service – Reno

Precipitation Extremes (Snow)

The NOAA National Climatic Data Center has records of 167 days of heavy snow events in Washoe County since 1950. These events included one death and three injuries and a total of $80,000 in reportable damages.

The 2013 Nevada Enhanced Hazard Mitigation Plan reports that in order to qualify as an 'extreme' event the snowfall had to be above the 15th percentile of overall snowfall at that particular station. Washoe County is a thin, long county stretching from Lake Tahoe to Oregon. The range of extreme snowfall events was wide, from a high of 5.91 inches of liquid equivalent snowfall at Marlette Lake to a low of 0.20 inches in Empire. The average value at the 15th

percentile was 1.98 inches in one day. The summary of the snowfall events above the 15th percentile follow:

- Stead - Days > 15th = 60; Freq = 2.85 days/year
- Reno AP- Days > 15th = 189; Freq = 2.82 days/year
- Marlette Lake - Days > 15th = 55; Freq = 2.35 days/year
- Empire - Days > 15th = 36; Freq = 4.24 days/year

Lightning

The NOAA National Climatic Data Center has records of 5 lightning events in Washoe County since 1950. There have not been any deaths or reportable damages; however, there have been 6 injuries reported. Four of these injuries occurred in 2011, when lightning from a thunderstorm over the McQueen High School soccer field struck between two sets of bleachers, causing 4 injuries.

Tornadoes

The NOAA National Climatic Data Center has records of 10 tornado events in Washoe County since 1950. Two of these events were estimated as a F-1 scale which estimates wind speeds between 73-112 miles per hour. There have not been any deaths or reportable damages; however, there was one injury reported in 1973. No additional details are available.

Windstorms

The NOAA National Climatic Data Center has records of 152 days of high wind events in Washoe County from January 2000 - 2015. Not all of these events were specific to Washoe County and included the northern Nevada region. These events included two deaths and five injuries and a total of $7.88 million in reportable damages.

The National Weather Service defines a windstorm when wind gusts are 60 mph or higher for more than a few hours. **Figure 5-24** below illustrates the damages from a windstorm in December 2008.

The 2013 Nevada Enhanced Hazard Mitigation Plan reports recordable events in Washoe County are as follows:

Location	Number of Events	Average per Year
Barrel Springs	18	1.29
Buffalo Creek	15	1.00
Catnip Mountain	53	2.47
Desert Springs	57	2.92
Fox Mountain	7	0.44
Juniper Springs	4	0.29
Little Valley	47	11.8
Reno AP	8	0.27
Stead	0	0.00

Figure 5-24: NWS Reno Radar Damage from Wind (December 2008)

Source: Chris Smallcomb, National Weather Service - Reno

5.3.6.3 Location, Extent and Probability

Location:

Extreme heat and hailstorms can impact broad regions, and all locations within the planning area can be affected.

Impacts of regional storm systems, oftentimes precipitation and thunderstorm events, are generally greater in the southern portions of Washoe County where population and urban development is most concentrated. High elevations of the western portion of Washoe County experience the effects of winter storms, oftentimes snow storms, with greater frequency.

Tornadoes typically occur in flatter topography; this would be in the urban corridor of southern Washoe County.

Windstorms can occur anywhere in Washoe County's planning area.

Extent:

Magnitude and potential severity of impacts of extreme heat is considered **Low** in Washoe County. Events can typically be handled at the city or county level, disrupt services for 1 to 3 days, and economic impacts are limited to the immediate community or part of the city involved.

The extent of a hailstorm is typically **Low**. Although hail can be extremely damaging to property, most significantly to cars and roofs, the event and its economic impacts can usually be handled at the city level; critical facilities and/or services might be lost for 1 to 3 days.

The overall magnitude and potential severity of impacts from seasonal storms is considered **High** in Washoe County. Typical winter storms are handled at the state level, can disrupt service for 15 to 20 days, and have economic impacts on a statewide scale. Considering a worst case scenario, a winter storm event could require federal level support, could impact critical facilities and disrupt services for more than 20 days, and have nationwide economic impacts.

The overall magnitude and potential severity of impacts from tornadoes is considered **Low** in Washoe County. Less severe tornadoes could be handled at the city level, disrupt service for 4 to 7 days, and have economic impacts on a citywide scale. Considering a worst case scenario, a tornado event could require county level support, could impact critical facilities and disrupt services for 8 to 14 days, and have countywide economic impacts.

The overall magnitude and potential severity of impacts of windstorms is considered **Moderate** in Washoe County. Typical windstorms are handled at the city or county level, disrupt services for 1 to 3 days, and economic impacts are limited to the immediate community or part of the city involved.

Probability:

Probability of future heat waves is considered **Low**, with a 5 percent chance of occurrence in a given year.

The previous data indicates that there were 26 hailstorms in 63 years. These numbers indicate a hailstorm probability of 41% in Washoe County in any given year, therefore the probability is rated as **Very High**.

Based on the frequency of seasonal storms, there is a 44% chance of a winter storm, a 32% chance of heavy precipitation, and an 81% chance of thunderstorms occurring in any given year. Although lightning occurrences were included in the previous section, they will not be calculated here, as their probability is not predictable. The probability of future winter storm events is **Very High,** with greater than a 20 percent chance of occurrence in a given year.

There were 10 reported tornados in 64 years; there is a 16% chance of a tornado in Washoe County in any given year. The probability of future tornado events in the planning area is **Low**. According to the 2013 Nevada Enhanced Hazard Mitigation Plan, climate change is expected to have very little effect on the frequency and intensity of Nevada tornadoes, since they are rare and typically weak.

There have been 86 windstorms reported in a 59-year period; this indicates that odds of a windstorm each year are virtually 100%. Based on the number and frequency of occurrences of windstorms in Washoe County, probability of future occurrence is **Very High**.

Climate Change:

According to the Washoe County Regional Resiliency Study, general circulation models of climate variability predict that heat waves will become more frequent and intense. Although overall temperatures will increase, the greatest effect may be when the temperature differential between daytime and nighttime decreases, that is when there is less of a cooling effect during the nighttime. Many prevalent human diseases are linked to climate fluctuations and higher temperatures, such as cardiovascular mortality and respiratory illnesses exacerbated by warmer heat waves.

Planning Significance:

Based on the frequency of heatwaves and indications that they will become more frequent, the overall planning significance for extreme heat is considered **Moderate.**

Based on assessments of geographic area affected, frequency and magnitude, and severity, the overall planning significance for hailstorms and tornados is considered **Low.**

The overall planning significance for seasonal storms and windstorms is considered **Moderate.**

5.3.7 Volcano

Planning Significance:	Low

5.3.7.1 Nature

A volcano is an opening or rupture in a planet's surface that allows ash, gases, and/or molten rock under tremendous pressure to emerge from below the surface. Volcanic activity over long time scales can either form mountains as molten rock is gradually extruded or rapidly obliterate mountains via eruptions of ash and rock.

Depending on the type of volcano, an eruption is among the more spectacular of natural hazard events, ejecting materials thousands of feet into the air, darkening skies, and blanketing surrounding areas with a fine powdery ash or rivers of molten lava. Due to advanced geologic and seismic monitoring techniques, warning time for major eruptions is usually measured in weeks or months, and the duration of volcanic activity typically ranges from a few weeks to a few years.

Volcanic hazards can be described based on their range of impact from an eruption. Proximal hazards are considered to have an impact within a 30 mile radius. Distal hazards apply to impacts that occur greater than 30 miles from the event.

Proximal Hazards

- **Lava Flows**-Molten rock or magma that may be extruded as a flow during an eruption. Flows can be very slow moving and are brutally destructive. Associated with the Long Valley Caldera and Mount Rose complex.
- **Pyroclastic Flows**-A mixture of intensely heated volcanic ash, pulverized rock and gas that move downslope of a volcano during an eruption. Highly destructive and observed in the Lassen Peak, California (1914) eruption.
- **Lahars**-Mud or debris flows created from melting of high elevation snow fields, heavy rain that are composed of erupted and native material from the slope of a volcano. Can move at speeds up to 50 miles per hour (mph). Similar to very wet concrete and destructive. Observed during the Lassen Peak and Mount St. Helens, Washington (1980) eruption.

Distal Hazards

- **Eruption Cloud**-The blast of rock fragments, volcanic ash and gas that projects vertically in an eruption. Can extend for hundreds of miles downwind. The column observed in the Lassen Peak eruption was estimated to have extended 30,000 feet up wards.
- **Ash Fall-**Large eruption clouds of fine ash that extend downwind of an eruption. Can cover hundreds of square miles. Ash from the Mount St. Helens eruption traveled eastward 300 miles.

5.3.7.2 History

There are no recent instances of volcanic activity or direct impacts in the planning area. Considering the region that includes Washoe County, Lassen Peak erupted in 1915approximately 50 miles west of Washoe County-California state line and 100 miles northwest of Reno. Localized debris flows and a pyroclastic cloud caused damage and deforestation in a 3 square

mile area with flooding and debris damage occurring up to ten miles away in the Hat Creek Valley. Ash fall traveled at least 200 miles northeast to Winnemucca, NV. Small eruptions from the Mono Lake Craters sent ash into Nevada as recently as about 260 years ago.

Figures 5-25 & 5-26: Lassen Eruption, May 1915

Source: USGS

Historic occurrences of volcanic activity in Washoe County date back over one million years. The prominent knob of dark rock north of Mustang, Nevada is a product of one of the most recent volcanic events in the Washoe County region. The lava flow represented by this outcrop (McClellan Peak Basalt) is dated at 1.44 million years old. The composition of this lava flow is different from the composition of huge thicknesses of lava that erupted earlier in the region over several millions of years. There are also some one million-year-old rhyolitic lava flows in the Reno area near Steamboat Hot Springs, but volcanoes in this area are thought to be extinct.

5.3.7.3 Location, Extent, Probability of Future Events

Location:

Volcanoes are generally found where tectonic plates are pulled apart or come together. Seismic research on the north end of Lake Tahoe by the University of Nevada, Reno (K.D. Smith and others, 2004) is interpreted to indicate active magma at a depth of 18.6 miles. The research concludes that there does not appear to be a near-term threat of volcanic eruption from this area, in part because the last documented eruption in the area was approximately one million years ago.

The three closest potentially active volcanoes are all located in California. **Table 5-14** below indicates the approximate distances and bearings to these volcanoes from Reno. Mono Craters is a straight line of phreatic volcanoes or rhyolite domes; the most recent eruption was at Mono Lake between 1715 and 1865. Long Valley Caldera is a caldera volcano; its latest activity was in the 1750s. That volcano's location is pictured in **Figure 5-27** below. Lassen Peak is a dome volcano; its latest activity was in 1921. Mount Shasta is a stratovolcano; its latest activity was in 1786.

Table 5-14: Potentially Active Volcanoes, Distance and Bearings to Reno

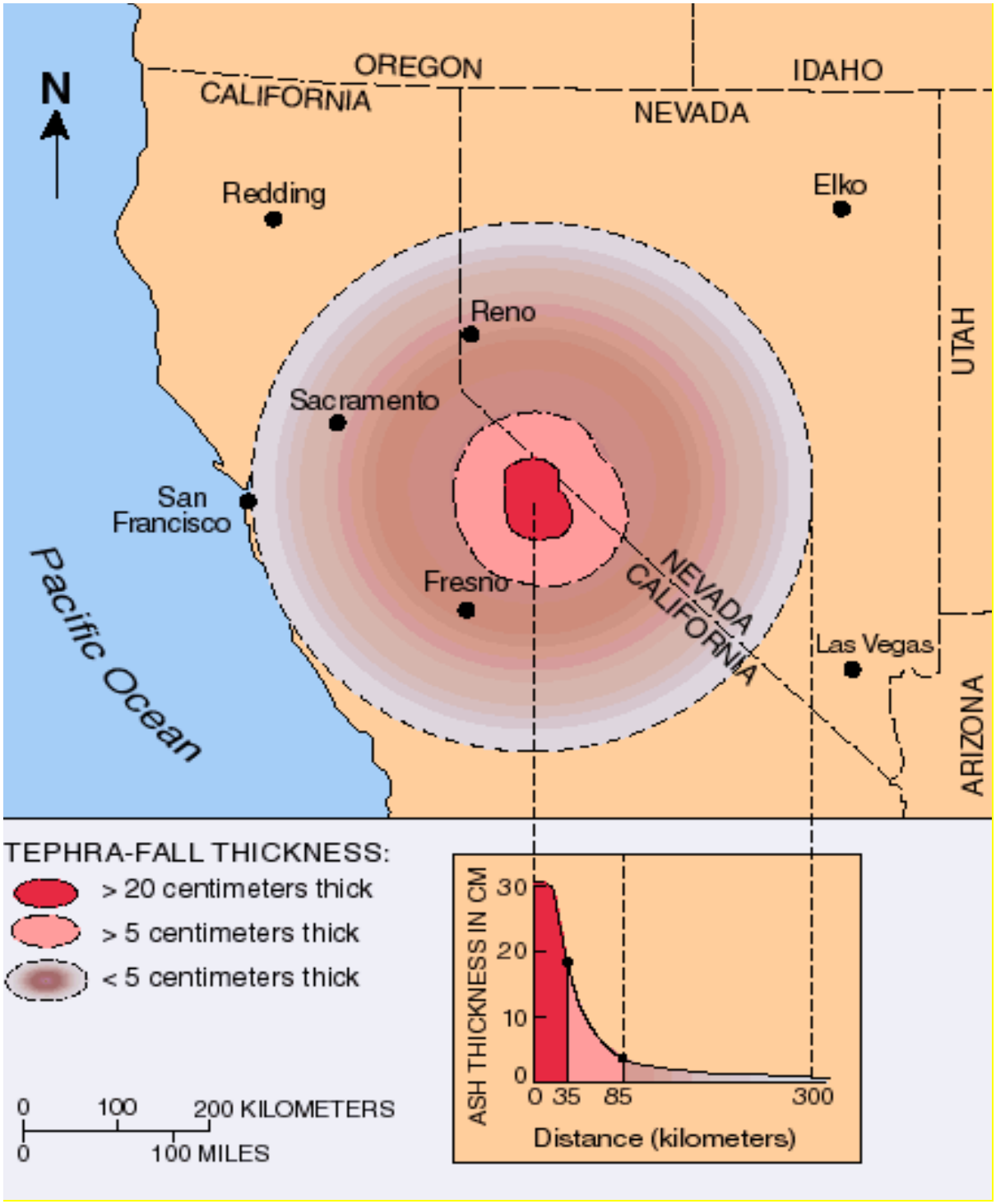
Volcano	Latitude	Longitude	Distance from Reno	Bearing from Reno
Mono Craters	37º 53' N	119º 00' W	~95 miles	South-Southeast
Long Valley Caldera	37º 35' N	119º 05' W	~110 miles	South-Southeast
Lassen Peak	40º 43' N	121º 44' W	~100 miles	Northwest
Mount Shasta	41º 36' N	121º 19' W	~150 miles	North-Northwest

Source: AMEC
Note: Reno's location, Latitude 39º 31'N Longitude 119º 48'W

The map in **Figure 5-27** indicates that the planning area is close enough to the Long Valley Caldera to be impacted by ash fall less than 5 cm thick, based on a small to moderate size eruption. Under this assumption, downwind deposits of ash could reach thicknesses of at least 20 cm at a distance of 35 km (8 in. at 22 mi), 5 cm at a distance of 85 km (2 in. at 53 mi), and about 1 cm at a distance of 300 km (0.5 in. at 185 mi).

Prevailing winds would have direct influence on the ash level Washoe County receives. Ash fall would significantly affect airplanes, air quality, and highway driving, as well as cause combustion engines failures and damage to agricultural products. This influence was observed during the Lassen Peak eruption as ash from the eruption was blown to the northeast and away from the Reno-Sparks municipal area.

Figure 5-27: Volcanic Ash Dispersal Map for the Long Valley Caldera



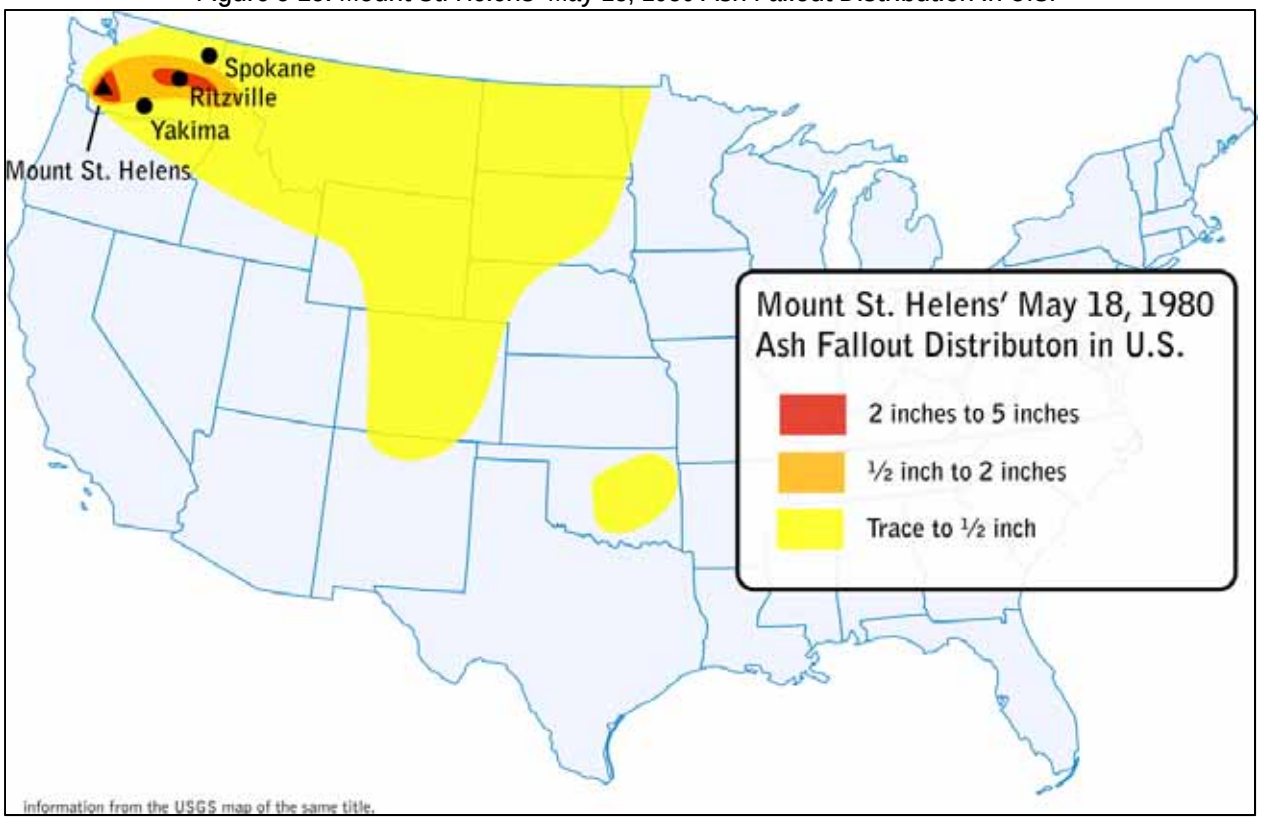
Source: USGS Volcano Hazards Program; C.D. Miller, J. Johnson; http://lvo.wr.usgs.gov/zones/TephraFall.html

Extent:

The overall magnitude and potential severity of impacts from volcanic activity is considered **Very Low** in Washoe County. Less severe volcanic events are manageable at the city and/or County level, disrupt services for 1 to 3 days, and have minor economic impacts on a countywide scale.

Considering a worst case scenario such as the Mount St. Helens eruption, state level support would be necessary, with impact to critical facilities and disruption of services for 4 to 7 days. Local and statewide economic impacts would also occur. An example of the severity potential associated with this hazard type is shown in **Figure 5-28**. This image shows the travel of the ash fall from the Mount St. Helen's eruption and is considered representative of what would occur with a future eruption from a west coast, "Cascade" type volcano such as Mount Shasta.

Figure 5-28: Mount St. Helens' May 18, 1980 Ash Fallout Distribution in U.S.



Source: USGS

Probability of Future Events:

The *State of Nevada Enhanced Hazard Mitigation Plan* notes that the most likely volcanic hazard for Nevada is an eruption from the Mono Craters area near Lee Vining and Mono Lake in Eastern California. Other volcanoes that could deposit ash in Nevada include Mount Lassen, Mount Shasta and the Long Valley Caldera in California, as well as volcanoes in the Cascade Mountains in Oregon. Generally, Washoe County is situated closer to these potential volcanic events than any other county in the state.

The last documented volcanic eruption in the Washoe area was approximately one million years ago. The aforementioned volcanoes that are within ~100-150 miles of Reno have erupted 4

times in the last 293 years. This indicates a 1.4% chance of those volcanoes erupting in any given year. Probability of future occurrence with direct consequences for the planning area is therefore considered **Low**.

Planning Significance:

Volcanoes are a naturally occurring phenomenon. Effective mitigation efforts are based on planning methods. Washoe County's only mitigation options are preparedness and community education. Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **Low.** General issues associated with this hazard when developing mitigation or preparedness strategies include:

- Volcanic eruptions have precursor indicators but they can be somewhat ambiguous,
- Range in magnitude of eruption with few reliable preliminary indicators,
- Eruption may surpass any previously experienced disaster,
- Outside of residents experience with a reduced ability to appreciate the hazard, and
- Impacts can be long term in nature.

5.3.8 Wildland Fire

Planning Significance:	High

5.3.8.1 Nature

A wildland fire is a fire that is started in, or moves into, areas where there is primarily native vegetation and brush, and structures are limited. Wildland fires can be caused by factors that are categorized as human or natural causes. The human causes may include campfires, improper disposal of ashes and arson, or an intentional act. Wildland fires caused by nature are those caused by lightning. Wildland fires are not confined to forested areas; they can burn wherever vegetation is prevalent, including park areas. Wildland fires can be categorized as urban, interface or intermix fires. Wildland Urban Interface areas are areas where residential structures are built within forested areas or areas where large amounts of natural vegetation close to those structures. Wildland Urban Intermix areas are those areas where large areas of vegetation exist in areas where there are predominately residential and commercial structures. Fires within the wildland-urban interface can result in major losses of property and structures.

A wildland fire spreads primarily by the consumption of vegetation, and that rate, area and extent of consumption is dependent on three main factors which are fuel, weather and topography. These factors can sustain a wildland fire and predict a given area's potential for a wildland fire and the associated damage that can occur and will affect land, infrastructure and people.

Fire conditions arise from a combination of hot weather, accumulation of vegetation and low moisture content in air and fuel. These conditions, especially when combined with high winds and years of drought, increase the potential for wildland fires to occur. The wildland fire risk is predominantly associated with wildland-urban interface areas, areas where development is interspersed or adjacent to landscapes that support wildland fires. Fires within the wildland-urban interface can result in major losses of property and structures. Climate change may also increase the length of wildland fire season by creating a hotter and drier climate in Washoe County.

- **Fuel** – Fuel is any material that can burn. Fuels are the source of energy that drives a fire and is a significant factor in wildland fire behavior. The type of prevalent fuel directly influences the behavior of a wildland fire. Fire behavior is dependent on fuel type, fuel loading and fuel availability. The amount of fuel in an area is dependent on the availability of water and elevation. The six major fuel types are grass, grass-shrub, shrub, timber-understory, timber litter and slash-blowdown. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses.

  Fuel types within the Washoe County planning area include: (1) high desert savannah, characteristic of seasonal forbs and grasses; (2) various species of sage brush, dominated by mountain blue sage; (3) bitter brush transitioning to mountain mahogany; and (4) pine dominated forests on the eastern aspects of the Carson Mountain Range.

  Located in the western portion of the Washoe County planning area, the upper elevations of the Carson Mountain Range are an alpine ecosystem dominated by ponderosa pines, various fir species, and brush understory. The northern and eastern parts of the Washoe County planning area are characterized by the transition from savannah grass to sage brush to pinyon and juniper forests with decadent brush understory.

Additionally, extensive invasive plant species exist within the planning area, such as cheat grass, Russian thistle, Russian knapweed, and common white top. All species threaten to overtake the native vegetation, smothering riparian areas and intensifying the wildland threat.

Fuel characteristics influence wildland fire spread and intensity. Fuel characteristics include:

- **Loading**: the amount of fuel that is present and is expressed in terms of tons per acre.
- **Availability**: the size and class – relative to the size of the fuel and how fast it will dry out in wind or fire conditions; the ratio of surface area to volume – exposure of the vegetation to the elements; and
- **Arrangement**: the manner in which fuels are spread over an identified area. Horizontal arrangement affects fire spread, patchy fuels could limit fire spread, and vertical arrangement allow the ability for a fire to move from a ground fire to a fire in the canopy of the trees in a forested area. Fuel moistures affect the rate of spread of a fire. The drier the fuels, the faster the fire will spread because the fuels are pre-heated and void of moisture so the fire can move quicker, versus fuels that have more moisture and are "wet" that will impede the progress of a wildland fire because it takes longer for the fuel to dry out and reach its ignition temperature.

- **Topography –** Slope and aspect of an area affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes. The aspect of an area can affect the fire spread and vegetation growth. The arrangement of vegetation throughout a hillside will contribute to increased fire activity on slopes. South and southwest slopes are generally exposed to the sun for longer periods of time and have lighter, sparser vegetation with lower fuel moistures and higher temperatures due to exposure. North and northwest facing slopes tend to have heavier fuels with higher fuel moistures and lower temperatures due to less exposure time from the sun.

  Topographic influences include slope and aspect of an area. The slope of an area affects a wildland fire. A fire will burn faster uphill than it will downhill. A fire will typically burn uphill in the daytime, influenced by upslope winds, and downhill at night, influenced by the shift in the temperature and winds that will blow downhill. Increased spread of a fire uphill is due to the fuels to be in closer contact with upward moving flames. Convection and radiant heat will help the fires catch more easily and the steeper the slope, the faster the fire will burn.

  Aspect is the direction the slope is facing. The aspect of a slope determines the amount of fuel and heating it will get from the sun, and the resulting amount, condition and types of fuels present. South and southwest slopes are exposed to more sunlight and generally have lighter and sparser fuels, lower humidity and higher temperatures. North facing slopes tend to have less exposure to the sun and more shade. This will produce heavier fuels, lower temperatures and higher relative humidity and fuel moistures. A north aspect will see less fire activity than a south facing slope.

The Washoe County planning area is located on the lee side of the Carson Range of the Sierra at elevations that range from 4,600 feet (ft) at the Valley Floor to over 10,000 feet above sea level at the Mount Rose Summit. The higher elevations are characterized by deep topographical drainages that are oriented west to east, descending from subalpine timber covered slopes.

- **Weather** – Weather is the most variable and unpredictable elements of the of the fire environment. Weather is the element that fire suppression crews must constantly monitor to ensure safety and make effective firefighting decisions. Weather conditions impact fire behavior and should be strong considerations for any wildland fire event. Temperature and relative humidity will also have an effect on fire behavior. When the temperature increases, the relative humidity decreases, making it easier for a fire to spread, as fuels area affected by both the humidity and temperature.

  Weather components such as temperature, relative humidity, wind, and lightning affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire, creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater the wind, the faster a fire will may spread and the more intense it may be. Lightning may also ignites wildfires, which are often in terrain that is difficult for firefighters to reach. Drought conditions contribute to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

  Winds can be significant at times in the Washoe County planning area during both the summer and winter fire season. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. The influence of the Carson Range of the Sierra Nevada Mountain Range and its steepness on the eastern side of Washoe County create three particularly dangerous situations. The Sierra Nevada Mountain wave is a disrupted linear flow of fast moving air perpendicular to the range from the west or southwest that creates rapid down slope winds that intensify in the afternoon and evenings. The Washoe zephyrs are afternoon and evening breezes that flow downhill on the east-facing slopes after the sun passes and the cool air starts sinking and flowing down slope. This creates down slope winds that can be contrary to the normal diurnal winds and can combine with the Sierra Nevada Mountain wave to scour the drainages and canyons that are lined with residences in the County and its cities. The third influence is the orographic lifting that facilitates the formation of thunderstorms. These thunderstorms can create winds in excess of 50-60 miles per hour, as well as tremendous short term downpours or dry lightning with very little or no precipitation.

  The National Weather Service will issue Red Flag Warnings to inform area firefighting and land management agencies that conditions are ideal for wildland fire ignition and propagation. Red Flag Warnings are issued for weather events which may result in extreme fire behavior that will occur within 24 hours. After drought conditions, and when humidity is very low, and especially when high or erratic winds which may include lightning are a factor, the Red Flag Warning becomes a critical statement for firefighting agencies, which often alter their staffing and equipment resources dramatically to accommodate the forecast risk. They are especially critical when high or erratic winds which may include lightning are a factor. To the public, a Red Flag Warning means high

fire danger with increased probability of a quickly spreading vegetation fire in the area within 24 hours.

5.3.8.2 History

Historical wildfire data was obtained from the Washoe County GIS. **Figure B-11: Washoe County Historic Wildfires (2000-2014)** in **Appendix B** presents historical fire areas within Washoe County from 2000-2014. **Table 5-15 Historical Wildfires in Washoe County**, represents historical wildfires from 2000-2014 and includes the number of acres burned for each fire event.

Table 5-15: Historical Wildfires in Washoe County

Year	Fire Name	Total Acres Burned	Year	Fire Name	Total Acres Burned
2012	Washoe Drive	3,177	2004	Waterfall	8764.3
2011	Caughlin	1,935	2004	Andrew	2692.9
2011	Great Stone	2,377	2004	Summerset	13.9
2010	Rock Creek	5,298	2004	Verdi	1079.9
2009	Red Rock	10,549	2004	CCD Border	350.8
2008	Patrick	26.3	2004	Hungry	39.2
2008	Oxbow	16.5	2004	Squaw	14.2
2008	Eastlake	960.2	2003	Robb	2197.3
2007	Melody	142.6	2003	Red Rock	117.6
2007	Rio Poco	13.6	2003	Petersen	41.0
2007	Plateau	0.0	2003	Smoke	7790.1
2007	Sand Pass	16765.4	2002	Tin Canyon	966.0
2007	Pig Rock	24.7	2001	Martis	2.1
2007	Granite	141.0	2001	Plesant	17.6
2007	Bedell	82.1	2001	TOLL	123.7
2007	Wiley	10.6	2001	Martis	5.1
2007	Sullivan	24.0	2001	Andrews	635.1
2007	Hungry Valley	569.2	2001	Martis	65.1
2007	Needles	658.2	2001	Martis	14356.4

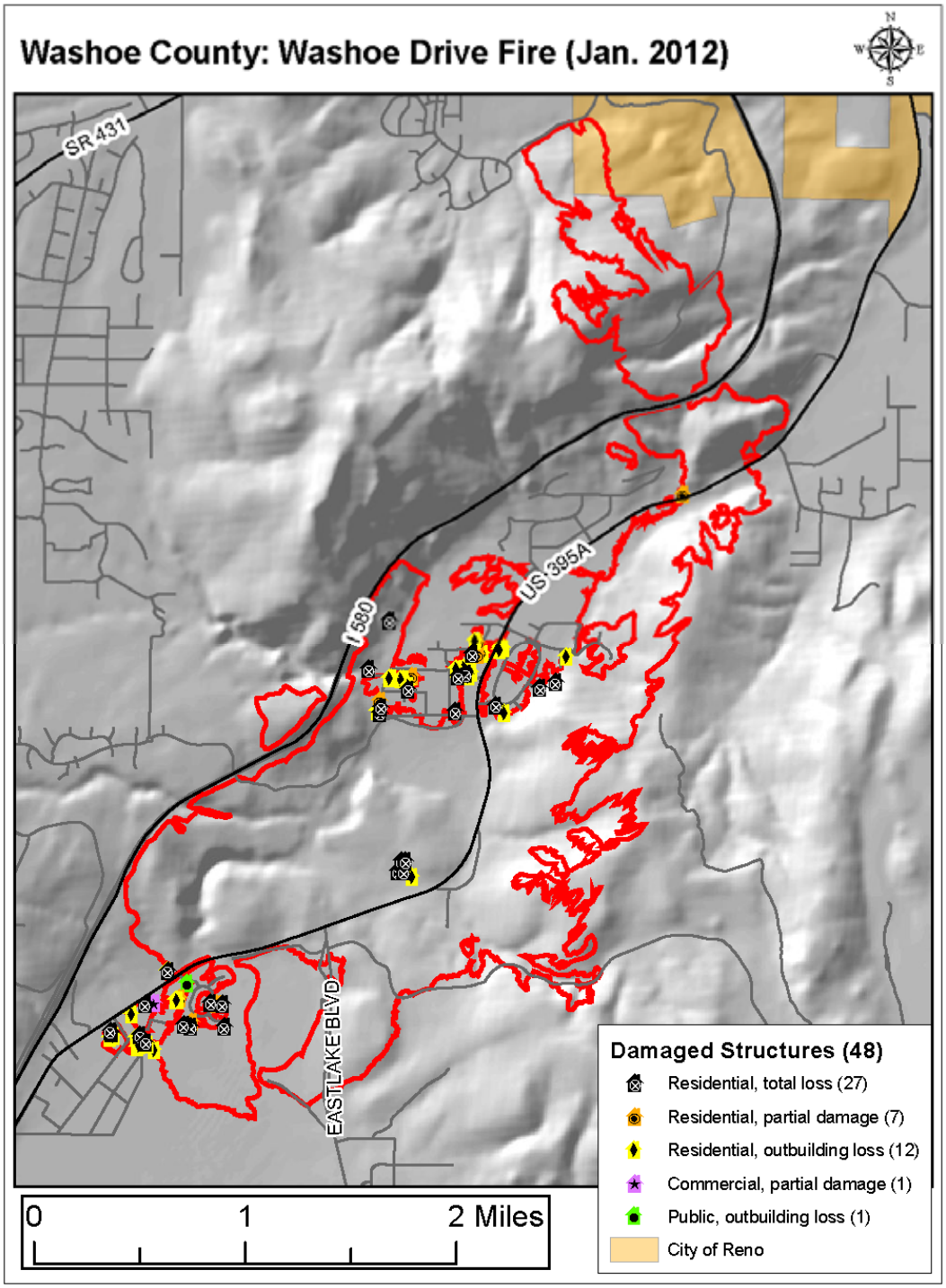
Year	Fire Name	Total Acres Burned	Year	Fire Name	Total Acres Burned
2007	Vista Swamp	95.5	2001	Peavine	65.9
2007	Virginia	16.4	2001	Olinghouse	265.1
2007	Mustang	1411.9	2001	Warrior	6524.9
2007	Washoe	120.6	2001	Fish	21476.4
2007	Pyramid Hwy	5.1	2001	Bull Basin	1859.4
2007	Whiskey Spgs	18.5	2000	Galena Hill	54.9
2007	Dam	18.1	2000	Unburned Area	97.2
2007	Hawken	2459.3	2000	Arrowcreek	2788.0
2006	Iveson Ranch	33.0	2000	Moss Lake	18.4
2006	Winnemucca Lake	45.0	2000	Fourth Street	45.8
2006	August	334.3	2000	8th Hole	1809.8
2006	Empire	2762.0	2000	Mitchell	604.2
2006	Jumbo	41.0	2000	Peavine	9.9
2006	Double R	152.0	2000	Seneca	1109.4
2006	Belmar	424.0	2000	Olinghouse	1795.3
2006	Leon	14.0	2000	Cold Springs	0.4
2006	Bootlegger	6683.0	2000	Cold Springs	162.9
2006	Verdi	5661.0	2000	Cold Springs	681.3
2006	Poito	5582.0	2000	Hungry Valley	4003.8
2006	Squaw Valley	2093.0	2000	Jones	2868.6
2006	Palomino Vly	289.3	2000	Red Rock	2202.5
2006	Oregon	105.7	2000	Antelope	7686.7
2005	Dog	51.2	2000	Rock Creek	246.0

Source: Bureau of Land Management

Additionally, the following are brief descriptions of some of the recent fires:

- **2012 Washoe Drive Fire:** The Washoe Drive fire burned approximately 3,177 acres in Washoe Valley and Pleasant Valley, just south of Reno. The fire destroyed 27 homes and resulted in U.S. 395 being closed down for a period of time. The fire was started by a homeowner who improperly disposed of their fireplace ashes.

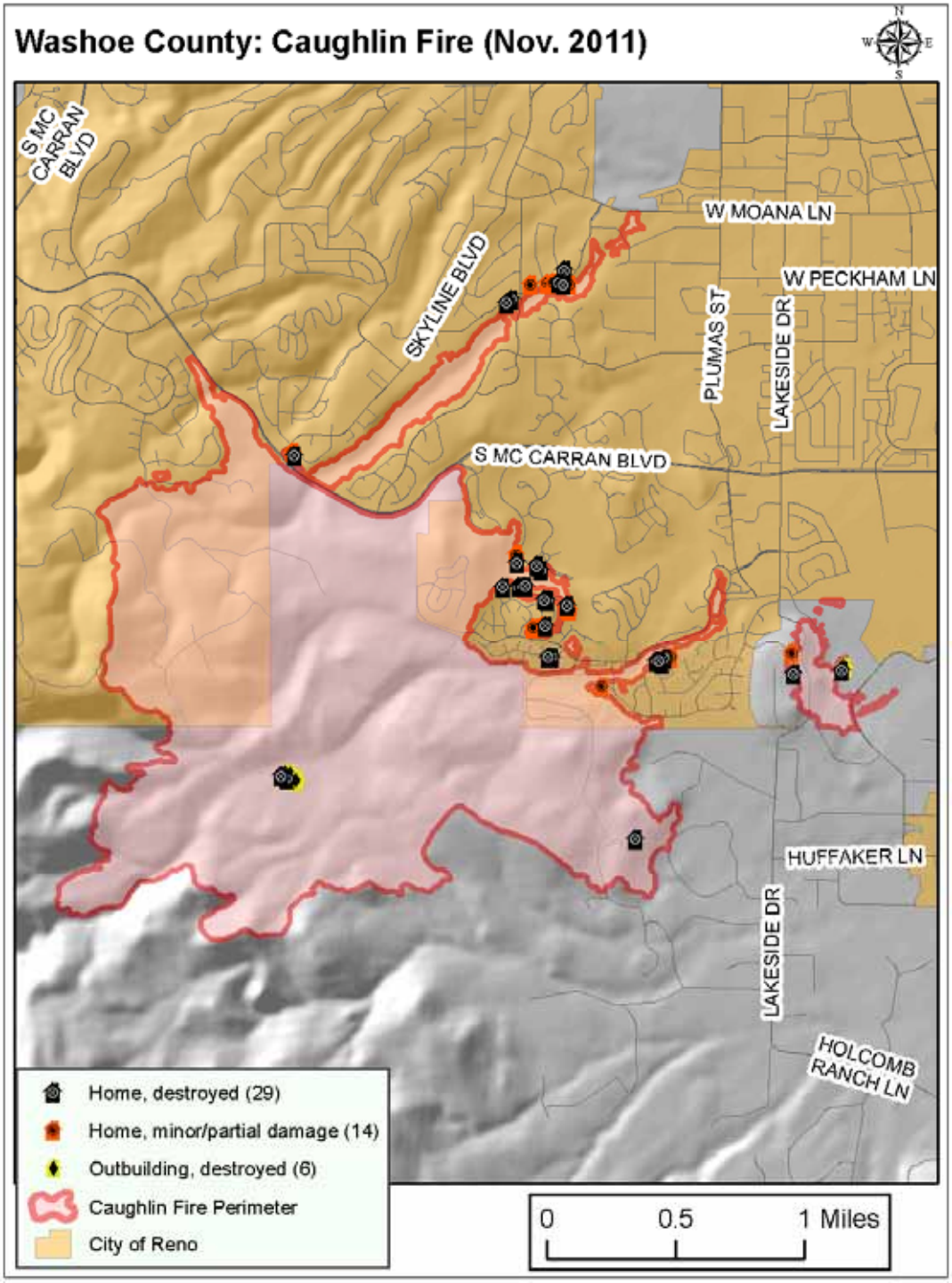
Figure 5-29: Washoe Drive Fire



Source: Washoe County GIS

- **2011 Caughlin Fire:** The Caughlin fire located in southwest Reno burned approximately 1,935 acres and destroyed 29 homes. The fire was started by arcing power lines.

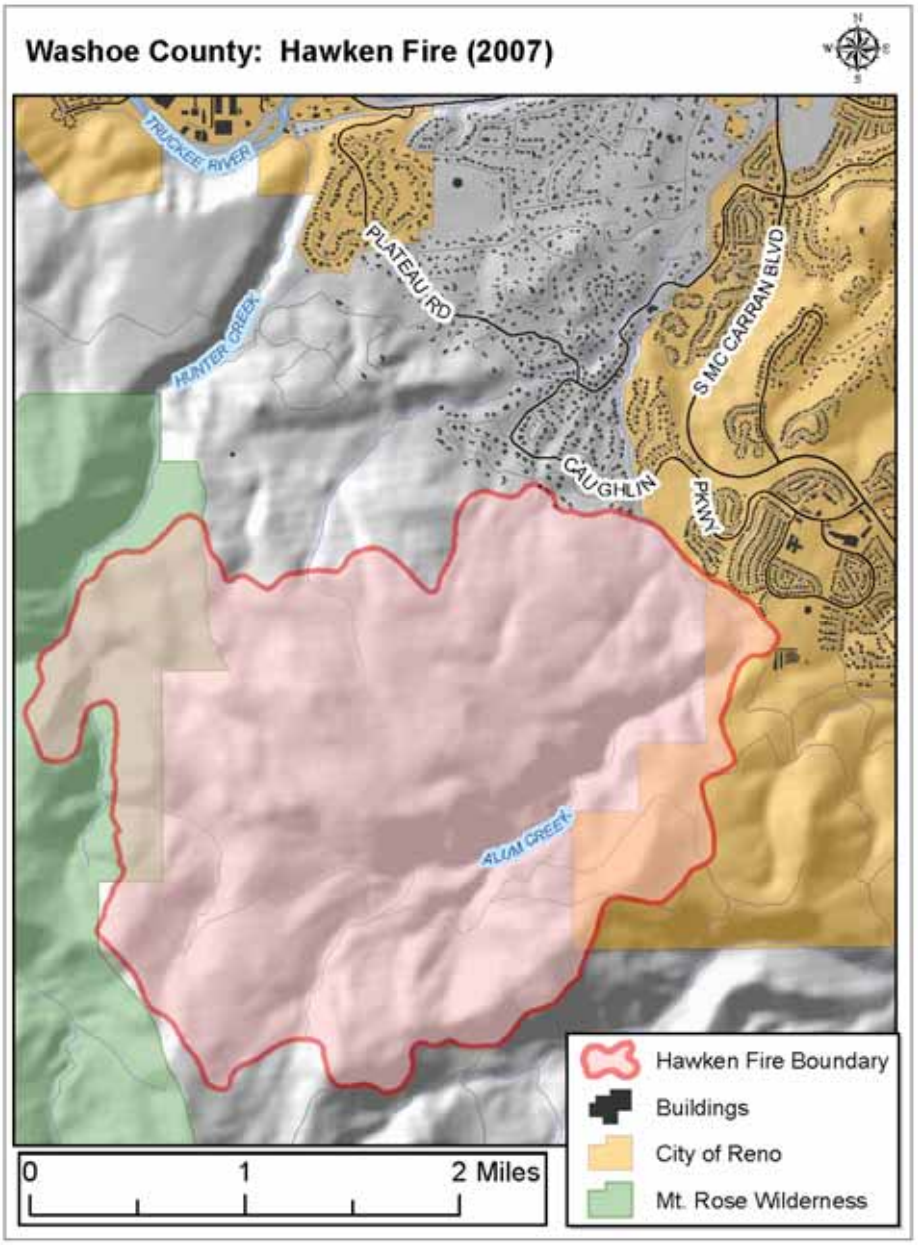
Figure 5-30: Caughlin Fire



Source: Washoe County GIS

- **2007 Hawken Fire**: The fire burned approximately 2,400 acres: 72% on federal land and 28% on private land. The fire broke out on Monday, July 16, behind the Caughlin Ranch neighborhood in western Reno. It initially burned close to several homes, which were saved as a result of the work from several area fire agencies. Tuesday morning, the fire advanced into tall timber and away from the residential neighborhood. With air tankers and helicopters making repeated fire retardant and water drops, firefighters were able to advance and contain on the blaze.

Figure 5-31: Hawken Fire



Source: Washoe County GIS

- **2006 Pine Haven Fire**: This fire was caused by power lines and windy conditions. Firefighters held the blaze to approximately 300 acres. Although the fire briefly threatened homes near Caughlin Ranch near Reno, no structures were damaged or lost.
- **2006 Verdi Fire**: This fire burned 6,000 acres near Reno, Nevada, threatening the Somersett area.
- **2006 Oregon Fire**: This fire burned more than 160 square miles of Nevada rangeland near the Oregon border. Also, this fire on the Oregon side threatened the major transmission lines that carry power between California and the Pacific Northwest.
- **2004 Andrew Lane Fire**: The fire was located between Carson City and Reno. The fire burned more than 1,000 acres and a few residences. The fire was threatening hundreds of homes in the town of Pleasant Valley. An estimated 300 people had been evacuated.
- **2004 Verdi Fire Complex**: This fire was located west and northwest of Reno. The blaze burned 1,094 acres west of Peavine Peak and cost $980,000 to fight.

5.3.8.3 Location, Extent, Probability of Future Events

Location:

While wildfire risk is predominantly associated with wildland-urban interface areas, significant wildfires can also occur in heavily populated areas. Wildfires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas, such as the Carson Range of the Sierra Nevada and Virginia range foothills, the risk of fire increases due to a greater chance for human carelessness and historical fire management practices.

In 2005, the Nevada Fire Safe Council contracted with Resource Concepts Inc. (RCI) for the purpose of developing a Community Wildfire Risk/Hazard Assessment Project within Washoe County. The end product is the identification of wildfire hazard severity areas rated low, moderate, high, or extreme fire hazard as presented in **Figure 5-32 Wildfire Hazard Severity Areas** and **Figure 5-33 Wildfire Hazard Severity Areas – Reno-Sparks Indian Colony**. Federal land within the County was not rated. The wildfire severity areas were reviewed and revised by a local task force comprised of the North Lake Tahoe Fire Protection District, Reno Fire, Washoe County, Washoe County GIS, Sparks Fire, Sierra Fire Protection District, Truckee Meadows Fire Protection District, Nevada Fire Safe Council and the UNR Cooperative extension Living with Fire Program.

Areas identified as having an extreme fire hazard severity risk are located within the Carson Range of the Sierra Nevada, predominately along the northern edge of Lake Tahoe and the western edge of Washoe Valley. Areas identified has having a high fire hazard severity risk include the western side of the Pah Rah mountain range, portions the Virginia Mountains, the foothills of the Sierra Nevada mountain range, and the western side of the Virginia Range. In other portions of the planning area, large concentrations of highly flammable brush located in flat open spaces are also quite susceptible to wildfire.

Figure 5-32: Wildfire Hazard Severity Areas

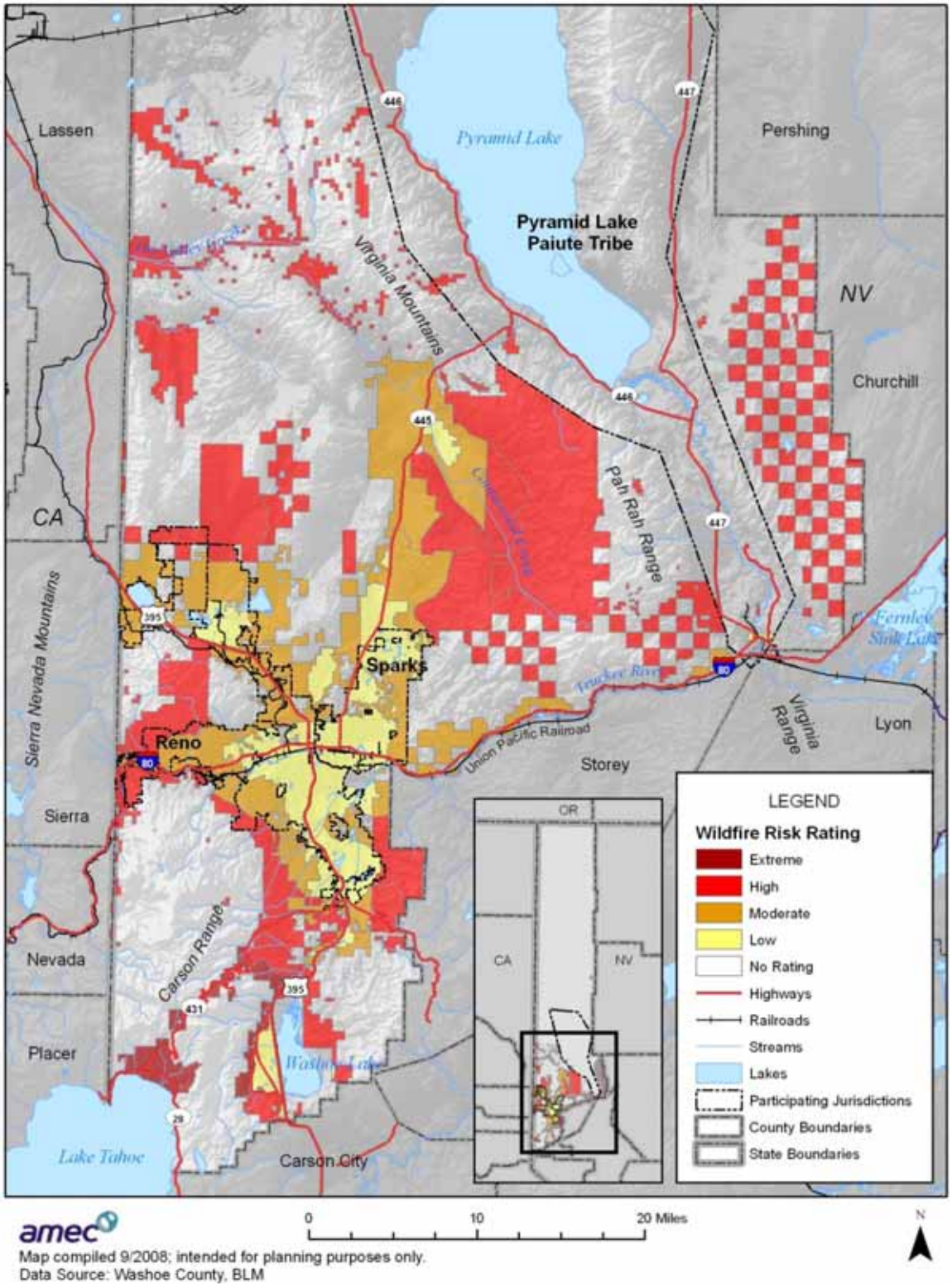
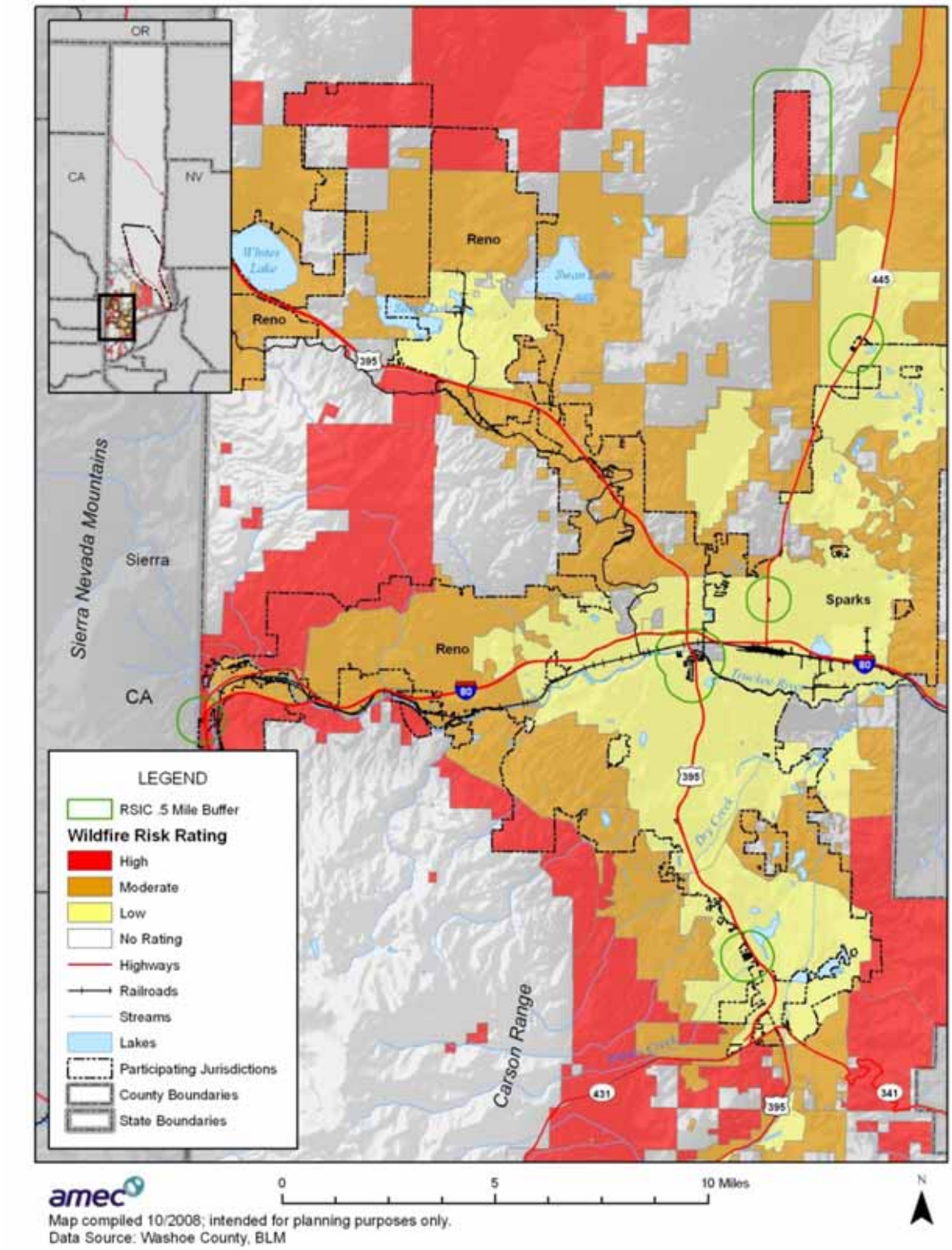


Figure 5-33: Wildfire Hazard Severity Areas – Reno-Sparks Indian Colony



Since the development of the wildfire risk maps for this plan update, Washoe County has created a new Washoe Wildfire Severity Hazard Areas map that is included as **Figure B-12** in **Appendix B.** These new maps include data on tribal lands as well as some modifications to risk ratings identified in the maps above.

Extent:

Wildland fires do or may occur within Washoe County. Generally, the fire season extends from June through October of each year during the hot, dry months. Most wildland fires are controlled and contained early with limited damage to residences and buildings. For those ignitions that are not readily contained and become wildfires, damage can be extensive and can quickly require State and Federal assistance.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, the quality and quantity of the water supply, assets such as timber, range and crop land, recreational opportunities, and economic losses. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can lead to secondary impacts or losses such as future flooding, landslides, and erosion during heavy rains.

The overall magnitude and potential severity of impacts of flooding is considered **High/Very High** in Washoe County. Wildland fire events are handled at the county level, but may require State and Federal assistance. These events can disrupt services for 4 to 7 days, and cause economic impacts, such as shipping delays, interruptions in employee productivity, loss of customers and tourism, that are felt at both the County and City level.

Considering a worst case scenario, wildland fires can require federal support, can impact critical facilities, disrupt services for 15 to 20 days, and have national economic impacts.

Probability of Future Occurrences:

There were a total of 84 events during the 14 year period of 2000 to 2014. While some of the events resulted in fewer than 5 acres burned, 51 events resulted in over 100 acres burned, and 30 events resulted in over 1,000 acres burned. The probability of a wildfire event within the year is 100 percent making the probability of future occurrence **Very High**.

Climate Change:

According to the Washoe County Regional Resiliency Study, numerous studies indicate that warmer weather coupled with lengthening of the fire season, could lead to an increase both in fire occurrence and in the areas burned. Increased surface drying and warmer temperatures increase vegetation stress, allowing trees to be more susceptible to mortality from insects. Changes in precipitation patterns along with increasing temperatures could shift plant species from their native locations. Invasive species, aided by climate variability, could affect the vegetative mix and the return interval for native species from fires of various intensities.

Planning Significance:

Effective mitigation efforts for wildland fire events can be based on both structural and planning methods. Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **High.**

5.4 MANMADE HAZARDS

5.4.1 Criminal Acts

Planning Significance:	Moderate

5.4.1.1 Nature

Civil disorder/riotous behavior refers to a situation where groups intentionally choose not to observe the law. The most common reason for this activity is to bring attention to an issue, cause, or to the group's agenda. Civil disorder may also be defined as random acts of violence by three or more persons with the potential to injure people or damage property, but that does not meet the definition of a terrorist act. Civil disorder can take the form of small gatherings or large groups that block or impede access to a building, or disrupt normal activities by generating noise and intimidating people. Other examples range from peaceful sit-ins to a full-scale riot in which a group destroys property and disregards or retaliates against law enforcement response. Civil disorder varies widely in size and scope, and its overall impact is generally low. Civil disorder/riotous behavior can be further defined into the following four categories:

- Civil Disobedience – The refusal to obey civil laws in an effort to affect change in governmental policy or legislation.
- Protest – A usually organized demonstration of disapproval.
- Civil Disturbance – Group acts of violence and disorder prejudicial to public law and order.
- Riot – A violent disturbance of the public peace by a statutorily defined number of people assembled for a common purpose.

Acts of violence refers to an intentional act against the public to include mass casualty incidents and workplace violence. There have been several incidents in Northern Nevada in the last decade. Criminal acts can be random in nature or preplanned and perpetrated by individuals or groups.

5.4.1.2 History

Civil Disorder

- On New Year's Eve 1980, thousands of revelers streamed out of downtown casinos, and riot broke out. About 10,000 people had gone into the streets for the traditional New Year's celebration; about 4,000 took part in the violence. About 300 police officers were called in as rioters smashed windows of cars, a barber shop, a restaurant, several offices and some smaller casinos.

Criminal Acts

- Priscilla Ford killed six people and injured 23 others when she drove her 1974 Lincoln Continental down a crowded Reno sidewalk on Thanksgiving Day in 1980. In 2005, she died at the Southern Nevada Women's Correctional Center in Las Vegas; she had been suffering from emphysema.

- On October 29, 2010, John Dennis Gillane, a Reno Walmart employee, shot and wounded three Walmart employees. He then surrendered to police after holding up in an office in the Kietzke Lane store for six hours.
- A gunman, identified as 32-year old Eduardo Sencion, opened fire at the International House of Pancakes (IHOP) restaurant in Carson City, killing four people including three members of the National Guard, and wounding seven others on September 6, 2011. Sencion shot and wounded himself in the head, and later died at a hospital.
- On September 23, 2011, a fight broke out involving members of the rival Hell's Angels and Vagos motorcycle clubs. Shots were fired near Trader Dick's bar inside John Ascuaga's Nugget. No employees or guests were injured, but one Hell's Angels member was shot dead and two members of the Vagos were injured.
- Prior to classes beginning on October 21, 2013, a 12-year-old student opened fire with a semi-automatic handgun at the basketball courts of Sparks Middle School, injuring two students and killing a teacher who was trying to intervene. The student then committed suicide by shooting himself in the head.
- On December 17, 2013, Alan Frazier, 51-years-old, entered the Center for Advanced Medicine, climbed the stairs to the third floor, and entered Urology Nevada. He proceeded through the medical center, firing shots at several individuals, and hitting one doctor in the arm and torso, one patient in the torso, and one doctor in the torso. One doctor died of his injuries. Frazier returned to the lobby of Urology Nevada and shot himself in the head.

5.4.1.3 Location, Extent and Probability of Future Events

Location:

Civil disorder and/or acts of violence are likely to occur in populated areas or places where people gather. Sporting events and public facilities including city halls, county courthouses and correctional facilities are specific locations where civil disorder may occur. Acts of violence commonly occur at schools, hospitals, restaurants, and casinos.

Extent:

The overall magnitude and potential severity of impacts from civil disorder and acts of violence is considered **Moderate** in Washoe County.

Considering a worst case scenario, civil disorder or acts of violence events can require state level support to respond to the incident, can impact critical facilities and disrupt services for 1 to 3 days, and have citywide economic impacts.

More typical civil disorder and acts of violence events are handled at the city level, disrupt services for less than one day, and economic impacts are limited to the immediate community or part of the city involved.

Probability of Future Events:

Based on assessment of previous occurrences and frequency of contributing factors of civil disorder and acts of violence, probability of future occurrence is considered **Moderate**, with an estimated occurrence of 1 to 2 large civil disorders or acts of violence in a given year.

Planning Significance:

Effective mitigation efforts should take into account location, frequency, severity and impact to the community. Overall planning significance is considered **Moderate.**

5.4.2 Energy Emergency

Planning Significance:	Low

5.4.2.1 Nature

An energy emergency is defined as an abrupt shift in available electricity, transportation fuel, coal or natural gas supplies that create shortages across all or some portion of the planning area. Potential causes of energy emergencies include electrical blackouts, rolling blackouts, pipeline malfunctions, fuel shipment disruptions, or an unanticipated surge in demand.

Episodes of widespread electrical blackouts affecting the eastern U.S. in recent years have brought this issue to the attention of Washoe County mitigation planners. The threat of sabotage of the energy distribution infrastructure from domestic or foreign terrorists is also an identified concern. Natural disasters and geopolitical conflicts that impact the energy supply chain can also lead to energy emergencies in Washoe County. Increasing wholesale costs of fossil fuels on the global market reflected in the recent surge in retail prices of diesel, gasoline and natural gas is a concern over a longer timeframe.

A rolling blackout is an engineered electrical power outage that is usually used by the electricity utility company in an effort to avoid a total blackout. This is necessary when the power grid is being overtaxed, or when the demand for electricity exceeds the power supply capability of the network. Rolling blackouts create emergency situations, as the power outage might affect large populations or even the entire planning area.

The causes of most of shortages are beyond control of local governments, due to the fact that the majority of the energy used in the planning area is imported from is original source. Responses by local or state government to energy emergencies may include rationing, and emergency supply distribution. Washoe County does have limited solar and geothermal energy resources located in Reno. Output from these plants is not considered critical to the system.

5.4.2.2 History

Historically, utility disruptions have been caused by both natural and human events. These events include earthquake, wildfire, flood, and human activities. The majority of the energy related emergencies can be traced back to a weather event. Since 2009 there have been 9 large weather outages in the County resulting in power loss ranging from 8 to 31 days. Due to the nature of the County, outages can affect less than 20 customers or more than 50,000. The 2013 Nevada State Enhanced HMP listed an additional six significant outages from 2009-2014. However, there is very little data to report number of customers affected, length of outage, or cause. The subcommittee attempted to obtain further information about these events from NV Energy but was unsuccessful. This data will continue to be pursued in the next plan update. The planning area experienced a near miss of a natural gas system outage in the early 1990s when a contractor ruptured the Paiute Pipeline near where the pipeline crosses the Idaho Nevada border. At the time of this occurrence, the Paiute Pipeline was the only natural gas supply to the area. A complete natural gas outage was avoided by utilizing existing line pressure pack, conservation by customers, and the use of the Paiute Pipeline Liquefied Natural Gas Plant in Lovelock, Nevada.

5.4.2.3 Location, Extent, and Probability of Future Events

Location:

Energy emergencies are generally regional in scale. They can potentially affect any portion of the planning area. The overall effects of a widespread energy emergency would be concentrated in population centers, but the condition is likely to be present throughout the planning area.

The petroleum, electricity and natural gas energy providers for the planning area are Kinder-Morgan Energy Partners for petroleum pipeline and storage facilities, NV Energy (formerly Sierra Pacific Power Company) for electric and natural gas, and Southwest Gas for natural gas in the Incline Village area. NV Energy owns and operates no facilities that are rated 'Critical' per the DHS criteria of National Critical Facilities.

Extent:

The overall magnitude and potential severity of impacts of energy emergency is considered **Medium** in Washoe County. Typical energy emergency events are handled at the regional level and economic impacts could affect the entire county.

Considering a worst case scenario, an energy emergency could require federal support, can impact critical facilities and disrupt services for several days, and have national economic impacts.

Probability of Future Events:

Due to the sporadic history of occurrences, the broad range of potential causes and the unpredictability of these causes and the improvements of energy supply systems since these previous occurrences, probability of future occurrence is difficult to measure for this hazard. Overall probability of future energy emergency events is considered **Medium,** with a 1 to 10 percent chance of occurrence in a given year.

Planning Significance:

Effective mitigation efforts can be based on both structural and planning methods. Estimated damage from this hazard is primarily economic impact with a primary impact from a reduction in tourism. The hotel/casino industry could conceivably lose millions of dollars of revenue.

Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **Low.**

5.4.3 Hazardous Materials Events

Planning Significance:	Moderate

5.4.3.1 Nature

A hazardous material is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Hazardous materials can be present in any form; gas, solid, or liquid. Environmental or atmospheric conditions can influence hazardous materials if they are uncontained.

The U.S. Occupational Safety and Health Administration's (OSHA) definition of hazardous material includes *any substance or chemical which is a "health hazard" or "physical hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics.*

The Environmental Protection Agency (EPA) incorporates the OSHA definition, and adds *any item or chemical which can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment*. The EPA maintains a list of 366 chemicals that are considered extremely hazardous substances (EHS). This list was developed under the Superfund Amendments and Reauthorization Act. The presence of EHSs in amounts in excess of a "threshold planning quantity" requires that certain emergency planning activities be conducted.

A release or spill of bulk hazardous materials could result in fire, explosion, toxic cloud or direct contamination of people and property. The effects may involve a local site or many square miles. Health problems may be immediate, such as corrosive effects on skin and lungs, or be gradual, such as the development of cancer from a carcinogen. Damage to property could range from immediate destruction by explosion to permanent contamination by a persistent hazardous material.

Accidents involving the transportation of hazardous materials could be just as catastrophic as accidents involving stored chemicals, possibly more so, since the location of a transportation accident is not predictable. The U.S. Department of Transportation divides hazardous materials into nine major hazard classes. A hazard class is a group of materials that share a common major hazardous property, i.e., radioactivity, flammability, etc. These hazard classes include:

- Class 1-Explosives
- Class 2-Compressed Gases
- Class 3-Flammable Liquids
- Class 4-Flammable Solids; Spontaneously Combustible Materials; Dangers When Wet Materials/Water-Reactive Substances

- Class 5-Oxidizing Substances and Organic Peroxides
- Class 6-Toxic Substances and Infectious Substances
- Class 7-Radioactive Materials
- Class 8-Corrosives
- Class 9-Miscellaneous Hazardous Materials/Products, Substances, or Organisms

5.4.3.2 History

According to the Washoe County, Nevada Hazardous Materials Report: A Countywide Analysis of Fixed Facilities and Hazardous Materials in Transit, 314 hazardous material incidents were reported between 2008 and 2012, with a low of 47 incidents in 2010 and a high of 75 incidents in 2011. Of these incidents, 295 incidents occurred on local highways, 10 occurred on local railways, and 8 airway incidents were reported. The majority of these incidences occurred during the loading and unloads stage of the materials transportation.

One example of a highway hazardous materials incident occurred on August 5, 2008, when a semi-trailer truck carrying hazardous materials overturned one of its trailers. Several corrosive and flammable materials were spilled, resulting in the closure of eastbound I-80 ramps to and from Sparks Boulevard. The Nevada State Patrol, Sparks Fire Department, and Washoe County Health District responded to the accident. The freeway ramps remained closed for about eight hours while a private company performed clean-up operations. No injuries were reported resulting from the incident.

Over the five-year period for which data were analyzed, the most common hazard types involved in hazards materials were flammable combustible liquids and corrosive materials. The majority of the incidents occurred during the loading and unloading phase.

5.4.3.3 Location, Extent, and Probability of Future Events

Location:

Potential for contact with hazardous materials is present throughout all areas of Washoe County, due to three main factors:

- The widespread distribution of hazardous materials storage locations (fixed facility);
- The transport of hazardous materials via motor transportation and rail (transportation); and
- The transport of hazardous materials via pipeline (pipeline).

Fixed Facility

Nevada Administrative Code 477.323 states "A person shall not store a hazardous material in excess of the amount set forth in the International Fire Code, 2006 Edition as adopted pursuant to NAC 477.281, unless he has been issued an operational permit by the State Fire Marshal to store that material." A hazardous materials permit must be renewed annually through the Department of Public Safety, State Fire Marshal's Division (SFM).

In 1986, the Federal Superfund Amendments and Reauthorization Act (SARA) was passed. Title III of SARA is a freestanding statue titled the Emergency Planning and Community Right-To-Know Act (EPCRA).

Under EPCRA, certain businesses are required to annually report information about hazardous substances used and stored at their facilities. These annual reports, known as Tier II Reports, are submitted to County LEPCs, State Emergency Response Commissions (SERCs), and local fire departments.

EPCRA also includes planning requirements for facilities containing specified amounts of chemicals that are especially toxic and could pose a threat to the general public if released. The chemicals on this list are known as Extremely Hazardous Substances (EHSs), and the amount of each one that could pose a threat is known as its Threshold Planning Quantity (TPQ). There are 355 chemicals on this EHS list. Facilities that contain quantities of one or more of these chemical above their TPQ are considered emergency planning facilities and must comply with Section 302 of EPCRA. These facilities are required to notify SERCs and LEPCs of these chemicals' presence and assist with local emergency planning efforts as requested. Approximately one-third of the chemicals on the EHS list are also included in the list of materials designated as Hazardous Substances (HS) by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which includes hundreds of other chemicals. Additionally, facilities that contain more than 10,000 pounds of any other chemical designated as hazardous by the Occupational Safety and Health Administration (i.e., any chemical for which an employer must have a Material Safety Data Sheet, except for those considered as nuisance dust hazards only) must annually submit Tier II reports as discussed above. EPCRA also contains notification requirements for releases of EHSs or CERCLA Hazardous Substances above their Reportable Quantity. Responsible parties are required to notify the community emergency coordinator for the LEPC and local emergency response agency of any area likely to be affected by the release. Additionally, the SERC must be notified. If the release includes a CERCLA HS at or above its Reportable Quantity, the National Response Center (NRC) must also be notified. This information is used by local planners to update the inventory of reporting facilities, develop emergency response plans for potential releases, and identify ways of reducing the risks to their communities.

Highway Transportation

The Washoe County area is dissected by two main transportation corridors: Interstate 80 (east-west route) and US Highway 395 (north-south route). State routes in the area include SR 28 at Lake Tahoe, SR 431 at Mount Rose Highway, SR 341 Geiger Grade, and SR 445, 446, and 447 that lead north out of the Truckee Meadows. Refer to **Figure B-13** in **Appendix B** for a map of the I-80 and Hwy 395-580 transportation corridors.

There have been several studies regarding the shipments of hazardous materials along these corridors. NDOT completed a study in 1993; the State Emergency Response Commission completed a study in 1995; and ENR Consulting completed a snapshot survey in 1999. The focus of all studies was the major transportation corridors of I-80 and US 395. **Table 5-16** presents the results of the NDOT study.

Table 5-16: Hazardous Materials Statistics for Motor Transportation

US DOT Hazardous Materials Class	US 395-580 Daily Percentage of Materials (%)	US 395 Total Tonnage	I-80 Daily Percentage of Materials (%)	I-80 Total Tonnage
Class 1 – Explosives	2.2	6.52	5.0	114.13
Class 2 – Compressed Gases	19.5	109.73	10.2	230.20
Class 3 – Flammable Liquids	73.4	831.20	49.0	1109.23
Class 4 – Flammable Solids			1.6	36.20
Class 5 – Oxidizers and Organic Peroxides	2.6	24.91	7.7	174.73
Class 6 – Toxic and Infectious Substances			1.9	43.71
Class 8 – Corrosives	3.3	32.45	23.7	536.46
Class 9 – Miscellaneous Hazardous Materials			0.7	16.89
TOTAL		1004.81		2261.55

Source: NDOT; Washoe County Multi-Hazard Mitigation Plan, 2005

Rail Transport

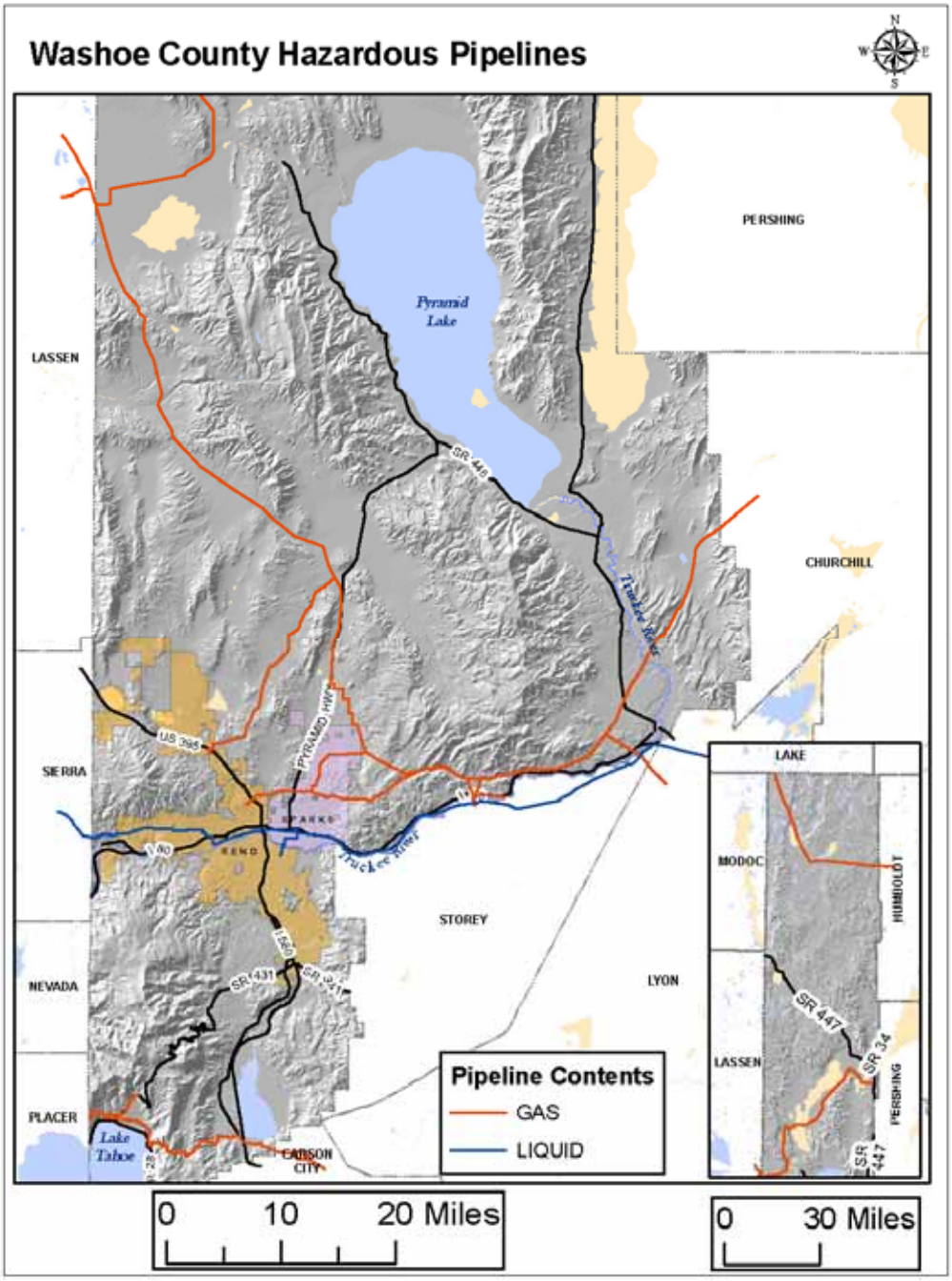
Nevada is served by the Union Pacific Railroad. It maintains a main line track that travels east and west along the Truckee River Corridor starting at Truckee, California and continuing east to Fernley, Nevada. The railroad route is within 100 yards of the Truckee River at many locations and crosses waterways at several additional locations. Refer to **Figure B-13** in **Appendix B** for a map of the Union Pacific Railroad transportation corridor.

Data supplied by Union Pacific for 1998 consisted of a total of 10,352 loads of hazardous materials. The hazardous materials loads can and will be mixed with other freight being moved by the train on any given day. The amount of hazardous materials is dependent upon product demand and can vary based on season.

Pipeline

There are three major pipeline systems that cross the planning area transporting hazardous materials. One carries petroleum products (gasoline, diesel, and jet fuel) and two others are high pressure natural gas transmission lines. **Figure 5-34,** shows the location of the pipelines profiled below.

Figure 5-34 - Washoe County Pipelines



Source: Washoe County GIS

Kinder Morgan Pipeline - Petroleum

Kinder Morgan operates an underground pipeline that transports approximately 13 million barrels of petroleum products (gasoline, diesel, and jet fuel) from the pump station in Rocklin, California to the Sparks, Nevada terminal annually. Jet fuel is then pumped from the Sparks terminal to the Fallon Naval Air Station in neighboring Churchill County, Nevada. Additionally, Kinder Morgan maintains a storage facility in the City of Sparks.

The Sparks Storage Facility terminal consists of 44 above ground steel storage tanks, 33 of which are owned and operated by Kinder Morgan. The remainders of the tanks belong to BP Air, Time Oil, Berry-Hinkley, and Shell Oil. None of the Kinder Morgan tanks are bolted down to the foundation, but are all protected by containment dikes. Capacities of the tanks range between 3,000 and 30,000 barrels. Fire protection consists of subsurface injection piping as well as numerous fire hydrants throughout the terminal.

Paiute and Tuscarora Gas Transmission Pipelines – Natural Gas

There are two high-pressure natural gas lines that supply the Washoe County region, the Paiute Company pipeline and the Tuscarora Gas Transmission Company pipeline. These pipelines deliver bulk rate natural gas to Southwest Gas Company and Sierra Pacific Power Company, which in turn deliver to the consumer. Both transmission lines originate in Canada but enter Nevada in different locations. **Table 5-17**, below, outlines the specifications for each pipeline.

Table 5-17: High Pressure Natural Gas Transmission Lines, Washoe County

Attribute	Paiute Pipeline	Tuscarora Gas Transmission
Date of Construction	1963	1995
Entry to Nevada	Approx. Mountain Home, ID	Herlong, CA
Size of Pipeline	12", 16", & 20"	20"
Line Pressure	1400 psi	1000 psi
Buried Depth	24" to 60"	24" to 60"

Source: Washoe County Multi-Hazard Mitigation Plan, 2005

Both natural gas pipelines are monitored by telemetry and can be shut down from remote locations. Both lines have block valves that are consistent with industry standards applicable at the time of installation. Each pipeline has vertical line of sight markers installed that provide warnings regarding pipe location, 'Call before You Dig' signs and emergency numbers.

Both of these lines are subject to damage by earth moving equipment, most likely from road construction and/or fighting wildfires. Both lines were constructed to withstand a 7.5 magnitude earthquake and the Paiute line has proven track record in this area.

Extent:

The overall magnitude and potential severity of impacts of hazardous materials spills is considered **Medium** in Washoe County, but varies based on type of facility. The impact of an accident and spill during roadway or rail transport depends largely on the spill location in reference to population centers and waterways. The vulnerability to hazardous materials disasters at fixed facilities includes either the potential for an explosive release or insidious leaking of materials into the ground or groundwater. Any release from the pipeline could have severe consequences to the population and the environment. The proximity of an existing pipeline to the Truckee River, its inlets and outlets, signifies a potential threat to the water system. All of the communities located along the Truckee River draw their water supply from the river or from wells that are directly affected by any product released from the pipeline. Cascading effects of a pipeline accident, particularly the potential for causing wildfires, is an additional concern.

More typical hazardous materials accidents are handled at the city or county level, disrupt services for up to two weeks, and have countywide economic impacts. Considering a worst case scenario, a hazardous materials release could require federal support, could impact critical facilities and disrupt services for more than 20 days, and have national economic impacts.

Probability of Future Events:

The average number of incidents from 2008-2012 is approximately 63 incidents per year. Based on the recurrence interval of previous hazmat release events (greater than 17% in any given year), and typical frequency of contributing factors or causes of hazardous materials release, probability of future events is considered **Very High**.

Probability of future hazardous materials events varies based on type of accident considered. As volume of hazardous materials transport, handling or production increases, the expected frequency of accidents involving uncontained release increases correspondingly. It is important to note, however, that an increase in hazardous materials regulation is likely to decrease potential for hazmat release events. Probability of a hazardous materials release via roadway, rail or fixed facility accident is marginally higher than probability of pipeline accidents, due to increased potential for human error or mechanical failure. Indicators for probability for pipeline accidents are linked to probability for other identified hazards including terrorism, earthquake and to a lesser extent wildfire. Frequency and probability of future hazardous materials accidents is discussed by facility type below, followed by an overall probability summary for hazardous materials events.

Fixed Facilities

The Washoe County Local Emergency Planning Committee (LEPC) Hazardous Materials Emergency Plan evaluated each of the fixed facilities through the use of the National Oceanic and Atmospheric Administration (NOAA) computer model known as CAMEO, Computer Aided Management of Emergency Operations and determined a likelihood of occurrence. This information is provided for each facility in **Table 5-18.**

Table 5-18: Washoe County Fixed Facilities Probability

Facility	Likelihood of Occurrence	Facility	Likelihood of Occurrence
Alta Gold Company Olinhouse Project	Low	Precision Rolled Products	Low to Medium
Amerigas	Low	R. R. Donnelly and Sons	Low to Medium
Bayshore Truck Equipment Company	Low	SEA Corporation	Low
Berry Hinkley Terminal	Low	7-Up Bottling Plant	Low
Crumrine MFG Jewelers	Low	Sierra Chemical Company	Low to Medium
Granite Construction Co. Lockwood Hot Plant	Low	Sierra Sid's 76 Inc.	Low
Granite Construction Co. Wadsworth Facility Cell	Low	Sun Chemical	Low to Medium
Henry Schein Company	Low to Medium	Time Oil Company	Low
Industrial Sterilization of Nevada	Low	Union Pacific Railroad Sparks Yard	Low
Model Dairy	Low to Medium	Washoe Medical Center	Low

Source: Washoe County Multi-Hazard Mitigation Plan, 2005

Highway Transportation

Higher volumes of hazardous materials traffic indicate increased probability of accident occurrence, assuming other factors remain unchanged. According to a study by the State Emergency Response Commission from 1995, data on accident frequency of roadway shipments of hazardous materials is available on a statewide level. Based on application of this statewide data to hazardous materials shipment volume in Washoe County, the study projected seven accidents per year along the I-80 corridor and three accidents per year along stretches of U.S. 395-580 in Washoe County. The probability of future occurrences is more frequent than annually.

Rail Transport

Data supplied by Union Pacific reports a total of 10,352 loads of hazardous materials for the calendar year 1998; **Table 5-19** provides detail on this report. The number of westbound loads of hazardous materials is approximately three times higher than eastward bound rail traffic.

Table 5-19: Union Pacific Railroad Commodity Report, 1998

Direction of Traffic	Type	Number
Westbound Rail Traffic	Car loads	2,087
	Inter-modal loads	5,481
	Sub Total	7,568
Eastbound Rail Traffic	Car loads	945
	Inter-modal loads	1,839
	Sub Total	2,784
Total		10,352

Source: Washoe County Multi-Hazard Mitigation Plan, 2005

Note: Loads may be mixed with other freight being moved by the train on any given day. The amount of hazardous materials transported is dictated by product demand and can vary based on the season. (Example: Substantially more hydrocarbons will be shipped in the winter months than summer.)

Pipeline

The following listed narrative describes probable scenarios for failure of the Kinder Morgan pipeline:

- **Construction:** Excavation is the most likely cause of damage to the pipeline. The potential for rupture due to nearby excavation is greatest in areas where the pipeline corridor intersects highways and railroad right of ways and areas of new construction. Breaks in the pipeline caused by excavation are also the most easily preventable type of break. Public education and awareness of the need for pipeline locates before digging or operating heavy equipment near the pipeline and coordinated efforts to make pipeline and utility locates easy to acquire and to identify will help to prevent future breaks. As the area within the pipeline corridor continues to grow and expand, the potential for damage will also continue to grow.
- **Earthquake:** Earthquakes pose a threat to the Kinder Morgan pipeline as well as to the terminal and fuel stations that are part of the distribution system fed by the pipeline. An earthquake has the potential of damaging the pipeline through three major forms of ground deformation: liquefaction, surface rupture, and landslide. The Kinder Morgan pipeline is constructed of high-grade steel using modern full penetration welding techniques. Pipelines constructed similarly to the Kinder Morgan Pipeline have withstood major earthquakes in the past with minor to no damage due to the ability of welded steel pipe to withstand considerable ground deformation without failure. The ductility of high-grade steel pipe provides the pipe with a large amount of resistance to rupture due to most ground deformation and shaking. Damage to tanks and connections, however, are common during events of extreme shaking. Tank damage such as sidewall buckling, separation of sidewalls from the bottom plate, and sloshing of liquids can result from severe shaking. If connections between pipes and tanks are not flexible they are vulnerable to damage during earthquakes. Containment dikes serve as a good line of defense in the event pipe connections break. Once contained within the dikes the petroleum products can be kept from ignition sources and the spill can be controlled.
- **Floods and Erosion:** River and stream crossings and locations where the pipeline is near embankments are subject to erosion. Floodwaters pose the greatest threat to breaking the pipeline since flooding can result in large amounts of erosion and mass wasting along drainage over a very short period of time. The pipe was originally buried at least 3 feet below the riverbed. Erosion has worn away the river bottom at some stream and river crossings sometimes leaving the pipe exposed. Kinder Morgan Pipeline has been vigilant about keeping embankments in place using riprap and other erosion control measures, retrenching, and reburying the pipe when it becomes exposed. These preventative measures have kept stream erosion from causing any breaks in the pipe in the past, however heavy flood waters can change the whole course of a river or stream in minutes. Some of these crossing may be at higher risk of erosion or embankment failure due to soil types, nearby tectonic activity, and gradient of the embankments and river. There are many more washes, dry creeks, marshes, and irrigation ditches that drain into the Truckee River that is transversed by the pipeline. It is imperative that, in the event of a spill, an assessment of the location is made to determine if it is in a drainage.

- **Corrosion & Settlement:** Pipelines are often subject to corrosion due to saline or alkaline ground water or in some cases chemical spills near the pipeline. Corrosion can in extreme cases lead to seepage and leakage underground. Kinder Morgan has a pilot fly the pipeline once a week looking for signs that such an underground leak has occurred. Unfortunately, often by the time above ground detection is made, damage may have already occurred to the watershed.
- **Landslide:** In the mountainous terrain along the west portion of the pipeline through Verdi, landslides and avalanches have the potential of uncovering and/or damaging the pipeline. The greatest hazard exists where the pipeline crosses steep mountainous areas due to landslides and stream erosion. Earthquakes, flooding and times of high run off can lead to an increased likelihood of landslides. During the original construction of the pipeline crews took into account the probability of avalanche and landslides and buried the pipe along steep inclines with up to 5 feet of ground cover. This foresight has probably saved the pipe from ever being subject to breakage from an avalanche or landslide in the past.
- **Summary:** A hazardous materials leak upstream form Chalk Bluff water treatment plant and downstream from Sparks on the spur to Fallon would be particularly problematic. A seepage of fuel would be the most difficult to detect and may be the most probable type of leak to impact the Truckee River watershed. Any release or potential for release within the Truckee River watershed area should be cause to review the Truckee River Regional Hazardous

Planning Significance:

Hazardous materials accidents are most-often human caused. Effective mitigation efforts can be based on both structural and planning methods. Based on assessments of geographic area affected, frequency and magnitude and severity, overall planning significance is considered **Moderate.**

5.4.4 Terrorism/Weapons of Mass Destruction (WMD)

Planning Significance:	Low

5.4.4.1 Nature

The Department of Justice (DOJ) Federal Bureau of Investigation (FBI) defines terrorism as the unlawful use of force or violence against persons or property to intimidate or coerce a government and/or the civilian population in furtherance of political or social objectives. Weapons of Mass Destruction (WMD) associated with terrorism can be chemical, biological, radiological, nuclear, or explosive in origin. Technological terrorism is defined as the intentional disruption in the nation's data control systems. Attacks on financial, business, and governmental computer networks are being considered as technological terrorist-related acts.

As defined by the FBI, **international terrorism** involves violent acts or acts dangerous to human life that are a violation of the criminal laws of the United States or any state, or that would be a criminal violation if committed within the jurisdiction of the United States or any state. These acts appear to be intended to intimidate or coerce a civilian population, influence the policy of a government by intimidation or coercion, or affect the conduct of a government by assassination or kidnapping. International terrorist acts occur outside the United States or transcend national boundaries in terms of the means by which they are accomplished, the persons they appear intended to coerce or intimidate, or the locale in which their perpetrators operate or seek asylum.‖ According to the U.S. Department of State, the current list of designated foreign terrorist organizations contains over 50 groups. Most prominent among these groups are al-Qa‘ida, Al-Shabaab, Boko Harem, HAMAS (Islamic Resistance Movement), ISIS, and Hizballah (Party of God). These groups share a similar Islamic extremist ideology; however, their objectives and, more importantly, their capabilities are different.

As defined by the FBI, **domestic terrorism** is the unlawful use, or threatened use, of force or violence by a group or individual based and operating entirely within the United States or Puerto Rico without foreign direction committed against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof in furtherance of political or social objectives.‖ Forms of domestic terrorism include: the illegal acts of those described as Homegrown Violent Extremists (HVEs), Extremists (religious, anti-government, political, etc), Hate Groups, and Lone Offenders.

The FBI is the primary investigatory agency for domestic terrorism. The Central Intelligence Agency (CIA) monitors potential security threats from foreign sources. The DOJ through the FBI will coordinate the domestic preparedness programs and activities of this nation to address the threat posed by terrorists and the use of weapons of mass destruction.

Examples of terrorism include the World Trade Center bombing in New York City, the Murrah Federal Building bombing in Oklahoma City, the Olympic Centennial Park bombing in Atlanta, and the Pan American Flight bombing over Lockerbie, Scotland.

Acts of terrorism may originate from a single person, special interest groups, or acts sponsored by a foreign government. Terrorist acts include the use of arson, hostile takeovers, shootings, biological agents (such as anthrax, plague, botulism and others), chemical agents (such as hydrogen cyanide, sulfur mustard, sarin and chlorine), hostage taking, and cyber. The most popular method used in recent events in the United States has been terrorism by bombing.

Bioterrorism

A bioterrorism attack is the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants. Most biological agents are naturally occurring in various parts of the world. They can be weaponized to enhance their virulence, make them resistant to current vaccines and antibiotics, or increase their ability to be spread into the environment. Biological agents can be spread through the air, through water, or in food. Terrorists use biological agents because they can be extremely difficult to detect, they do not cause illness for several hours to several days, and even the threatened use of a bio-weapon can have a tremendous psychological impact on the population. According to the Centers for Disease Control and Prevention (CDC), bioterrorism agents can be separated into three categories, depending on how easily they can be spread and the severity of illness or death they cause. These three categories include Category A, Category B, and Category C Bioterrorism agents. Following is a description of each category of bioterrorism agents:

Category A Bioterrorism Agents

These high-priority agents include organisms or toxins that pose the highest risk to the public and national security. They may be easily spread or transmitted from person to person. They result in high death rates, have the potential for major public health threat, and may cause public panic and social disruption. Category A agents include:

- Anthrax (Bacillus anthracis)
- Botulism (Clostridium botulinum toxin)
- Plague (Yersinia pestis)
- Smallpox (variola major)
- Tularemia (Francisella tularensis)
- Viral hemorrhagic fevers (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., Lassa, Machupo])

Category B Bioterrorism Agents

These agents are the second highest priority and are moderately easy to spread. They result in moderate illness rates and low death rates, and they require specific enhancements of CDC's laboratory capacity and enhanced disease monitoring. Category B agents include:

- Brucellosis (Brucella species)
- Epsilon toxin of Clostridium perfringens
- Food safety threats (e.g., Salmonella species, Escherichia coli O157:H7, Shigella)
- Glanders (Burkholderia mallei)
- Melioidosis (Burkholderia pseudomallei)
- Psittacosis (Chlamydia psittaci)
- Q fever (Coxiella burnetii)
- Ricin toxin from Ricinus communis (castor beans)
- Staphylococcal enterotoxin B
- Typhus fever (Rickettsia prowazekii)
- Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])
- Water safety threats (e.g., Vibrio cholerae, Cryptosporidium parvum)

Category C Bioterrorism Agents
These third highest agents include emerging pathogens that could be engineered for mass spread in the future. They are easily available, produced and spread. They have potential for high morbidity, mortality rates, and major health impact.

While bioterrorism attacks using any category of agent could create great psychological stress as well as physical illness and death, Category A agents would have a greater impact on public health and national security.

Chemical Agents

There are many different chemical agents that might be used in a terrorist attack. Varying effects include blistering, choking, incapacitation, and vomiting. Following is a list of chemical agents categorized byeffect.

Blood (Blister/Vesicants)
- Arsine (SA)
- Cyanogen Chloride (CK)
- Hydrogen Chloride
- Hydrogen Cyanide (AC)

Choking/Lung/Pulmonary Damaging
- Chlorine (CL)
- Diphosgene (DP)
- Cyanide
- Nitrogen Oxide (NO)
- Perflurorisobutylene (PHIB)
- Phosgene (CG)
- Red Phosphorous (RP)
- Sulfur Trioxide-Chlorosulfonic Acid (FS)
- Teflon and Perflurorisobutylene (PHIB)
- Titanium Tetrachloride (FM)
- Zinc Oxide (HC)

Incapacitating (Nerve/Riot Control/Tear Gas)
- Bromobenzylcyanide (CA)
- Chloroacetophenone (CN)
- Chloropicrin (PS)
- CNB - (CN in Benzene and Carbon Tetrachloride)
- CNC - (CN in Chloroform)
- CNS - (CN and Chloropicrin in Chloroform)
- CR
- CS

Vomiting
- Adamsite (DM)
- Diphenylchloroarsine (DA)

- Diphenylcyanoarsine (DC)

5.4.4.2 History

In May 2002, Lucas Helder was arrested for planting 18 pipe bombs in five states, including in Washoe County. The accused mailbox bomber told authorities that he was planting the bombs in a pattern to show a smiley face during this five-state weekend spree, and that he was fully aware that people would be injured when they exploded.

5.4.4.3 Location, Extent, and Probability of Future Events

Location:

All areas of Washoe County are potentially susceptible to the impacts of terrorism, though risk is comparatively higher in areas with larger concentrations of people. According to the FBI, sporting events, political gatherings, and other special events are attractive targets for domestic and foreign terrorists because they are highly visible and attract celebrities and political leaders. Based on this, the geographic location of high capacity venues is at relatively higher risk of terrorist attack. Other potential targets of terrorist activities include public works facilities, utilities, major infrastructure, and transportation facilities such as airports, bus and train stations. Military bases, schools, medical facilities and other state and federal facilities are other identified potential targets.

Extent:

Based on the Homeland Security Threat-Level System, it is anticipated that terrorism will remain a high to very high threat into the foreseeable future. Because terrorism events typically are focused on a single location or facility, estimated damage is less than one percent damage to facilities in Washoe County.

The overall magnitude and potential severity of impacts of terrorism and weapons of mass destruction is considered **High/Very High** in Washoe County.

Considering a worst case scenario, terrorism events can require state level support to respond to the incident, can impact critical facilities and disrupt services for 1 to 3 days, and have citywide economic impacts.

More typical terrorism events are handled at the city level, disrupt services for less than one day, and economic impacts are limited to the immediate community or part of the city involved.

Probability of Future Events:

Based on assessment of previous occurrences and frequency of contributing factors of terrorism, probability of future occurrence is considered **Low**, with an estimated occurrence of .1 to.5 percent chance of occurrence in a given year.

Planning Significance:

Effective mitigation efforts should take into account location, frequency, severity and impact to the community. Overall planning significance is considered **Low.**

5.4.5 Transportation of Radiological Materials and Waste

Planning Significance:	Moderate

5.4.5.1 Nature

The transportation of nuclear waste and other types of radiological materials is a common, yet maybe not widely known, practice within and through Washoe County. Washoe County roadways, railways, and airways ship different forms of radiological materials on a daily basis by many different sources. Washoe County is home to 40 specific licensees where radioactive materials are stored or used. These facilities include medical centers, which use radioactive materials for nuclear medicine and cancer treatment; industrial radiography for non-destructive testing of steel and concrete structures; research and academic institutions; and portable nuclear density gauges used at construction sites.

Radioactive materials are widely used and may be transported through Nevada if US DOT hazardous materials regulations are followed. Most shipments do not require prior notification and do not follow restricted routes. If the type or quantity of radiation exceeds a "Quantity of Concern" the shipper must notify the State of the planned time and route. These Radioactive Material in Quantities of Concern **(**RAMQC) shipments are not restricted and are not required to wait for approval. A more restricted category is Highway Route Controlled Quantity (HRCQ), which requires prior notification, and pursuant to a Governor's directive the shipment and transportation vehicle is inspected then escorted by the Nevada Highway Patrol. These shipments occur infrequently and only occasionally, about once every 3 years, through Washoe County.

The US Department of Energy (DOE) ships large quantities of low-level radioactive waste into Nevada for disposal at the Nevada National Security Site. The DOE has negotiated preferred routes for these shipments which do not cross Washoe County. Shipments could pass through Washoe County in the event of road closures on the preferred routes, but to date there are no documented cases of this happening.

The DOE also ships transuranic waste from California to Idaho via I 80. Transuranic waste is typically a result of cold war nuclear weapons research that took place at national laboratories. These shipments are inspected and escorted through Nevada on designated routes and with predetermined stopping points. In 2010 the DOE estimated that approximately 40 truckloads per year for 2 years would travel through Washoe County, however only 6 of these shipments actually took place. The potential for future shipments is unknown, and the I-80 route is still eligible.

The federal government initiative to establish a nuclear waste storage facility at Yucca Mountain in southern Nevada brings with it the assumption that nuclear waste and radioactive materials would be transported through Washoe County and that an accident involving the release of radioactive materials could occur.

Transportation of these materials is highly regulated by the DOE. Training, planning, and permitting are all provided by the DOE in order to help manage and mitigate the risks and hazards associated with the transportation of these materials.

5.4.5.2 History

There is no known history of nuclear waste transport spills in Washoe County.

5.4.5.3 Location, Extent and Probability of Future Events

Location:

The geographic location of transported nuclear waste would be along rail systems, major airports and highway corridors that cross Washoe County. The zone of potential impacts would extend beyond these transportation facilities. The size and shape of the zone of potential impacts is affected by the material released as well as atmospheric and environmental effects such as wind speed and water flow.

Figure 5-35 below, shows Nuclear Facility locations in the continental United States. Note Yucca Mountain in Nevada, southeast of Washoe County and Lawrence Livermore National Laboratory near San Francisco are both current and/or future locations which may require large amounts of waste to be transported through the state.

Figure 5-35 - Nuclear Facilities Locator Map, March 10, 2015

Source: Department of Energy, http://energy.gov/ea/nuclear-facilities
Note: Red rectangle indicates approximate location of Washoe County. Numerical map data points indicate two or more nuclear facilities in the same geographic location.

Extent:

The overall magnitude and potential severity of impacts of a nuclear waste transport accident is considered **Very High** in Washoe County.

A nuclear waste transport accident involving a release of radioactive materials could require federal support to respond, could impact critical facilities and disrupt services for more than 20 days, and have nationwide economic impacts.

Probability of Future Events:

There are several measures of probability for an accident involving the release of radioactive waste within the planning area.

The first is based on the fact that local radiological sources require transportation through the County daily. The chance Washoe County will experience an incident is probable simply due to the high amount of activity which occurs on a regular basis.

Major transportation routes existing in the County, such as Interstate 80, US Highway 395/580, major railroad routes, and Reno Tahoe International Airport, provide a likely location for a potential incident. Medical, construction, and traditional radiological materials, to include waste is commonly transported through these route sources, and as traffic increases and the demand for transportation grows the potential for an incident on one of these routes increases.

Accident potential would be marginally higher at rail and highway interchanges, tight radius corners, steep downgrades and locations vulnerable to terrorism. Based on variable circumstances affecting probability and frequency of previous occurrences, probability of future events is estimated as **Very Low,** with less than a 0.1 percent chance of occurrence in any given year.

Planning Significance:

The transportation of radiological materials to include waste is a human caused phenomenon. Effective mitigation efforts can be implemented during siting and design of fixed facilities, as well as through the development of hazardous materials management plans. Based on assessments of geographic area affected, frequency and magnitude and severity and uncertainty regarding the location of disposal sites, overall planning significance is considered Moderate**.**

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A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis consists of the following six steps: assets inventory, methodology, data limitations, exposure analysis, and summary of impacts.

6.1 ASSET INVENTORY

Asset inventory is the first step of a vulnerability analysis. Assets within each community that may be affected by hazard events include population, residential and non-residential buildings, and critical facilities and infrastructure. Assets and insured values throughout Washoe County are identified and discussed in detail below.

6.1.1 Population and Building Stock

Population data was obtained from the Nevada State Demographer's estimate of 2013 and shown in **Table 6-1.** Estimated numbers and replacement values for residential buildings, as shown in **Table 6-1**, were obtained from Washoe County Planning 2013 Residential Units data. Estimated numbers and replacement values for nonresidential buildings, as shown in **Table 6-1**, were obtained from Washoe County Assessor 2015 data.

The residential buildings considered in this analysis include single-family dwellings, mobile homes, multi-family dwellings, temporary lodgings, and nursing homes. Nonresidential buildings were also analyzed including commercial, industrial, agricultural, government, educational, and religious centers. Residential and nonresidential building replacement costs were calculated from appraised building values.

Although the building count or value may not be precise, whether residential or nonresidential, this analysis will meet the intention of DMA 2000 by providing County, City, and participating jurisdictions' residents with an accurate visual representation of their community's risk by hazard. This data is the most complete dataset available at the time and will be updated in a future version of the HMP.

Table 6-1: Estimated Population and Building Inventory

Population[1]	Residential Buildings[2]		Nonresidential Buildings[3]	
Total	Total Building Count	Total Value of Buildings (in billions)	Total Building Count	Total Value of Buildings (in billions)
Washoe County (Unincorporated)				
108,531	42,333	7.30B	1,180	.989B
City of Reno				
232,243	100,064	8.29B	50,390	8.84B
City of Sparks				
91,551	36,993	3.09B	6,747	1.93B
Pyramid Lake Paiute Tribe				
1,187	N/A	N/A	N/A	N/A
Reno-Sparks Indian Colony				
1,603	N/A	N/A	N/A	N/A
Truckee River Flood Management Authority				
N/A	N/A	N/A	N/A	N/A

[1]Nevada State Demographer Certified Estimate 2013
[2]Washoe County Assessor 2013
[3]Washoe County Assessor 2015

6.1.2 Critical Facilities and Infrastructure

A critical facility is defined as a public or private facility that provides essential products and services to the general public, such as preserving the quality of life in the County, Cities, and participating jurisdictions and fulfilling important public safety, emergency response, and disaster recovery functions. They are identified in Table 6-2.

Similar to critical facilities, critical infrastructure is defined as infrastructure that is essential to preserve the quality of life and safety in the County. Critical infrastructure is identified in **Table 6-2**.

Table 6-2: Critical Facilities and Infrastructure

Category	Type	Number	Estimated Value Total Structure/Mile (millions of $)
Washoe County			
Critical Facilities	Police Stations	7	12.92
	Fire Stations	24	8.37
	Government Buildings	66	539.07
	Public Primary and Secondary Schools	23	134.03
	Senior Center	1	N/A
	Care Facilities	3	9.73
	Communication Facilities (County Owned)	12	14.55
Critical Infrastructure	State and Federal Highways (miles)	602.68	N/A
	Airport Facilities	5	N/A

Table 6-2: Critical Facilities and Infrastructure

Category	Type	Number	Estimated Value Total Structure/Mile (millions of $)
	Bridges	76	16.0
	Utilities Sewer Lift Station Sewer Treatment TMWA Water Structures	 11 3 336	 .564 26.44 115.16
City of Reno			
Critical Facilities	Police Stations	7	123.23
	Fire Stations	14	26.30
	Government Buildings	25	125.55
	Public Primary and Secondary Schools	51	371.35
	Senior Centers	3	7.06
	Care Facilities	21	377.65
	Communication Facilities	N/A	N/A
Critical Infrastructure	State and Federal Highways (miles)	102.4	N/A
	Airport Facilities	3	530.0
	Bridges	115	240.35
	Utilities Water Treatment TMWA Water Structures	 1 339	 10.3 106.42
City of Sparks			
Critical Facilities	Police Stations	1	5.81
	Fire Stations	5	6.94
	Government Buildings	8	55.96
	Public Primary and Secondary Schools	20	108.50
	Senior Center	1	414.0K
	Care Facilities	10	57.31
	Communication Facilities	N/A	N/A
Critical Infrastructure	State and Federal Highways (miles)	19.3	N/A
	Bridges	30	62.70
	Utilities TMWA Water Structures	 134	 31.88
Reno Sparks Indian Colony			
Critical Facilities	Police Stations	2	139.8K
	Fire Stations	1	305K
	Admin Buildings	11	10.3
	Public Primary and Secondary Schools	3	1.31
	Senior Center	2	4.08
	Hospital/Emergency Room & Urgent Care/Ambulance	1	18.4
	Communication Facilities (City Owned)	N/A	N/A

Table 6-2: Critical Facilities and Infrastructure

Category	Type	Number	Estimated Value Total Structure/Mile (millions of $)
Critical Infrastructure	State and Federal Highways (miles)	0	0
	Bridges	0	0
	Utilities (Water, Waste Water, Gas, Electrical)	3	584K
Pyramid Lake Paiute Tribe			
Critical Facilities	Police Stations	1	250K
	Fire Stations	2	700K
	Admin Buildings	1	1.6
	Public Primary and Secondary Schools	3	2.9
	Senior Center/Rec Center	1	N/A
	Hospital/Emergency Room & Urgent Care/Ambulance	1	750K
	Communication Facilities	N/A	N/A
Critical Infrastructure	State and Federal Highways (miles)	N/A	50
	Bridges	1	2
	Utilities (Water, Waste Water, Gas, Electrical)	3	490K

- Estimated Value Total Structure: Washoe County Assessor – 2014

- Washoe County State and Federal Highways : 210.72 freeway miles maintained by NDOT; 391.96 highway miles maintained by NDOT

- Reno State and Federal Highways: 102.4 freeway miles maintained by NDOT

- Sparks State and Federal Highways: 19.3 freeway miles maintained by NDOT

Source: FEMA HAZUS-MH, Washoe County GIS, Washoe County Assessor, Pyramid Lake Paiute Tribe Emergency Manager, Reno-Sparks Indian Colony Emergency Manager.

*The Airport Facilities category includes the Nevada Army and Air National Guard facilities.

6.1.3 Other Assets

Assessing the vulnerability of Washoe County to disaster also involves inventorying the natural, historic, cultural, and economic assets of the area. This is important for the following reasons:

- The County may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing about them ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

- Losses to economic assets (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

In Washoe County, specific assets include the following:

- Natural Resources: There are three endangered species in the County: cui-ui (fish), carson wandering skipper (invertebrate), and steamboat buckwheat (plant). There are two threatened species in the County: warner sucker (fish) and lahontan cutthroat trout (fish). There is one proposed threatened species: webber's ivesia (plant). There are four candidate species for possible listing as threatened and endangered: mountain yellow-legged frog (amphibian), greater sage-grouse (bird), tahoe yellow cress (plant), and whitebark pin (plant).
- Historic Resources: There are 77 properties on the National Register of Historic Places within Washoe County.
- Cultural Resources: The Reno Philharmonic, Reno Chamber Orchestra, Fleischmann Planetarium, Nevada Opera, William F. Harrah Foundation National Automobile Museum, Nevada Museum of Art, Artouring, Sparks Heritage Foundation and Museum, Carson City, Donner Lake, Lake Tahoe, Tahoe Rim Trail, National Bowling Stadium, Pyramid Lake, Sparks Marina Park, Virginia City, and Wild Island are all cultural organizations and resources for the County.
- Economic Assets: According to the Washoe County Consensus Forecast 2008 - 2030, the industries that employed the highest percentages of Washoe County's labor force in 2008 were services (40%); retail trade (13%); finance, insurance, and real estate (11%); and government (10%).

After a disaster, economic vitality is the engine that drives recovery. Every community has a specific set of economic drivers, which are important to understand when planning ahead to reduce disaster impacts to the economy. When major employers and sectors suffer severe losses and/or are unable to return to normal operations, impacts ripple throughout the community.

6.2 METHODOLOGY

This section describes the overall vulnerability, identifies structures and estimates potential losses to building, infrastructure and critical facilities located in identified hazard areas. This assessment was limited to the hazards that were considered moderate or high in planning significance, based on the Planning Committee input and the hazard profiles. Hazards with low planning significance are not included in the vulnerability assessment. These include the following:

- Criminal Acts
- Energy Emergency
- Volcano

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. Hazard areas were determined using information provided by the U.S. Seasonal Drought Monitor, HAZUS, Nevada Bureau of Mines and Geology, and NWS. This analysis is a

simplified assessment of the potential effects of the hazard on values at risk without consideration of probability or level of damage.

Using GIS, the building locations of critical facilities were compared to locations where hazards are likely to occur. If any portion of the property where the critical facility was located fell within a hazard area, it was counted as impacted. Population estimates of impacted properties were calculated using residential units data and occupancy and persons per household multipliers from the Washoe County Population Estimate Model .Using census block level information, a spatial proportion was used to determine the percentage of the population and residential and nonresidential structures located where hazards are likely to occur. Census blocks that are completely within the boundary of the hazard area were determined to be vulnerable and were totaled by count. A spatial proportion was also used to determine the amount of linear assets, such as highways and pipelines, within a hazard area. The exposure analysis for linear assets was measured in miles. For drought and infectious disease, population was the only asset analyzed, as drought mainly affects people and agricultural lands.

Replacement values were developed for physical assets. These values were obtained from the County's Assessor's Office and HAZUS-MH 2014 run. For facilities that did not have specific values per building in a multi-building scenario (e.g., schools), the buildings were grouped together and assigned one value. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared except for earthquake (HAZUS-MH 2014).

6.3 DATA LIMITATIONS & FUTURE DEVELOPMENT

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

The resulting analysis was compiled to the highest degree possible with the hardware, software and data availability limitations discovered during plan preparation. HAZUS was able to determine the population and critical facilities within a given hazard area and from there a limited assessment was derived. In the situation of Drought & Infectious Disease, where structures would not usually be affected the term N/A (not applicable) is used.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to a hazard. It was beyond the scope of this HMP to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the HMP.

6.3.1 Future Development

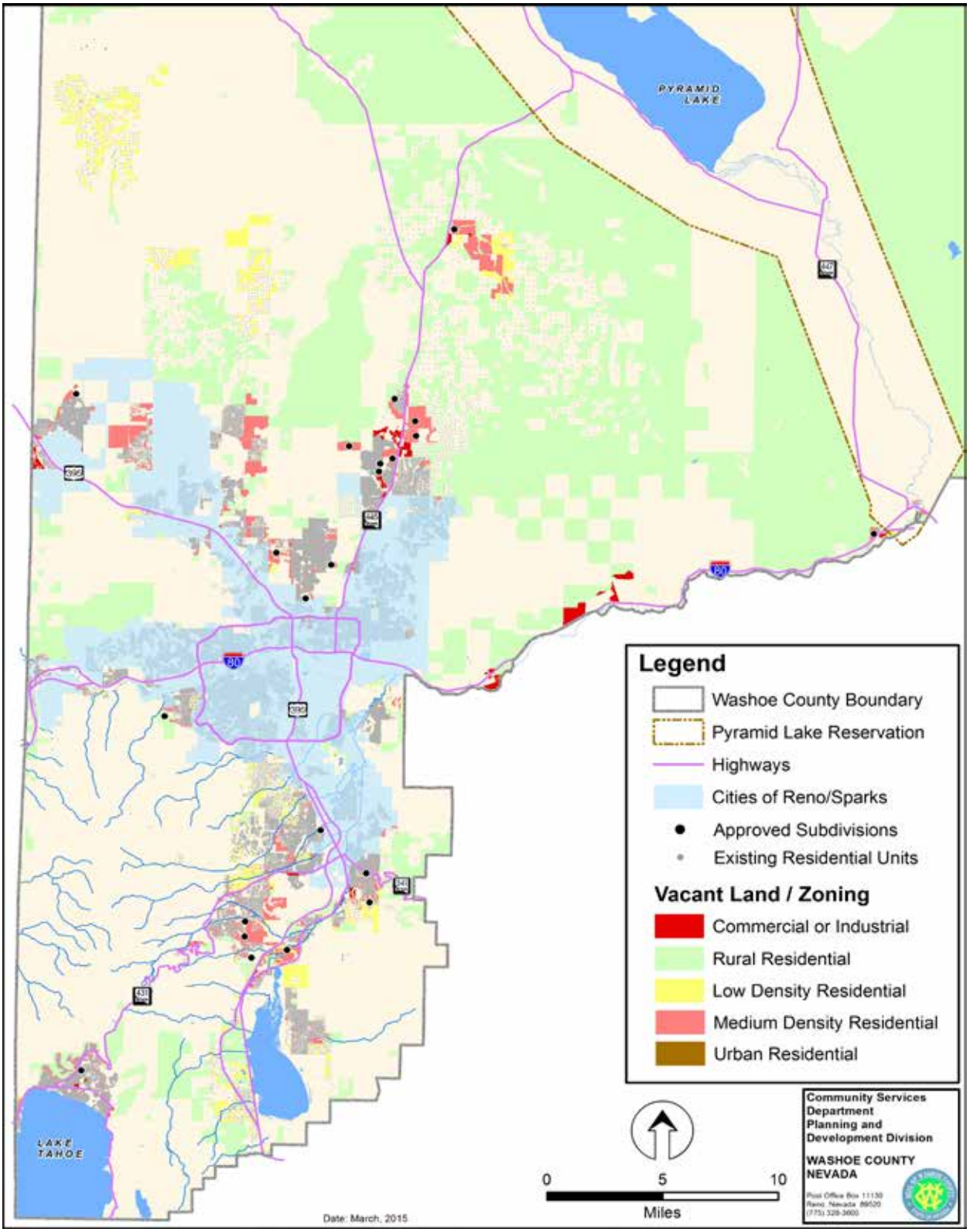
Washoe County has been steadily growing over the last four decades. Long term forecasts by the Nevada State Demographer project population growth in Washoe County continuing through the middle of the century, effectively doubling the 2000 county population by the year 2030.

Vacant residential land in the unincorporated County is currently zoned for a variety of single-family densities. Multi-family densities are generally prohibited by the Truckee Meadows Regional Plan in the unincorporated county, although there is some potential for such density in the Incline Village area of Lake Tahoe. Much of the vacant land is zoned for low density (2,015 units) and medium density (18,105 units at total build-out potential) suburban development. There is also a large amount (3,017,105 acres) of vacant general rural residential land that is meant for very low density or no development at all. Less land is zoned for more intense uses. There are only 64 acres of vacant land zoned for urban residential density in the unincorporated county, most of which is located in the Lake Tahoe basin.

Figure 6-1 below illustrates existing and potential development for the unincorporated County. Areas of more intense existing and potential development can be identified by the density of existing residential development and vacant land zoned for medium density residential, urban residential, commercial, or Industrial land uses. Approved (but not yet built out) subdivision projects are also depicted. Various mitigation actions are set forth in Section 8.0 Mitigation Strategy to address the mitigation of these existing and potential development areas.

The zoning and master plan for the County and Cities take into account mapped hazards. Impacts on future development due to natural hazards are mitigated by existing building codes and zoning ordinances.

Figure 6-1 Washoe County Vacant Land/Zoning



Land Use/Zoning

The regionally permitted land use patterns in Washoe County are dictated by the latest adopted version of the Truckee Meadows Regional Plan. In general, urban intensity land uses are restricted to the cities of Reno and Sparks. The unincorporated county is allowed to permit suburban residential development at a maximum density of 3 dwelling units per acre, although there are some legacy areas that pre-date the regional planning legislation that do allow more urban level development, but they are very limited in size. Commercial and Industrial development is allowed in the unincorporated area, but at a limited scale. The Lake Tahoe basin is regulated by the Tahoe Regional Planning Agency. More intense and clustered urban type development is allowed in the Lake Tahoe basin under certain circumstances.

- **Maximum permitted residential density:** The zoning districts in unincorporated Washoe County allow for a variety of housing types. Some communities are maintaining their historic rural character with large lot zones and others are comprised of more suburban landscapes typical of areas on the outskirts of cities in the western United States. The more rural communities, such as Rancho Haven, are in zones that allow a minimum of one dwelling unit for every 10 acres (0.1 dwelling units per acre) and are often associated with equestrian uses. Unincorporated Washoe County has 3 rural residential zoning districts. Low Density Rurual allows 10-acre lots, Medium Density Rural 5-acre lots, and High Density Rural 2.5-acre lots. Most of this type of development is more remote and is generally not served by municipal infrastructure, such as a community water and sewer systems, but rather by wells and septic systems. The next group of zones is suburban, which allow from one unit per acre to seven dwelling units per acre for single-family detached or nine dwelling units acre for single-family attached and mobile homes. Although Washoe County does have a High Density Suburban zoning designation, which allows 7 dwelling units per acre (9 attached), the Truckee Meadows Regional Plan prohibits the county from applying this designation to new areas and limits overall suburban density to 3 dwelling units per acre (i.e. Medium Density Suburban). The final group is the urban zones. These zones are generally located either in established communities near the cities of Reno-Sparks or in the Lake Tahoe basin, or denote mobile home parks. The least dense urban zone allows 10 dwelling units per acre for detached homes, 14 units per acre for multi-family homes and 12 units per acre for mobile homes. The densest zone allows up to 42 multi-family units per acre, but this zone is no longer utilized by the county.

- **Minimum lot size:** Minimum lot sizes can contribute to the character and design of a neighborhood as much as the assigned density or intensity of units allowed. Minimum lot sizes can also be varied or altered if the common open space subdivision process is utilized. The Low Density Rural zone requires eight acre minimum lots while the Medium Density Rural zone requires at least four acres. These rural zones generally utilize parcel maps to subdivide (4 lots or less, no municipal infrastructure such as curb and gutter required), which often results in typical contiguous platted lots with no open space. The suburban zones require an acre or less. The low density suburban zone requires a lot of at least 35,000 square feet and the high density suburban zone requires smaller lots of 5,000 square feet, although this is an uncommon regulatory zone in the

unincorporated county. The most common suburban designations and developments (in terms of number and geographic area) are comprised of the Medium Density Suburban (3 units per acre) and Low Density Suburban (1 unit per acre) zones. The lots continue to get smaller in the urban zones from 3,700 square feet for single family detached and 8,000 square feet for single-family attached units. In the low density urban zone, to 3,700 square feet for single-family detached homes and 8,000 square feet for 8- unit multi-family developments.

- **Maximum height:** Six of the nine zoning categories in the County have maximum height standards of 35 feet. The urban zones have higher maximums beginning with 40 feet for the low density urban zone, and 70 feet for both the medium and high density urban zones. Maximum heights for commercial and/or industrial range from 45 to 80 feet.

The planning and zoning enabling legislation in the Nevada Revised Statues require an analysis of land characteristics that are appropriate for development and subsequent zoning districts regarding the intensity and location of land uses. The following zoning and vacant land information addresses this point. The County's zoning classifications allow a variety of development types throughout the County.

Residential Zoning Districts

As discussed previously, Washoe County's residential base zones permit a wide range of densities that reflect the range of lifestyle opportunities available in the unincorporated County. The following describes in more detail the zoning districts available and their intended purpose:

- **Low Density Rural Regulatory Zone (LDR) -** The LDR zone is designed to preserve areas where agriculture, grazing, and/or open space predominate. Single-family, detached dwellings are permitted on large lots; detached or attached accessory dwellings 50% the size of the main dwelling are allowed with an administrative approval; single-family dwellings may be clustered to retain open space and agricultural uses. The maximum number of dwelling units that may be located in this regulatory zone is one (1) unit per ten (10) acres. The minimum lot area in this regulatory zone is eight (8) acres.

- **Medium Density Rural Regulatory Zone (MDR) -** The Medium Density Rural (MDR) Regulatory Zone is intended to preserve areas where agriculture, grazing and/or open space predominate. Single-family, detached residences in this area are generally on five (5)-acre lots and have limited public services and facilities available; detached or attached accessory dwellings 50% the size of the main dwelling are allowed with an administrative approval. Multi-family residences are not appropriate, but single-family homes may be clustered to retain open space and agricultural uses. The maximum number of dwelling units that may be located in this regulatory zone is one (1) unit per five (5) acres. The minimum lot area in this regulatory zone is four (4) acres.

- **High Density Rural Regulatory Zone (HDR) -** The High Density Rural (HDR) Regulatory Zone is intended to preserve and create areas of single-family, detached dwellings in a semi-rural setting. Livestock grazing and agricultural activities are

common secondary uses, as are detached or attached accessory dwellings 50% the size of the main dwelling.

- **Low Density Suburban Regulatory Zone (LDS)** - The Low Density Suburban (LDS) Regulatory Zone is intended to create and preserve areas where single-family, detached homes on one (1) acre lots are predominant. Detached or attached accessory dwellings 50% the size of the main dwelling are allowed with an administrative approval. Small neighborhood commercial uses may be permitted when they serve the needs of residents and are compatible with the residential character of the area. The maximum number of dwelling units that may be located in this regulatory zone is one (1) unit per one (1) acre. The minimum lot area in this regulatory zone is thirty-five thousand (35,000) square feet.

- **Medium Density Suburban Regulatory Zone (MDS)** - The Medium Density Suburban (MDS) Regulatory Zone is intended to create and preserve areas where the predominant dwelling type is single-family, detached units at three (3) units per acre. Detached or attached accessory dwellings 50% the size of the main dwelling (800 square feet maximum) are allowed with an approval of a Special Use Permit from the Board of Adjustment. Small neighborhood commercial and civic uses may be permitted when they serve the needs of the residents and are compatible with the residential character of the area. The maximum number of dwelling units that may be located in this regulatory zone is three (3) units per one (1) acre. The minimum lot area in this regulatory zone is twelve thousand (12,000) square feet.

- **High Density Suburban Zone (HDS)** - The High Density Suburban (HDS) Regulatory Zone is intended to create and preserve neighborhoods where the predominant housing type is single-family, detached units at seven (7) units per acre. Attached single-family units are also permitted at nine (9) units per acre, subject to special review. Small neighborhood commercial and civic uses may be permitted when they serve the needs of the residents and are compatible with the residential character of the area. The maximum number of dwelling units that may be located in this regulatory zone is seven (7) units per one (1) acre for single-family detached; and nine (9) units per one (1) acre for attached single family and mobile home parks. The minimum lot area in this regulatory zone is five thousand (5,000) square feet.

- **Low Density Urban Regulatory Zone (LDU)** - The Low Density Urban (LDU) Regulatory Zone is intended to create and preserve areas where single-family dwellings (at ten (10) units per acre) and multi-family dwellings (at fourteen (14) units per acre) are located. Some commercial, professional and civic uses may be permitted when they serve the needs of local residents and are compatible with the residential environment. The maximum number of dwelling units that may be located in this regulatory zone is ten (10) units per one (1) acre for single-family; fourteen (14) units per one (1) acre for multi-family; and twelve (12) units per one (1) acre for mobile home parks. The minimum lot area in this regulatory zone is eight thousand (8,000) square feet, with two (2) dwelling units (attached) per lot. The minimum lot area for an individual dwelling unit in this regulatory zone is three thousand seven hundred (3,700) square feet.

- **Medium Density Urban Regulatory Zone (MDU) -** The Medium Density Urban (MDU) Regulatory Zone creates and preserves areas where the predominant housing type is multi-family dwellings at twenty-one (21) units per acre. In Medium Density Urban areas, commercial, professional, and civic uses are permitted when they serve the needs of the local residents and are compatible with the residential environment. The maximum number of dwelling units that may be located in this regulatory zone is twenty-one (21) units per one (1) acre. The minimum lot area in this regulatory zone is eight thousand (8,000) square feet, with four (4) multi-family units per lot. The minimum lot area for an individual dwelling unit in this regulatory zone is three thousand seven hundred (3,700) square feet.

- **High Density Urban Regulatory Zone (HDU) -** The High Density Urban (HDU) Regulatory Zone is intended to create and preserve areas where multi-family dwellings at forty-two (42) units per acre are predominant. In High Density Urban areas, commercial, professional, and civic uses are permitted when they serve the needs of local residents and are compatible with the residential environment. The maximum number of dwelling units that may be located in this regulatory zone is forty-two (42) units per one (1) acre. The minimum lot area in this regulatory zone is eight thousand (8,000) square feet with eight (8) multi-family units allowed per lot. The minimum lot area for an individual dwelling unit in this regulatory zone is three thousand seven hundred (3,700) square feet.

- **General Rural Regulatory Zone (GR) -** The General Rural (GR) Regulatory Zone is intended to identify areas that are:

  (1) Remote and will have no or very low density development (i.e. one (1) dwelling unit per forty (40) acres),

  (2) Remote but where unique developments may occur (e.g. destination resorts).

  (3) Suitable for more intensive resource extraction, including energy production, and

  (4) Suitable for large scale agricultural and/or grazing operations. This regulatory zone identifies areas that may have one or more of the following characteristics:

    (i) Floodplains. The parcel or area is within the 100-year floodplain identified on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) or other potential floodplain areas identified by the Washoe County Department of Public Works.

    (ii) Potential Wetlands. The parcel or area is within a "potential wetland area" as identified by the U.S. Army Corps of Engineers (COE) or other potential wetland areas identified by the Washoe County Department of Community Development and the Washoe County Department of Public Works.

    (iii) Slopes. The parcel or area has moderate slopes (between fifteen (15) and thirty (30) percent) or steep slopes (thirty (30) percent or steeper) based on the best available topographic information.

    (iv) Public Ownership. The parcel or area is under public ownership.

(v) Remote Location Lacking Infrastructure. The parcel or area is in a remote location that does not have public infrastructure adjacent to or near the site.

(vi) Agriculture and Grazing. The parcel or area is actively engaged in agricultural production or livestock grazing.

(vii) Resource Extraction and Energy Production. The parcel or area is suitable for, or is currently engaged in, resource extraction related uses or energy production.

(viii) Conservation of Natural Resources and Open Space. The parcel or area has unique natural resources, scenic quality, habitat value, or open spaces.

Table 6-3 below breaks down vacant residential land by zoning type and its development potential (assuming no constraints and total build-out).

Table 6-3 Vacant Residential Land by Zoning in Unincorporated Washoe County

Zone	Sites	Acres	Approximate Dwelling Unit Potential
Low Density Rural (LDR .1 du/acre)	509	5,766	577
Medium Density Rural (MDR .2 du/acre)	268	2,430	486
High Density Rural (HDR .4 du/acre)	702	2,383	953
Low Density Suburban (LDS 1 du/acre)	1,526	7,377	7,377
Medium Density Suburban (MDS 3 du/acre)	1397	3,323	9,969
High Density Suburban (HDS 7 du/acre)	520	109	763
Low Density Urban (LDU 10 du/acre)	57	62	620
Medium Density Urban (MDU 14 to 21 du/acre)	10	2	28
Total	4,989	21,452	20,773

6.3.2 Changes in Development

Due to the economic downturn, overall development in the County for the last five years has been minimal.

Washoe County

All development in Washoe County is subject to significant earthquake hazards due the seismic zone and geologic characteristics of the region. In fact, historical records of earthquake activity indicate that the area is overdue for a significant earthquake event. Current building codes account for this risk to the extent possible, but complete mitigation is not achievable. Certain areas of the county are more at risk than other areas regarding earthquake hazards. Planning staff is not aware of any major developments that are located or proposed to be located in such areas, such as below Slide Mountain or in soils with significant liquefaction potential. To staff's knowledge, known fault zones do not underlie any of the existing major development projects in the unincorporated county. County code requires known fault zones to be depicted on plans for building permits and for new subdivisions.

Several existing and approved but not built developments are at risk of flooding or are in flood prone areas, but approval of such developments requires mitigation measures, such as Letter of Map Revisions (LOMR) to FEMA FIRM maps, on-site detention / retention basins, elevation / fills for building pads, and drainage improvements. Through its land use and zoning authority, the county has attempted to zone flood prone areas for less intense development or no development at all.

Fire is also a risk for all development in Washoe County due to the high desert climate and vegetation. Fire codes account for this risk, but complete mitigation is not possible. The most at risk existing and future development for wildland fire are residential subdivisions located near the wild land urban interface, particularly in the more forested areas of the county. Private land zoned for residential subdivisions (of varying density) with such characteristics will continue to be developed but mitigation, such as defensible space and indoor sprinkler systems, will be required to mitigate this risk to the extent possible. The County's Fire and Building Codes were updated in 2014 to require additional fire safety building measures and methods for construction in identified Wildland Urban Interface areas.

County codes are continually being updated to address known risks that emerge as natural disaster events occur. Zoning is rarely changed in response to such events, but changes do occasionally occur, usually as a result of private land converting to public use. The Conservation Element of the Washoe County Master Plan has been updated to incorporate policies and mapping that addresses known hazards.

City of Reno

The City of Reno is the largest and fastest growing urban area in the Washoe County planning area. The only natural resource constraints that would affect growth are availability of developable land and water supply. The first constraint can be removed by expanding the amount of land available for development in the City of Reno. This has been achieved through recent expansions of Reno's share of the Truckee Meadows Service Area and by increasing the density of development on the remaining vacant, underutilized, and redeveloped land, particularly in the TOD's and Regional Centers.

The Reno portion of the Truckee Meadows Service Area (TMSA) is defined in the Regional Plan as areas within which municipal services and infrastructure will be provided. The City TMSA boundary is synonymous with its Sphere of Influence boundary and is the specific area in which the City can expand its corporate limits. Based on this information, and with its aggressive infill policy, the City can accommodate an increase in population from an estimated 220,600 in 2007 to 339,500 in 2030 at the required average minimum densities of 4 people per acre. The second constraint can be removed by developing new sources of water supply, particularly in the Lemmon Valley Hydrographic Basin. There are currently efforts underway to do so. Hence, the population forecast is not constrained; it accommodates a continuation of current market trends identified in the consensus forecast.

City of Sparks

The City of Sparks is the second largest urban area in Washoe County, behind the City of Reno. This future growth is planned at an overall minimum density of 4 persons per acre, however, it is expected that the developable areas within the future service areas will occur at significantly higher densities. It is also expected that certain areas within the current population center will experience significant intensification of use. The City plans on both its future service areas and infill areas to develop in a sustainable, mixed-use manner based upon principles which are compatible with the regions arid climate. This growth will require effective master planning to serve the newly developed areas, as well as to mitigate any potential impact upon the services of the current population centers. In order to meet the anticipated needs of the City of Sparks, an annexation program was prepared in compliance with Chapters 268 and 278 of the Nevada Revised Statutes. The program identifies areas in "Sphere of Influence" of the City of Sparks as shown in the Truckee Meadows Regional Plan to be considered for annexation to the City within the seven-year period from 2008 to 2015. This program identifies areas proposed for annexation and review of these annexation areas in light of the factors to be considered in the Truckee Meadows Regional Plan.

All incorporated areas contiguous to the City are eligible for annexation under NRS 268.670 upon application of 100% if the property owners of the subject area. Areas within the City's Sphere of Influence area also eligible for annexation under the processes laid out in NRS 268.610 through 268.668 which are governed in part by 268.670.

Reno-Sparks Indian Colony

Reno-Sparks Indian Colony's Economic Development Department is in the process of expanding commercial projects including a 24-acre site in Spanish Springs and future redevelopment of the parcel which currently houses the Northern Nevada Restitution Center. Reno-Sparks Indian Colony's Economic Development Department is also in the process of expanding commercial projects including a 24-acre site in Spanish Springs and future redevelopment of the parcel which currently houses the Northern Nevada Restitution Center. There is no other significant industrial or residential development for the Reno-Sparks Indian Colony planned in the next five years. Additionally, there are no land use or zoning changes planned.

Pyramid Lake Paiute Tribe

Pyramid Lake Paiute Tribe is also in the process of developing an economic development plan that will expand commercial businesses into the Wadsworth area. They are in the early stages of replacing all water and sewer lines in the Wadsworth area to accommodate this anticipated

commercial growth. The water lines have been replaced and updated to better serve the community. The Wadsworth area sits in a low area that has experienced flooding in years past. The 1997 flood sent a large amount of water down the river which runs through the Wadsworth community causing extensive flooding in the Wadsworth area. A mitigation plan has to be developed and then completed to protect this community in the future.

6.4 EXPOSURE ANALYSIS

The requirements for a risk assessment, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

Assessing Vulnerability: Overview
Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
Element
- Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- Does the new or updated plan address the impact of each hazard on the jurisdiction?

Source: FEMA 2008.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Identifying Structures

Assessing Vulnerability: Identifying Structures
Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.
Element
- Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
- Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

Source: FEMA 2008.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Estimating Potential Losses

Assessing Vulnerability: Estimating Potential Losses
Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.
Element
- Does the new or updated plan estimate potential dollar losses to vulnerable structures?
- Does the new or updated plan reflect changes in development in loss estimates?
- Does the new or updated plan describe the methodology used to prepare the estimate?

Source: FEMA 2008.

The results of the exposure analysis are summarized in **Tables 6-4** through **6-13** and in the discussion below. The results in this exposure analysis were greatly affected by the hardware,

software and data availability limitations described above. The significant hazards designated as high and moderate are included in the exposure analysis below.

This vulnerability analysis was largely performed by the Washoe County GIS Department in cooperation with the Washoe County Assessor's Office. Therefore, the data and hazard mapping available was more detailed than the previous plan update. As a result, there is an increase in most of the loss estimates.

Future development based on building code and zoning ordinances was considered in the compilation of the loss estimates. Impacts on future development due to natural hazards are mitigated by existing building codes and zoning ordinances.

Table 6-4: Washoe County Potential Hazard Vulnerability Assessment – Population and Buildings

Hazard	Population	Buildings			
		Residential		Nonresidential	
	Number	Number	Value ($)	Number	Value ($)
Unincorporated Washoe County	108,531	42,333	7.30B	1,180	989.53M
Avalanche	17,977	7,786	1.82B	3,963	244.35M
Drought	108,531	N/A	N/A	N/A	N/A
Earthquake –Magnitude 6.5 (50% chance in 50 years)	108,531	339	584M	95	79.2M
Flood – 100-Year Flood Zone	3631	1573	264.27M	1657	36.79M
Flood - 500-Year Flood Zone	1664	721	96.72M	166	15.4M
Hazardous Materials Event – 1-mile radius hazardous facilities	60,934	26,391	3.49B	6,871	779.04M
Hazardous Materials Event – 1-mile buffer transport corridors	52,502	22,739	4.67B	6,339	845.17M
Infectious Disease	108,531	N/A	N/A	N/A	N/A
Nuclear Waste Transport – 1 mile buffer transport corridors	52,502	22,739	4.67B	6,339	845.17M
Severe Weather – 25% of population & .5% of buildings	27,133	211	36.4M	37	4.7M
Wildland Fire	68,671	29,742	5.81B	13,091	661.5M

N/A – Not Available or Not Applicable

Sources: Washoe County GIS; Washoe County Assessor; Washoe County Planning; Washoe County Population Estimate Model; Nevada Bureau of Mines and Geology HAZUS-MH Report 2014; Nevada State Demographer

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-5: Washoe County Potential Hazard Vulnerability Assessment – Critical Facilities and Infrastructure

	Police Stations (7)		Fire Stations (24)		Government Buildings (66)		Public Primary & Secondary Schools (23)		Care Facilities (3)		Communication Facilities (12)		Airport Facilities (5)		Utilities (350)	
Hazard	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)
Avalanche	1	12.07K	0	0	3	1.15	3	9.46	1	3.24	0	0	0	0	0	0
Drought	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Earthquake - Magnitude 6.5	1	1.85	2	697.5K	6	49	2	11.65	1	3.32	1	1.21	1	N/A	28	26.5
Flood - 100-Year Flood Zone	2	19.03	4	675.73 K	8	33.08	2	3.75	0	0	1	500K	0	0	18	9.14
Flood – 500 – Year Flood Zone	1	12.29	2	22.88K	16	140.33	0	0	2	9.73	0	0	0	0	3	146.21 K
Hazardous Materials Event – 1-mile radius hazardous facilities	5	12.91	10	3.44	58	518.40	18	81.23	3	9.73	6	8.8	3	N/A	107	43.44
Hazardous Materials Event – 1-mile buffer transport corridors	4	143.0K	15	4.99	45	422.89	14	68.07	3	9.73	8	9.8	1	N/A	195	63.01
Infectious Disease	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear Waste Transport	4	143.0K	15	4.99	45	422.89	14	68.07	3	9.73	8	9.8	1	N/A	195	63.01
Severe Weather – 25% of population & .5% buildings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wildland Fire	3	142.6K	22	8.23	23	237.88	16	82.75	1	3.26	8	10.55	2	N/A	272	78

Value ($) in millions / buildings only N/A = Not Applicable or Not Available

Sources: Washoe County GIS; Washoe County Assessor; Washoe County Planning; Washoe County Population Estimate Model; Nevada Bureau of Mines and Geology HAZUS-MH Report 2014; Nevada State Demographer

1. Airport Facilities includes airstrips only at Spanish Springs, Hungry Valley, Columbia Hill, Warm Springs and Empire.
2. Utilities include TMWA water structures, and Washoe County sewer lift stations and sewer treatment facilities. Value for TMWA water structures is average replacement cost; value for Washoe County facilities is appraised building value.

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-6: City of Reno Potential Hazard Vulnerability Assessment – Population and Buildings

Hazard	Population	Buildings			
		Residential		Nonresidential	
	Number	Number	Value ($)	Number	Value ($)
Total for City of Reno	215,533	100,064	8.29B	50,390	8.84B
Avalanche	0	0	0	0	0
Drought	215,533	0	0	0	0
Earthquake –Magnitude 6.5 (30-40% chance in 50 years)	215,533	256	110.75M	191	167.58M
Flood – 100-Year Flood Zone	2,556	1,187	150.18M	456	230.30M
Flood - 500-Year Flood Zone	10,761	4,996	113.28M	2,328	1.36B
Hazardous Materials Event – 1-mile radius hazardous facilities	128,244	59,539	6.92B	50,306	8.74B
Hazardous Materials Event – 1-mile buffer transport corridors	93,765	43,532	4.91B	47,678	7.93B
Infectious Disease	215,533	0	0	0	0
Nuclear Waste Transport	93,765	43,532	4.91B	47,678	7.93B
Severe Weather – 25% of population & .5% of buildings	53,883	500	41.45M	238	44.20M
Wildland Fire	48,453	22,495	3.55B	4,968	1.02B

Sources: Washoe County GIS; Washoe County Assessor; Washoe County Planning; Washoe County Population Estimate Model; Nevada Bureau of Mines and Geology HAZUS-MH Report 2014; Nevada State Demographer

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-7: City of Reno Potential Hazard Vulnerability Assessment – Critical Facilities and Infrastructure

	Police Stations (7)		Fire Stations (14)		Government Buildings (25)		Public Primary & Secondary Schools (51)		Care Facilities (21)		Communication Facilities (0)		Airport Facilities (3)		Utilities (339)	
Hazard	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)
Avalanche	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drought	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Earthquake - Magnitude 6.5	1	17.60	1	1.88	2	10.04	5	36.41	2	26.44	N/A	N/A	1	N/A	28	8.79
Flood - 100-Year Flood Zone	0	0	0	0	3	1.81M	2	30.54M	0	0	N/A	N/A	1	530.0	10	4.79
Flood – 500 – Year Flood Zone	1	2.32M	1	550K	6	12.77	6	23.73	5	13.50	N/A	N/A	1	530.0	37	12.55
Hazardous Materials Event – 1-mile radius hazardous facilities	7	123.23	11	21.28	95	2.54B	50	366.62	21	377.65	N/A	N/A	3	530.0	289	90.92
Hazardous Materials Event – 1-mile buffer transport corridors	7	123.23	10	23.95	83	2.46B	41	260.86	19	365.07	N/A	N/A	3	530.0	218	70.58
Infectious Disease	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear Waste Transport	7	123.23	10	23.95	83	2.46B	41	260.86	19	365.07	N/A	N/A	3	530.0	218	70.58
Severe Weather – 25% of population & .5% of buildings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wildland Fire	2	76.94M	6	6.06M	1	1.42M	10	100.78 M	3	2.35M	N/A	N/A	1	N/A	205	48.71

Value ($) in millions / buildings only N/A = Not Applicable or Not Available

Sources: Washoe County GIS; Washoe County Assessor; Washoe County Planning; Washoe County Population Estimate Model; Nevada Bureau of Mines and Geology HAZUS-MH Report 2014; Nevada State Demographer

1. Airport Facilities includes Reno-Tahoe International Airport, Reno-Stead Airport, and Nevada Air National Guard facilities. Value ($) only for Reno-Tahoe International Airport.
2. Utilities include TMWA water structures; value equals average replacement cost.

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-8: City of Sparks Potential Hazard Vulnerability Assessment – Population and Buildings

Hazard	Population	Buildings			
		Residential		Nonresidential	
	Number	Number	Value ($)	Number	Value ($)
Total for City of Sparks	91,110	36,993	3.09B	6,747	1.93B
Avalanche	0	0	0	0	0
Drought	91,110	N/A	N/A	N/A	N/A
Earthquake –Magnitude 6.5 (30-40% chance in 50 years)	91,110	240	105.86	192	171.08M
Flood – 100-Year Flood Zone	211	86	16.8M	746	458.87M
Flood - 500-Year Flood Zone	54	22	2.55M	82	52.53M
Hazardous Materials Event – 1-mile radius hazardous facilities	78,722	31,963	2.32B	6,744	1.90B
Hazardous Materials Event – 1-mile buffer transport corridors	55,144	22,390	1.25B	6,005	1.61B
Infectious Disease	91,110	N/A	N/A	N/A	N/A
Nuclear Waste Transport	55,144	22,390	1.25B	6,005	1.61B
Severe Weather – 25% of population & .5% of buildings	22,777	184	1.25B	1687	9.65M
Wildland Fire	5,898	2,395	393.38 M	966	119.74M

Sources: Washoe County GIS; Washoe County Assessor; Washoe County Planning; Washoe County Population Estimate Model; Nevada Bureau of Mines and Geology HAZUS-MH Report 2014; Nevada State Demographer

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-9: City of Sparks Potential Hazard Vulnerability Assessment – Critical Facilities and Infrastructure

	Police Stations (1)		Fire Stations (5)		Government Buildings (8)		Public Primary & Secondary Schools (20)		Care Facilities (10)		Communication Facilities (0)		Airport Facilities (0)		Utilities (134)	
Hazard	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)
Avalanche	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Drought	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Earthquake - Magnitude 6.5	1	5.81	1	1.39	1	7.0	2	10.85	1	5.73	N/A	N/A	N/A	N/A	11	2.62
Flood - 100-Year Flood Zone	0	0	2	2.61M	0	0	0	0	0	0	0	0	0	0	63	4.66
Flood – 500 – Year Flood Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.3
Hazardous Materials Event – 1-mile radius hazardous facilities	1	5.81	4	5.10	14	49.12	20	94.60	10	57.31	N/A	N/A	0	0	101	23.44
Hazardous Materials Event – 1-mile buffer transport corridors	1	5.81	2	3.45	14	85.20	17	70.72	8	22.79	N/A	N/A	0	0	92	16.25
Infectious Disease	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear Waste Transport	1	5.81	2	3.45	14	85.20	17	70.72	8	22.79	N/A	N/A	0	0	92	16.25
Severe Weather – 25% of population & .5% of buildings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wildland Fire	0	0	0	0	0	0	0	0	0	0	N/A	N/A	0	0	28	7.58

Value ($) in millions / buildings only

N/A = Not Applicable or Not Available

Sources: Washoe County GIS; Washoe County Assessor; Washoe County Planning; Washoe County Population Estimate Model; Nevada Bureau of Mines and Geology HAZUS-MH Report 2014; Nevada State Demographer. (1) Utilities include TMWA water structures; value equals average replacement cost.

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-10: Reno-Sparks Indian Colony Potential Hazard Vulnerability Assessment – Population and Buildings

Hazard	Population	Buildings			
		Residential		Nonresidential	
	Number	Number	Value ($)	Number	Value ($)
Total for Reno-Sparks Indian Colony	1,081[a]	467	N/A	35	14.4M
Avalanche	N/A	N/A	N/A	N/A	N/A
Drought	1,081	N/A	N/A	N/A	N/A
Earthquake –Magnitude 6.5 (30-40% chance in 50 years)	1,081	38	N/A	3	N/A
Flood – 100-Year Flood Zone[b]	N/A	0	0	1	9.77M
Flood - 500-Year Flood Zone[b]	N/A	N/A	N/A	1	9.77M
Hazardous Materials Event – 1-mile radius hazardous facilities	485[a]	N/A	N/A	24	14.4M
Hazardous Materials Event – 1-mile buffer transport corridors	485[a]	N/A	N/A	24	14.4M
Infectious Disease	1,081	N/A	N/A	N/A	N/A
Nuclear Waste Transport	485[a]	N/A	N/A	24	14.4M
Severe Weather – 25% of population & .5% of buildings	271	3	N/A	1	N/A
Wildland Fire[c]	586[a]	2	11,784	42	1.41M

N/A = Not Applicable or Not Available
Source:
(a) Tribal Data Resources, 1997 - Reno-Sparks and Hungry Valley combined
(b) FEMA DFIRM
(c) Hungry Valley Tribal lands only

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-11: Reno-Sparks Indian Colony
Potential Hazard Vulnerability Assessment – Critical Facilities and Infrastructure

	Police Stations (2)		Fire Stations (1)		EOC & County Admin Buildings (11)		Public Primary & Secondary Schools (3)		Hospital/ Ambulance Urgent Care Facilities (1)		Communication Facilities (0)		Airport Facilities (0)		Water / Sewer Facilities (3)	
Hazard	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]
Avalanche	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Earthquake - Magnitude 6.5	1	69.9K	1	305K	1	93.64K	1	43.67K	1	18.4	N/A	N/A	N/A	N/A	1	194.67 K
Flood - 100-Year Flood Zone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hazardous Materials Event – 1-mile radius hazardous facilities	N/A	N/A	N/A	N/A	3	1.99	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hazardous Materials Event – 1-mile buffer transport corridors	N/A	N/A	N/A	N/A	3	1.99	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Infectious Disease	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear Waste Transport	N/A	N/A	N/A	N/A	3	1.99	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Severe Weather – 25% of population & .5% of buildings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wildland Fire	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Value ($) in millions / buildings only

N/A = Not Applicable or Not Available

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-12: Pyramid Lake Paiute Tribe Potential Hazard Vulnerability Assessment – Population and Buildings

Hazard	Population	Buildings			
		Residential		Nonresidential	
	Number	Number	Value ($)	Number	Value ($)
Total for Pyramid Lake Paiute Tribe	1,650			9	5.99M
Avalanche	N/A	N/A	N/A	N/A	N/A
Drought	1,650	N/A	N/A	N/A	N/A
Earthquake –Magnitude 6.5 (30-40% chance in 50 years)	1,650	N/A	N/A	1	665.56K
Flood – 100-Year Flood Zone	1,650	N/A	N/A	N/A	N/A
Flood - 500-Year Flood Zone	N/A	N/A	N/A	N/A	N/A
Hazardous Materials Event – 1-mile radius hazardous facilities	1,052	N/A	N/A	1	2M
Hazardous Materials Event – 1-mile buffer transport corridors	1,564	N/A	N/A	N/A	N/A
Infectious Disease	1,650	N/A	N/A	N/A	N/A
Nuclear Waste Transport – 1-mile buffer transport corridors	1,564	N/A	N/A	N/A	N/A
Severe Weather – 25% of population & .5% of buildings	412	N/A	N/A	1	30K
Wildland Fire	1,458	158	$974K	44	$1.03M

N/A = Not Applicable or Not Available
Source: Census 2010 tracts – total all persons.

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

Table 6-13: Pyramid Lake Paiute Tribe
Potential Hazard Vulnerability Assessment – Critical Facilities and Infrastructure

	Police Stations (1)		Fire Stations (2)		EOC & County Admin Buildings (1)		Public Primary & Secondary Schools (3)		Hospital/ Ambulance Urgent Care Facilities (1)		Communication Facilities (0)		Airport Facilities (0)		Water / Sewer Facilities (3)	
Hazard	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]	Number	Value ($)[1]
Avalanche	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Earthquake - Magnitude 6.5	1	250K	1	350K	1	1.6	1	966.67 K	1	750K	N/A	N/A	N/A	N/A	1	163.33 K
Flood - 100-Year Flood Zone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flood – 500 – Year Flood Zone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hazardous Materials Event – 1-mile radius hazardous facilities	N/A	N/A	N/A	N/A	N/A	N/A	1	2	N/A	N/A	N/A	N/A	NA	NA	N/A	N/A
Hazardous Materials Event – 1-mile buffer transport corridors	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Infectious Disease	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear Waste Transport	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Severe Weather – 25% of population & .5% of buildings	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wildland Fire	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Value ($) in millions / buildings only

N/A = Not Applicable or Not Available

Note: Nevada Bureau of Mines and Geology HAZUS-MH Report 2014 indicated that 8.00% of buildings would be at least moderately damaged. Estimates for earthquake losses considered this 8.00% as a total loss.

6.4.1 Avalanche

In unincorporated Washoe County, there are 17,977 persons affected by avalanche. As many as 7,786 residences could be damaged totaling $1.82 billion and 3,963 nonresidential buildings totaling $244.35 million. Two sheriff's stations/jails, three fire stations, three government buildings, three primary schools, and one care facility are within avalanche paths. Potential damage to these facilities totals $15.4 million.

There are no known avalanche risks in the City of Reno, City of Sparks, Pyramid Lake Paiute Tribe, or Reno-Sparks Indian Colony.

6.4.2 Drought

According to the U.S. Seasonal Drought Monitor, the entire area of the County is at equal risk to a drought event. The entire population of Washoe County, 432,324, may be affected by drought. However, buildings and critical facilities would just be limited in their use but would not be damaged. The vulnerability of Washoe County to drought is countywide, but impacts may vary and include reduction in water supply, agricultural losses, and an increase in dry fuels.

During droughts affecting the Truckee River watersheds the TMWA's customers are expected to reduce water use. Depending on the severity of the drought and the amount TMWA's drought reserve water supplies (i.e., Independence Lake, Donner Lake, and extra groundwater pumping drought reserves) that may be drawn upon during a Drought Situation, conservation measures, such as assigned-day watering and landscape retrofit programs, may be modified to achieve targeted and/or necessary water reductions to preserve TMWA's drought reserve water supplies.

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Droughts affect different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in Washoe County continues to grow, so will the demand for water.

The impact of a drought on the Reno -Sparks Indian Colony is primarily one of water supply; however, the impact to natural resources in the Colony is also a concern. A multiple year drought can severely compromise the water supply within the district and adversely impact natural resources. With the unknowns of drought and globally changing climate conditions, the RSIC continues to promote water conservation throughout the community.

There are a number of alfalfa farms on the Pyramid Lake Paiute Tribe reservation that rely on their allotment of water each year. Droughts seem to run in five to ten year cycles with the Tribes share of crop water being reduced as the overall water within Washoe County is reduced. Drought also affects the tribe number one source of income, Pyramid Lake. As water levels are reduced the flow from the Truckee River is reduced. The river flow cannot keep up with the evaporation rate of the lakes water and the water levels of the lake go down by feet each year. This affects both the summertime recreation as well as the fishing season at Pyramid Lake.

Drought also affects the environment by losses in fish and wildlife habitat, lack of food and drinking water for wildlife, lower water levels in reservoirs, lakes and ponds. Additional effects include wind and water erosion of soils and poor soil quality.

6.4.3 Earthquakes

The earthquake hazard in Nevada, and more specifically in Washoe County, is significant. Damage from major earthquakes could range from hundreds of thousands of dollars in sparsely populated rural counties to tens of billions of dollars in urban areas. Tens of thousands of buildings could suffer extensive or complete damage. Fatalities could reach into the hundreds. Thousands of people may need public shelter. Many earthquakes are likely to cause significant, simultaneous damage in multiple counties. In particular, a major earthquake anywhere in the Reno-Carson City urban corridor is likely to cause significant damage in not only Carson City but also Douglas, Storey, and southern Washoe Counties.

To assess risks and vulnerability to the state, the Nevada Bureau of Mines and Geology ran FEMA's loss-estimation model, HAZUS-MH, in August 2014. Loss estimates were provided, using five earthquake scenarios located at an epicenter in downtown Reno (-119.81 longitude, 39.52 latitude) at magnitudes of 5.0, 5.5, 6.0, 6.5, and 7.0. Each of the earthquake scenarios can create surface offsets, may be of long duration, and can cause significant damage to the Cities of Reno, Sparks and surrounding areas. A magnitude 7 earthquake can cause widespread structural and nonstructural damage, and requires a significant "recovery period" for communities to get back to the way they were before the quake.

The HAZUS-MH loss estimation was calculated to show impacts to Washoe County as a whole, and therefore the specific loss estimates were not reported for each in the individual jurisdiction in **Tables 6-4 through 6-13**. **Table 6-14** and **6-15** below helps quantify the HAZUS-MH loss estimation for the City of Reno and the City of Sparks.

Table 6-14: City of Reno Earthquake Scenarios Using HAZUS

Earthquake Scenario Magnitude	Total Economic Loss ($ million)	Buildings with Extensive or Complete Damage	Fatalities	People Needing Public Shelter
5.0	20	0	0	0
5.5	200	4	0	2
6.0	950	480	2	180
6.5	2,700	3,100	58	1,200
7.0	4,500	6,100	170	2,200

Table 6-15: City of Sparks Earthquake Scenarios Using HAZUS

Earthquake Scenario Magnitude	Total Economic Loss ($ million)	Buildings with Extensive or Complete Damage	Fatalities	People Needing Public Shelter
5.0	21	0	0	0
5.5	180	3	0	1
6.0	910	460	2	150
6.5	2,600	3,000	61	1,100
7.0	4,400	5,800	160	2,000

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Essential facilities will be severely stressed following major earthquakes. HAZUS-MH predicts that few hospitals in the epicenter areas will have sufficient beds to accommodate the injured people; this means that plans need to be in place for transporting injured people to other jurisdictions. Fire stations, police stations, and schools will most likely be operating at reduced capacity, and there will be significant damage to utilities and transportation systems.

HAZUS uses population data from the 2002 Census Bureau data. Washoe County has experienced rapid growth since 2000, such that damage numbers from HAZUS runs may be underestimated. On the other hand, given all the uncertainties in actual ground shaking and damage potential during earthquakes, estimates from HAZUS are unlikely to be accurate to better than a factor of two and could be off by as much as a factor of ten. Nonetheless, HAZUS provides a reasonable, widely accepted methodology for assessing vulnerabilities and ranking areas by relative risk.

Using HAZUS-MH earthquake perimeters of a 6.5 magnitude event which has a 50% chance of happening in the next 50 years according to NBMG, about 12,091 or 8.00% of the buildings will at least be moderately damaged. It is estimated that 447 buildings will be damaged beyond repair. The 8% estimated damages sustained from moderate to severe could be up to 9,273 residential buildings (worth $1.36 billion), and 2,819 non-residential buildings (worth $7.20 billion).

The HAZUS run indicated that the hospitals will have minor damage but will only have 36% of the hospital beds available on the day of the earthquake. 138 schools, 9 police stations and 5 fire stations would be affected by more than 50% functionality.

The entire population of the County, Cities and participating jurisdictions (432,324) is considered impacted by an earthquake due to potential road and utility damage, critical infrastructure damage leading to reduced services, in addition to building damage. The HAZUS-MH estimates that 37 deaths, 172 hospitalizations, or 152 injuries requiring medical attention will occur.

The percentage of building damage (8%), total building numbers, affected population, were obtained from the HAZUS-MH run dated August 18, 2014 from the Bureau of Mines and Geology. Non-residential building values were calculated from the HAZUS-MH run, while residential buildings were valued by an average replacement value of $146,673. The affected critical infrastructure building and values were calculated from the County's Assessors Office and the planning committee.

Un-reinforced Masonry Buildings

Nevada Bureau of Mines and Geology has a contract with Advanced Data Solutions to inventory the un-reinforced masonry buildings within the State. In Washoe County, assessor data from May 2015 shows that 3,155 commercial buildings and 2,048 residential buildings are constructed of un-reinforced masonry. These buildings will have significantly more damage during an earthquake than other buildings. In Washoe County, unreinforced masonry buildings account for $1.31 billion in residential buildings and $4.47 billion in commercial buildings.

6.4.4 Floods

The unincorporated County and participating jurisdictions of Washoe County have mapped flood hazard areas. As presented within the flood hazard profile, areas identified on a draft Digital Flood Insurance Rate Map (DFIRM) as being inundated by a 100-year floodplain are located along the Truckee River, Steamboat Creek and Dry Creek in eastern Reno and southern Sparks. The 100-year floodplain refers to the flood that has a one percent chance in any given year of being equaled or exceeded. Parts of the 100-year floodplain are designated as an 'AE Zone', indicating that there are Base Flood Elevation (BFE) cross-sections available, in addition to the floodplain boundary. A 500-year floodplain has been identified in mostly southern Sparks and northeastern Reno, as well as in the unincorporated county. The 500-year floodplain refers to the flood that has a 0.2 percent chance of being equaled or exceeded in any given year.

GIS was used to determine the possible impacts of flooding within the County and how the flood risk varies across the planning area, by jurisdiction. The following methodology was followed in creating these flood vulnerability maps and determining values at risk to the 100-year and 500-year flood events.

The draft DFIRMs were used as the floodplain layer. The county's parcel and assessor data was used as the basis for the inventory of developed parcels. In some cases, there are parcels in multiple flood zones. GIS was used to create centroids, or points, to represent the center of each parcel polygon. The layer was then overlaid on the floodplain layer. For the purposes of this analysis, the flood zone in which the centroid was located was assigned as the flood zone for the entire parcel.

The percentage of the total Washoe County population at risk within the 100-year floodplain is 1.5% or approximately 6,398 persons. The total at-risk population increases to 4.55% or approximately 18,877 persons when the 500-year floodplain is considered, which encompasses a much wider area than the 100-year floodplain. Total number of residential buildings at risk within the 100-year floodplain is approximately 2,846, with a replacement value of $431.25 million. Total nonresidential buildings at risk are approximately 2,949, with a replacement value of $2.95 billion. Critical facilities exposed to risk within the 100-year floodplain include two police stations valued at $19.03 million; six fire stations valued at $3.28 million; 11 government buildings valued at $34.89 million; four public schools valued at $34.29 million; one communications facility valued at $500,000; and one airport facility valued at $530 million.

There are approximately 9 parcels in the Reno-Sparks Indian Colony that are located within the 100 and 500-year floodplain. However, there are no critical facilities within the Reno-Sparks Indian Colony that intersect the mapped floodplain.

There is not a mapped floodplain in the Pyramid Lake Paiute Tribe area; however, the tribe is at risk to both the 100 and 500-year events. Pyramid Lake and the Truckee River are likely to flood in the event of heavy precipitation. Because the area has not been included in the DFIRM analysis, a vulnerability assessment was not conducted for this jurisdiction.

6.4.5 Hazardous Materials

GIS tools were used to map one-mile buffer zones around hazardous facility point data in order to help determine potential at-risk population property during a hazardous materials event. Population figures were then estimated by analyzing the intersection of the zones with planning

residential units data and the occupancy rate and persons per household multipliers from the Washoe County Population Estimate Model (WCPEM). The analysis estimated that 367,900 people reside within the buffer zones. In addition to the population figures, building exposure figures within the buffer zones includes 117,893 residential buildings valued at $12.73 billion, and 63,921 non-residential buildings valued at $11.41 billion. Building values were derived from county assessor data.

Additionally, GIS tools were used to map one-mile buffer zones around main transport corridor vector data including the rail system, Interstate 80 and Highway 395, in order to help determine potential at-risk population figures during a hazardous materials event. Population figures were then estimated by analyzing the intersection of the zones with planning residential units data and the occupancy rate and persons per household multipliers from the Washoe County Population Estimate Model (WCPEM). The analysis estimated that 201,411 people reside within the buffer zones. In addition to the population figures, building exposure figures within the buffer zones includes 88,661 residential buildings valued at $10.83 billion, and 60,022 non-residential buildings valued at $10.38 billion. Building values were derived from county assessor data.

The critical facilities exposure to a hazardous materials spill is high since most of the facilities reside within the one-mile radius. They include the following:

Washoe County:
13 Fire Stations: $5.13 million
58 Government Buildings: $518.40 million
18 Public Primary and Secondary Schools: $81.23 million
3 Care Facilities: $9.73 million
7 Water/Sewer Facilities: $17.24 million

City of Reno

7 Law Enforcement Facilities: $123.23 million
11 Fire Stations: $21.28 million
95 Government Buildings: $2.54 billion
50 Public Primary and Secondary Schools: $366.62 million
21 Care Facilities: $377.65 million
2 Airport Facilities: $604 million

City of Sparks

1 Law Enforcement Facilities: $5.81 million
4 Fire Stations: $5.10 million
14 Government Buildings: $49.12 million
20 Public Primary and Secondary Schools: $94.60 million
10 Care Facilities: $57.31 million

Reno-Sparks Indian Colony

1 Senior Center, School, and Care Facility: $1.99 million

Pyramid Lake Paiute Tribe

1 School: $2 million

6.4.6 Infectious Disease

Epidemic was included as a possible hazard to the citizens of Washoe County. The entire populations of Washoe County, 432,324, including the City of Reno and City of Sparks, as well as Pyramid Lake Paiute Tribe and the Reno-Sparks Indian Colony, may be affected by the illness. However, buildings and critical facilities would just be limited in their use but would not be damaged.

6.4.7 Severe Weather

Using winter storm data provided by the National Weather Service (NWS), risk posed by winter storms were calculated for the County. All population and buildings are within the severe winter storm hazard area; however, homes and buildings within the area are built to withstand a degree of severe weather. The Planning Committee determined that a severe winter storm or wind event may affect 25% of population, which includes 27,133 people in unincorporated Washoe County; 53,883 people in Reno; 22,777 people in Sparks; 271 people in the Reno-Sparks Indian Colony; and 564 people in the Pyramid Lake Paiute Tribe. The Planning Committee also determined that .5% of the buildings may be affected. The total number of buildings and values ae listed in the tables.

6.4.8 Transportation of Radiological Materials and Waste

GIS tools were used to map one-mile buffer zones around main transport corridor vector data including the rail system, Interstate 80 and Highway 395, in order to help determine potential at-risk population figures during a radiological materials event. Population figures were then estimated by analyzing the intersection of the zones with planning residential units data and the occupancy rate and persons per household multipliers from the Washoe County Population Estimate Model (WCPEM). The analysis estimated that 201,411 people reside within the buffer zones. In addition to the population figures, building exposure figures within the buffer zones includes 88,661 residential buildings valued at $10.83 billion, and 60,022 non-residential buildings valued at $10.38 billion. Building values were derived from county assessor data.

The critical facilities exposure to a radiological materials spill is high since most of the facilities reside within the one-mile radius. They include the following:

Washoe County

4 Law Enforcement Facilities: $143,000
19 Fire Stations: $7.01 million
45 Government Buildings: $422.89 million
14 Public Primary and Secondary Schools: $68.07 million
3 Care Facilities: $9.73 million
6 Water/Sewer Facilities: $438,000

City of Reno

7 Law Enforcement Facilities: $123.23 million
10 Fire Stations: $23.95 million
83 Government Buildings: $2.46 billion
41 Public Primary and Secondary Schools: $260.86 million

19 Care Facilities: $365.07 million
2 Airport Facilities: $604 million

City of Sparks

1 Law Enforcement Facilities: $5.81 million
2 Fire Stations: $3.45 million
14 Government Buildings: $85.20 million
17 Public Primary and Secondary Schools: $70.72 million
8 Care Facilities: $22.79 million

Reno-Sparks Indian Colony

1 Senior Center, School, and Care Facility: $1.99 million

6.4.9 Wildland Fires

As presented within the wildfire hazard profile, areas identified as having an extreme fire hazard severity risk are located within the Carson Range of the Sierra Nevada, predominately along the northern edge of Lake Tahoe and the western edge of the Washoe Valley. Areas identified has having a high fire hazard severity risk include the western side of the Pah Rah mountain range, portions the Virginia Mountains, the foothills of the Sierra Nevada mountain range, and the western side of the Virginia Range. In other portions of the planning area, large concentrations of highly flammable brush located in flat open spaces are also quite susceptible to wildfire.

Using GIS, the fire hazard severity zones were overlain on the County's parcels. The parcels were segregated and analyzed for each jurisdiction: unincorporated Washoe County, Reno, Sparks, the Reno-Sparks Indian Colony, and the Pyramid Lake Paiute Tribe. Parcels located in the extreme, high, and moderate wildfire risks areas were identified. Based on this analysis, there are over 29,742 residential parcels valued at approximately $5.81 billion and over 13,091 non-residential parcels valued at approximately $661.5 million within these areas of wildfire risk within unincorporated Washoe County. Within the City of Reno, there are over 22,495 residential parcels located within extreme, high, and moderate wildfire risk areas valued at approximately $3.55 billion and 4,968 non-residential parcels valued at $1.02 billion. Within the City of Sparks, there are over 2,395 residential parcels located within extreme, high, and moderate wildfire risk areas valued at approximately $394 million dollars and 966 non-residential parcels valued at $119.7 million. Within the Reno-Sparks Indian Colony there are three residential parcels valued at $11,784 and 42 non-residential properties valued at $122,000 dollars within extreme, high, and moderate wildfire risk areas. Within the Pyramid Lake Paiute Tribe, there are 158 residential properties valued at $974,000 dollars and 44 non-residential parcels valued at $1.03 million.

The critical facilities located in the extreme, high and moderate wildfire risk areas include the following:

Washoe County

3 Law Enforcement Facilities: $143,000
22 Fire Stations: $8.23 million
23 Government Buildings: $237.88 million
16 Public Primary and Secondary Schools: $82.75 million

1 Care Facilities: $3.26 million
8 Communication Facilities: $10.55
2 Airport Facilities: $N/A
13 Water/Sewer Facilities: $26.82 million

City of Reno

2 Law Enforcement Facilities: $76.94 million
6 Fire Stations: $6.06 million
1 Government Buildings: $1.42 million
10 Public Primary and Secondary Schools: $100.78 million
3 Care Facilities: $2.35 million
1 Airport Facilities: $N/A
18 Utility Facilities: $N/A

City of Sparks

9 Utility Facilities: $N/A

There are no critical or special facilities within the Pyramid Lake Paiute Tribe located in the extreme, high or moderate wildfire risk areas.

There are no critical or special facilities in the Reno-Sparks Indian Colony located in the extreme, high or moderate wildfire risk areas.

From an environmental perspective, an increase in the number and intensity of fires may have a profound effect upon the habitats of the region's local wildlife. The heat generated by wildfires may damage soil by burning organic matter, breaking down soil structure, and reducing the soil's ability to retain water. The burned soils lose important nutrients, which impact re-growth of native plants, and become susceptible to infestation by weeds and non-native plants. The animals that depended on the native plants for food will be forced to move to other areas which can create more stress on the overall ecosystem.

6.5 CASCADING EFFECTS

All hazards can significantly affect the continuity of operations, the public, public perception and confidence, and the health and safety of response personnel.

6.5.1 Continuity of Operations

Washoe County and the participating jurisdictions have essential functions that must be performed, or rapidly and efficiently, resumed in an emergency. Natural and man-made disasters can adversely impact an agency's ability to continue to support essential functions and to provide support to the operations of clients and external agencies. A disaster may require staff to function with limited automated support and some degradation of service until full recovery is made.

While the impacts of a disaster cannot be predicted, planning for operations under such conditions can mitigate the impact of the emergency on our people and facilities. Washoe County and the participating jurisdictions have Continuity of Operations (COOP) plans in place to ensure the continuation of essential functions, delivery of services, protection of facilities,

equipment, records and other assets, facilitate decision-making during an emergency, and achieve an orderly recovery from emergency operations.

6.5.2 Effects on Public

It is essential that the public is included in emergency planning and response. If the public is well educated about a certain disaster and knows what to expect, they are more likely to cooperate with and have more confidence in officials during a response. The government must be able to provide timely, accurate, and relevant information to the public during an incident to maintain the publics' confidence and trust in the government. This information should address the anxiety, fears, and doubts that people are facing as a result of the incident. Effective emergency messaging for different ethnicities and cultures should also be considered, as well as media training for emergency responders. Without proper information, people may evacuate towards a hazard, putting them in greater danger, or may evacuate unnecessarily and create additional congestion on identified evacuation routes.

6.5.3 Public Perception and Confidence

Public perception and confidence in the government during or following a natural hazard is dependent on many different factors. The government's reputation is impacted by the publics' perception of how well responders coordinated activities and assessed actual and potential impacts, provided warnings, instructions, and information, and established a continuity of business operations during and immediately after the incident.

Public perception of the government's reaction to an incident is just as important as the tactical and operating response. Public opinion is formed on how quickly the government can respond to an incident, effectively communicate with other departments, jurisdictions, and agencies, coordinate and effectively use resources, and exemplify, an organized command structure. If the public senses that these efforts are botched through media reports, rumors, or on-site observation, it can have a negative impact on the governments' reputation and perceived ability to effectively respond to an incident.

6.5.4 Health and Safety of Response Personnel

Although the short and long term effects of natural and man-made hazards vary greatly on a host of factors, response personnel are more than likely to spend more time in the affected area than the public at large. This can result in a broad range of health and mental health consequences as a result of work-related exposures to natural and man-made disasters.

Please see Annex C: Washoe County RHMP Hazard Identification and Risk Assessment (HIRA) for a complete assessment of each hazard's impacts on public; continuity of operations; property, facilities, infrastructure; environment; responders, economic conditions, and public confidence.

While not required by the DMA 2000, an important component of a hazard mitigation plan is a review of the County's, Cities', and participating jurisdictions' resources to identify, evaluate, and enhance the capacity of those resources to mitigate the effects of hazards. This section evaluates the County's, Cities', and participating local jurisdictions' resources in three areas—legal and regulatory, administrative and technical, and financial—and assesses capabilities to implement current and future hazard mitigation actions. Washoe County, the City of Reno, the City of Sparks, RSIC, PLPT, and TRMFA have prepared a capability assessment as seen in **Tables 7-1** through **7-18.**

7.1 LEGAL AND REGULATORY CAPABILITIES

Legal and regulatory capabilities include applicable Building Codes, Zoning Ordinance, Subdivision Regulations, Capital Improvement Plan, and other regulatory development guides which provide specified support to hazard mitigation activities. Other less prescriptive documents that describe each jurisdiction's hazard mitigation capabilities include various Master Plan elements, Economic Development Strategy, Emergency Response Plan, and Post-Disaster Recovery Plans, among others. This section lists these various tools, recognizes the local authority of the specific activity, and identifies the interaction of the specific tools with State and higher-level authorities.

In addition to policies and regulations, each jurisdiction participates in several hazard mitigation programs including the National Flood Insurance Program (NFIP), The Great Nevada Shakeout, and StormReady.

Table 7-1: Washoe County Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Master plan	Yes	No		Master Plan is divided into elements and area plans; presently they have been, or are being, updated for compliance with the adopted Truckee Meadows Regional Plan
Zoning ordinance	Yes	No		Known as the Development Code
Subdivision ordinance	Yes	No		Incorporated in Development Code
Growth management ordinance	No	No		
Floodplain ordinance	Yes	No	Yes	Incorporated in Development Code
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	No	Yes	Hillside, Significant Hydrologic Resources, etc. – see Development Code
Building code	Yes	No		Updated in Sept 2013; based on 2012 IBC: See Building and Safety Department for particulars
Fire department ISO rating	Yes	No		Rating: See Building and Safety Department, Reno Fire Department and Sierra Fire Protection District for particulars

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Erosion or sediment control program	Yes	No		See Engineering Division, Public Works Department
Stormwater management program	Yes	No		See Engineering Division, Public Works Department
Site plan review requirements	Yes	No		Reviewed according to Code requirements through building permit or as part of conditions of a discretionary permit approval by the County's Design Review Committee
Capital improvements plan	Yes	No		See Finance Division
Economic development plan	No	No		
Local emergency operations plan	Yes	No		See Emergency Management Division
Other special plans	Yes	No		Specific Plans in Comprehensive Plan
Flood insurance study or other engineering study for streams	Yes	No	Yes	See Engineering Division, Public Works Department
Elevation certificates	Yes	No	Yes	See Engineering Division, Public Works Department

Table 7-2: City of Reno Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Master plan	Yes	No		
Zoning ordinance	Yes	No		
Subdivision ordinance	Yes	No		
Growth management ordinance	Yes	No		
Floodplain ordinance	Yes	No	Yes	
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	No	Yes	Stormwater, steep slope, and wildfire
Building code	Yes	No		
Fire department ISO rating	Yes	No		
Erosion or sediment control program	Yes	No		
Stormwater management program	Yes	No		
Site plan review requirements	Yes	No		
Capital improvements plan	Yes	No		

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Economic development plan	Yes	No		
Local emergency operations plan	Yes	No		
Other special plans	Yes	No		
Flood insurance study or other engineering study for streams	Yes	No	Yes	
Elevation certificates	Yes	No	Yes	

Table 7-3: City of Sparks Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Master plan	Yes	No		
Zoning ordinance	Yes	No		
Subdivision ordinance	Yes	No		
Growth management ordinance	Yes	No		
Floodplain ordinance	Yes	No	Yes	
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	No	Yes	Steep slope, wildfire
Building code	Yes	No		
Fire department ISO rating	Yes	No		ISO Rating
Erosion or sediment control program	Yes	No		
Stormwater management program	Yes	No		
Site plan review requirements	Yes	No		
Capital improvements plan	Yes	No		
Economic development plan	Yes	No		
Local emergency operations plan	Yes	No		
Other special plans	Yes	No		Habitat Management, Master Drainage Plan, Redevelopment Master Plan
Flood insurance study or other engineering study for streams	Yes	No	Yes	
Elevation certificates	Yes	No	Yes	

Table 7-4: Reno-Sparks Indian Colony Legal
and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Master plan	Yes	No		RSIC Land Use Plan 2000
Zoning ordinance	No	No		There are areas identified in the plan.
Subdivision ordinance	No	No		There are areas identified in the plan.
Growth management ordinance	No	No		
Floodplain ordinance	No	No	Yes	
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	No	Yes	
Building code	No	No		Version: Use whatever version of applicable codes
Fire department ISO rating	None	No		Rating: Use Reno Fire per Fire Agreement
Erosion or sediment control program	No	No		
Stormwater management program	Yes	No		Permits by project
Site plan review requirements	Yes	No		Project specific
Capital improvements plan	Yes	No		Planning prepares the annual CIP
Economic development plan	Yes	No		Economic Development prepares the annual ED plan & budget
Local emergency operations plan	Yes	No		Currently working on EOP
Other special plans	No	No		
Flood insurance study or other engineering study for streams	Yes	No	Yes	Preliminary Studies for Hungry Valley
Elevation certificates	No	No	Yes	

Table 7-5: Pyramid Lake Paiute Tribe Legal
and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Master plan	Yes	No		Chairman's Office
Zoning ordinance	No	No		
Subdivision ordinance	Unknown	No		Possibly with housing

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Growth management ordinance	No	No		
Floodplain ordinance	No	No	Yes	
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	No	Yes	Open burning permits through environmental department
Building code	Yes	No		Housing
Fire department ISO rating	No	No		
Erosion or sediment control program	Yes	No		Environmental Department
Stormwater management program	Yes	No		Public Utilities Department
Site plan review requirements	Unknown	No		Possibly Housing
Capital improvements plan	Yes	No		Chairman's Office
Economic development plan	Yes	No		Economic Planner
Local emergency operations plan	Yes	No		Emergency Response
Other special plans	Unknown	No		
Flood insurance study or other engineering study for streams	Yes	No	Yes	Washoe County Flood Management Plan
Elevation certificates	Unknown	No	Yes	Possibly GIS

Table 7-6: Truckee River Flood Management Authority Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Master plan	Yes	No		Authority limited to review & comment
Zoning ordinance	Yes	No		Authority limited to review & comment
Subdivision ordinance	Yes	No		Authority limited to review & comment
Growth management ordinance	No	No		
Floodplain ordinance	Yes	No	Yes	Authority limited to review & comment
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	No		
Building code	No	No		

Regulatory Tool (ordinances, codes, plans)	Local Authority	Does State Prohibit	Higher Level Jurisdiction Authority	Comments
Fire department ISO rating	No	No		
Erosion or sediment control program	Yes	No		Truckee River Flood Protection Plan
Stormwater management program	No	No		Support Stormwater Permit Subcommittee
Site plan review requirements	No	No		
Capital improvements plan	Yes	No		Truckee River Flood Protection Plan
Economic development plan	No	No		
Local emergency operations plan	Yes	No		Truckee River Flood Warning Plan
Other special plans	Yes	No		Truckee River Flood Protection Plan
Flood insurance study or other engineering study for streams	Yes	No	Yes	Perform at discretion of Washoe, Reno, and Sparks
Elevation certificates	Yes	No	Yes	Authority limited to review & comment

7.2 ADMINISTRATIVE AND TECHNICAL CAPABILITIES

The administrative and technical capability of each jurisdiction provides an identification of the staff, personnel, and department resources available to expedite the actions identified in the Mitigation Strategy. Specific resources reviewed include those involving technical personnel that apply planning and engineering, floodplain management, Geographic Information Systems (GIS), environmental scientists, management authority, and various other services needed to facilitate hazard mitigation throughout Washoe County. The administrative and technical capabilities of the Counties and City are listed in **Tables 7-7** through **7-12**.

Table 7-7: Washoe County's Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with knowledge of land development/land management practices	Y	Community Development Director/Planning Managers, Advanced and Current Planning Program planners	
Engineer/Professional trained in construction practices related to buildings and/or infrastructure	Y	Building and Safety Department, Building Inspectors	See Engineering Division, Public Works Department, and Building and Safety Department for particulars
Planner/Engineer/Scientist with an understanding of natural hazards	Y	Community Development, Senior Planner, Advanced Planning Program	
Personnel skilled in GIS	Y	Community Development, Senior Planner with Community Services Program	See GIS Program, Technical Services Department, for particulars
Full time building official	Y	Building and Safety Department/Chief Building Official	
Floodplain Manager	Y	Truckee Meadows Flood Project, Director	See Engineering Division, Public Works Department, for particulars
Emergency Manager	Y	Emergency Management Division/Emergency Management Director	
Grant writer	Y		See County Manager's Office, for particulars
Other personnel			
GIS Data – Hazard areas			See GIS Program, Technical Services Department, for particulars
GIS Data - Critical facilities	Y		See GIS Program, Technical Services Department, for particulars
GIS Data – Building footprints	Y		See GIS Program, Technical Services Department, for particulars
GIS Data – Land use	Y	Community Development/Senior Planner, Community Services Program	
GIS Data – Links to Assessor's data	Y		See GIS Program, Technical Services Department, and Assessor's Office for particulars
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	Y	Emergency Management Program/Emergency Management Director	

Table 7-8: City of Reno's Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Y	Public Works	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Fire Department Building Department	
Planner/engineer/scientist with an understanding of natural hazards	Y	Public Works	
Personnel skilled in GIS	Y	IT	
Full time building official	Y	Community Development	
Floodplain manager	Y	Public Works	
Emergency manager	Y	Fire Department	
Grant writer	N		
Warning systems/services (Reverse 9-11, cable override, outdoor warning signals)	Y	Various	

Table 7-9: City of Sparks' Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Y	Engineering, Planning, Redevelopment	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Building Department	
Planner/engineer/scientist with an understanding of natural hazards	Y	Engineering, Planning, Fire Marshals	
Personnel skilled in GIS	Y	GIS Staff in Planning, GIS, Public Works	
Full time building official	Y	Community Development	
Floodplain manager	Y	Engineering, Public Works	
Emergency manager	Y	City Manager (EOC Director or Designee)	
Grant writer	Y	Various Departments throughout City of Sparks	
Warning systems/services (Reverse 9-11, cable override, outdoor warning signals)	Y		

Table 7-10: Reno Sparks Indian Colony's Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	Tribal Planner	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	No		
Planner/engineer/scientist with an understanding of natural hazards	No		
Personnel skilled in GIS	No		Indian Health Service
Full time building official	Yes	Public Works Director	
Floodplain manager	No		
Emergency manager	Yes	Emergency Services Manager	
Grant writer	Yes		
Warning systems/services (Reverse 9-11, cable override, outdoor warning signals)	Yes		Washoe County Notification System per Emergency Management

Table 7-11: Pyramid Lake Paiute Tribe's Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Y	Economic Planner	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Water Resources Department Infrastructure Engineer	
Planner/engineer/scientist with an understanding of natural hazards	Y	Emergency Response Coordinator	
Personnel skilled in GIS	Y	Environmental Department GIS Specialist	
Full time building official	N		
Floodplain manager	Y	Water Resources Director	
Emergency manager	Y	Emergency Response Coordinator	
Grant writer	Y	Grants and Contracts Administrator	
Other personnel			
GIS Data – Hazard Areas	N		
GIS Data – Critical Facilities	Y	Environmental Department GIS Specialist	
GIS Data – Building Footprints	Y	Environmental Department	

Personnel Resources	Yes/No	Department/Position	Comments
		GIS Specialist	
GIS Data – Land Use	Y	Environmental Department GIS Specialist	
GIS Data – Link to Assessor's Data	N		
Warning systems/services (Reverse 9-11, cable override, outdoor warning signals)	N		

Table 7-12: Truckee River Flood Management Authority's Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Y	Licensed Engineer	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Licensed Engineer	
Planner/engineer/scientist with an understanding of natural hazards	Y	Natural Resource Planning Manager	
Planner/engineer/scientist with an understanding of natural hazards	Y	Senior Hydrogeologist	
Floodplain manager	Y	CFM, Director	
Emergency manager	Y	N/A	
Grant writer	Y	N/A	
Truckee River Flood Warning System	Y	Senior Hydrogeologist	

7.3 FINANCIAL CAPABILITIES

Specific financial and budgetary tools available to each jurisdiction for hazard mitigation include federal entitlements, general fund monies, secondary sales and property taxes, user fees for infrastructure, impact fees applied to new development, and various unique debt service techniques including bonding indebtedness.

Table 7-13: Washoe County Financial Resources for Hazard Mitigation

Financial Resources	Accessible/Eligible to Use (Y/N)	Comments
Community Development Block Grants	Y	
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	Y	See County Manager's Office, Finance Division
Fees for water, sewer, gas, or electric services	Y	See Department of Water Resources
Impact fees for new development	Y	See Engineering Division, Public Works Department
Incur debt through general obligation bonds	Y	See County Manager's Office, Finance Division
Incur debt through special tax bonds	Y	See County Manager's Office, Finance Division
Incur debt through private activities	Y	See County Manager's Office, Finance Division
Withhold spending in hazard prone areas	Unsure	See County Manager's Office, Finance Division

Table 7-14: City of Reno Financial Resources for Hazard Mitigation

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Y	
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	Y	Sewer
Impact fees for new development	Y	
Incur debt through general obligation bonds	Y	
Incur debt through special tax bonds	Y	
Incur debt through private activities	N	
Withhold spending in hazard-prone areas	Y	

Table 7-15: City of Sparks Financial Resources for Hazard Mitigation

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Y	
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Incur debt through general obligation bonds	Y	
Incur debt through special tax bonds	Y	
Incur debt through private activities	Y	
Withhold spending in hazard-prone areas	Y	

Table 7-16: Reno Sparks Indian Colony Financial Resources for Hazard Mitigation

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Yes	
Capital improvements project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	Yes	
Incur debt through general obligation bonds	No	
Incur debt through special tax bonds	Yes	
Incur debt through private activities	Yes	
Withhold spending in hazard-prone areas	Yes	

Table 7-17: Pyramid Lake Paiute Tribe Financial Resources for Hazard Mitigation

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Eligible to Use	
Capital improvements project funding	Yes	
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric services	Yes	Public Utilities District
Impact fees for new development	No	
Incur debt through general obligation bonds	Eligible to Use	
Incur debt through special tax bonds	No	
Incur debt through private activities	Accessible/Eligible	
Withhold spending in hazard-prone areas	No	

Table 7-18: Truckee River Flood Management Authority Financial Resources for Hazard Mitigation

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	No	
Capital improvements project funding	Yes	
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric services	Yes	Flood Damage Reduction Fees
Impact fees for new development	No	
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Incur debt through private activities	No	
Withhold spending in hazard-prone areas	Yes	

7.4 NATIONAL FLOOD INSURANCE PROGRAM

DMA 2000 Requirements: Mitigation Strategy – National Flood Insurance Program

National Flood Insurance Program (NFIP) Compliance)
Requirement: §201.6(c)(3)(iii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.
Element

- Does the updated plan document how the planning team reviewed and analyzed this section of the plan and whether this section was revised as part of the update process?
- Does the new or updated plan describe the jurisdiction(s) participation in the NFIP?)
- Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?

Source: FEMA, March 2008.

Unincorporated Washoe County joined the National Flood Insurance Program (NFIP) on August 1, 1984. Unincorporated Washoe County, the City of Reno and the City of Sparks are all members of the NFIP. In addition to providing insurance for properties at risk of flooding, the program collects and published statistics on flood-related losses in participating jurisdictions. Neither the Reno-Sparks Indian Colony nor the Pyramid Lake Paiute Tribe participates in the National Flood Insurance Program. Pyramid Lake Paiute Tribe has no effective FIRMs.

Currently, the FEMA Digital Flood Insurance Rate Maps for Washoe County including the City of Reno and the City of Sparks are effective as of June 18, 2013. The County actively participates in the Community Rating System (CRS). The CRS is a voluntary program for the NFIP-participating communities. The goals of the CRS are to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance. The County is a CRS Class 7 community and they receive a 15% discount.

The County, Cities and participating jurisdictions outlined mitigation actions listed under goals for flood detailed below in Table 8-3, Mitigation Goals and Potential Actions.

NFIP insurance data indicates that as of February 28, 2015, the unincorporated county had 956 policies in force resulting in $239,025,800 of insurance in force. There have been 131 historic claims for flood losses totaling $3,833,484.

Unincorporated Washoe County has 8 repetitive loss properties. The City of Reno has a total of 11 repetitive loss properties. The City of Sparks has a total of 25 repetitive loss properties.

The following provides an overview of the four-step process for preparing a mitigation strategy: developing mitigation goals, identifying and analyzing potential actions, prioritizing mitigation actions, and implementing an action plan.

8.1 MITIGATION GOALS AND OBJECTIVES

The requirements for the local hazard mitigation goals, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy – Local Hazard Mitigation Goals

Local Hazard Mitigation Goals
Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
Element

- Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?

Source: FEMA, March 2008.

Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. The Planning Committees developed 12 goals to reduce or avoid long-term vulnerabilities to the identified hazards (Table 8-1). All high risk and medium risk hazards identified by the County and participating jurisdictions have a specific goal except for energy emergency, and volcano. These two hazards will be addressed under Goal One and Two.

Table 8-1: Mitigation Goals

Goal Number	Goal Description
1	Promote increased and ongoing County and City involvement in hazard mitigation planning and projects.
2	Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
3	Reduce the possibility of damage and losses due to avalanche.
4	Reduce the possibility of damage and losses due to drought.
5	Reduce the possibility of threat to life and losses due to earthquake.
6	Reduce the possibility of damage and losses due to floods.
7	Reduce the possibility of damage and losses due to infectious disease.
8	Reduce the possibility of damage and losses due to severe weather.
9	Reduce the possibility of damage and losses due to wildland fires.

10	Reduce the possibility of damage and losses due to hazardous materials release.
11	Reduce the possibility of damage and losses due to radiological materials and waste.
12	Reduce the possibility of damage and losses due to terrorism/weapons of mass destruction and civil disorder.

8.2 IDENTIFYING MITIGATION ACTIONS

The requirements for the identification and analysis of mitigation actions, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy

Identification and Analysis of Mitigation Actions
Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.
Element

- Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?
- Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure?
- Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure?
- Does the mitigation strategy identify actions related to the participation in and continued compliance with the NFIP?

Source: FEMA, March 2008.

Mitigation actions are usually grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. The Planning Committees worked together as a group to provide mitigation actions. As such, Table 8-3 lists the goals and potential actions selected for this HMP. As stated above the Planning Committees felt that actions under Goals One and Two were sufficient to address energy emergency, and volcano, specifically 1.A, 1.B, 1.C, 2.A, 2.B, and 2.C.

Table 8-2: Mitigation Goals and Potential Actions

Goals	Jurisdiction	Action	New or Existing	Description
Goal 1: *Promote increased and ongoing involvement in hazard-mitigation planning and projects.*	All Jurisdictions	1.1	E	Enhance/Develop the Seasonal Multi-Hazard Public Awareness Program.
	All Jurisdictions	1.2	N	Review/update the Master Plan to incorporate the RHMP.
	All Jurisdictions	1.3	N	Adopt IBC 2018 code.
Goal 2: *Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.*	City of Reno	2.1	E	Develop, enhance, and implement education programs aimed at mitigating natural hazard, and reducing the risk to citizens, public agencies, private property owners, business, and schools.*
	City of Reno	2.2	E	Continue to reinforce/support the all-risk urban search and rescue program.
	All Jurisdictions	2.3	N	Increase interagency coordination and cooperation.
	Reno-Sparks Indian Colony	2.4	E	Obtain and implement community warning system.
	Reno-Sparks Indian Colony	2.5	E	Implement and activate an Emergency Operations Center (EOC).
	Washoe County, Reno-Sparks Indian Colony	2.6	E/N	Implement and/or utilize Community Emergency Response Teams (CERT) as well as the Citizens Homeland Security Council (CHSC) to shift burden from sworn officers, where appropriate.
Goal 3 *Reduce the possibility of damage and losses due to avalanche.*	Washoe County	3.1	N	Develop plan for strategically placed snow fences to protect the Crystal Bay Subdivision and construct avalanche defense structure for Third Creek water tank.
	Washoe County	3.2	E	Develop mapping, hazard plans and zoning/land use codes for areas prone to landslides and/or avalanches.
Goal 4 *Reduce the possibility of damage and losses due to drought.*	Reno-Sparks Indian Colony	4.1	E	Property Protection: Drought – improve water supply; Hungry Valley monitoring of water levels.
	All Jurisdictions	4.2	N	Implement current TMWA Conservation Plan including encouraging transition to less water-intensive landscaping on both public and private properties.

*Please Note: Action 2.1 is applicable to all hazards.

Goal 5: *Reduce the possibility of damage and losses due to earthquakes.*	All Jurisdictions	5.1	E	Review and update the regional Earthquake Transportation Evacuation Routes and incorporate into appropriate planning documents.
	Washoe County, Reno & Sparks	5.2	N	Encourage seismic strength evaluations of critical facilities in the jurisdiction to identify vulnerabilities for mitigation of schools and community college, public infrastructure, and critical facilities to meet current seismic standards.
	Washoe County, Reno & Sparks	5.3	E	Encourage non-structural mitigation by increasing public awareness of earthquakes through wide distribution of newspaper supplements, booklets, brochures, etc. on what to do before, during, and after an earthquake.
	Washoe County, Reno, Sparks, and Reno-Sparks Indian Colony	5.4	N	Identify "at risk" buildings for retrofitting or eliminating life threatening buildings, particularly URMs.
	Washoe County, Reno & Sparks	5.5	E	Assess, repair, and/or replace infrastructure that may fail during earthquakes (e.g., Keystone Ave. Bridge).
Goal 6: *Reduce the possibility of damage and losses due to floods.*	Washoe County	6.1	E	Stormwater Capital Improvement Project: Culvert Improvements, including: · CIP#A15-1 Village Parkway @ Mudsprings ("Village Parkway Wash"); · CIP#A16-4 & A16-5 Cold Springs Drive; · CIP#A16-7 Village Parkway; · CIP#C17-1 Sun Valley ("Amargosa Wash") @ Middle Fork Drive; · CIP#C17-2 Sun Valley ("Amargosa Wash") @ Amargosa Drive; · CIP#C17-4 Sun Valley ("Amargosa Wash") Culvert Upgrade at Sun Valley Blvd; · CIP#C17-5 Sun Valley ("Amargosa Wash") Culvert Upgrade at Smokey Canyon Drive; · CIP#C17-10 Sun Valley ("Amargosa Wash") Culvert Upgrade at E. 9th Ave; · CIP#C17-15 Sun Valley ("Amargosa Wash") Culvert Upgrade at E. 8th Ave; and, · CIP#D16-4 Spanish Springs Spanish Springs High School Area - Spanish Springs Village Subdivision.

Goal 6: *(continued)* *Reduce the possibility of damage and losses due to floods.*	Washoe County	6.2	E	Stormwater Capital Improvement Project: Channel Improvements, including; · CIP#A16-3 Cold Springs Drive; CIP#A16-6 Cold Springs Drive to White Lake; · CIP#C17-3 Sun Valley ("Amargosa Wash") Utility Protection/Relocation and Existing Channel Erosion Protection between Amargosa Drive and Sun Valley Blvd; and, · CIP#C17-16 Sun Valley ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive.
	Washoe County	6.3	E	Stormwater Capital Improvement Project: Detention Basin, including: · CIP#D16-1 Spanish Springs Kinglet Drive; · CIP#D16-2 Spanish Springs Nightingale Way; and, · CIP#D16-3 Spanish Springs Spanish Springs High School Area.
	TRFMA	6.4	N	New Floodwalls: Provide a berm with a buried floodwall, with the top of the floodwall set to the 100-year water surface elevation.
	TRFMA	6.5	N	Booth Street Bridge: Remove Booth Street Bridge which constricts flows and increases flood water elevations.
	TRFMA	6.6	N	Jones Street Signal Improvements: Construct signal at Jones and Keystone Ave.
	TRFMA	6.7	N	New Floodwalls (Geotechnical Recommendations): Drain trench along portions of the new floodwalls per Geotechnical Report.
	TRFMA	6.8	N	Pumping Station: Pumping station along Riverside Drive.
	TRFMA	6.9	N	Pedestrian Closure Gate Structures: Pedestrian gates are needed along the length of the floodwall to maintain the current pedestrian access points. A product such as FloodBreak or approved equivalent.
	TRFMA	6.10	N	Raise Pedestrian Bridge upstream and downstream of Arlington Ave.
	TRFMA	6.11	N	Floodproofing: Miscellaneous structures in Downtown Reno require floodproofing.
	TRFMA	6.12	N	Bridge protection at Arlington Ave Bridge.
	TRFMA	6.13	N	Replace Floodwalls: Replacement of old inadequate floodwalls from Arlington St. to Lake St.

Goal 6: *(continued)* *Reduce the possibility of damage and losses due to floods.*	TRFMA	6.14	N	Sierra Street Bridge: Replace Sierra Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.
	TRFMA	6.15	N	Virginia Street Bridge: Recommendation unchanged.
	TRFMA	6.16	N	Center Street Bridge: Replace Center Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.
	TRFMA	6.17	N	Lake Street Bridge: Replace Lake Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.
	TRFMA	6.18	N	Remove existing pedestrian bridge at Wells Ave. Install new pedestrian bridge upstream of Wells Ave.
	TRFMA	6.19	N	Bank stabilization and bridge protection around Wells Avenue at Wells Ave Bridge.
	TRFMA	6.20	N	Reno-Sparks Indian Colony Levee: This was an early action project involving the construction of an approximately 2,300 ft levee and floodwall. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg)
	TRFMA	6.21	N	Grand Sierra Floodwall: On the south (right) bank of the Truckee River a 3,000 foot long, 6 feet high floodwall would be built from Glendale to Greg Street. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg.)
	TRFMA	6.22	N	Sparks Levees and Floodwalls Glendale to Greg: Replacement of the existing levee on the north bank with on-bank floodwalls to minimize construction and right-of-way impacts to the TMWA Glendale Water Treatment Plant. Trail can be incorporated into floodwall maintenance road.
	TRFMA	6.23	N	Mill Street Levee - Greg to Rock: Reduced south bank floodplain terracing with the associated levee move closer to the Truckee River. Reduces excavation costs and reduces impact the existing Pioneer Ditch. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg.)

Goal 6: *(continued)* *Reduce the possibility of damage and losses due to floods.*	TRFMA	6.24	N	Terracing Greg to Rock: Reduced terracing to reduce the amount of excavation and avoid the existing Pioneer Ditch. The terracing and associated levee are moved northward toward the Truckee River and levee ties into the McCarran Blvd bridge.
	TRFMA	6.25	N	Rock Blvd Bridge: No bridge modifications. Levees/floodwalls and terracing will confine flood flows to existing bridge opening. Abutment and pier scour countermeasures may be required.
	TRFMA	6.26	N	Mill Street Levee - Rock to McCarran: Reduced south bank floodplain terracing with the associated levee move closer to the Truckee River. Reduces excavation costs and reduces impact the existing Pioneer Ditch. Pioneer Ditch will be piped to allow for use of the fill disposal area. (Cost included in Element 25 Sparks Levees and Floodwalls: Rock to McCarran)
	TRFMA	6.27	N	Terracing Rock to McCarran: Reduced terracing to reduce the amount of excavation and avoid the existing Pioneer Ditch. The terracing and associated levees are moved northward toward the Truckee River and levee ties into the Rock Blvd bridge. The land between Mill Street and the relocated levee can be used as a fill disposal site and reserved for future recreational use.
	TRFMA	6.27	N	Sparks Levees and Floodwalls - Rock to McCarran: Replacement of the north bank levee with on-bank floodwalls to minimize impacts to existing properties and railroad spurs. Some minor terracing on the north bank. Fill localized low lying areas on the landside of the floodwall. Trail can be incorporated into floodwall maintenance road.
	TRFMA	6.29	N	Terracing - Rock to Steamboat: Benching on north bank at Living River Parkway. Minimized terracing on south bank along Treatment Plant. Remove existing buildings as necessary.
	TRFMA	6.30	N	East McCarran Blvd. Bridge: No bridge modifications. Levees/floodwalls and terracing will confine flood flows to existing bridge opening. Abutment and pier scour countermeasures may be required.
	TRFMA	6.31	N	Main Station Farm Protection: Will flood proof select buildings and elevate the existing pads under the hay storage barns to keep hay dry. Main processing building is sufficiently elevated above flood waters. (Costs included in "Lands and Damages".)

Goal 6: *(continued)* *Reduce the possibility of damage and losses due to floods.*	TRFMA	6.32	N	Sparks Levees and Floodwalls - McCarran to Vista: Replacement of existing levee with on-bank floodwalls for approximately 20,000 feet east of McCarran to reduce overall footprint. Construction of levees for most of the remainder of the reach. Floodwall will be used in the vicinity of Larkin Circle to eliminate impacts to the roadway.
	TRFMA	6.33	N	North Truckee Drain: Relocation of the terminus to align with the East Truckee Canyon. The infrastructure will consists mostly of an underground box culvert.
	TRFMA	6.34	N	Vista Narrows Widening: Expanded benching of the Narrows extending to the first railroad bridge.
	TRFMA	6.35	N	Hidden Valley: Voluntary home elevation. An alternative may include floodproofing for certain residences in Hidden Valley. The method of floodproofing would probably vary from structure to structure, but all would be raised to at least the 100-year flood elevation.
	TRFMA	6.36	N	Sparks Levees and Floodwalls - Rock to McCarran: Replacement of the north bank levee with on-bank floodwalls to minimize impacts to existing properties and railroad spurs. Some minor terracing on the north bank. Fill localized low lying areas on the landside of the floodwall. Trail can be incorporated into floodwall maintenance road.
	TRFMA	6.37	N	Eastside Subdivision: Voluntary home elevation. Elevation of the buildings in the East Subdivision south of the Main Station Farm to above the 100-year floodwater level.
	TRFMA	6.38	N	Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.
	TRFMA	6.39	N	Rainbow Bend Home Elevation: Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.
	TRFMA	6.40	N	Wadsworth Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.
	TRFMA	6.41	N	Update Truckee River Flood Inundation Maps.
	Washoe County	6.42	E	Evaluate warning systems – Seiche.
	City of Reno	6.43	E	Mitigation of Risk Related to Flood Damage to Public Infrastructure – Lawton Interceptor at Oxbow Park

Goal 6: *(continued)* *Reduce the possibility of damage and losses due to floods.*	City of Reno	6.44	E	Mitigation of Risk Related to Flood Damage to Public Infrastructure and Private Property – Dant Wash Drainage Improvements
	City of Reno	6.45	N	Rosewood Wash Culvert and Channel Upgrades
	City of Reno	6.46	N	Virginia Street Bridge Utility Protection
	City of Reno	6.47	N	Cementary Drain Water Quality, Erosion Control, Drainage, and Sewer Improvements
	City of Reno	6.48	N	Warren Estates Evaluation and Drainage Improvement Project
	City of Reno	6.49	N	4th and Stoker Storm Drain Improvements Phase 1
	City of Reno	6.50	N	Stead Culvert Replacement @ Silver Lk Rd
	City of Reno	6.51	N	Truckee River Whitewater Park Repair Work
	City of Reno	6.52	N	Sadleir Southworth Area Storm Drain Improvements
	City of Reno	6.53	N	4th and Stoker SD Improvements Phase 2, including 7th/6th/Carlin and Stoker
	City of Reno	6.54	N	Belford Drainage Overpass at Lake Ditch
	City of Reno	6.55	N	Isbell Rd Cul de Sac Storm Drain Improvements
	City of Reno	6.56	N	Greenridge to Moore Lane Storm Drain Improvements
	City of Reno	6.57	N	Storm Drain Improvements between Mately and Terminal
	City of Reno	6.58	N	Highland Canal Erosion Issues at Putnam
	City of Reno	6.59	N	Double Diamond Levee Upgrades
	City of Reno	6.60	N	Union Pacific Railroad at Link Rd Drainage Improvements
	City of Reno	6.61	N	Island 18 Culvert Upgrades
	City of Reno	6.62	N	Dant Bypass Structure and Channel Improvements
	City of Reno	6.63	N	Autumn Hills Flood Control
	City of Reno	6.64	N	University Drain/Edison Way Culvert Upgrades
	City of Reno	6.65	N	Carlifornia Ave Storm Drain Replacement
	City of Reno	6.66	N	Irrigation Ditch Tributary Crossing Improvements
	City of Reno	6.67	N	Aquila Ave/Krupp Circle Drainage Improvments
	City of Reno	6.68	N	Thomas Creek at South Virginia between approximately Patriot and Gavian (US 395 interchange area).

	City of Reno	6.69	N	Stead Storm Drain Improvements Ph 1
	City of Reno	6.70	N	Wedikend Storm Drain Improvements
	City of Sparks	6.71	E	North Truckee River Drain Replacement
	City of Sparks	6.72	E	Implement Stormwater Plan (e.g., projects for storm drains, catch basins, surveys, etc.)
	Pyramid Lake Paiute Tribe	6.73	E	Mitigate where water enters the reservoir to the dam (retention, dry basins).
	Reno-Sparks Indian Colony	6.74	E	Structural projects: Culvert Maintenance
	Reno-Sparks Indian Colony	6.75	E	Structural projects : Drainage System Maintenance
	All Jurisdictions	6.76	N	Install back-up generators for critical infrastructure and facilities along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).
	All Jurisdictions	6.77	N	Drainage ditch improvements.
Goal 7: *Reduce the possibility of threat to life and losses due to infectious disease.*	Washoe County	7.1	E	Pandemic Influenza (from the 2005 objective titled: Continued Public Health Emergency management trainings and exercise.)
	Washoe County	7.2	E	Public notification for high risk disease events.
	Washoe County	7.3	E	Continued Public Health emergency management trainings and exercises.
Goal 8: *Reduce the possibility of damage and losses due to Severe Weather.*	Washoe County	8.1	N	Encourage the private sector to prepare and maintain 3-day preparedness kits.
	Washoe County	8.2	E	Conduct outreach programs to build resilience to severe storm hazards. (formerly 2005 action - Encourage homeowners to storm proof their buildings).
Goal 9: *Reduce the possibility of damage and losses due to wildland fires.*	All Jurisdictions	9.1	E	Increase communication, coordination, and collaboration between wildland/ urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.
	Washoe County	9.2	E	Mitigation of risk of fire related to the Mt. Rose Wilderness Area.

	Washoe County; Reno-Sparks Indian Colony	9.3	N	Coordination of fuels mitigation and management programs to creation defensible and survivable space, fire/fuel breaks, and increase community wildland fire awareness and participation.
	Washoe County	9.4	E	Collaboration with residents in wildland fire prone areas to create evacuate plans for the community and hold evacuation drills at least every three years.
	All Jurisdictions	9.5	N	Adoption and enforcement of Fire, Building and Wildland Urban Interface Codes to provide ignition-resistant construction in medium, high and extreme high fire hazard rating areas, fuels mitigation and maintenance on private property, and community safety features such as residential fire sprinklers, and fire department access/egress routes.
Goal 10: *Reduce the possibility of damage and losses due to hazardous materials.**	All Jurisdictions	10.1	N	Coordinate communication between state and local jurisdictions regarding hazardous materials.
Goal 11: *Reduce the possibility of damage and losses due to transportation of radiological materials and waste.*	Washoe County	11.1	E	Monitor radiological shipping campaigns that include Washoe County as an approved route.
	All Jurisdictions	11.2	N	Coordinate communication between state and local jurisdictions for the transportation of radiological materials and waste.
Goal 12: *Reduce the possibility of damage and losses due to terrorism/WMD and Criminal Acts.*	Washoe County	12.1	E	Provide training for the public and private sectors to improve response, management, and intervention of WMD terrorism incidents.
	Washoe County	12.2	E	Seek funding to provide methodology and operational functionality to perform vulnerability analysis to determine areas of risk and/or vulnerability to pipeline. Leverage relationships with pipeline owner/operators to insure adequate maintenance and monitoring of pipeline infrastructure. (From the 2005 Objective titled "Analyze pipeline to determine areas of vulnerability")
	All Jurisdictions	12.3	E	Increase law enforcement staff.

*Washoe County has a Hazardous Materials Response Plan which addresses additional strategies to reduce the possibility of damage and losses due to hazardous materials.

8.3 EVALUATING AND PRIORITIZING MITIGATION ACTION

The requirements for the evaluation and implementation of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions

Implementation of Mitigation Actions
Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
Element
- Does the mitigation strategy include how the actions are prioritized? (For example, is there a discussion of the process and criteria used?)
- Does the mitigation strategy address how the actions will be implemented and administered? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)
- Does the prioritization process include an emphasis on the use of a cost-benefit review (see page 3-36 of *Multi-Hazard Mitigation Planning Guidance*) to maximize benefits?

Source: FEMA, March 2008.

The mitigation actions were finalized following the Planning Committees' meetings in April of 2014. Following the meetings, the Planning Committees evaluated and prioritized each of the actions. To complete this task, the Planning Committees completed the STAPLE+E evaluation criteria using rankings of one for lowest and five for highest priority, acceptance, feasibility etc. The rankings for each action were totaled and the actions with the highest number of points were evaluated by the committee. See Table 8-4 for the evaluation criteria.

Table 8-3: STAPLE+E Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider..."	Considerations
Social	The public Support for the overall mitigation strategy and specific mitigation actions	Community acceptance; adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution	Technical feasibility; Long-term solutions; Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary	Staffing: Funding allocation; Maintenance/operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management	Political support; Local champion; Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations	Local, State, and Federal authority; Potential legal challenge

Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit Cost Analysis	Benefit/cost of action; Contributes to other economic goals; Outside funding required; FEMA Benefit Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community	Effect on local flora and fauna; Consistent with community environmental goals; Consistent with local, State and Federal laws

Upon review by the Planning Committees, mitigation actions were selected for the County, Cities and participating jurisdictions that best fulfill the goals of the RHMP and were appropriate and feasible to implement during the 5-year lifespan of this version of the RHMP. In reviewing the actions the Planning Committees considered the following:

- Actions that strengthen, elevate, relocate, or otherwise improve buildings, infrastructure, or other facilities to enhance their ability to withstand the damaging impacts of future disasters
- Actions in which the benefits (which are the reduction in expected future damages and losses) are greater than the costs considered as necessary to implement the specific action
- Actions that either address multi-hazard scenarios or address a hazard that present the greatest risk to the jurisdiction

The actions are shown in Table 8-4.

8.4 IMPLEMENTING A MITIGATION ACTION PLAN

A Mitigation Action Plan Matrix was prepared for the County and participating jurisdictions detailing the priority of the mitigation actions, how the overall benefit-cost were taken into consideration, and how each mitigation action will be implemented and administered. The County, Cities and participating jurisdictions only ranked the actions that were applicable to them since not all actions were the same for all jurisdictions. This matrix is Table 8-4.

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
1.1	Enhance/Develop the Seasonal Multi-Hazard Public Awareness Program.	All Jurisdiction's - Emergency Management Planning Committee Members	Local Gen. Fund, EMPG, HMGP, NV Health & Human Services, CDC, USFS	Ongoing	Provide information to the community in an effort to protect lives and property.	High
1.2	Review/update the Master Plan to incorporate the RHMP.	All Jurisdiction's - Community Development Emergency Mgmt.	Local Gen. Fund	36-48 months	Protection of lives due to pre-planning.	Moderate
1.3	Adopt IBC 2018 code.	All Jurisdictions – Community Development Building	Local Gen. Fund, USACE, PDM, HMGP	Ongoing	Protection of lives and property due to better infrastructure and building codes.	Moderate
2.1	Develop, enhance, and implement education programs aimed at mitigating natural hazard, and reducing the risk to citizens, public agencies, private property owners, business, and schools.	All Jurisdiction's - Emergency Mgmt.	UNR Living w/Fire, BLM, USFS, NDF, SERC, EMPG, Local Gen. Fund	Ongoing	Protection of lives and property due to pre-planning.	Moderate
2.2	Continue to reinforce/support the all-risk urban search and rescue program.	City of Reno Fire Department	Local Gen. Fund	Ongoing	Life Safety.	Moderate
2.3	Increase interagency coordination and corporation.	All Jurisdiction's - Emergency Mgmt., Police, Fire, Public Works	Local Gen. Fund	Ongoing	Protection of lives and property due to pre-planning.	Moderate
2.4	Obtain and implement community warning system.	Reno-Sparks Indian Colony Emergency	Local Gen. Fund, CDBG	12 to 24 months	Protection of lives and property due to pre-planning.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
		Management				
2.5	Implement and activate an Emergency Operations Center (EOC).	Reno-Sparks Indian Colony Emergency Management	Local Gen. Fund, CDBG, AFG	12-36 months	Protection of lives and property due to pre-planning.	Moderate
2.6	Implement and/or utilize Community Emergency Response Teams (CERT) as well as the Citizens Homeland Security Council (CHSC) to shift burden from sworn officers, where appropriate.	Washoe County Emergency Mgmt. Reno-Sparks Indian Colony Emergency Pyramid Lake Paiute Tribe	Local General Fund, DHS	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
3.1	Develop plan for strategically placed snow fences to protect the Crystal Bay Subdivision and construct avalanche defense structure for Third Creek water tank.	Washoe County Emergency Management	Local Gen. Fund	36-48 months	Protection of lives and property due to pre-planning.	Moderate
3.2	Develop mapping, hazard plans and zoning/land use codes for areas prone to landslides and/or avalanches.	Washoe County County Emergency Mgmt.	Local Gen. Fund	24-36 months	Protection of lives and property due to pre-planning.	Moderate
4.1	Property Protection: Drought – improve water supply; Hungry Valley monitoring of water levels.	Reno-Sparks Indian Colony Emergency Management	Local Gen. Fund, CDBG, USDA, EPA, State Revolving Funds	24 to 60 months	Protection of lives and property due to increased water supply for consumption and fire suppression.	Moderate
4.2	Implement current TMWA Conservation Plan including encouraging transition to less water-intensive landscaping on both public and private properties.	All Jurisdictions – Water Utilities	Local Gen. Fund, Local Utility Charge, NDEP	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
5.1	Review and update the regional	All Jurisdiction's -	Local Gen. Fund	24-36 months	Life Safety.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	Earthquake Transportation Evacuation Routes and incorporate into appropriate planning documents.	Emergency Mgmt.				
5.2	Encourage seismic strength evaluations of critical facilities in the jurisdiction to identify vulnerabilities for mitigation of schools and community college, public infrastructure, and critical facilities to meet current seismic standards.	All Jurisdiction's - Sheriff, Police, Public Works, School District	Local Gen. Fund, PDM, HMGP, HUD	24-36 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
5.3	Encourage non-structural mitigation by increasing public awareness of earthquakes through wide distribution of newspaper supplements, booklets, brochures, etc. on what to do before, during, and after an earthquake.	All Jurisdiction's - Emergency Mgmt.	Local Gen. Fund, FEMA	24-36 months	Protection of lives and property.	Moderate
5.4	Identify "at risk" buildings for retrofitting or eliminating life threatening buildings, particularly URMs.	All Jurisdiction's - Sheriff, Police, Public Works, School District	Local Gen. Fund, PDM, HMGP, HUD	24-36 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
5.5	Assess, repair, and/or replace infrastructure that may fail during earthquakes (e.g., Keystone Ave. Bridge).	All Jurisdiction's - Emergency Mgmt.	Local Gen. Fund, PDM, HMGP, HUD	24-36 months	Protection of lives and critical infrastructure.	Moderate
6.1	Stormwater Capital Improvement Project: Culvert Improvements, including: · CIP#A15-1 Village Parkway @ Mudsprings ("Village Parkway Wash"); · CIP#A16-4 & A16-5 Cold	Washoe County Public Works	Stormwater Utility District	48-60 Months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	Springs Drive; · CIP#A16-7 Village Parkway; · CIP#C17-1 Sun Valley ("Amargosa Wash") @ Middle Fork Drive; · CIP#C17-2 Sun Valley ("Amargosa Wash") @ Amargosa Drive; · CIP#C17-4 Sun Valley ("Amargosa Wash") Culvert Upgrade at Sun Valley Blvd; · CIP#C17-5 Sun Valley ("Amargosa Wash") Culvert Upgrade at Smokey Canyon Drive; · CIP#C17-10 Sun Valley ("Amargosa Wash") Culvert Upgrade at E. 9th Ave; · CIP#C17-15 Sun Valley ("Amargosa Wash") Culvert Upgrade at E. 8th Ave; and, · CIP#D16-4 Spanish Springs Spanish Springs High School Area - Spanish Springs Village Subdivision.					
6.2	Stormwater Capital Improvement Project: Channel Improvements, including; · CIP#A16-3 Cold Springs Drive; CIP#A16-6 Cold Springs Drive to White Lake;	Washoe County Public Works	Stormwater Utility District	48-60 Months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	· CIP#C17-3 Sun Valley ("Amargosa Wash") Utility Protection/Relocation and Existing Channel Erosion Protection between Amargosa Drive and Sun Valley Blvd; and · CIP#C17-16 Sun Valley ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive.					
6.3	Stormwater Capital Improvement Project: Detention Basin, including: · CIP#D16-1 Spanish Springs Kinglet Drive; · CIP#D16-2 Spanish Springs Nightingale Way; and, · CIP#D16-3 Spanish Springs Spanish Springs High School Area.	Washoe County Public Works	Stormwater Utility District	48-60 Months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.4	New Floodwalls: Provide a berm with a buried floodwall, with the top of the floodwall set to the 100-year water surface elevation.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.5	Booth Street Bridge: Remove Booth Street Bridge which constricts flows and increases flood water elevations.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.6	Jones Street Signal Improvements:	TRFMA	Sales tax, Flood	24-48 months	Protection of lives, homes, businesses,	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	Construct signal at Jones and Keystone Ave.		District Rates, FEMA HMGP		infrastructure, and critical facilities.	
6.7	New Floodwalls (Geotechnical Recommendations): Drain trench along portions of the new floodwalls per Geotechnical Report.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.8	Pumping Station: Pumping station along Riverside Drive.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.9	Pedestrian Closure Gate Structures: Pedestrian gates are needed along the length of the floodwall to maintain the current pedestrian access points. A product such as FloodBreak or approved equivalent.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.10	Raise Pedestrian Bridge upstream and downstream of Arlington Ave.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.11	Floodproofing: Miscellaneous structures in Downtown Reno require floodproofing.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.12	Bridge protection at Arlington Ave Bridge.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.13	Replace Floodwalls: Replacement of old inadequate floodwalls from Arlington St. to Lake St.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.14	Sierra Street Bridge: Replace Sierra Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
6.15	Virginia Street Bridge: Recommendation unchanged.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.16	Center Street Bridge: Replace Center Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.17	Lake Street Bridge: Replace Lake Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.18	Remove existing pedestrian bridge at Wells Ave. Install new pedestrian bridge upstream of Wells Ave.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.19	Bank stabilization and bridge protection around Wells Avenue at Wells Ave Bridge.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.20	Reno-Sparks Indian Colony Levee: This was an early action project involving the construction of an approximately 2,300 ft levee and floodwall. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg)	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.21	Grand Sierra Floodwall: On the south (right) bank of the Truckee River a 3,000 foot long, 6 feet high floodwall would be built from Glendale to Greg Street. (Costs included in Element	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	19 Sparks Levees and Floodwalls: Glendale to Greg.)					
6.22	Sparks Levees and Floodwalls Glendale to Greg: Replacement of the existing levee on the north bank with on-bank floodwalls to minimize construction and right-of-way impacts to the TMWA Glendale Water Treatment Plant. Trail can be incorporated into floodwall maintenance road.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.23	Mill Street Levee - Greg to Rock: Reduced south bank floodplain terracing with the associated levee move closer to the Truckee River. Reduces excavation costs and reduces impact the existing Pioneer Ditch. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg.)	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.24	Terracing Greg to Rock: Reduced terracing to reduce the amount of excavation and avoid the existing Pioneer Ditch. The terracing and associated levee are moved northward toward the Truckee River and levee ties into the McCarran Blvd bridge.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.25	Rock Blvd Bridge: No bridge modifications. Levees/floodwalls and terracing will confine flood flows to existing bridge opening. Abutment and pier scour countermeasures may be required.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
6.26	Mill Street Levee - Rock to McCarran: Reduced south bank floodplain terracing with the associated levee move closer to the Truckee River. Reduces excavation costs and reduces impact the existing Pioneer Ditch. Pioneer Ditch will be piped to allow for use of the fill disposal area. (Cost included in Element 25 Sparks Levees and Floodwalls: Rock to McCarran)	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.27	Terracing Rock to McCarran: Reduced terracing to reduce the amount of excavation and avoid the existing Pioneer Ditch. The terracing and associated levees are moved northward toward the Truckee River and levee ties into the Rock Blvd bridge. The land between Mill Street and the relocated levee can be used as a fill disposal site and reserved for future recreational use.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.28	Sparks Levees and Floodwalls - Rock to McCarran: Replacement of the north bank levee with on-bank floodwalls to minimize impacts to existing properties and railroad spurs. Some minor terracing on the north bank. Fill localized low lying areas on the landside of the floodwall. Trail can be incorporated into floodwall maintenance road.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.29	Terracing - Rock to Steamboat: Benching on north bank at Living	TRFMA	Sales tax, Flood District Rates, FEMA	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	River Parkway. Minimized terracing on south bank along Treatment Plant. Remove existing buildings as necessary.		HMGP			
6.30	East McCarran Blvd. Bridge: No bridge modifications. Levees/floodwalls and terracing will confine flood flows to existing bridge opening. Abutment and pier scour countermeasures may be required.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.31	Main Station Farm Protection: Will flood proof select buildings and elevate the existing pads under the hay storage barns to keep hay dry. Main processing building is sufficiently elevated above flood waters. (Costs included in "Lands and Damages".)	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.32	Sparks Levees and Floodwalls - McCarran to Vista: Replacement of existing levee with on-bank floodwalls for approximately 20,000 feet east of McCarran to reduce overall footprint. Construction of levees for most of the remainder of the reach. Floodwall will be used in the vicinity of Larkin Circle to eliminate impacts to the roadway.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.33	North Truckee Drain: Relocation of the terminus to align with the East Truckee Canyon. The infrastructure will consists mostly of an underground box culvert.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.34	Vista Narrows Widening: Expanded	TRFMA	Sales tax, Flood	24-48 months	Protection of lives, homes, businesses,	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	benching of the Narrows extending to the first railroad bridge.		District Rates, FEMA HMGP		infrastructure, and critical facilities.	
6.35	Hidden Valley: Voluntary home elevation. An alternative may include floodproofing for certain residences in Hidden Valley. The method of floodproofing would probably vary from structure to structure, but all would be raised to at least the 100-year flood elevation.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.36	Sparks Levees and Floodwalls - Rock to McCarran: Replacement of the north bank levee with on-bank floodwalls to minimize impacts to existing properties and railroad spurs. Some minor terracing on the north bank. Fill localized low lying areas on the landside of the floodwall. Trail can be incorporated into floodwall maintenance road.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.37	Eastside Subdivision: Voluntary home elevation. Elevation of the buildings in the East Subdivision south of the Main Station Farm to above the 100-year floodwater level.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.38	Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.39	Rainbow Bend Home Elevation: Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.40	Wadsworth Non-Voluntary Home	TRFMA	Sales tax, Flood	24-48 months	Protection of lives, homes, businesses,	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	Elevation/Mitigation: as required dependent upon further analysis.		District Rates, FEMA HMGP		infrastructure, and critical facilities.	
6.41	Update Truckee River Flood Inundation Maps.	TRFMA	Sales tax, Flood District Rates, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.42	Evaluate warning systems – Seiche.	Washoe County Emergency Mgmt.	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.43	Mitigation of Risk Related to Flood Damage to Public Infrastructure – Lawton Interceptor at Oxbow Park	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Low
6.44	Mitigation of Risk Related to Flood Damage to Public Infrastructure and Private Property – Dant Wash Drainage Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Low
6.45	Rosewood Wash Culvert and Channel Upgrades	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.46	Virginia Street Bridge Utility Protection	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.47	Cementary Drain Water Quality, Erosion Control, Drainage, and Sewer Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.48	Warren Estates Evaluation and Drainage Improvement Project	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.49	4th and Stoker Storm Drain Improvements Phase 1	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.50	Stead Culvert Replacement @ Silver Lk Rd	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.51	Truckee River Whitewater Park Repair Work	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.52	Sadleir Southworth Area Storm	City of Reno Public	Local Gen. Fund,	24-48 months	Protection of lives, homes, businesses,	High

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	Drain Improvements	Works	FEMA HMGP		infrastructure, and critical facilities.	
6.53	4th and Stoker SD Improvements Phase 2, including 7th/6th/Carlin and Stoker	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.54	Belford Drainage Overpass at Lake Ditch	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.55	Isbell Rd Cul de Sac Storm Drain Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.56	Greenridge to Moore Lane Storm Drain Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.57	Storm Drain Improvements between Mately and Terminal	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.58	Highland Canal Erosion Issues at Putnam	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.59	Double Diamond Levee Upgrades	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Low
6.60	Union Pacific Railroad at Link Rd Drainage Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.61	Island 18 Culvert Upgrades	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.62	Dant Bypass Structure and Channel Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.63	Autumn Hills Flood Control	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.64	University Drain/Edison Way Culvert Upgrades	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.65	Carlifornia Ave Storm Drain Replacement	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.66	Irrigation Ditch Tributary Crossing	City of Reno Public	Local Gen. Fund,	24-48 months	Protection of lives, homes, businesses,	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	Improvements	Works	FEMA HMGP		infrastructure, and critical facilities.	
6.67	Aquila Ave/Krupp Circle Drainage Improvments	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.68	Thomas Creek at South Virginia between approximately Patriot and Gavian (US 395 interchange area).	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.69	Stead Storm Drain Improvements Ph 1	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.70	Wedikend Storm Drain Improvements	City of Reno Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
6.71	North Truckee River Drain Replacement	City of Sparks Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.72	Implement Stormwater Plan (e.g., projects for storm drains, catch basins, surveys, etc.)	City of Sparks Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.73	Mitigate where water enters the reservoir to the dam (retention, dry basins).	Pyramid Lake Paiute Tribe Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
6.74	Structural projects: Culvert Maintenance	Reno-Sparks Indian Colony Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Low
6.75	Structural projects : Drainage System Maintenance	Reno-Sparks Indian Colony Public Works	Local Gen. Fund, FEMA HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Low
6.76	Install back-up generators for critical infrastructure and facilities along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).	All Jurisdictions	Local Gen. Fund, FEMA HMGP	48-60 months	Protection of lives and property due to pre-planning.	Moderate
6.77	Drainage ditch improvements.	All Jurisdictions	Local Gen. Fund,	48-60 months	Protection of lives, homes, businesses,	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
			FEMA HMGP		infrastructure, and critical facilities.	
7.1	Pandemic Influenza (from the 2005 objective titled: Continued Public Health Emergency management trainings and exercise.)	Washoe County Health District	CDC	Ongoing	Protection of lives due to preplanning.	Moderate
7.2	Public notification for high risk disease events.	Washoe County Health District	CDC	Ongoing	Protection of lives due to pre-planning.	Moderate
7.3	Continued Public Health emergency management trainings and exercises.	Washoe County Health District	CDC	Ongoing	Protection of lives due to pre-planning.	Moderate
8.1	Encourage the private sector to prepare and maintain 3-day preparedness kits.	All Jurisdictions- Emergency Mgmt.	Local General Fund, EMPG	Ongoing	Protection of lives due to pre-planning.	Moderate
8.2	Conduct outreach programs to build resilience to severe storm hazards. (formerly 2005 action - Encourage homeowners to storm proof their buildings).	All Jurisdictions- Emergency Mgmt.	Local General Fund, EMPG	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
9.1	Increase communication, coordination, and collaboration between wildland/ urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.	All Jurisdictions- Emergency Mgmt.	Local General Fund, NDEP, USEPA, NDF, USFS, PDM, HMGP, BLM	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
9.2	Mitigation of risk of fire related to the Mt. Rose Wilderness Area.	Washoe County Emergency Mgmt. Truckee Meadows Fire Protection District	Local General Fund, NDEP, USEPA, NDF, USFS, PDM, HMGP	24-48 months	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
9.3	Coordination of fuels mitigation and management programs to creation	Washoe County Emergency Mgmt.	Local General Fund, NDEP, USEPA, NDF,	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	defensible and survivable space, fire/fuel breaks, and increase community wildland fire awareness and participation.	Truckee Meadows Fire Protection District Reno-Sparks Indian Colony Emergency Mgmt.	USFS, PDM, HMGP, BLM			
9.4	Collaboration with residents in wildland fire prone areas to create evacuate plans for the community and hold evacuation drills at least every three years.	Washoe County Emergency Mgmt. Truckee Meadows Fire Protection District	Local General Fund, NDEP, USEPA, NDF, USFS, PDM, HMGP	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
9.5	Adoption and enforcement of Fire, Building and Wildland Urban Interface Codes to provide ignition-resistant construction in medium, high and extreme high fire hazard rating areas, fuels mitigation and maintenance on private property, and community safety features such as residential fire sprinklers, and fire department access/egress routes.	Washoe County Emergency Mgmt. Truckee Meadows Fire Protection District	Local General Fund, NDEP, USEPA, NDF, USFS, PDM, HMGP	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
10.1	Coordinate communication between state and local jurisdictions regarding hazardous materials.	All Jurisdictions Emergency Mgmt, Building Department, Fire Department	Local General Fund, NDEP, USEPA	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
11.1	Monitor radiological shipping campaigns that include Washoe County as an approved route.	All Jurisdictions Emergency Mgmt, Sheriff/Police, Fire Department	Local General Fund, NDEP, USEPA	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
11.2	Coordinate communication between state and local jurisdictions for the	All Jurisdictions Emergency Mgmt,	Local General Fund, NDEP, USEPA	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

Table 8-4: Action Plan Matrix

Action Number	Action Item	Department / Division	Potential Funding Source	Implementation Timeline	Economic Justification	Priority Level
	transportation of radiological materials and waste.	Sheriff/Police, Fire Department				
12.1	Provide training for the public and private sectors to improve response, management, and intervention of WMD terrorism incidents.	All Jurisdictions Emergency Mgmt, Sheriff/Police, Fire Department	Local General Fund, DHS	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate
12.2	Seek funding to provide methodology and operational functionality to perform vulnerability analysis to determine areas of risk and/or vulnerability to pipeline. Leverage relationships with pipeline owner/operators to insure adequate maintenance and monitoring of pipeline infrastructure. (From the 2005 Objective titled "Analyze pipeline to determine areas of vulnerability")	Washoe County Emergency Mgmt.	Local General Fund, DHS	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	High
12.3	Increase law enforcement staff.	All Jurisdictions Sheriff/Police	Local General Fund, DHS	Ongoing	Protection of lives, homes, businesses, infrastructure, and critical facilities.	Moderate

BLM= Bureau of Land Management
PW = Public Works
DHS= Dept. of Homeland Security
EMPG = Emergency Management Performance Grant
HMGP = Hazard Mitigation Grant Program
HUD=Housing & Urban Development
NDEP = Nevada Division of Environmental Protection
NDF = Nevada Department of Forestry
PDM = Pre-Disaster Mitigation
SERC = State Emergency Response Commission
USDA = U.S. Department of Agriculture
USEPA = U.S. Environmental Protection Agency
USFS = U.S. Fire Service

This section describes a formal plan maintenance process to ensure that the RHMP remains an active and applicable document. It includes an explanation of how the County, Cities, participating jurisdictions, and the Planning Committee intend to organize its efforts to ensure that improvements and revisions to the RHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail below:

- Monitoring, evaluating, and updating the RHMP
- Implementation through existing planning mechanisms
- Continued public involvement

9.1 MONITORING, EVALUATING, AND UPDATING THE RHMP

The requirements for monitoring, evaluating, and updating the RHMP, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Monitoring, Evaluating, and Updating the Plan

Monitoring, Evaluating and Updating the Plan

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element

- Does the new or updated plan describe the method and schedule for monitoring the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)
- Does the new or updated plan describe the method and schedule for evaluating the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)
- Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?

Source: FEMA 2008.

The Emergency Managers for each participating jurisdiction recognize the need for plan maintenance and wanted to include tools into the plan for maintenance. The RHMP was prepared as a collaborative effort between the each participating jurisdiction's Emergency Management, the Local Emergency Preparedness Committee (LEPC) and the Nevada Division of Emergency Management. To maintain momentum and build upon this hazard mitigation planning effort, the Planning Committee will monitor, evaluate, and update the RHMP. The Planning Committee will be responsible for implementing the Mitigation Action Plan. The Washoe County Emergency Manager will serve as the primary points of contact and will coordinate all local efforts to monitor, evaluate, and revise the RHMP.

In 2013, the State Hazard Mitigation Officer and DEM implemented a program for table top exercises to be completed annually in order for each jurisdiction to review the progress of implementing the RHMP. Washoe County completed an annual review in 2014 and all jurisdictions participated. Because this review was successful, the LEPC will continue to conduct an annual review of the progress in implementing the RHMP, particularly the Mitigation

Action Plan. As shown in **Appendix E**, the Annual Review Questionnaire and Mitigation Action Progress Report will provide the basis for possible changes in the overall Mitigation Action Plan by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the RHMP implementation. The Washoe County Emergency Manager will initiate the annual review one month prior to the month of date of adoption. The findings from this review will be presented annually to the County and City Managers, as well as the Tribal Councils and TRFMA Board of Directors. The review will include an evaluation of the following:

- Participation of agency personnel from the County, City, and participating jurisdictions and others in the RHMP implementation.
- Notable changes in the County, Cities' and participating jurisdictions' risk of natural or human-caused hazards.
- Impacts of land development activities and related programs on hazard mitigation.
- Progress made implementing the Mitigation Action Plan (identify problems and suggest improvements as necessary).
- The adequacy of resources for implementation of the RHMP.

The process of reviewing the progress on achieving the mitigation goals and implementing the Mitigation Action Plan activities and projects will also be accomplished during the annual review process. During each annual review, a Mitigation Action Progress Report will be submitted to the Planning Committee and provide a brief overview of mitigation projects completed or in progress since the last review. As shown in **Appendix E**, the report will include the current status of the mitigation project, including any changes made to the project, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped achieve the appropriate goals identified in the plan.

In addition to the annual review, the Planning Committee will update the RHMP every five years. To ensure that this occurs, in the third year following adoption of the RHMP, the Planning Committee will undertake the following activities:

- Thoroughly analyze and update the County's, Cities' and participating jurisdictions' risk of natural and man-made hazards.
- Provide a new annual review (as noted above), plus a review of the three previous annual reports.
- Provide a detailed review and revision of the mitigation strategy.
- Prepare a new action plan with prioritized actions, responsible parties, and resources.
- Prepare a new draft RHMP and submit it to the County Board, City Councils, Tribal Councils, and TRFMA Board of Directors for adoption.
- Submit an updated RHMP to the Nevada State Hazard Mitigation Officer and FEMA for approval.

9.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The requirements for implementation through existing planning mechanisms, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Incorporation into Existing Planning Mechanisms

Incorporation into Existing Planning Mechanisms
Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
Element
- Does the new or updated plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?
- Does the new or updated plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?

Source: FEMA 2008.

Since the 2010 HMP Update, the County and participating jurisdictions have successfully utilized and integrated hazard profiles, vulnerability and mitigation actions into other planning mechanisms and documents including the following:

- ***City of Reno Capital Improvement Program:*** Incorporates mitigation actions.
- ***City of Sparks Capital Improvement Plan:*** Incorporates mitigation actions.
- ***Reno-Sparks Indian Colony THIRA (2014):*** Utilizes hazard profiles and vulnerability assessment from RHMP.
- ***Reno-Sparks Indian Colony COOP (2013):*** Utilizes hazard profiles and vulnerability assessment from RHMP.
- ***Pyramid Lake Paiute Tribe THIRA (In progress):*** Utilizes hazard profiles and vulnerability assessment from RHMP.
- ***EIR for Truckee Meadows Flood Control Project (2013):*** USACE study of proposed flood control development in the City of Reno, City of Sparks, Reno-Sparks Indian Colony and to the Pyramid Lake Indian Reservation.
- ***City of Sparks, Flood Response Action Plan (2011)****:* Provides information on flood hazards in the City of Sparks.
- ***City of Sparks, Earthquake Action Plan (2012)****:* Provides information on earthquake hazards in the City of Sparks.
- ***State of Nevada Enhanced Hazard Mitigation Plan (2013)****:* This plan, prepared by NDEM, included hazard profile information and historic events from the County's RHMP.
- ***Truckee River Flood Plan – The Living River (2011)****:* Includes findings and recommendations for flood mitigation projects along the Truckee River.

- ***Truckee River Flood Warning Plan (2013)****:* Regional plan which identifies flood hazards in Washoe County and mitigation actions.
- ***Washoe County, Nevada Hazardous Materials Report: A Countywide Analysis of Fixed Facilities and Hazardous Materials in Transit (2013):*** Includes data and analysis of hazardous materials in transit and fixed facilities in Washoe County.
- ***Washoe County Regional Resiliency Study (2014)****:* This plan provides information on climate variability concerns in the region and potential mitigation measures.

After the adoption of the RHMP, the Committee will continue to ensure that the RHMP, in particular the Mitigation Action Plan, is incorporated into existing planning mechanisms. Each member of the Planning Committee will achieve this incorporation by undertaking the following activities.

- Conduct a review of the community-specific regulatory tools to assess the integration of the mitigation strategy. These regulatory tools are identified in Table 7-1.
- Work with pertinent divisions and departments to increase awareness of the RHMP and provide assistance in integrating the mitigation strategy (including the action plan) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.

9.3 CONTINUED PUBLIC INVOLVEMENT

The requirements for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Continued Public Involvement

Continued Public Involvement

Requirement §201.6(c)(4)(iii): [The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.

Element

- Does the new or updated plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an ongoing mitigation plan committee, or annual review meetings with stakeholders?)

Source: FEMA 2008.

The County, Cities and participating jurisdictions are dedicated to involving the public directly in the continual reshaping and updating of the RHMP. Hard copies of the RHMP will be provided to each department. In addition, a downloadable copy of the plan and any proposed changes will be posted on the County's web site. The site will also contain an e-mail address and phone number to which interested parties may direct their comments or concerns.

Washoe County has taken a very proactive approach in public awareness of hazards and emergency preparedness and leads the effort to complete evacuation plans for counties statewide. Through several statewide initiatives, Washoe County takes a program management role to assist Nevada communities. These initiatives have included Evacuation, Mass Care, & Sheltering

planning, Mass Fatality planning, and Schools Prepared And Ready Together Across Nevada (SPARTAN) planning.

In addition to these initiatives, the County provides existing forums to work directly with other organizations and community members on preparedness and mitigation measures through various committees and media opportunities. These committees are: Community Emergency Response Team, Medical Reserve Corps, Inter-Hospital Coordinating Council, Local Emergency Planning Committee, Emergency Preparedness Council, Truckee River Flood Management Authority, Fire Safe Council, READY Washoe, PREPARE Washoe, Voluntary Organizations Active in Disaster (VOAD), and Amateur Radio Emergency Service (ARES).

Continued public involvement is also imperative to the overall success of the plan's implementation. Recognizing that citizen involvement is imperative to the success of these projects, the following will be utilized as a tool to receive public comment on projects. The Emergency Management staff participates in the Citizen Advisory Board when new projects or plans are being written. The planning team reaches out to the public for awareness of the mitigation activities, planned projects, and the planning process.

The update process provides an opportunity to publicize success stories from the plan implementation and seek additional public comment. A public hearing(s) to receive public comment on plan maintenance and updating will be held during the update period. Additionally, the hazard mitigation projects will be reviewed by the Local Emergency Planning Committee on an annual basis. The LEPC is open to the public, with agendas posted throughout the community. This will allow for citizen feedback throughout the five year period. When the Planning Committee reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan.

The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings. Washoe County has a policy regarding electronic social media, which act as a one-way communication tool. Therefore, periodic updates on the projects will be sent and citizens will be directed to respond directly to our office with any questions or concerns. Another internet based tool utilized will be the Emergency Management website. The plan will be published to the site and available for citizens to review at their convenience.

Emergency management representatives attend local service clubs as guest speakers, public safety events at parks and shopping centers, as well as local community radio and television shows. The over-arching purpose is to share the hazard mitigation actions that citizens can implement to make a plan, assemble a kit, and stay informed.

Any public comments received regarding the RHMP will be collected by the Emergency Managers, included in the annual report to the County and City Managers, Tribal Councils and TRFMA Board of Directors and considered during future RHMP updates. A press release and public notice by the County will be issued each year before the annual maintenance meeting inviting the public to participate.

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Appendix A
Adoption Resolution

Sample Adoption Resolution #_____

WHEREAS _____ has historically experienced severe damage from natural and human-caused hazards such as flooding, wildfire, drought, thunderstorms/high winds, and hazardous materials incidents on many occasions in the past century, resulting in loss of property and life, economic hardship, and threats to public health and safety;

WHEREAS the _____ Hazard Mitigation Plan (the Plan) has been developed after more than one year of research and work by the *County's* Office of Emergency Management in association and cooperation with the County Planning Team for the reduction of hazard risk to the community;

WHEREAS the Plan specifically addresses hazard mitigation strategies and plan maintenance procedures for _____;

WHEREAS the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural and human caused hazards that impact _____ with the effect of protecting people and property from loss associated with those hazards;

WHEREAS a public meeting was held to present the Plan for comment and review as required by law;

NOW THEREFORE BE IT RESOLVED

by the *Board of Supervisors or County Commission*, that:

1. The Plan is hereby Adopted as an official plan of _____

2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them.

3. Future revisions and Plan maintenance required by the Disaster Mitigation Act of 2000 and FEMA, are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.

4. An annual report on the progress of the implementation elements of the Plan shall be presented to the, *County Commission* by October 31st of each calendar year.

PASSED by *the County Commission, this ___th day of December, 2015*.

Commission Chair, *insert name*	Date
Commissioner, *insert name*	Date
Commissioner, *insert name*	Date

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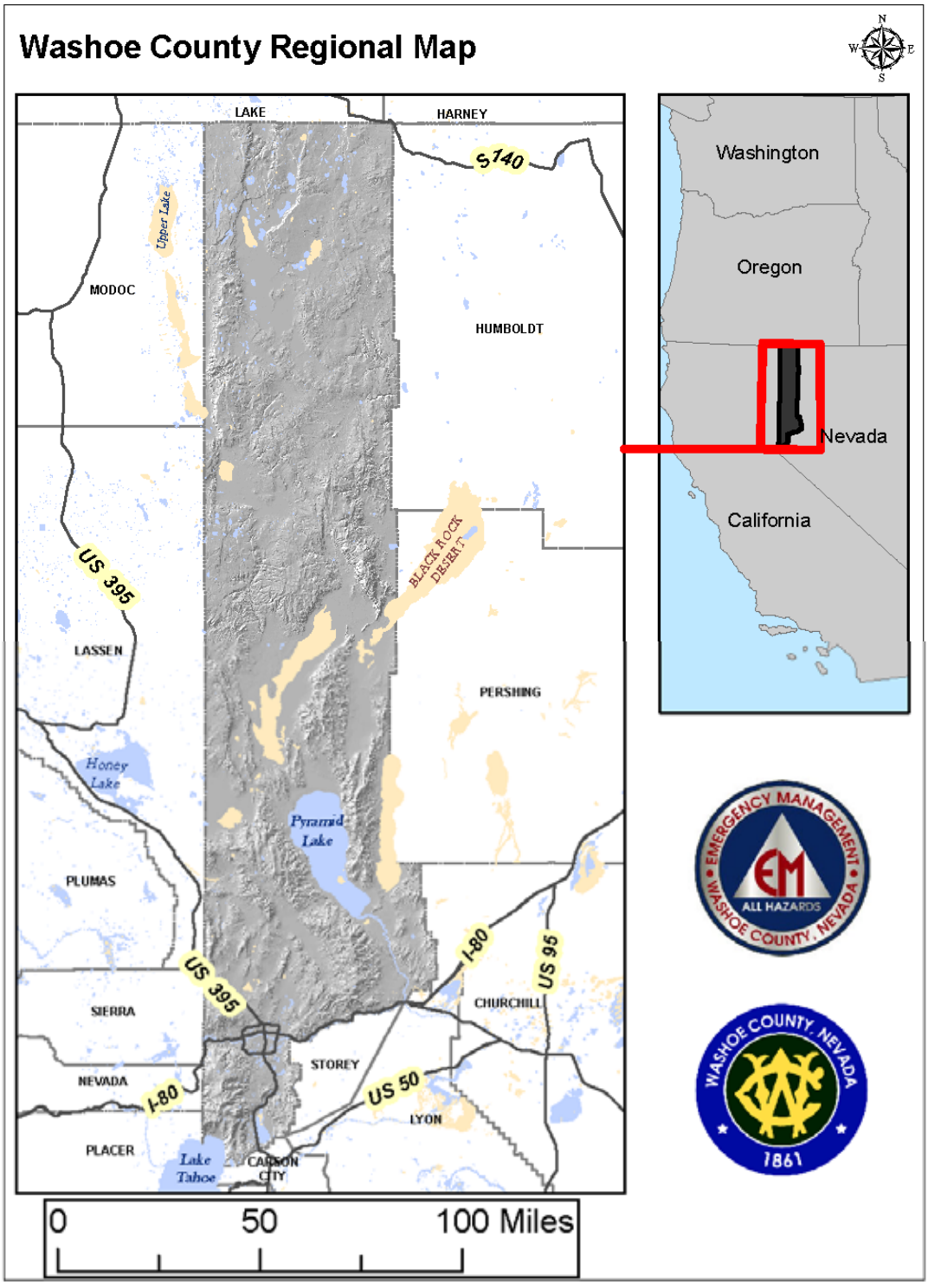
Appendix B

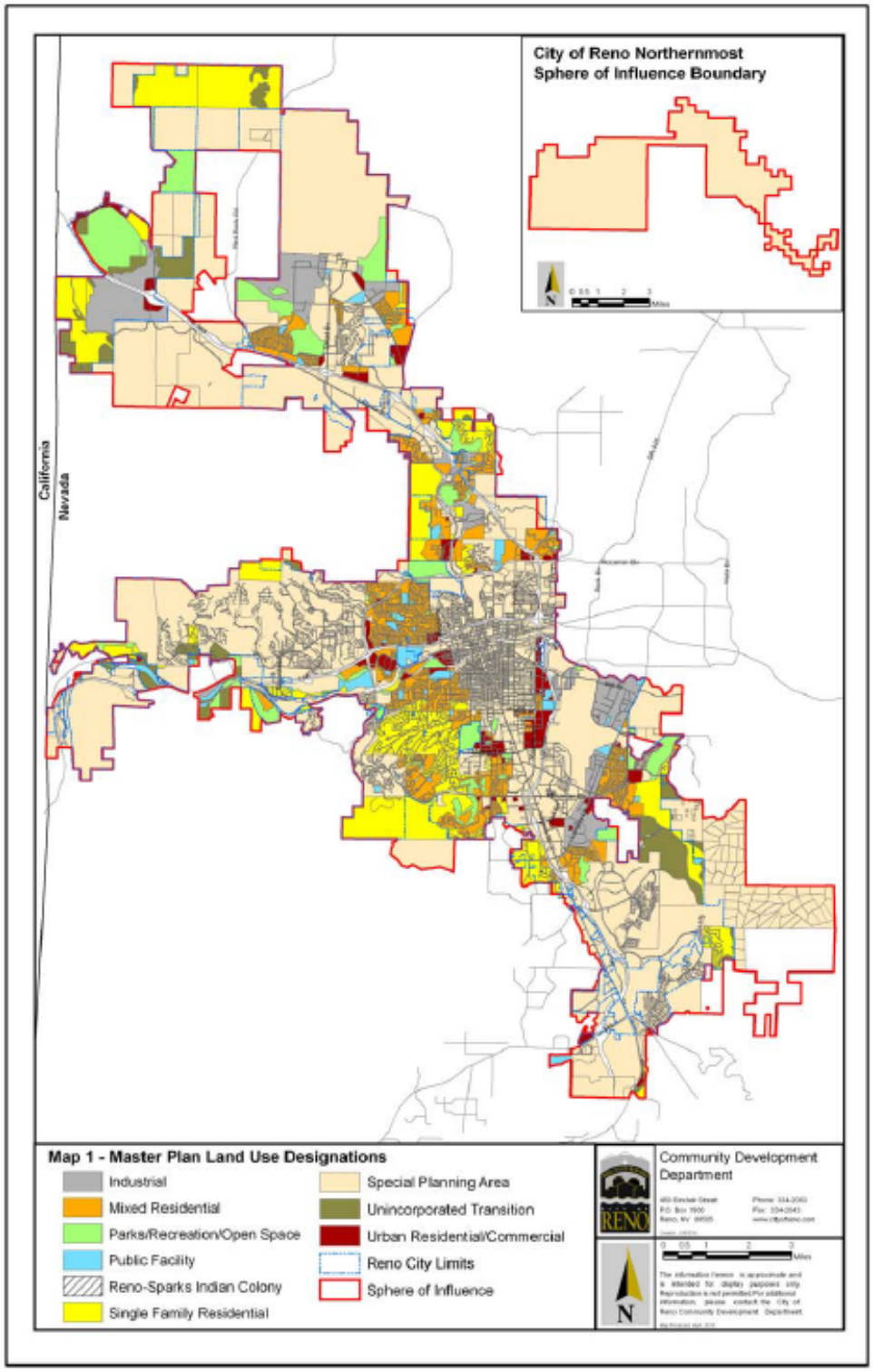
Figures

Figure B-1: Washoe County Regional Map



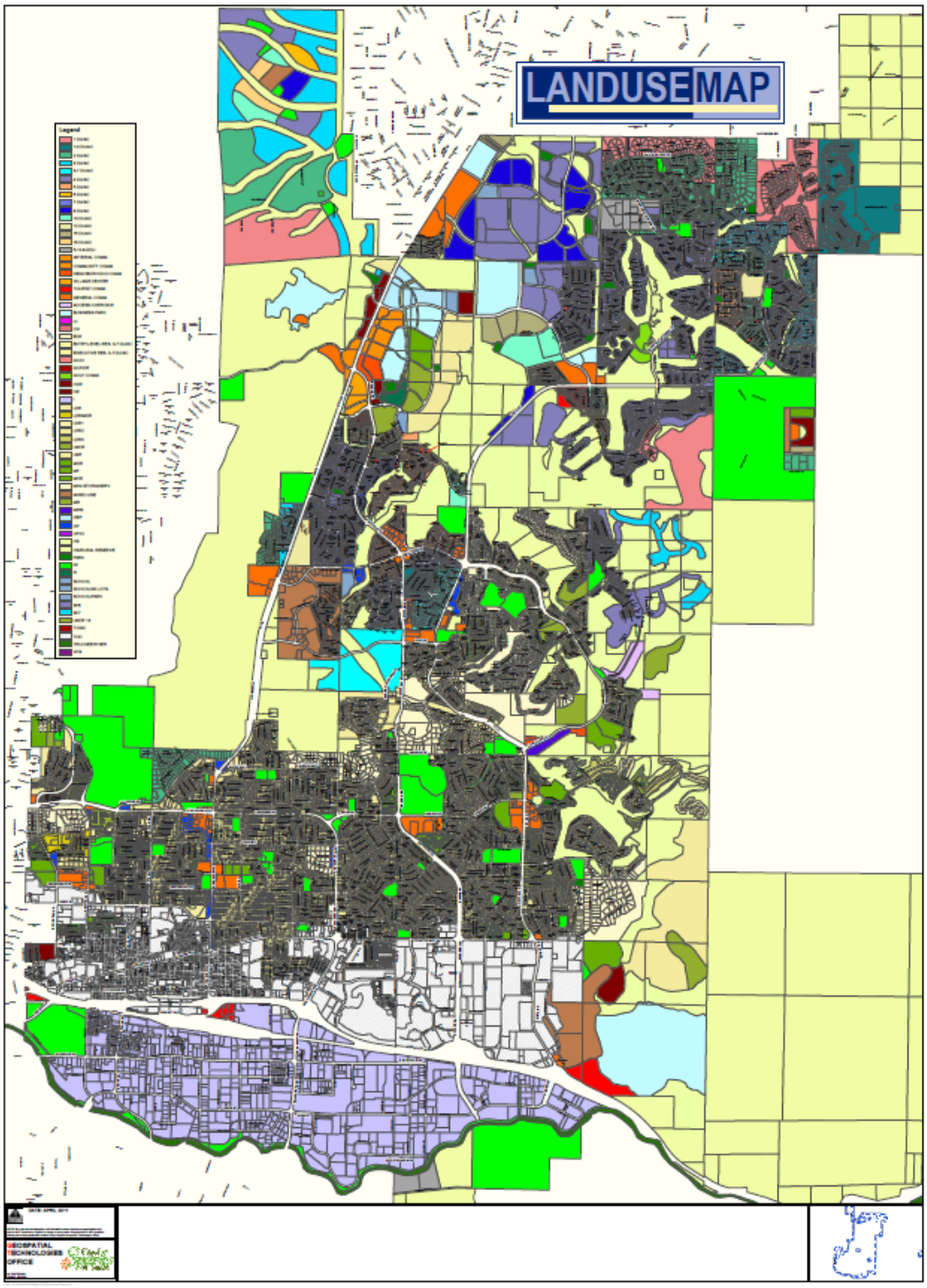
Source: Washoe County GIS

Figure B-2: City of Reno Land Use Map



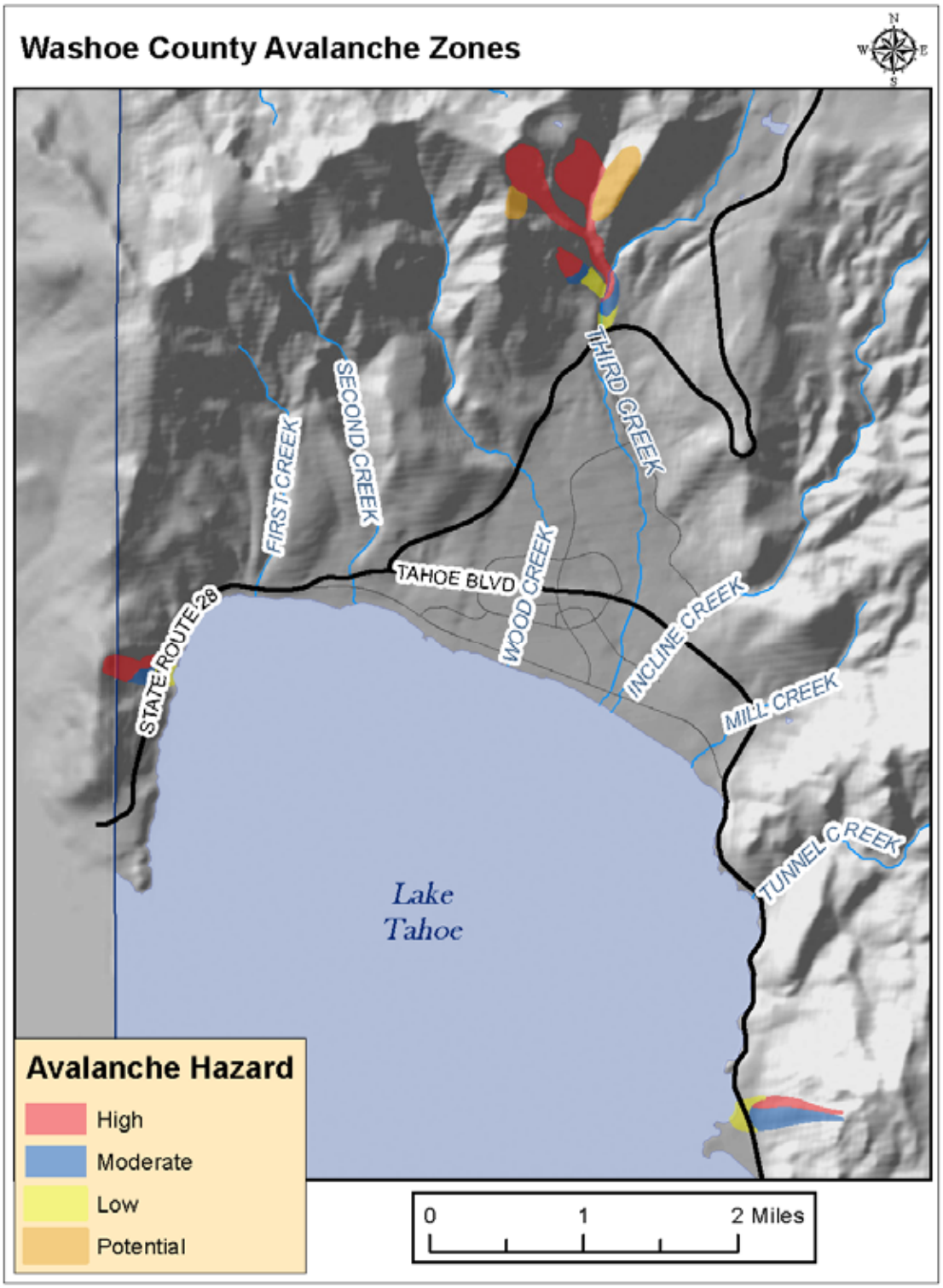
Source: City of Reno

Figure B-3: City of Sparks Land Use Map



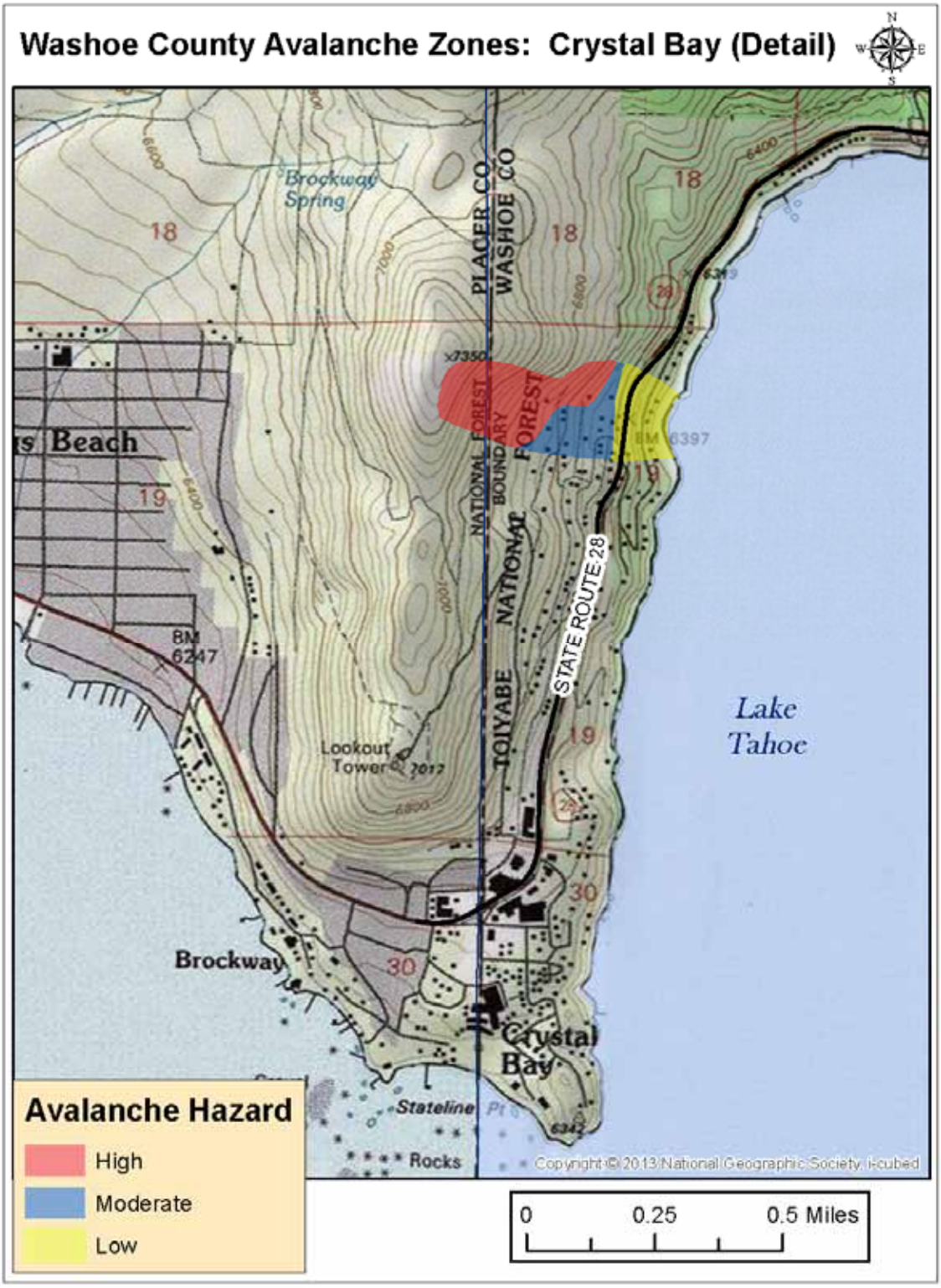
Source: City of Sparks

Figure B-4: Washoe County Overall Avalanche Zones



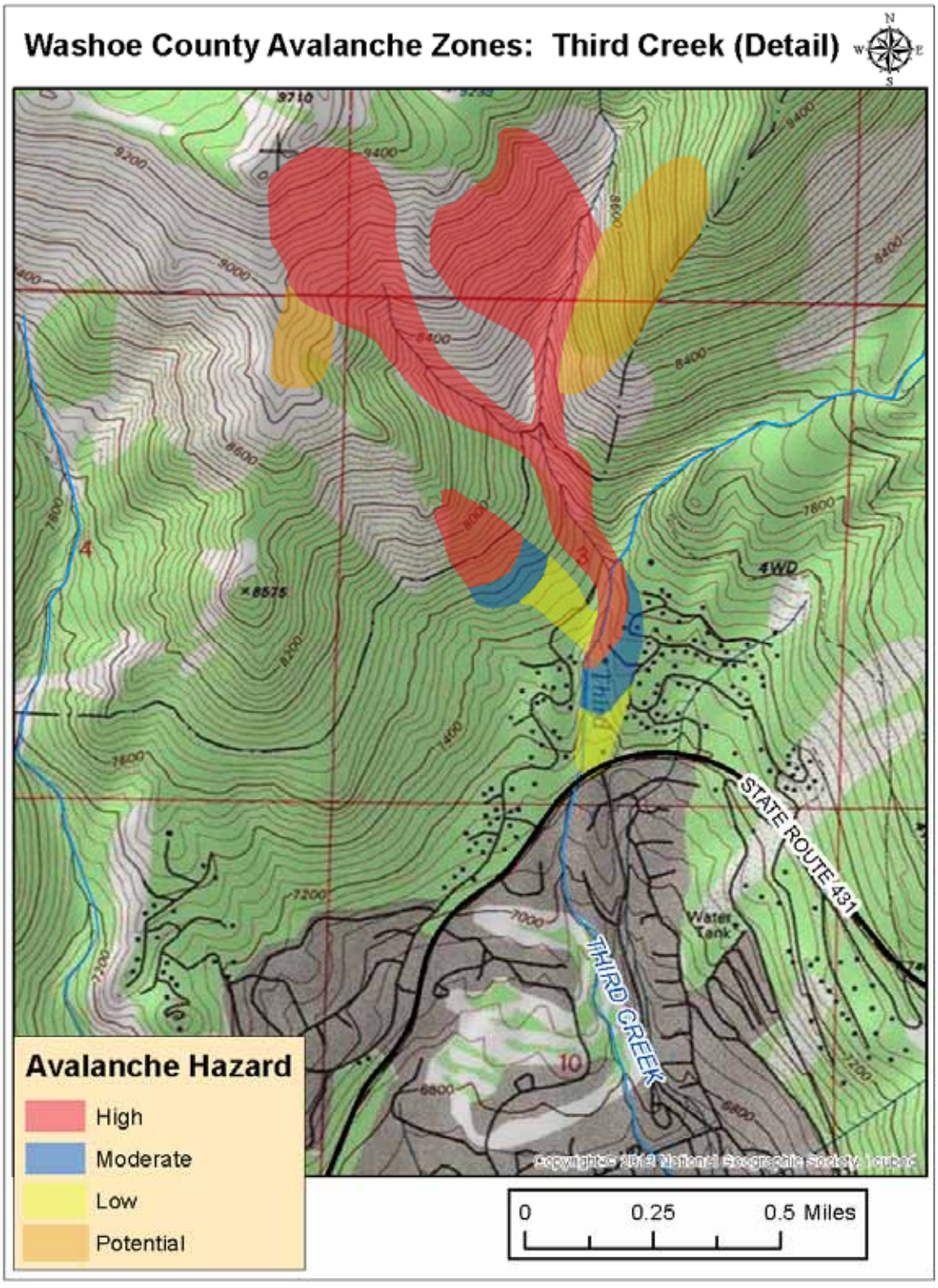
Source: Washoe County GIS

Figure B-5: Washoe County Avalanche Zones: Crystal Bay



Source: Washoe County GIS

Figure B-6: Washoe County Avalanche Zones: Third Creek

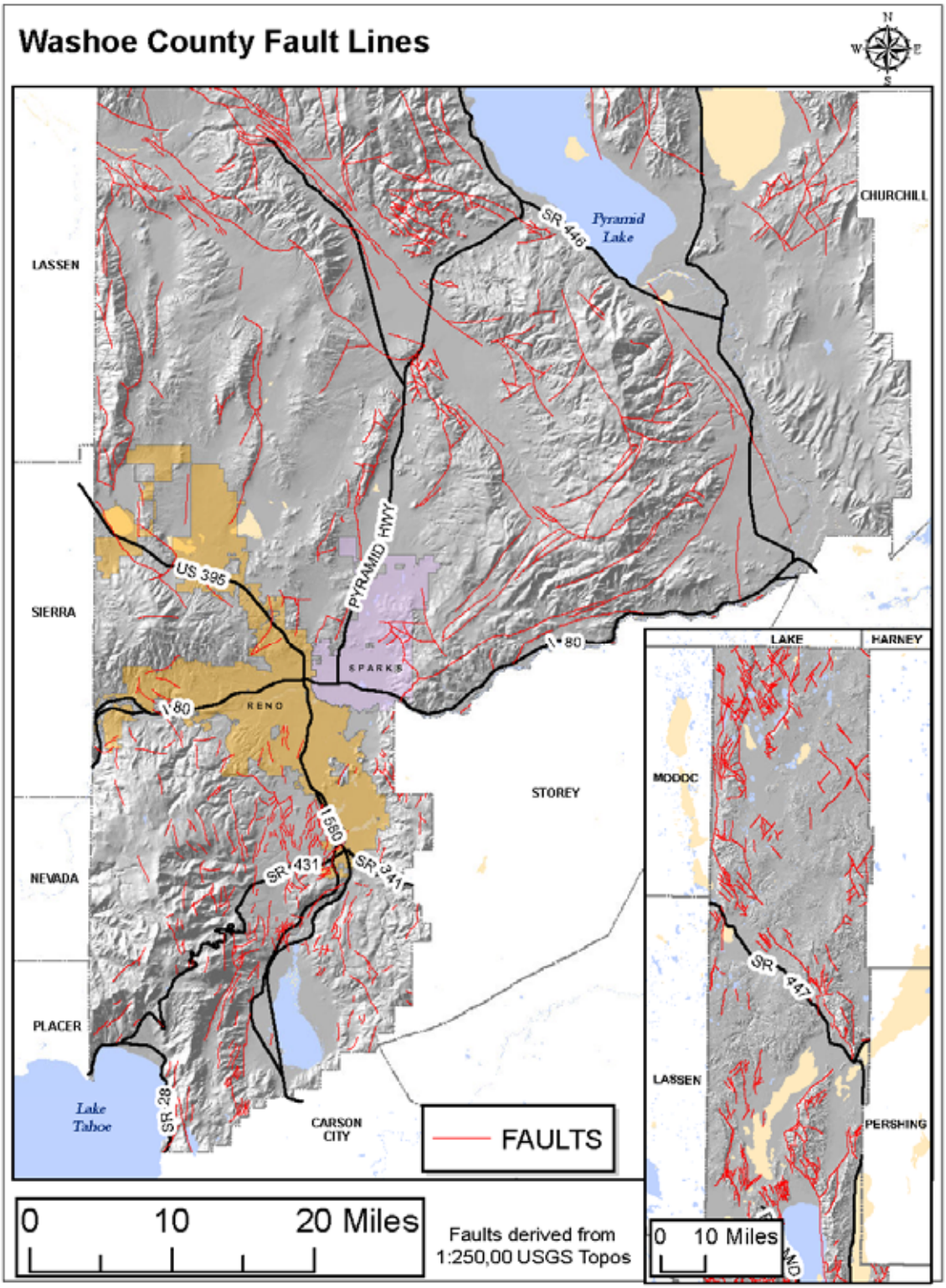


Source: Washoe County GIS

Figure B-7: Washoe County Avalanche Zones: Sand Harbor

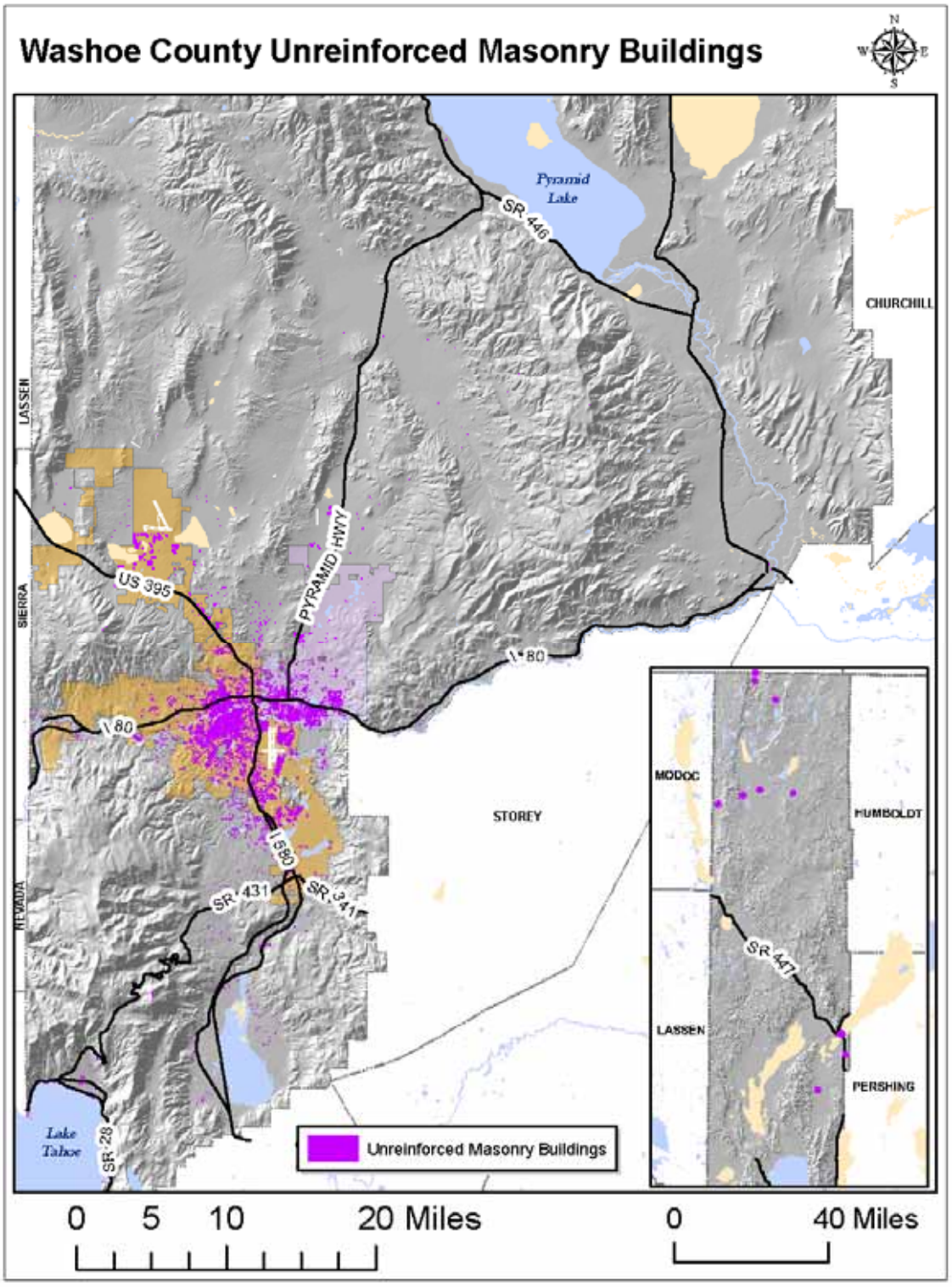
Source: Washoe County GIS

Figure B-8: Washoe County Fault Lines



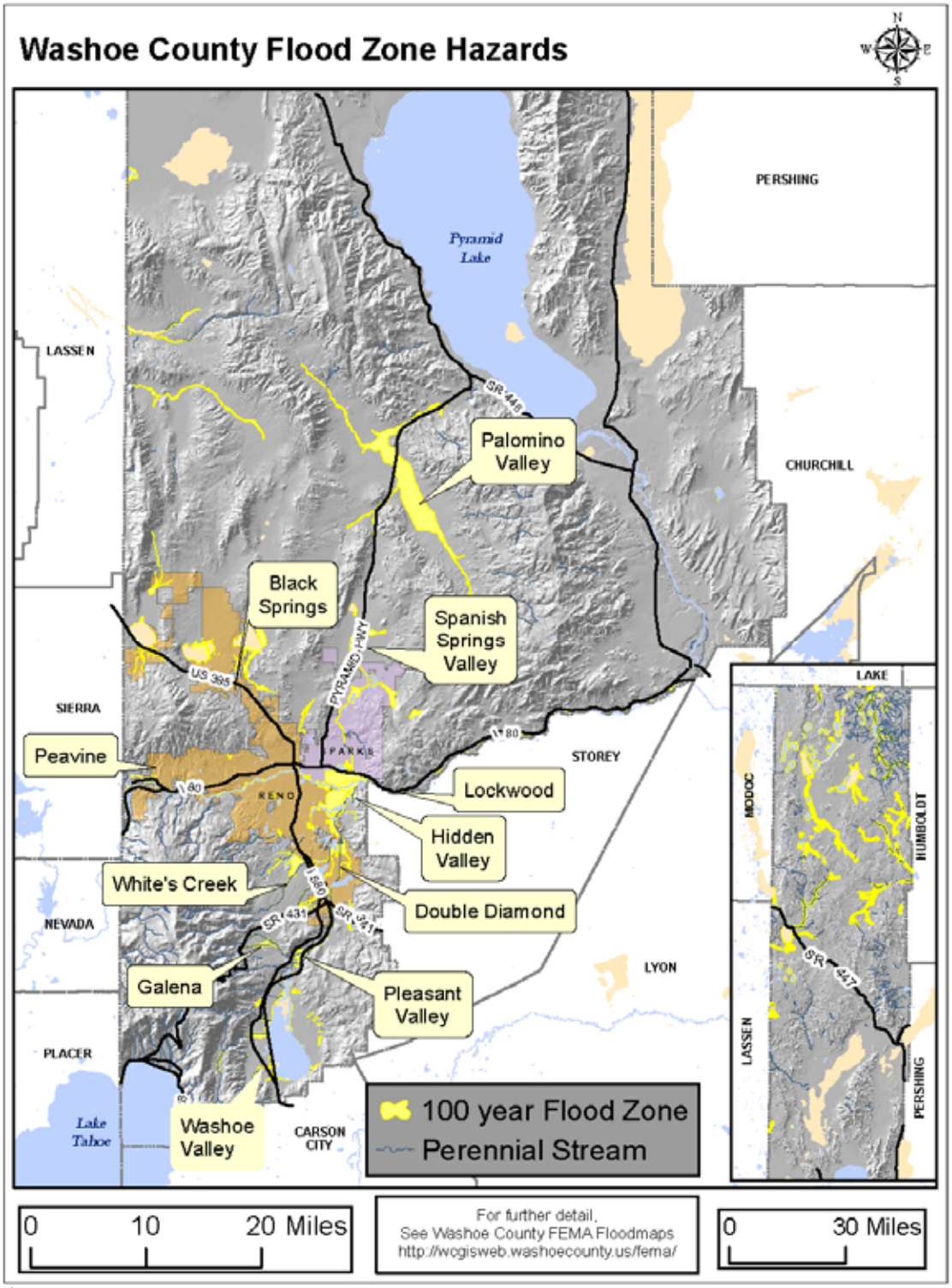
Source: Washoe County GIS

Figure B-9: Washoe County Unreinforced Masonry Buildings



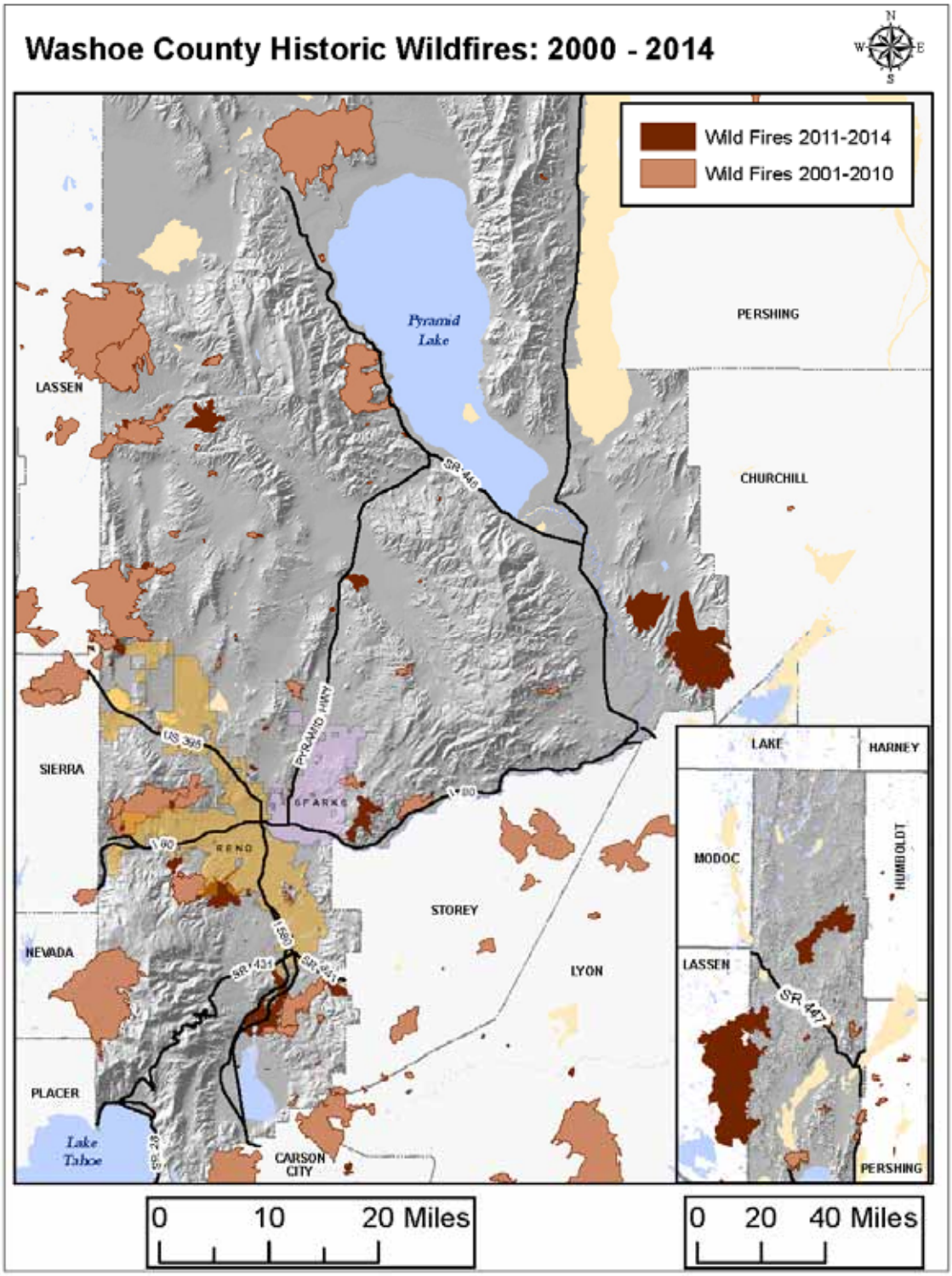
Source: Washoe County GIS

Figure B-10: Washoe County Flood Zone Hazard Areas



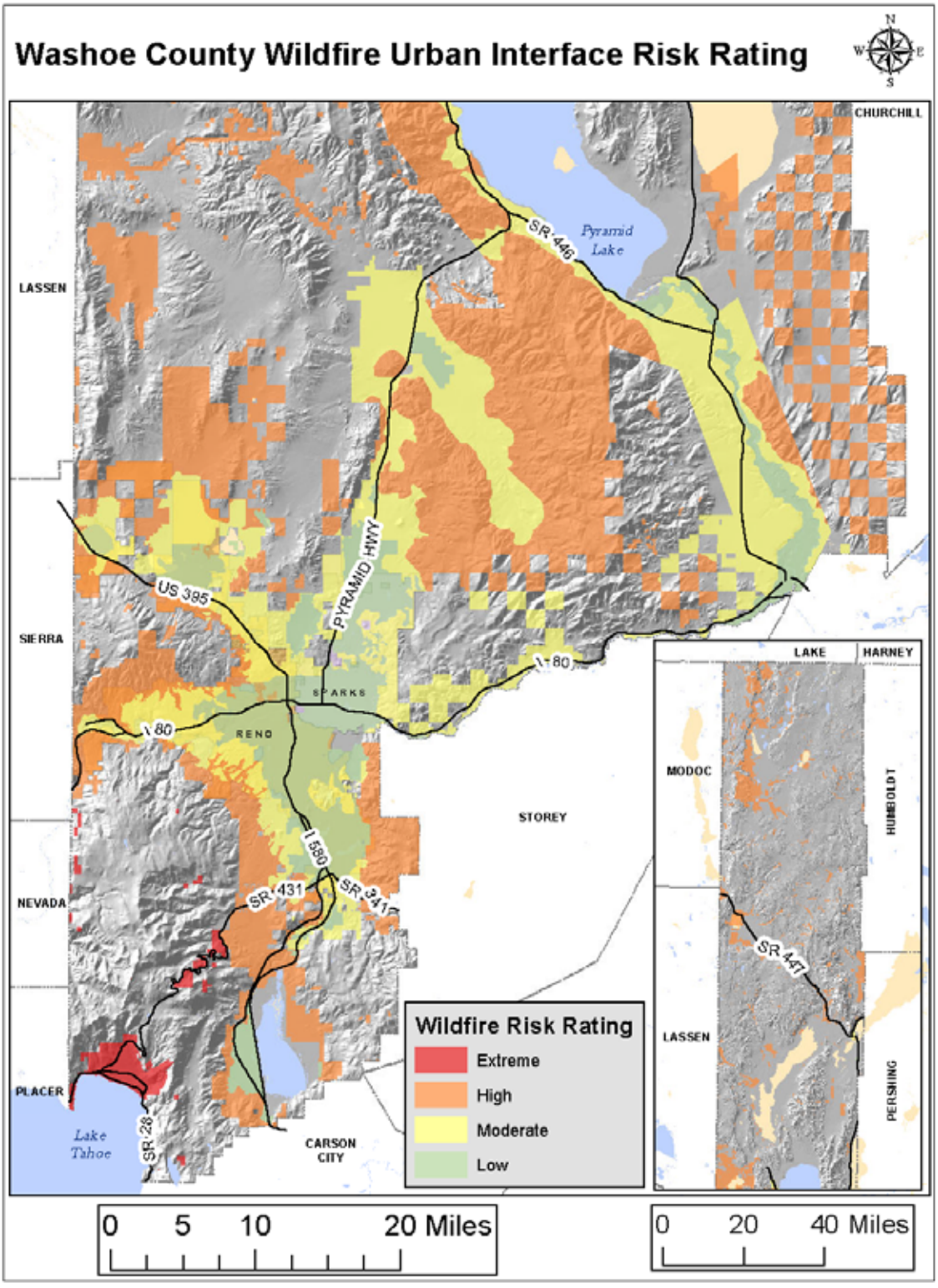
Source: Washoe County GIS

Figure B-11: Washoe County Historic Wildfires (2000-2014)



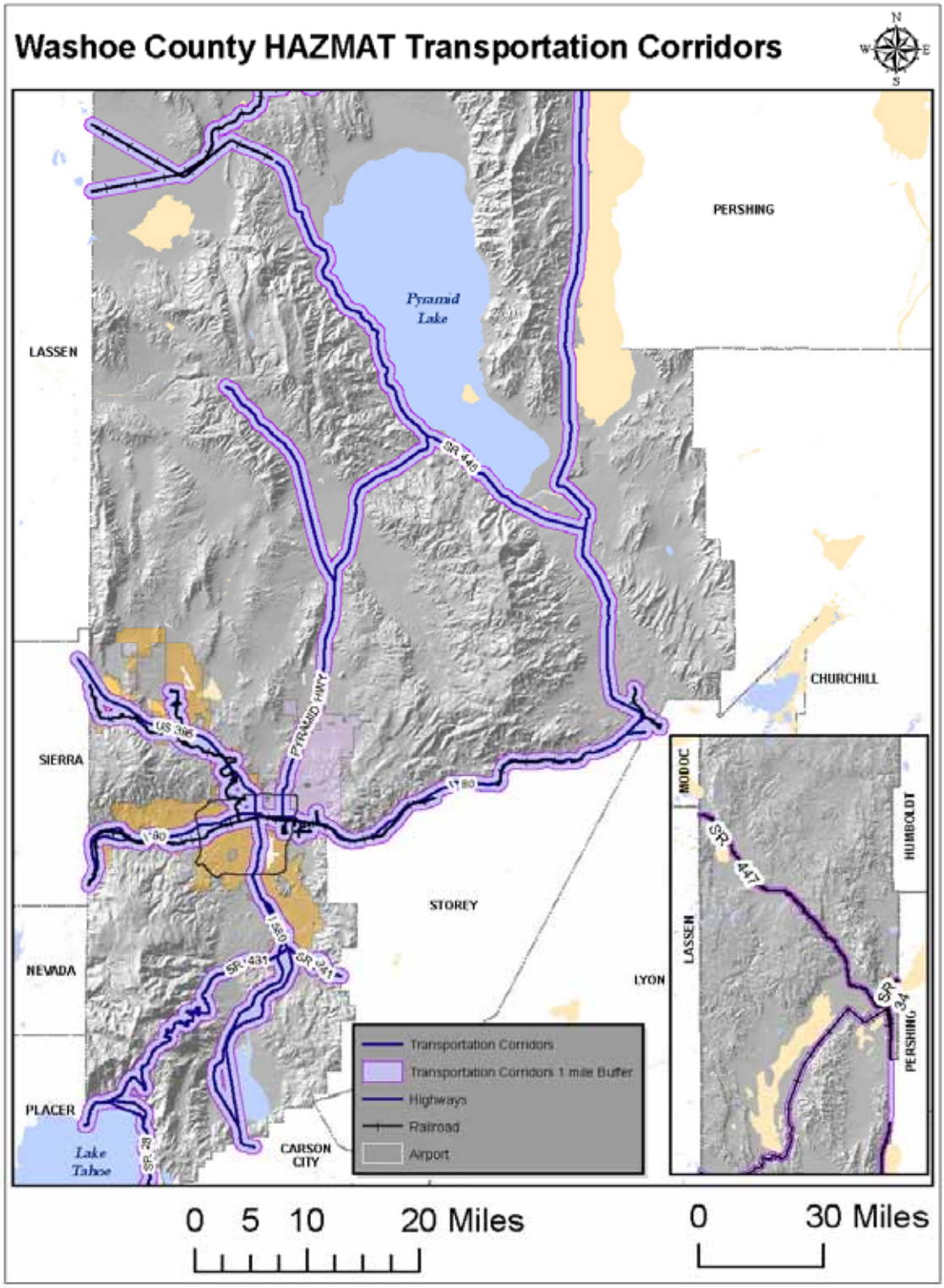
Source: Washoe County GIS

Figure B-12: Washoe County Wildfire Urban Interface Risk Areas



Source: Washoe County GIS

Figure B-13: Washoe County HAZMAT Transportation Corridors



Source: Washoe County GIS

Appendix C
Public Information

WASHOE COUNTY
"Dedicated to Excellence in Public Service"
EMERGENCY MANAGEMENT PROGRAM
5195 Spectrum Blvd. Reno, NV 89512 - Phone: (775) 337-5898 - Fax: (775) 337-5987

Press Release
For Immediate Release
website: http://www.readywashoe.com

Media Contact: Aaron Kenneston
tel. 775.337.5898
PR 14-174

Washoe County asks the public for help in creating a Regional Hazard Mitigation Plan

Reno, Nevada. Oct. 6, 2014. In recent years, nature has been restless in Nevada – there have been a swarm of earthquakes rattling the western portion of the state, recent flash flooding due to summer thunderstorms, and every year there are major wild land fires in or near Washoe County and throughout the state. All of these emergency events demonstrate that Washoe County can be vulnerable to disasters. The risks from such hazards will continue to increase as the County's population continues to grow.

Washoe County has launched a planning effort to prepare a *Regional Hazard Mitigation Plan*. This plan will assess and prioritize the risks posed by natural and man-made hazards and identify ways to reduce those risks. This plan is required by the Federal Disaster Mitigation Act of 2000 and is a prerequisite to acquiring federal funding for mitigation or recovery from disasters.

Washoe County began this effort this past August. Shortly, a questionnaire will be distributed to the public asking for input on local disaster mitigation and recovery needs. Washoe County, City of Reno, City of Sparks, Reno-Sparks Indian Colony, Pyramid Lake Paiute Tribe and the Truckee River Flood Management Authority plan on submitting a draft plan to local governing boards in the fall of 2015 for their approval. The final plan will then be sent to FEMA for final approval.

Public comments and participation are welcomed and encouraged. For additional information to become a volunteer or to make comments, please contact Aaron Kenneston, Washoe County Emergency Management and Homeland Security at (775) 337-5898 or AKenneston@washoecounty.us.

###

From: Kenneston, Aaron <AKenneston@washoecounty.us>
Sent: Thursday, September 11, 2014 3:02 PM
To: Curtis, Joe; Belt, Stacey
Cc: Giomi, Stacy; Stephanie Hicks
Subject: Washoe County RHMP Meeting Invitation to Neighboring Communities

Joe & Stacey,

As you are aware, it's a small world, and an even smaller Northern Nevada! I know that you are busy, but I'd appreciate your consideration of being part of our Washoe County regional Hazard Mitigation Planning process. (*see below*)

Aaron

Over the next few months, Washoe County will conduct a planning effort to create a Regional Hazard Mitigation Plan. This plan will be developed to facilitate compliance with federal requirements and to provide a tool for local government, industry, and private venues to help reduce the impact of these threats. Further, the plan will help our community develop infrastructure to lessen potential damage.

One of the major components of the plan development is having a good cross-section of community input and participation by neighboring communities, and that is the reason for this invitation. I am hoping that you will agree to be included on the planning team. The level of commitment will involve a few meetings, plus a review of the components of the plan as they are written. I anticipate meeting four times over the next eight to ten months. Generally, much of the work can be completed via email.

I am hoping that you can participate as a representative of your profession in our neighboring communities. If you are willing to join our group, please RSVP to AKenneston@WashoeCounty.us.

Attached below, please find our upcoming meeting agenda.

Washoe County Emergency Management and Homeland Security would like to invite you to our second meeting regarding the County's mitigation planning process. One of the major components of the plan development is having a good cross-section of community input and participation, so please feel free to pass this on to other appropriate representatives.

We look forward to seeing you on October 8, 2014!

Agenda

Washoe County Regional Hazard Mitigation Plan

October 8, 2014
9:00 AM – 11:00 AM
REOC - 5195 Spectrum Blvd., Reno, NV 89512

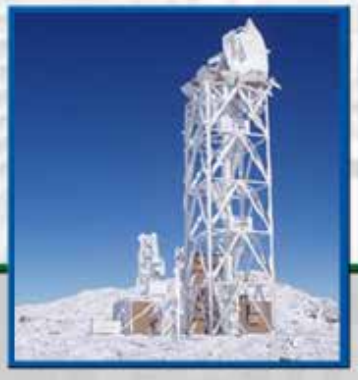
Meeting called by:	Aaron Kenneston, CEM Washoe County Emergency Management & Homeland Security Program
Type of meeting:	Hazard Mitigation Planning Committee Meeting

Agenda Topics

Welcome & Introductions	Aaron Kenneston
Incorporation of Existing Plans	Stephanie Hicks
Hazard Identification Table & Hazard Ranking	All
Public Involvement	Stephanie Hicks
Formation of Hazard Subcommittees	Stephanie Hicks
Announcement of Future Meetings Future meetings are scheduled tentatively as follows: 1. February 18, 2015 2. April 8, 2015 3. June 3, 2015 4. Public Workshops in July	Stephanie Hicks

Hazard Mitigation Planning Workshops

Washoe County Emergency Management, in partnership with the Cities of Reno and Sparks, the Reno-Sparks Indian Colony, the Pyramid Lake Paiute Tribe and Truckee River Flood Management Authority, is hosting five public workshops to review and discuss the Draft 2015 Washoe County Regional Hazard Mitigation Plan. These workshops are an opportunity for the public to hear a presentation of the Draft Plan and to ask questions and provide feedback.



City of Reno
Tuesday, July 7th from 6:00 to 7:30 p.m.
The Reno City Council Chambers at City Hall
1 East 1st St, Reno, Nevada

City of Sparks
Tuesday, July 14th from 6:00 to 7:30 p.m.
City of Sparks Legislative Council Chambers
745 4th St, Sparks, Nevada

Verdi
Thursday, July 16th from 6:00 to 7:30 p.m.
Verdi Community Library and Nature Center
270 Bridge St, Verdi, Nevada

Reno-Sparks Indian Colony
Wednesday, July 22nd from 6:00 to 7:30 p.m.
Reno Sparks Tribal Health Center
1715 Kuenzli St, Reno, Nevada

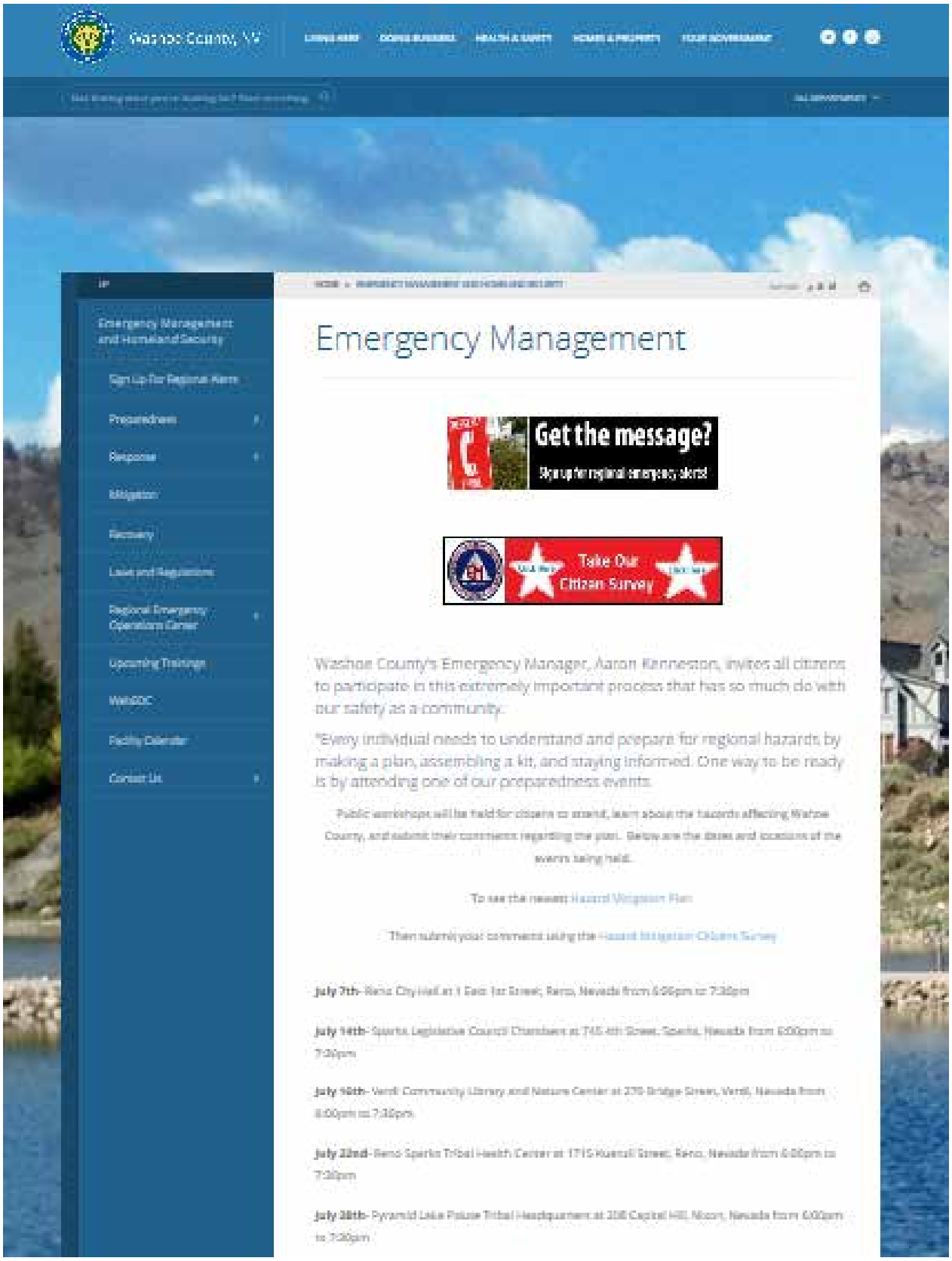
Pyramid Lake Paiute Tribe
Tuesday, July 28th from 6:00 to 7:30 p.m.
Pyramid Lake Paiute Tribal Headquarters
208 Capital Hill, Nixon, Nevada

Visit the Ready Washoe website at
www.ReadyWashoe.com
for more details and to take our online public survey.

For more information:
Washoe County Emergency Management and Homeland Security Program
5195 Spectrum Blvd, Reno, NV 89512
Aaron R. Kenneston, CEM AKenneston@washoecounty.us 775.337.5898

R.O. Anderson Engineering
140 W. Huffaker Lane #507, Reno, NV 89511
Stephanie Hicks, AICP, CFM shicks@roanderson.com 775.215.5042
Marie Hulse, P.L.A., CPESC mhulse@roanderson.com 775.215.5045

R|O|Anderson


Washoe County, NV
Emergency Management and Homeland Security
Sign Up for Regional Alerts
Preparedness
Response
Mitigation
Recovery
Laws and Regulations
Regional Emergency Operations Center
Upcoming Trainings
WebEOC
Facility Calendar
Contact Us
Emergency Management
Get the message?
Sign up for regional emergency alerts!
Take Our Citizen Survey
Washoe County's Emergency Manager, Aaron Kenneston, invites all citizens to participate in this extremely important process that has so much do with our safety as a community.
"Every individual needs to understand and prepare for regional hazards by making a plan, assembling a kit, and staying informed. One way to be ready is by attending one of our preparedness events.
Public workshops will be held for citizens to attend, learn about the hazards affecting Washoe County, and submit their comments regarding the plan. Below are the dates and locations of the events being held.
To see the newest Hazard Mitigation Plan
Then submit your comments using the Hazard Mitigation Citizens Survey
July 7th- Reno City Hall at 1 East 1st Street, Reno, Nevada from 6:00pm to 7:30pm
July 14th- Sparks Legislative Council Chambers at 745 4th Street, Sparks, Nevada from 6:00pm to 7:30pm
July 16th- Verdi Community Library and Nature Center at 270 Bridge Street, Verdi, Nevada from 6:00pm to 7:30pm
July 22nd- Reno Sparks Tribal Health Center at 1715 Kuenzli Street, Reno, Nevada from 6:00pm to 7:30pm
July 28th- Pyramid Lake Paiute Tribal Headquarters at 208 Capitol Hill, Nixon, Nevada from 6:00pm to 7:30pm

MITIGATION QUESTIONNAIRE

A county and city partnership has recently been formed to address natural and man-made hazards that may occur in Washoe County. A planning committee has been selected to oversee this process. In order to identify and plan for future natural and man-made disasters, we need assistance from the residents of Washoe County. This questionnaire is designed to gauge the level of knowledge local citizens have about natural and man-made disaster issues and areas vulnerable to any type of natural and man-made disasters. The information you provide will help coordinate activities to reduce the risk of injury or property damage in the future.

This questionnaire consists of 11 questions and will take approximately 5 minutes to complete

GENERAL HOUSEHOLD INFORMATION

The following requested demographic information will aid the planning committee in determining the hazard mitigation needs of our community. For example, indicating whether you own a house or are a tenant will help determine the needs for both renters and homeowners. The answers provided in this action will be treated as confidential and will be used solely for the preparation of this plan and will not be provided to any other group or interest.

1. Please indicate your zip code: _____

2. Please check all that apply.

   Do you own a home in Washoe County? ☐ Yes ☐ No

   If you do not own a home, do you rent a residence in Washoe County? ☐ Yes ☐ No

   Do you own a business located in Washoe County? ☐ Yes ☐ No

   Do you own a business outside of Washoe County, but operate your business in the County? ☐ Yes ☐ No

   Do you own or operate a vehicle in Washoe County? ☐ Yes ☐ No

NATURAL AND MAN-MADE HAZARD INFORMATION

The following requested demographic information will aid the planning committee in determining needs and desires for educating and preparing our community for natural and man-made disasters. The answers provided in this action will be treated as confidential and will be used solely for the preparation of this plan and will not be provided to any other group or interest.

3. In the past 10 years which of the following types of natural and man-made hazard events have you or someone in your household experienced within Washoe County, and indicate your level of concern for the hazards impact on Washoe County? (Please check all that apply.)

Natural and Man-Made Hazards	Have Experienced Y/N	Low Concern	Moderate Concern	High Concern
Avalanche				
Drought				

MITIGATION QUESTIONNAIRE

Earthquake				
Flood				
Severe Weather				
Volcanic Ashfall				
Wildland Fire				
Infectious Disease				
Criminal Acts				
Energy Emergency				
Hazardous Materials				
Radiation Contamination				
Acts of Terrorism				
Other _____				

4. Prior to receiving this questionnaire, were you aware of your county's Regional Hazard Mitigation Plan (RHMP)?
☐ Yes ☐ No

5. Prior to receiving this questionnaire, were you aware that the Federal Emergency Management Agency (FEMA) requires your county to update the RHMP every five years in order for your county to be eligible for federal pre- and post-disaster hazard mitigation funds? ☐ Yes ☐ No

PREPAREDNESS ACTIVITIES IN YOUR HOUSEHOLD

Households can do many things to prepare for a natural and man-made disaster or emergency. What you have on hand or are trained to do when a disaster strikes can make a big difference in your comfort and safety in the hours and days following a natural and man-made disasters or emergency. Basic services, such as electricity, gas, water, and telephones, may be cut off, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for a disaster event.

6. The following questions focus on your household's preparedness for a disaster event.

In your household, have you or someone in your household:	Have Experienced	Plan To Do	Not Done	Unable To Do
Attended meetings or received written information on natural and man-made disasters or emergency preparedness?				
Talked with members of your household about what to do in case of natural and man-made disasters or emergency?				

MITIGATION QUESTIONNAIRE

Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?				
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies)?				
In the last year, has anyone in your household been trained in First Aid, Cardio-Pulmonary Resuscitation (CPR) or AED?				

7. What steps, if any, have you or someone in your household taken to prepare for natural and man-made disasters?

- ☐ Food
- ☐ Water
- ☐ Flashlight(s)
- ☐ Batteries
- ☐ Battery-Powered Radio
- ☐ Make a Fire Escape Plan
- ☐ Fire Extinguisher
- ☐ Prepared a Disaster Supply Kit
- ☐ Medical Supplies (First Aid Kit)
- ☐ Received First Aid/CPR/AED Training
- ☐ Developed a Reconnection Plan (Where to Go and Who to Call)
- ☐ Discussed Utility Shutoffs
- ☐ Smoke Detector on Each Level of the Home
- ☐ Other (please specify): _____

8. Have you ever received information about how to make your household and home safer from natural and man-made disasters?

☐ Yes ☐ No (IF "NO" Skip to Question 9)

If "YES", how recently?

- ☐ Within the Last 6 Months
- ☐ Between 6 to 12 Months
- ☐ Between 1 to 2 Years
- ☐ Between 2 to 5 Years
- ☐ 5 Years or More

9. From whom did you receive information about how to make your household and home safer from natural and man-made disasters? (Please check all that apply.)

- ☐ News Media
- ☐ University or Research Institution
- ☐ Insurance Agent or Company
- ☐ Utility Company
- ☐ American Red Cross
- ☐ Emergency Manager
- ☐ Health District
- ☐ Other Government Agency
- ☐ Not Sure
- ☐ Other : _____

10. Who would you most trust to provide you with information about how to make your household and home safer from

MITIGATION QUESTIONNAIRE

natural and man-made disasters? (Please check all that apply.)

- ☐ News Media
- ☐ University or Research Institution
- ☐ Insurance Agent or Company
- ☐ Utility Company
- ☐ American Red Cross
- ☐ Emergency Manager
- ☐ Health District
- ☐ Other Government Agency
- ☐ Not Sure
- ☐ Other : _____

11. What is the most effective way for you to receive information about how to make your household and home safer from natural and man-made disasters? (Please check all that apply.)

Newspapers:

- ☐ Newspaper Stories
- ☐ Newspaper Ads

Television:

- ☐ Television Stories
- ☐ Television Ads

Radio:

- ☐ Radio Stories
- ☐ Radio Ads

Other Methods:

- ☐ Books
- ☐ Postal Mail
- ☐ Email

Other Methods (cont.):

- ☐ Magazines
- ☐ Internet
- ☐ Outdoor Advertisements (Billboards, etc.)
- ☐ Fact Sheet/Brochure
- ☐ School
- ☐ University or Research Institution
- ☐ Fire Department/Rescue
- ☐ Emergency Manager
- ☐ Chamber of Commerce
- ☐ Public Workshops/Meetings
- ☐ Other: _____

Other Comments:

Please return this questionnaire to: Aaron R. Kenneston, CEM, Washoe County Emergency Management and Homeland Security Program, 5195 Spectrum Rd., Reno, Nevada 89512, AKenneston@washoecounty.us

Washoe County Regional Hazard Mitigation Plan Questionnaire 2015

MITIGATION QUESTIONNAIRE

A county and city partnership has recently been formed to address natural and man-made hazards that may occur in Washoe County. A planning committee has been selected to oversee this process. In order to identify and plan for future natural and man-made disasters, we need assistance from the residents of Washoe County. This questionnaire is designed to gauge the level of knowledge local citizens have about natural and man-made disaster issues and areas vulnerable to any type of natural and man-made disasters. The information you provide will help coordinate activities to reduce the risk of injury or property damage in the future.

This questionnaire will take approximately 5 minutes to complete.

Next

Questionnaire Responses

Survey Question	#1 Participants zip code											#2 Own/Rent/ Operate					#3 Natural disasters experienced													
												Residence		Business																
Survey Source	89431	89434	89436	89441	89451	89503	89506	89508	89511	89521	89523	Own	Rent	Own	Operate Only	Vehicle	Avalanche	Drought	Earthquake	Flood	Severe Weather	Volcanic Ashfall	Wildland Fire	Infectious Disease	Criminal Acts	Energy Emergency	Hazardous Materials	Radiation Contamination	Acts of Terrorism	Other
Total Online Survey	0	1	3	1	1	1	3	2	2	1	1	16	1	1	0	17	0	15	14	9	15	0	9	6	8	5	1	0	0	0
Total Hard Copy	1	0	0	1	0	0	2	0	0	0	0	5	0	2	0	5	1	5	5	4	3	1	3	0	3	2	1	0	0	0
Overall	**1**	**1**	**3**	**2**	**1**	**1**	**5**	**2**	**2**	**1**	**1**	**21**	**1**	**3**	**0**	**22**	**1**	**20**	**19**	**13**	**18**	**1**	**12**	**6**	**11**	**7**	**2**	**0**	**0**	**0**

Survey Question	#4 Level of hazard concern that impact Washoe County																																								#5 Were aware of the Plan		#6 Were aware of FEMA require ments	
	Avalanche			Drought			Earthquake			Flood			Severe Weather			Volcanic Ashfall			Wildland Fire			Infectious Disease			Criminal Acts			Energy Emergency			Hazardous Materials			Radiation Contaminatio n			Acts of Terrorism			Other				
Survey Source	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High		Yes	No	Yes	No
Total Online Survey	12	4	0	0	3	14	0	6	11	1	7	9	2	6	9	13	3	0	1	2	14	3	9	4	1	11	4	5	8	4	6	6	4	11	4	1	7	6	3	0	7	9	8	9
Total Hard Copy	3	1	2	1	0	4	0	0	4	0	1	1	2	0	3	1	3	2	5	1	0	0	5	0	1	0	2	4	0	0	4	2	0	0	5	0	0	0	5	5	3	1	3	2
Overall	**15**	**5**	**2**	**1**	**3**	**18**	**0**	**6**	**15**	**1**	**8**	**10**	**4**	**6**	**12**	**14**	**6**	**2**	**6**	**3**	**14**	**3**	**14**	**4**	**2**	**11**	**6**	**9**	**8**	**4**	**10**	**8**	**4**	**11**	**9**	**1**	**7**	**6**	**8**	**5**	**10**	**10**	**11**	**11**

Survey Question	#7 Disaster preparness actions																#8 Steps taken to prepare for a disaster														#9 Safety information received from				
	Attended Meetings on Disasters or Preparedness			Talked About What to Do			Developed a Plan			Prepares a Kit			Training				Food	Water	Flashlights	Batteries	Battery Powered Radio	Fire Escape Plan	Fire Extinguisher	Disaster Supply Kit	Medical Supply Kit	Received Training	Reconnection Plan	Utility Shutoffs	Smoke Detectors	Other	Yes	No	If YES, how often			
Survey Source	Have Experienced	Plan to Do	Not Done	Have Experienced	Plan to Do	Not Done	Have Experienced	Plan to Do	Not Done	Have Experienced	Plan to Do	Not Done	Have Experienced	Plan to Do	Not Done	Unable to Do																	<6 Months	6-12 Months	1-2 Years	2-5 Years	5+ Years
Total Online Survey	12	0	6	10	4	3	7	7	3	11	9	3	14	0	8	0	12	10	14	14	9	9	14	7	12	10	8	6	15	1	9	8	2	1	3	2
Total Hard Copy	5	1	0	5	4	0	4	2	0	4	2	0	5	0	0	0	5	5	5	5	3	3	4	4	5	5	3	3	5	0	5	0	4	1	0	0
Overall	**17**	**1**	**6**	**15**	**8**	**3**	**11**	**9**	**3**	**15**	**11**	**3**	**19**	**0**	**8**	**0**	**17**	**15**	**19**	**19**	**12**	**12**	**18**	**11**	**17**	**15**	**11**	**9**	**20**	**1**	**14**	**8**	**6**	**2**	**3**	**2**

Survey Question	#10 Information sources									#11 Most trusted sources								#12 Most effective way to receive information																	
	News Media	University or Research Institutions	Insurance Agent or Company	Utility Company	American Red Cross	Emergency Manager	Health District	Other Government Agencies	Not Sure	Other	News Media	University or Research Institutions	Insurance Agent or Company	Utility Company	American Red Cross	Emergency Manager	Health District	Other Government Agencies	Not Sure	Other	Newspaper	Television	Radio	Books	Postal Mail	Email	Magazines	Internet	Outdoor Advertisements	Fact Sheets/Brochure	School	University or Research Institutions	Fire Department/Rescue	Emergency Manager	Chamber of Commerce	Public Workshops/Meetings	Other
Survey Source																					Stories	Ads	Stories	Ads	Stories	Ads										
Total Online Survey	4	3	1	3	2	2	1	2	2	3	4	8	3	5	8	10	5	7	4	2	3	0	8	3	4	3	4	11	10	3	14	1	9	3	2	5	8	0	3	2
Total Hard Copy	1	0	1	2	1	2	5	0	1	2	1	1	0	1	3	4	2	3	0	1	1	0	9	0	0	0	0	1	2	1	1	1	3	0	1	3	4	1	2	0
Overall	**5**	**3**	**2**	**5**	**3**	**4**	**6**	**2**	**3**	**5**	**5**	**9**	**3**	**6**	**11**	**14**	**7**	**10**	**4**	**3**	**4**	**0**	**17**	**3**	**4**	**3**	**4**	**12**	**12**	**4**	**15**	**2**	**12**	**3**	**3**	**8**	**12**	**1**	**5**	**2**

Comments:

Flooding in North Valleys

Thank you for doing what you do to keep our area prepared!

How prepared is the county to assist people in the out lying areas? I don't feel that they are based on emergency responses on a day to day mode.

Washoe County Hazard Mitigation Plan Table 5-1: Identification and Screening of Hazards Nevada Listed Hazard Types Should It Be Profiled? Explanation Expansive Soils No No recent or historic events have occurred. I would refer you to the following publication: Bell, E.J., Louiselli, R.H. & Vestbie, N.S., 1986, Definition of and Development in Expansive Rock of the Peavine-Wedekind District, Reno, Nevada: Geological Society of America, Abstracts with Programs, v. 18, no. 2, p. 84. In addition, I believe there may still be materials on file at the Nevada Bureau of Mines & Geology that document the impacts on structures caused by expansive soils across the northern portion of Reno in this district. Structures that have been built on these expansive soil/rock materials do show signs of differential movement that, unless mitigated, continue to worsen over time. For many years, there was what had once been a rather nice ranch-style home near what is now North McCarran & I-395 that remained abandoned until it was eventually demolished.

Appendix D
Meeting Agendas & Handouts

Washoe County Regional Hazard Mitigation Plan

Meeting #1 –AGENDA

Washoe County Regional Hazard Mitigation Plan Kick-off Meeting

August 20, 2014 9:00 a.m. – 11::00 a.m.

REOC- 5195 Spectrum Blvd., Reno, NV 89512

Why: The FEMA-required Regional Mitigation Plan is due for its 5-year update.
(Without this plan, regional partners cannot apply for FEMA mitigation funds- and may not receive full reimbursements after a disaster.)

Who: City of Sparks, Reno, Reno-Sparks Indian Colony, Pyramid Lake Paiute Tribe, Truckee River Flood Management Authority, and Washoe County. (*Representatives of Public Works, Community Planning, Flood Plain Manager, and GIS. Also, Hazard Experts from UNR Seismology Lab, Wild Land Fire, DRI, and NNRIC.)*

Meeting No. 1 Sign In Sheet

Hazard Mitigation TTX

08/20/2014

	NAME	AGENCY	TELEPHONE	EMAIL
1.	Aaron Kenneston	We Emers. Mgt.	337-5898	akenneston@washoecounty.us
2.	Karen Johnson	NDEM	687-0373	kjohnson@dps.state.nv.us
3.	MARSHA LAMDIN	WC EMS	328-2032	MCARDINAL@washoecounty.us
4.	Deeric Russell	WC ARES	722-6582	DC-Russell@charter.net
5.	David Hunkup	Reno-Sparks Indian Colony	785-1373	dhunkup@rsic.org
6.	Tom McKnight	REOC	775-316-6667	tmcknight@tmservices solutions.com
7.	Debbie Tanaka	NDEM	775-687-0314	debbie.tanaka@dps.state.nv.us
8.	ED EVANS	TRFMA	850-7405	eevans@washoecounty.us
9.	Stephanie Hicks	RO Anderson	775-215-5042	shicks@roanderson.com
10.	Kimberly Corbridge	WC CSD	328-2041	Kcorbridge@washoecounty.us
11.	Tim Krause	WC CSD	328 3786	TKRAUSE@WC.US
12.	Rob Webb	WC CSD	328 - 36223	bwebb@washoecounty.us
13.	Chris Smallcomb	NOAA NWS	673-8100	chris.smallcomb@noaa.gov

Hazard Mitigation TTX

08/20/2014

NAME	AGENCY	TELEPHONE	EMAIL
1. Gary Zaepfel	WC	328-3627	GZAEPFEL@WASHOECOUNTY.US
2. DAVID GONZALES	WC	328.2121	dgonzales@washoecounty.us
3. Don Jeppson	WC		
4. [illegible]	W		
5. Tim Spencer	RFD	7507976	spencert@reno.gov
6. Dave Solaro	WASHOE COUNTY CSP	328.3624	dsolaro@washoecounty.us
7. Jeff Whitesides	WCHD	326-6051	jwhitesides@washoecounty.us
8. Sara Dinga	WCHD	326-6054	sdinga@washoecounty.us
9. TIM BROWN	DRI	674-7090	TIM.BROWN@DRI.EDU
10. Eric Crump	Washoe County CSD	328-2182	ECrump@washoecounty.us
11. Walter West	WC CSD	328-2338	wwest@washoecounty.us
12. Tim Hendricks	C.O.R.	224-6525	hendrickst@reno.gov
13.			

Handouts – Meeting No. 1

Table 4.1 Washoe County Planning Area's Mitigation Actions

Mitigation Action	Lead Jurisdiction	New/2005 Action	Points/Status Worksheet
Avalanche			
Develop plan for strategically placed snow fences to protect the Crystal Bay Subdivision (from 2005 objective titled "Construct Snow Fence (above Crystal Bay and Third Creek Area in Placer County)")	Washoe County	2005	16/
Mapping, Hazard Plans and Zoning/Land Use Codes for Areas Prone to Landslides and/or Avalanches	Washoe County	New	1/
Biological Infection			
Pandemic Influenza (from the 2005 objective titled: Continued Public Health Emergency management trainings and exercise.)	Washoe County	2005	
Public notification for high risk disease events.	Washoe County	2005	
Continued Public Health emergency management trainings and exercises.	Washoe County	2005	
Drought			
Connect into County Water Supply System	Reno-Sparks Indian Colony	New	3/
Property Protection: Drought – improve water supply	Reno-Sparks Indian Colony	New	-
Nuclear Waste Transport			
Monitor Radiological Shipping Campaigns that include Washoe County as an approved route. (from the 2005 action titled "Monitor progress on Yucca Mountain, and work with Nevada Department of Transportation to develop protocols"	Washoe County	2005	
Severe Storms			
Encourage the public sector to prepare and maintain 3-day preparedness kits	Washoe County	2005	
Conduct outreach programs to build resilience to severe storm hazards. (formerly 2005 action - Encourage homeowners to storm proof their buildings)	Washoe County	New/2005	
Energy Emergency			
Retrofit backup power systems for critical infrastructure	Washoe County	2005	

Earthquake			
Public Awareness & Education - earthquake hazards, earthquake preparedness, building code adoption	Washoe County	2005	
Develop the Regional Earthquake Transportation Evacuation Routes into appropriate planning documents	City of Reno (All jurisdictions in 2009 update)	2005	
Encourage seismic strength evaluations of critical facilities in the city to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards	City of Reno	2005	
Encourage non-structural mitigation by increasing public awareness of earthquakes through wide distribution of newspaper supplements, booklets, brochures, etc. on what to do before, during, and after an earthquake	Washoe County and the Cities of Reno and Sparks	New	9/
Strengthen building codes & land use planning:	Washoe County and the Cities of Reno and Sparks	New	26/
Provide Incentives for Retrofitting or Eliminating Life-Threatening Buildings, particularly URMs.	Washoe County and the Cities of Reno and Sparks	New	7/
Assess, Repair, and/or Replace Infrastructure that may Fail During Earthquakes (e.g., Keystone Ave. Bridge)	Washoe County and the Cities of Reno and Sparks	New	1/

Terrorism and Weapons of Mass Destruction		
Seek funding for basic terrorism training for community responders in relation to proximity to military bases and military transportation routes.	Washoe County	2005
Provide training for the public and private sectors to improve response, management, and intervention of WMD terrorism incidents	Washoe County	2005
Utilize Community Emergency Response Teams (CERT) as well as the Citizens Homeland Security Council (CHSC) to shift burden from sworn officers, where appropriate	Washoe County	2005
Seek funding to provide methodology and operational functionality to perform vulnerability analysis to determine areas of risk and/or vulnerability to pipeline. Leverage relationships with pipeline owner/operators to insure adequate maintenance and monitoring of pipeline infrastructure. (From the 2005 Objective titled "Analyze pipeline to determine areas of vulnerability")	Washoe County	2005
Increase Law Enforcement Staff (from the 2005 objective titled "Double Law Enforcement Staffing)	City of Sparks	2005

Wildland Fire			
Increase communication, coordination, and collaboration between wildland/ urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.	City of Reno (Now All Jurisdictions)	New/2005	
Defensible Space Creation and Hazardous Fuels Reduction	Washoe County	New	22/Complete
Hazardous Wood Roof Replacement Program	Washoe County	New	3/Complete
Establish good access routes/signage	Washoe County	New	3/
Identify the boundaries of the Wildland Urban Interface within the County.	Washoe County	New	-
Encourage local chapters of the Fire Safety Council	Washoe County	2005	
Property Protection: Create Defensible Space (DS)	Reno-Sparks Indian Colony	New	8/
Fuel Management – Fire breaks	Reno-Sparks Indian Colony	New	-

Multi-Hazard			
Develop, enhance, and implement education programs aimed at mitigating natural hazard, and reducing the risk to citizens, public agencies, private property owners, business, and schools.	City of Reno	2005 (Now All Jurisdictions)	
Reinforce Technical Rescue Program	City of Reno	2005	
Enhance/Develop the Seasonal Multi-Hazard Public Awareness Program	Washoe County	New	5/
Warning systems	Reno-Sparks Indian Colony	New	-
Emergency Planning – Activating the EOC	Reno-Sparks Indian Colony	New	-
Post Disaster Mitigation – Building inspections	Reno-Sparks Indian Colony	New	-
Public Information – Outreach Projects	Reno-Sparks Indian Colony	New	-

Flooding			
Stormwater Capital Improvement Project: CIP#A15-1 Village Parkway @ Mudsprings ("Village Parkway Wash") Culvert Improvements	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#A16-3 Cold Springs Drive Channel Improvements	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#A16-4 & A16-5 Cold Springs Drive Culvert Improvements	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#A16-6 Cold Springs Drive to White Lake Channel Improvements	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#A16-7 Village Parkway Culvert Improvements	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-1 Sun Valley Drainage Improvements ("Amargosa Wash") @ Middle Fork Drive	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-2 Sun Valley Drainage Improvements ("Amargosa Wash") @ Amargosa Drive	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-3 Sun Valley Drainage Improvements ("Amargosa Wash") Utility Protection/Relocation and Existing Channel Erosion Protection between Amargosa Drive and Sun Valley Blvd.	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-4 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at Sun Valley Blvd.	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-5 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at Smokey Canyon Drive.	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-10 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at E. 9th Ave	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-15 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at E. 8th Ave	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-16 Sun Valley Drainage Improvements ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-17 Sun Valley Drainage Improvements ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#D16-1 Spanish Springs Kinglet Drive Drainage – Detention Basin	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#D16-2 Spanish Springs Nightingale Way Drainage – Detention Basin	Washoe County	New	20/Complete

Flooding			
Stormwater Capital Improvement Project: CIP#D16-3 Spanish Springs Spanish Springs High School Area – Detention Basin	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#D16-4 Spanish Springs Spanish Springs High School Area – Channel and Culvert Improvements in Spanish Springs Village Subdivision	Washoe County	New	20/Complete
Truckee River Flood Control Project: West Second Street to Booth Street	Washoe County	New	-
Truckee River Flood Control Project: Booth Street to Ralston Street	Washoe County	New	-
Truckee River Flood Control Project: Ralston Street to South Arlington Avenue	Washoe County	New	-
Truckee River Flood Control Project: South Arlington Avenue to North Sierra Street	Washoe County	New	-
Truckee River Flood Control Project: Sierra Street Bridge	Washoe County	New	-
Truckee River Flood Control Project: North Sierra Street to North Virginia Street	Washoe County	New	-
Truckee River Flood Control Project: Virginia Street Bridge	Washoe County	New	-
Truckee River Flood Control Project: Center Street Bridge	Washoe County	New	-
Truckee River Flood Control Project: Lake Street Bridge	Washoe County	New	-
Truckee River Flood Control Project: Virginia Street to Evens Avenue	Washoe County	New	-
Truckee River Flood Control Project: Evans Avenue to Kuenzli Street	Washoe County	New	-
Truckee River Flood Control Project: Kuenzli Street Ballpark	Washoe County	New	-
Truckee River Flood Control Project: Kuenzli Street to Highway 395	Washoe County	New	-
Truckee River Flood Control Project: Wells Pedestrian Bridge	Washoe County	New	-
Truckee River Flood Control Project: Glendale Avenue to Greg Street	Washoe County	New	-
Truckee River Flood Control Project: Greg Street to South Rock Boulevard	Washoe County	New	-
Truckee River Flood Control Project: Rock Boulevard Bridge Extension	Washoe County	New	-
Truckee River Flood Control Project: South Rock Boulevard to South McCarran Boulevard	Washoe County	New	-
Truckee River Flood Control Project: South McCarran Boulevard Bridge Extension	Washoe County	New	-

Flooding			
Truckee River Flood Control Project: UNR Mainstation Farm	Washoe County	New	-
Truckee River Flood Control Project: South McCarran Boulevard to Steamboat Creek	Washoe County	New	-
Truckee River Flood Control Project: Steamboat Creek to First Railroad Bridge	Washoe County	New	-
Truckee River Flood Control Project: Hidden Valley/Eastside Subdivision	Washoe County	New	-
Truckee River Flood Control Project: Wadsworth Levee	Washoe County	New	54/
Evaluate warning systems – Seiche	Washoe County	New	3/
North Truckee River Drain Replacement	City of Sparks	New	3/
Implement Stormwater Plan (e.g., projects for storm drains, catch basins, surveys, etc.)	City of Sparks	New	-
Mitigate where water enters the reservoir to the dam (retention, dry basins)	Pyramid Lake Paiute Tribe	New	18
Structural projects: Culvert Maintenance	Reno-Sparks Indian Colony	New	-
Structural projects – Drainage System Maintenance	Reno-Sparks Indian Colony	New	-

the hazard mitigation planning process

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and human-caused hazards. Four basic phases are described for the hazard mitigation planning process as shown in this diagram.

For illustration purposes, this diagram portrays a process that appears to proceed sequentially. However, the mitigation planning process is rarely a linear process. It is not unusual that ideas developed while assessing risks should need revision and additional information while developing the mitigation plan, or that implementing the plan may result in new goals or additional risk assessment.

organize resources

From the start, communities should focus on the resources needed for a successful mitigation planning process. Essential steps include identifying and organizing interested members of the community as well as the technical expertise required during the planning process.

assess risks

Next, communities need to identify the characteristics and potential consequences of hazards. It is important to understand how much of the community can be affected by specific hazards and what the impacts would be on important community assets.

develop a mitigation plan

Armed with an understanding of the risks posed by hazards, communities need to determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a hazard mitigation plan and strategy for implementation.

implement the plan and monitor progress

Communities can bring the plan to life in a variety of ways ranging from implementing specific mitigation projects to changes in the day-to-day operation of the local government. To ensure the success of an on-going program, it is critical that the plan remains relevant. Thus, it is important to conduct periodic evaluations and make revisions as needed.

foreword

Funding Impacted by the Plan

Individual Assistance After a disaster, Federal funds are provided to qualified individuals to facilitate recovery. Assistance comes in the form of low interest loans (SBA), housing assistance, cash grants etc.	→	Not impacted by plan
Public Assistance Categories A&B: Emergency measures and debris removal	→	Not impacted by plan
Categories C-G: Reconstruction of public facilities and infrastructure to current codes and standards.	→	An approved State or Tribal plan is required in order to receive funding.
Mitigation Hazard Mitigation Grant Program (HMGP): Up to 15% (20% for States with an approved Enhanced Mitigation Plan) of the total disaster grants awarded by FEMA to implement long-term hazard mitigation measures after a major disaster declaration. Pre-Disaster Mitigation Program (PDM): An annual competitive grant not tied to disaster.	}	An approved State or Tribal and Local, Multi-jurisdictional or Local Tribal plan is required in order to received funding for projects. Funding support for planning remains available.
Wildfire Fire Management Assistance Grants (FMAG): Financial assistance in the form of grants to the state for firefighting costs.	}	An approved State or Tribal and Local, Multi-jurisdictional or Local Tribal plan is required in order to received funding for projects. Funding support for planning remains available.
Flood Management Assistance Grants Flood Management Assistance program (FMA), Repetitive Flood Claim program (RFC), Severe Repetitive Loss Claim program (SRL): An annual competitive grant program.	}	An approved State or Tribal and Local, Multi-jurisdictional or Local Tribal plan is required in order to received funding for projects. Funding support for planning remains available.

FEMA

Meeting #2 –AGENDA

Washoe County
Regional Hazard Mitigation Planning Committee
Meeting Agenda

Wednesday ~ October 8, 2014 ~ 9:00 A.M.

REGIONAL EMERGENCY OPERATIONS CENTER

5195 SPECTRUM BOULEVARD

RENO, NEVADA 89512

PURSUANT TO NRS 241.020, THIS NOTICE HAS BEEN POSTED AT THE FOLLOWING LOCATIONS: Regional Emergency Operations Center, 5195 Spectrum Boulevard, Reno, Nevada; Reno City Hall, One East First Street, Reno, Nevada; Sparks City Hall, 431 Prater Way, Sparks, Nevada; Reno Sparks Indian Colony, 98 Colony Road, Reno, Nevada; Pyramid Lake Paiute Tribe, 208 Capitol Hill, Nixon, Nevada . This agenda is also posted on the Nevada Public Notice Website at: https://notice.nv.gov/

The Hazard Mitigation Planning Committee may consider items on the agenda out of order.

The Hazard Mitigation Planning Committee may combine two or more agenda items for consideration.

The Hazard Mitigation Planning Committee may remove an item from the agenda or delay discussion relating to an item on the agenda at any time.

The Hazard Mitigation Planning Committee's agenda and supporting materials may be obtained at the Washoe County Regional Emergency Operations Center, 5195 Spectrum Blvd., Reno NV 89512. Contact Cathy Ludwig 775-337-5859.

Time Limits - Public comments are welcomed during the Public Comment periods for all matters, whether listed on the agenda or not, and are limited to three (3) minutes per person. Additionally, public comment of three (3) minutes per person will be heard during individual action items on the agenda. Persons are invited to submit comments in writing on the agenda items and/or attend and make comment on that item at the Hazard Mitigation Planning Committee meeting. Persons may not allocate unused time to other speakers.

Forum Restrictions and Orderly Conduct of Business – The Hazard Mitigation Planning Committee conducts the business of Washoe County and its citizens during its meetings. The presiding officer may order the removal of any person whose statement or other conduct disrupts the orderly, efficient or safe conduct of the meeting. Warnings against disruptive comments or behavior may or may not be given prior to removal. The viewpoint of a speaker will not be restricted, but reasonable restrictions may be imposed upon the time, place and manner of speech. Irrelevant and unduly repetitious statements and personal attacks which antagonize or incite others are examples of speech that may be reasonably limited.

Responses to Public Comments – The Hazard Mitigation Planning Committee can deliberate or take action only if a matter has been listed on an agenda properly posted prior to the meeting. During the Public Comment period, speakers may address matters listed or not listed on the published agenda. The Open Meeting Law does not expressly prohibit responses to public comments by the Hazard Mitigation Planning Committee. However, responses from Hazard Mitigation Planning Committee to unlisted public comment topics could become deliberation on a matter without notice to the public. On the advice of legal counsel and to ensure the public has notice of all matters the Hazard Mitigation Planning Committee will consider, Hazard Mitigation Planning Committee may choose not to respond to public comments, except to correct factual inaccuracies, ask for Washoe County staff action or to ask that a matter be listed on a future Hazard Mitigation Planning Committee meeting agenda. The Hazard Mitigation Planning Committee may do this either during the Public Comment item or during the following item: "**HAZARD MITIGATION PLANNING COMMITTEE ANNOUNCEMENTS, REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS** (Non-action item)."

This facility is accessible to the disabled. Persons with disabilities who require special accommodations or assistance (e.g., sign language, interpreters or assisted listening devices) at the meeting should notify Regional Emergency Operations Center, 775-337-5859, 48-hours before the meeting.

1. **WELCOME AND INTRODUCTIONS** - *(Non-action item) – Aaron Kenneston, Washoe County Emergency Manager*

2. **PUBLIC COMMENTS -** (Non-action item) *Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

3. **INCORPORATION OF EXISTING PLANS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

4. **HAZARD IDENTIFICATION TABLE & HAZARD RANKING -** *(For possible action) – Committee Input*

5. **PUBLIC INVOLVEMENT** - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

6. **FORMATION OF HAZARD SUBCOMMITTEES -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

7. **ANNOUNCEMENT OF FUTURE MEETINGS** - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

8. **HAZARD MITIGATION PLANNING COMMITTEE ANNOUNCEMENTS, REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS** (Non-action item) - *No discussion among committee members will* take *place on this item.*

9. **PUBLIC COMMENT** (Non-action item) - *Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

10. **ADJOURNMENT**

Meeting No. 2 Sign In Sheet

Washoe County RHMP
December 3, 2014
Hazard Subcommittee Meetings

Name	Firm/Agency	Phone Number	Email
Ed Evans	TRFMA	850-7465	eevans@washoecounty.us
Randall Lorenz	Washoe Co CERT	775 622 7305	randallclorenz@yahoo.com
Shaker Gork	R.O Anderson	775. 215-5022	SGORLA@ROANDERSON.COM
Adam Searcy	Washoe – Roads	328.2192	asearcy@washoecounty.us
Rob Reeder	RTC	722 4037	rreeder@rtcwashoe.com
Dick Penniman	Washoe – Avalanche	530 587-0121	dpenniman@snowbridge.org
John Dunn	Washoe County Sheriff's Office S.M.A.R.T. Sheriff's Mobile Auxiliary Response Team	775/815-5115	j.d.dunn@sbcglobal.net
Bob Miller	ARES	775 843-5952	WAGMTY@gbis.com
Ernie Burdick	S.M.A.R.T.	775/276-0070	burddog-5@charter.net
Tom Garrison	Sparks Fire	527-3703	tgarrison@cityofsparks.us
Mitch Cardinal	Washoe GIS	328-2343	mcardinal@washoecounty.us
Nate Parker	RPD	391-9479	parkern@reno.gov

Washoe County RHMP
December 3, 2014
Hazard Subcommittee Meetings

Name	Firm/Agency	Phone Number	Email
Tom McKnight	REOC	775-316-6667	tomnicky4@EMPRR.org
Chris Smallcomb	NOAA/NWS	775.673.8100	chris.smallcomb@noaa.gov
Michelle Brown	Nevada Vet Medical Assoc Lakeside Animal Hosp.	515-835-1630	brmvet@hotmail.com
Randall C Lorenz	WC ARES	775 622 7305	PIO@WCARES.US
Kimble Corbridge	Washoe County	775 328-2041	Kcorbridge@washoecounty.us
Bob Webb	WCSO	328-3623	bwebb@washoecounty.us
Andy Koski	Sparks Fire	353 2265	akoski@cityofsparks.us
Ryan Sommers	WLTFPD	8310551	rsommers@nltfpd.net
Dawn Hunkup	RSIC	785-1373	dhunkup@RSIC.org
Kori Hood	WCSD	843-8007	rhood@washoeschools.net
Tom Fuller	IVGID	745-6970	jwd@IVGID.org
Kyle West	COR	334-2364	westk@reno.gov

Washoe County RHMP
December 3, 2014
Hazard Subcommittee Meetings

Name	Firm/Agency	Phone Number	Email
Sara Dinga	WCHD	(775) 326-6054	sdinga@washoecounty.us
MARIE HUISE	RDANDERSON REVEEEN	775.215.5045	MHUISE@RDANDERSON.COM
Brian Taylor	REMSA		
Chas Syverson	City of Sparks	725-353-1633	csyverson@cityofsparks.us
Nicole Franklin	WCHECO	775-785-6114	NFranklin@washoecounty.us
Tilly Domingues	City of Sparks	775 353 7835	tdominguez@cityofsparks.us
Stephanie Hicks	R.O. Anderson	775-215-5042	shicks@roanderson.com

Handouts – Meeting No. 2

Washoe County Regional Hazard Mitigation Plan

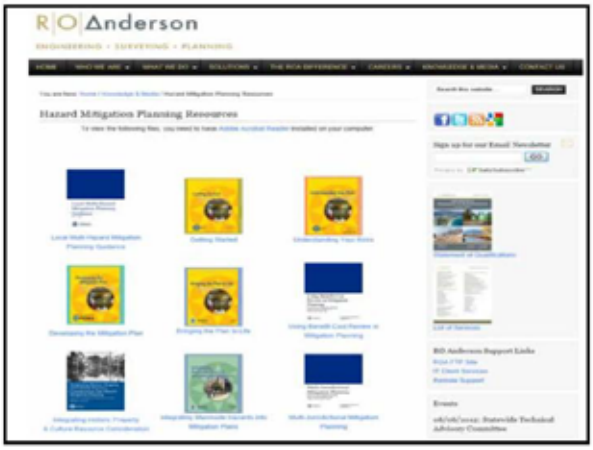
Hazard Mitigation
Planning Committee Meeting
October 8, 2014

R O Anderson

Agenda

- **Welcome & Introductions** – *Aaron Kenneston*
- **Incorporation of Existing Plans** – *Stephanie Hicks*
- **Hazard Identification Table & Hazard Ranking** – *Stephanie Hicks*
- **Public Involvement** – *Stephanie Hicks*
- **Formation of Hazard Subcommittees** – *Stephanie Hicks*
- **Announcement of Future Meetings** – *Stephanie Hicks*

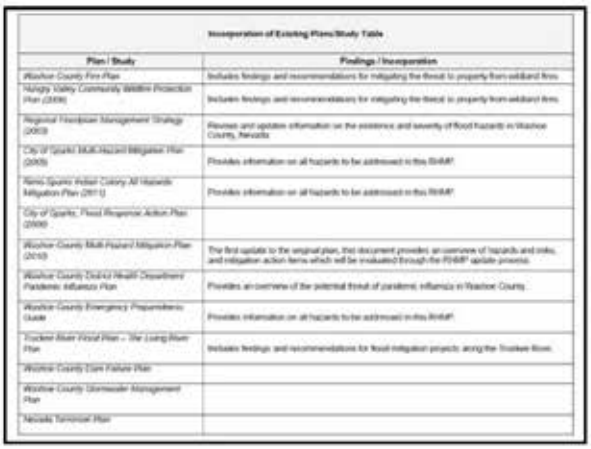
R O Anderson



Incorporation of Existing Plans

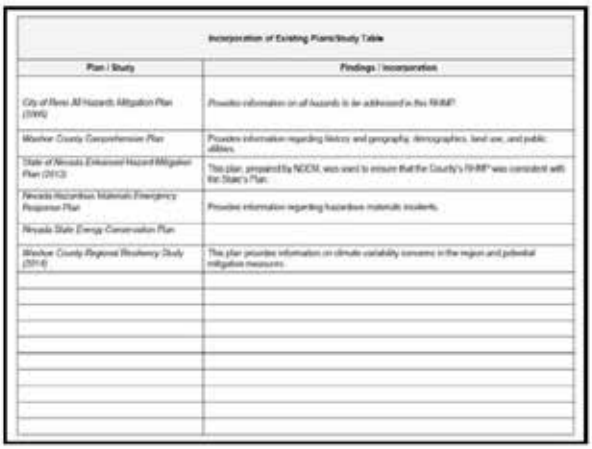
- Some other special purpose community plans that can be used to help support mitigation planning include:
  - Master Plans
  - Stormwater Management Plans
  - Open Space and Recreation Plans
  - Redevelopment and Housing Plans
  - Transportation Plans
  - Capital Improvement Plans
  - Emergency Management Plans

R O Anderson



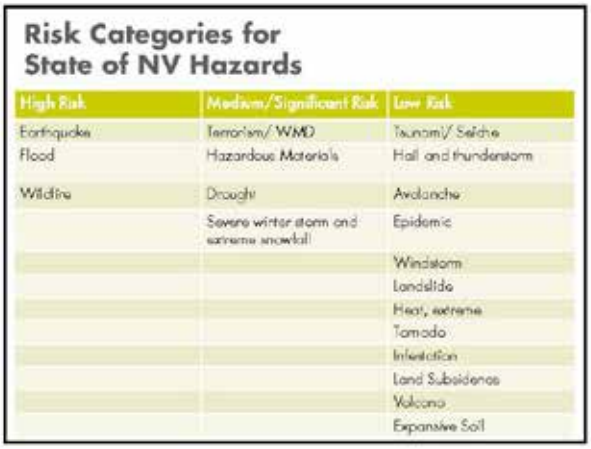
Incorporation of Existing Plans/Study Table

Plan / Study	Findings / Incorporation
Washoe County Fire Plan	Includes findings and recommendations for mitigating the threat to property from wildland fires.
Hungry Valley Community Wildfire Protection Plan (2006)	Includes findings and recommendations for mitigating the threat to property from wildland fires.
Regional Floodplain Management Strategy (2003)	Reviews and updates information on the existence and severity of flood hazards in Washoe County, Nevada.
City Of Sparks' Multi-Hazard Mitigation Plan (2005)	Provides information on all hazards to be addressed in this RHMP.
Reno-Sparks Indian Colony All Hazards Mitigation Plan (2011)	Provides information on all hazards to be addressed in this RHMP.
City of Sparks, Flood Response Action Plan (2006)	
Washoe County Multi-Hazard Mitigation Plan (2010)	The first update to the original plan, this document provides an overview of hazards and risks, and mitigation action items which will be evaluated through the RHMP update process.
Washoe County District Health Department Pandemic Influenza Plan	Provides an overview of the potential threat of pandemic influenza in Washoe County.
Washoe County Emergency Preparedness Guide	Provides information on all hazards to be addressed in this RHMP.
Truckee River Flood Plan – The Living River Plan	Includes findings and recommendations for flood mitigation projects along the Truckee River.
Washoe County Dam Failure Plan	
Washoe County Stormwater Management Plan	
Nevada Terrorism Plan	



Incorporation of Existing Plans/Study Table

Plan / Study	Findings / Incorporation
City of Reno All Hazards Mitigation Plan (2005)	Provides information on all hazards to be addressed in this RHMP.
Washoe County Comprehensive Plan	Provides information regarding history and geography, demographics, land use, and public utilities.
State of Nevada Enhanced Hazard Mitigation Plan (2013)	This plan, prepared by NDEM, was used to ensure that the County's RHMP was consistent with the State's Plan.
Nevada Hazardous Materials Emergency Response Plan	Provides information regarding hazardous materials incidents.
Nevada State Energy Conservation Plan	
Washoe County Regional Resiliency Study (2014)	This plan provides information on climate variability concerns in the region and potential mitigation measures.



Risk Categories for State of NV Hazards

High Risk	Medium/Significant Risk	Low Risk
Earthquake	Terrorism/ WMD	Tsunami/ Seiche
Flood	Hazardous Materials	Hail and thunderstorm
Wildfire	Drought	Avalanche
	Severe winter storm and extreme snowfall	Epidemic
		Windstorm
		Landslide
		Heat, extreme
		Tornado
		Infestation
		Land Subsidence
		Volcano
		Expansive Soil

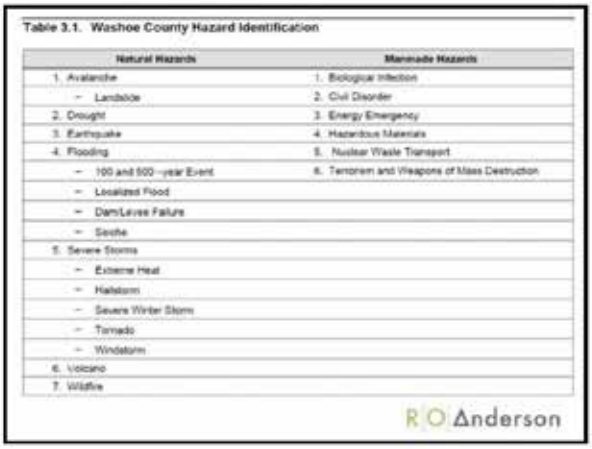


Table 3.1. Washoe County Hazard Identification

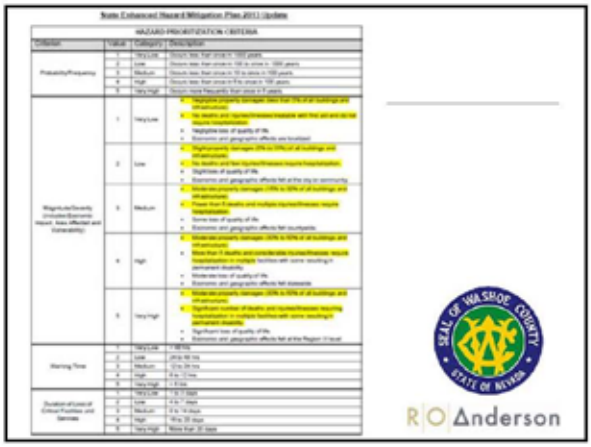
Natural Hazards	Manmade Hazards
1. Avalanche	1. Biological Infection
– Landslide	2. Civil Disorder
2. Drought	3. Energy Emergency
3. Earthquake	4. Hazardous Materials
4. Flooding	5. Nuclear Waste Transport
– 100 and 500 –year Event	6. Terrorism and Weapons of Mass Destruction
– Localized Flood	
– Dam/Levee Failure	
– Seiche	
5. Severe Storms	
– Extreme Heat	
– Hailstorm	
– Severe Winter Storm	
– Tornado	
– Windstorm	
6. Volcano	
7. Wildfire	

R O Anderson

Hazard Identification & Ranking

- Hazard Prioritization Criteria
  - Based on the State Enhanced Hazard Mitigation Plan 2013 Update
    - Probability/Frequency
    - Magnitude/Severity (includes Economic Impact, Area Affected and Vulnerability)
    - Warning Time
    - Duration of loss of critical facilities and services.

R O Anderson



R O Anderson

Hazard Profiling Worksheet

Formation of Hazard Subcommittees

- Hazard Ranking Results will be emailed out
  - Next meeting - Hazard Profile Review – Top 3

R O Anderson

Public Involvement

- Invite to neighboring communities
- Press Release
- Public Workshops
- Public Questionnaire

R O Anderson

Future Meetings

- February 18, 2015
- April 8, 2015
- June 3, 2015
- Public Workshops in July

R O Anderson

Preliminary Hazard Ranking Results

Incorporation of Existing Plans/Study Table	
Plan / Study	**Findings / Incorporation**
Washoe County Fire Plan	Includes findings and recommendations for mitigating the threat to property from wildland fires. http://www.rci-nv.com/reports/washoe/
Hungry Valley Community Wildfire Protection Plan (2006)	Includes findings and recommendations for mitigating the threat to property from wildland fires.
Regional Floodplain Management Strategy (2003)	Revises and updates information on the existence and severity of flood hazards in Washoe County, Nevada.
City of Sparks Multi-Hazard Mitigation Plan (2005)	Provides information on all hazards to be addressed in this RHMP.
Reno-Sparks Indian Colony All Hazards Mitigation Plan (2011)	Provides information on all hazards to be addressed in this RHMP.
City of Sparks, Flood Response Action Plan (2006)	
Washoe County Multi-Hazard Mitigation Plan (2010)	The first update to the original plan, this document provides an overview of hazards and risks, and mitigation action items which will be evaluated through the RHMP update process.
Washoe County District Health Department Pandemic Influenza Plan	Provides an overview of the potential threat of pandemic influenza in Washoe County.
Washoe County Emergency Preparedness Guide	· Provides information on all hazards to be addressed in this RHMP.
Truckee River Flood Plan – The Living River Plan	· Includes findings and recommendations for flood mitigation projects along the Truckee River.
Washoe County Dam Failure Plan	
Washoe County Stormwater Management Plan	
Nevada Terrorism Plan	
City of Reno All Hazards Mitigation Plan (2005)	*Provides information on all hazards to be addressed in this RHMP.*
Washoe County Comprehensive	Provides information regarding history and geography, demographics, land use, and public utilities.

Incorporation of Existing Plans/Study Table	
Plan / Study	**Findings / Incorporation**
Plan	
State of Nevada Enhanced Hazard Mitigation Plan (2013)	This plan, prepared by NDEM, was used to ensure that the County's RHMP was consistent with the State's Plan.
Nevada Hazardous Materials Emergency Response Plan	Provides information regarding hazardous materials incidents.
Nevada State Energy Conservation Plan	
Washoe County Regional Resiliency Study (2014)	This plan provides information on climate variability concerns in the region and potential mitigation measures.
	This document is the main reference source for managing disasters and large scale emergencies in Eureka County.
	This plan provides guidance to emergency response personnel on the general plan of action for a response to a hazardous materials emergency and provides for a resource directory.

Hazard Ranking Instructions

During the Hazard Mitigation Planning Committee Meeting of October 8, 2014, Planning Committee members reviewed the State's identified hazards from the State of Nevada Hazard Mitigation Plan and the hazards listed in Washoe County's Multi-Hazard Mitigation of 2010. The Planning Committee identified eight (8) natural hazards and seven (7) manmade hazards for Washoe County.

During the meeting, the members were tasked to prioritize the hazards based on their total impact in the community. We are forwarding this exercise to you as well so that we have input from all communities and participants of the plan update.

This exercise requires completion of the *Hazard Profiling Worksheet* which creates a tabulated ranking of each hazard. The exercise formula takes into account the probability/frequency, the magnitude/severity, warning time, and duration of loss of critical facilities and services based on historical occurrences. Please rank each hazard based on the *Hazard Prioritization Criteria* sheet with a value from 1 to 5. Please also provide a total tabulation for each hazard.

Your ranking will be included in the averaging of the data in order to analyze and prioritize the hazards.

Name:_____ Date:_____

Agency:_____ Specialty:_____

Hazard Profiling Worksheet

Legend: 1 = lowest; 5 = highest

Hazard Type	Probability/ Frequency	Magnitude/ Severity	Warning Time	Duration of loss of critical facilities and services	Total
Natural Hazards					
Avalanche					
-Snow					
-Landslide					
Drought					
Earthquakes					
Flood					
-100 and 500-year Event					
-Localized Flood					
-Dam/Levee Failure					
-Seiche					
Infectious Disease					
Severe Storms					
-Extreme Weather					
-Hailstorms					
- Severe Winter Storm					
- Tornado					
-Windstorm					
Volcano					
Wildfire					
Manmade Hazards					
Biological Infection/Infectious Disease					
Civil Disorder					
Energy Emergency					
Hazardous Materials					
Nuclear Waste Transport					
Terrorism/WMD					
Acts of Violence					

State Enhanced Hazard Mitigation Plan 2013 Update

Hazard Prioritization Criteria			
Criterion	**Value**	**Category**	**Description**
Probability/Frequency	1	Very Low	Occurs less than once in 1000 years
	2	Low	Occurs less than once in 100 to 1000 years
	3	Medium	Occurs less than once in 10 to 100 years
	4	High	Occurs less than once in 5 to 10 years
	5	Very High	Occurs less that once in 5 years
Magnitude/Severity (includes Economic Impact, Area Affected and vulnerability)	1	Very Low	• Negligible property damages (less than 5% of all buildings and infrastructure) • Negligible loss of quality of life • Local emergency response capability is sufficient to manage the hazard
	2	Low	• Slight property damages (5% to 15%) of all buildings and infrastructure) • Slight loss of quality of life • Emergency response capability of the city or surrounding community is sufficient to manage the hazard
	3	Medium	• Moderate property damages (15% to 30% of all buildings and infrastructure) • Some loss of quality of life • Emergency response capability, economic, and geographic effects of the hazard are of sufficient magnitude to involve one or more counties
	4	High	• Moderate property damages (30% to 50% of all buildings and infrastructure) • Moderate loss of quality of life • Emergency response capability, economic, and geographic effects of the hazard are of sufficient magnitude to require state assistance
	5	Very High	• Property damages to greater than 50% of all buildings and infrastructure • Significant loss of quality of life • Emergency response capability, economic, and geographic effects of the hazard are of sufficient magnitude to require federal assistance
Warning Time	1	Very Low	> 48 hours
	2	Low	24 to 48 hours
	3	Medium	12 to 24 hours
	4	High	6 to 12 hours
	5	Very High	< 6 hours
Duration of loss of critical facilities and services	1	Very Low	1 to 3 days
	2	Low	4 to 7 days
	3	Medium	8 to 14 days
	4	High	15 to 20 days
	5	Very High	More than 20 days

Meeting #3 –AGENDA

Washoe County

Regional Hazard Mitigation Planning Committee

Meeting Agenda

Wednesday ~ February 18, 2015 ~ 9:00 A.M.

REGIONAL EMERGENCY OPERATIONS CENTER

5195 SPECTRUM BOULEVARD

RENO, NEVADA 89512

PURSUANT TO NRS 241.020, THIS NOTICE HAS BEEN POSTED AT THE FOLLOWING LOCATIONS: Regional Emergency Operations Center, 5195 Spectrum Boulevard, Reno, Nevada; Reno City Hall, One East First Street, Reno, Nevada; Sparks City Hall, 431 Prater Way, Sparks, Nevada; Reno Sparks Indian Colony, 98 Colony Road, Reno, Nevada; Pyramid Lake Paiute Tribe, 208 Capitol Hill, Nixon, Nevada . This agenda is also posted on the Nevada Public Notice Website at: https://notice.nv.gov/

The Hazard Mitigation Planning Committee may consider items on the agenda out of order.

The Hazard Mitigation Planning Committee may combine two or more agenda items for consideration.

The Hazard Mitigation Planning Committee may remove an item from the agenda or delay discussion relating to an item on the agenda at any time.

The Hazard Mitigation Planning Committee's agenda and supporting materials may be obtained at the Washoe County Regional Emergency Operations Center, 5195 Spectrum Blvd., Reno NV 89512. Contact Cathy Ludwig 775-337-5859.

Time Limits - Public comments are welcomed during the Public Comment periods for all matters, whether listed on the agenda or not, and are limited to three (3) minutes per person. Additionally, public comment of three (3) minutes per person will be heard during individual action items on the agenda. Persons are invited to submit comments in writing on the agenda items and/or attend and make comment on that item at the Hazard Mitigation Planning Committee meeting. Persons may not allocate unused time to other speakers.

Forum Restrictions and Orderly Conduct of Business – The Hazard Mitigation Planning Committee conducts the business of Washoe County and its citizens during its meetings. The presiding officer may order the removal of any person whose statement or other conduct disrupts the orderly, efficient or safe conduct of the meeting. Warnings against disruptive comments or behavior may or may not be given prior to removal. The viewpoint of a speaker will not be restricted, but reasonable restrictions may be imposed upon the time, place and manner of speech. Irrelevant and unduly repetitious statements and personal attacks which antagonize or incite others are examples of speech that may be reasonably limited.

Responses to Public Comments – The Hazard Mitigation Planning Committee can deliberate or take action only if a matter has been listed on an agenda properly posted prior to the meeting. During the Public Comment period, speakers may address matters listed or not listed on the published agenda. The Open Meeting Law does not expressly prohibit responses to public comments by the Hazard Mitigation Planning Committee. However, responses from Hazard Mitigation Planning Committee to unlisted public comment topics could become deliberation on a matter without notice to the public. On the advice of legal counsel and to ensure the public has notice of all matters the Hazard Mitigation Planning Committee will consider, Hazard Mitigation Planning Committee may choose not to respond to public comments, except to correct factual inaccuracies, ask for Washoe County staff action or to ask that a matter be listed on a future Hazard Mitigation Planning Committee meeting agenda. The Hazard Mitigation Planning Committee may do this either during the Public Comment item or during the following item: "**HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS, REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS*** (Non-action item)."

This facility is accessible to the disabled. Persons with disabilities who require special accommodations or assistance (e.g., sign language, interpreters or assisted listening devices) at the meeting should notify Regional Emergency Operations Center, 775-337-5859, 48-hours before the meeting.

1. **WELCOME AND INTRODUCTIONS** - *(Non-action item) – Aaron Kenneston, Washoe County Emergency Manager*

2. **PUBLIC COMMENTS -** *(Non-action item) - Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

3. **HAZARD RANKING RESULTS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

4. **HAZARD PROFILE REVIEW -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

    ~ Avalanche – Dick Penniman

~ Drought – Chris Smallcomb

~ Earthquake – Rob Reeder

~ Flood – Kimble Corbridge

~ Infectious Disease – Sara Dinga

~ Volcano – Ed Evans

~ Wildland Fire - Charles Moore

5. THREAT AND HAZARD IDENTIFICATION AND RISK ASSESSMENT (THIRA) PRESENTATION - *(Non-action item) – Paul Burke, NV Division of Emergency Mgt.*

6. REVIEW OF SECTIONS 1-4 - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

7. WHAT'S NEXT - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

8. ANNOUNCEMENT OF FUTURE MEETINGS - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

~ April 8, 2015

~ June 3, 2015

~ Public Workshops in July

9. HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS,*

REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS - *(Non-action item) - No discussion among committee members will take place on this item.*

10. PUBLIC COMMENT - *(Non-action item)* **-** *Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

11. ADJOURNMENT

Meeting No. 3 Sign In Sheet

Regional Hazard Mitigtion Planning Committee Meeting
02/18/2015

	NAME	AGENCY	TELEPHONE	EMAIL
1.	Karen Jessop	WCME	785-6114	kjessop@washoecounty.us
2.	Donald Reit	PLFR/EMS	560-4417	dpelt@plpt.nsn.us
3.	Cassandra Darrough	PLFR/EMS	453-5971	cdarrough@plpt.nsn.us
4.	JOE COUDRIET	CITY OF RENO	334-2679	COUDRIETJ@RENO.GOV
5.	Mark Kaster	Reno PD	334-2175	
6.	Amy Ray	TMFPD	326-6005	aray@tmfpd.us
7.	Russ Pearson	WCSO	328-3004	RPEARSON@WASHOECOUNTY.US
8.	Brian Taylor	REMSA		
9.	Bob Larson	NNRIC	321 4911	
10.	Nancy Leuenhagen	Washoe Cnty	328-2069	nleuenhagen@washoecounty.us
11.	Tracy Domingues	City of Sparks	3537835	tdominguez@cityofsparks.us
12.	Mamell Heinz	City of Reno	775-657-4571	heinzm@reno.gov
13.	Kyle West	City of Reno	848-8909	westk@reno.gov

Regional Hazard Mitigtion Planning Committee Meeting
02/18/2015

	NAME	AGENCY	TELEPHONE	EMAIL
1.	Kimbi Corbridge	WC CSD - Eng	328-2041	Kcorbridge@washoecounty.us
2.	Andy Kosh	Sparks FD	353 2365	akosh@cityofsparks.us
3.	Tim Leighton	Truckee Meadows FD	315-6609	TLeighton@tmfpd.us
4.	Debbie Tanaka	NDEM	775-687-0314	Debbie.Tanaka@dps.state.nv.us
5.	Rob Reeder	RTC	722 4037	rreeder@rtcwashoe.com
6.	Eric Crump	W. C. CSD	328-2182	Ecrump@washoecounty.us
7.	ADAM SEARCY	WASHOE Co. ROADS	328. 2192	asearcy@washoecounty.us
8.	John Flora	IVGID	745-6770	jflora@IVGID.org
9.	Dave Solaro	WC - CSD	328. 3624	dsolaro@washoecounty.us
10.	Dick Penniman	WC Env	530 587-0121	dpenniman@sierraridge.org
11.	Ed Evans	TRFMA	850-7465	eevans@washoecounty.us
12.	Jeff Cossio	WCSO	(775) 742-3898	jcossio@Washoe County.us
13.	Tom Garrison	SFD	527-3703	tgarrison@cityofsparks.us

Regional Hazard Mitigtion Planning Committee Meeting
02/18/2015

	NAME	AGENCY	TELEPHONE	EMAIL
	Aaron Kenneston	WC Emers. Mgt.	337-5898	AKenneston @ washoecounty.us
	Cathy Ludwig	" "	337-5859	cludwig @ washoecounty.us
3.	Liz Paulsen	" "	337-5855	epaulsen @ washoecounty.us
4.	Bob Miller	ARES	843-5952	WA6MTY@gbis.com
5.	STEPHANIE HICKS	ROAANDERSON	215-5042	SHICKS@ROANDERSON.COM
6.	MARK HELSE	" "	215-5045	MHELSE@ROANDERSON.COM
7.	RANDALL C LORENZ	WC ARES	775 622 7305	PIO@WCARES.US
8.	MARSHA CARDINAL	WC GIS	328-2032	MCARDINAL@WASHOECOUNTY.US
9.	Sara Dinga	WCHD	326-6054	sdinga@washoecounty.us
10.	Chris Cenac	TMWA	834-8036	CCenac@TMWA.com
11.	Chris Smallcomb	NWS	673-8100 X223	chris.smallcomb@noaa.gov.
12.	Paul McArthur	WC	328-2563	pmcarthur@washoecounty.us
13.	John Dunn	WCSO - SMART	775/815-5115	J.d.dunn@sbcglobal.net

Handouts – Meeting No. 3

Washoe County Regional Hazard Mitigation Plan

Hazard Mitigation
Planning Committee Meeting
February 18, 2015

Agenda

- **Welcome & Introductions** – *Aaron Kenneston*
- **Hazard Ranking Results** – *Stephanie Hicks*
- **Hazard Profile Review** – *Stephanie Hicks*
  - *Avalanche* — *Dick Penniman*
  - *Drought* — *Chris Smallcomb*
  - *Earthquake* — *Rob Reeder*
  - *Flood* — *Kimble Corbridge*
  - *Infectious Disease* — *Sara Dinga*
  - *Volcano* — *Ed Evans*
  - *Wildland Fire* — *Charles Moore*

Agenda

- **THIRA Presentation** – *Paul Burke*
- **Review of Sections 1-4** – *Stephanie Hicks*
- **What's Next** – *Stephanie Hicks*
- **Announcement of Future Meetings** – *Stephanie Hicks*

Hazard Ranking Results

Table 5-3: Washoe County Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Wildfire Severe Storms	Flood Infectious Disease	Avalanche Drought Civil Disorder Energy Emergency Hazardous Materials Terrorism/WMD/Acts of Violence	Volcano Nuclear Waste Transport

Table 5-4: City of Reno Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Wildfire	Terrorism/WMD/Acts of Violence	Avalanche Drought Flood Biological Infection Energy Emergency	Infectious Disease Severe Storms Volcano Civil Disorder Hazardous Materials Nuclear Waste Transport

Hazard Ranking Results

Table 5-6: City of Sparks Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Wildfire Hazardous Materials Nuclear Waste Transport	Infectious Disease Terrorism/WMD/Acts of Violence	Avalanche Drought Flood Energy Emergency	Severe Storms Volcano Civil Disorder

Table 5-8: Reno-Sparks Indian Colony Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Wildfire	Volcano	Flood Hazardous Materials	Avalanche Drought Infectious Disease Severe Storms Civil Disorder Energy Emergency Nuclear Waste Transport Terrorism/WMD/ Acts of Violence

Hazard Ranking Results

Table 5-7: Pyramid Lake Paiute Tribe Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Drought Wildfire	Earthquake Flood Infectious Disease Energy Emergency Nuclear Waste Transport Terrorism/WMD	Hazardous Materials Severe Storms	Avalanche Volcano Civil Disorder

Table 5-8: Truckee River Flood Management Authority Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Earthquake Terrorism/WMD/Acts of Violence		Avalanche Flood Infectious Disease Civil Disorder Hazardous Materials	Drought Severe Storms Wildfire Energy Emergency Nuclear Waste Transport

Hazard Ranking Results

Table 5-9: Washoe County RHMP Hazard Ranking

High Risk	Moderate Risk	Low Risk
Earthquake Wildfire Flood	Avalanche Drought Infectious Disease Hazardous Materials Nuclear Waste Transport Severe Weather Terrorism/WMD/Acts of Violence	Criminal Acts Energy Emergency Volcano

Hazard Profile Review

- *Avalanche* — *Dick Penniman*
- *Drought* — *Chris Smallcomb*
- *Earthquake* — *Rob Reeder*
- *Flood* — *Kimble Corbridge*
- *Infectious Disease* — *Sara Dinga*
- *Volcano* — *Ed Evans*
- *Wildland Fire* — *Charles Moore*

THIRA Presentation

- Paul Burke

Review of Sections 1- 4

- Section One Official Record of Adoption
- Section Two Background
- Section Three Community Description
- Section Four Planning Process

What's Next

- Receive comments on presented Sections by March 11, 2015.
- April Meeting
  - Present Draft Revisions
  - Complete Hazard Profiles
  - Complete Vulnerability Analysis

Future Meetings

- April 8, 2015
- June 3, 2015
- Public Workshops in July

Meeting #4 –AGENDA

Washoe County

Regional Hazard Mitigation Planning Committee

Meeting Agenda

Wednesday ~ April 8, 2015 ~ 9:00 A.M.

REGIONAL EMERGENCY OPERATIONS CENTER

5195 SPECTRUM BOULEVARD

RENO, NEVADA 89512

PURSUANT TO NRS 241.020, THIS NOTICE HAS BEEN POSTED AT THE FOLLOWING LOCATIONS: Regional Emergency Operations Center, 5195 Spectrum Boulevard, Reno, Nevada; Reno City Hall, One East First Street, Reno, Nevada; Sparks City Hall, 431 Prater Way, Sparks, Nevada; Reno Sparks Indian Colony, 98 Colony Road, Reno, Nevada; Pyramid Lake Paiute Tribe, 208 Capitol Hill, Nixon, Nevada . This agenda is also posted on the Nevada Public Notice Website at: https://notice.nv.gov/

The Hazard Mitigation Planning Committee may consider items on the agenda out of order.

The Hazard Mitigation Planning Committee may combine two or more agenda items for consideration.

The Hazard Mitigation Planning Committee may remove an item from the agenda or delay discussion relating to an item on the agenda at any time.

The Hazard Mitigation Planning Committee's agenda and supporting materials may be obtained at the Washoe County Regional Emergency Operations Center, 5195 Spectrum Blvd., Reno NV 89512. Contact Cathy Ludwig 775-337-5859.

Time Limits - Public comments are welcomed during the Public Comment periods for all matters, whether listed on the agenda or not, and are limited to three (3) minutes per person. Additionally, public comment of three (3) minutes per person will be heard during individual action items on the agenda. Persons are invited to submit comments in writing on the agenda items and/or attend and make comment on that item at the Hazard Mitigation Planning Committee meeting. Persons may not allocate unused time to other speakers.

Forum Restrictions and Orderly Conduct of Business – The Hazard Mitigation Planning Committee conducts the business of Washoe County and its citizens during its meetings. The presiding officer may order the removal of any person whose statement or other conduct disrupts the orderly, efficient or safe conduct of the meeting. Warnings

against disruptive comments or behavior may or may not be given prior to removal. The viewpoint of a speaker will not be restricted, but reasonable restrictions may be imposed upon the time, place and manner of speech. Irrelevant and unduly repetitious statements and personal attacks which antagonize or incite others are examples of speech that may be reasonably limited.

Responses to Public Comments – The Hazard Mitigation Planning Committee can deliberate or take action only if a matter has been listed on an agenda properly posted prior to the meeting. During the Public Comment period, speakers may address matters listed or not listed on the published agenda. The Open Meeting Law does not expressly prohibit responses to public comments by the Hazard Mitigation Planning Committee. However, responses from Hazard Mitigation Planning Committee to unlisted public comment topics could become deliberation on a matter without notice to the public. On the advice of legal counsel and to ensure the public has notice of all matters the Hazard Mitigation Planning Committee will consider, Hazard Mitigation Planning Committee may choose not to respond to public comments, except to correct factual inaccuracies, ask for Washoe County staff action or to ask that a matter be listed on a future Hazard Mitigation Planning Committee meeting agenda. The Hazard Mitigation Planning Committee may do this either during the Public Comment item or during the following item: "**HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS, REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS*** (Non-action item)."

This facility is accessible to the disabled. Persons with disabilities who require special accommodations or assistance (e.g., sign language, interpreters or assisted listening devices) at the meeting should notify Regional Emergency Operations Center, 775-337-5859, 48-hours before the meeting.

1. **WELCOME AND INTRODUCTIONS** - *(Non-action item) – Aaron Kenneston, Washoe County Emergency Manager*

2. **PUBLIC COMMENTS -** *(Non-action item) - Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

3. **HAZARD PROFILE REVIEW -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

~ Severe Weather – Chris Smallcomb

~ Criminal Acts – Nate Parker

~ Energy Emergency – Stephanie Hicks

~ Hazardous Materials – Tom Garrison

~ Transportation of Radiological Materials & Waste – Scott Alquist

~ Volcano – Ed Evans

~ Terrorism/WMD – Nate Parker

4. **VULNERABILITY ANALYSIS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

5. **MITIGATION ACTION ITEMS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

6. **OVERVIEW OF PLAN SECTIONS 1-5** - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

7. **PUBLIC OUTREACH -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

   ~ Workshop Locations/Dates

   ~ Questionnaire

8. **ANNOUNCEMENT OF FUTURE MEETINGS** - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

   ~ June 3, 2015

   ~ Public Workshops in July

9. **HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS,***

   REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS - *(Non-action item) - No discussion among committee members will take place on this item.*

10. **PUBLIC COMMENT -** *(Non-action item)* **-** *Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

11. **ADJOURNMENT**

Washoe County RHMP
April 8, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
Stephanie Hicks	RO Anderson	215-5042	shicks@roanderson.com
Marie Hulse	RO Anderson	215-5045	mhulse@roanderson.com
Tammy Kinsley	RO Anderson	215-5013	tkinsley@roanderson.com
Gary Zaepfel	Washoe County	328-2349	gzaepfel@washoecounty.us
Debbie Tanaka	NDEM	775-687-0314	Debbie.Tanaka@dps.state.nv.us
Nate Parker	RPD	334-2194	
Celeste Wallick	WC Risk	328 2662	cwallick@washoecounty.us
Tom McKnight	REOC	775-326-6667	tommck4@empr.org
Ed Evans	TRFMA	850-7465	eevans@washoecounty.us
Jerry Baldridge	WCSO	775-321-4912	jbaldridge@washoecounty.us
Chris Smallcomb	NOAA/NWS	775-673-8100 x223	chris.smallcomb@noaa.gov
Glenn Lader	NOAA/NWS	775-673-8100 x223	''

Meeting No. 4 Sign In Sheet

Washoe County RHMP
April 8, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
Cara Argall	WCHD	775-525-4975	cargall@washoecounty.us
Jack Byrom	TMWA	775-843-5677	jbyrom@tmwa.com
Chris Syverson	Sparks	775-353-1633	csyverson@cityofsparks.us
Brian Rakeman	NV Energy	775 834 7864	BRakeman@NVEnergy.com
Kyle West	City of Reno	775-334-2364	westk@reno.gov
Amy Ray	TMFPD	326-6005	aray@tmfpd.us
Kelly Boyd	Red Cross	849-4708	Kelly.Boyd2@redcross.org
JOE CONRAD	CO RENO	334-2679	CONRADJ@RENO.GOV
Kimble Corbridge	WC	328-2041	Kcorbridge@washoecounty.us
Jeff Whitesides	WCHD	328-2051	jwhitesides@washoecounty.us
Karen Jessop	WCME	785-6114	kjessop@washoecounty.us
Rob Pierson	RTC	322-4037	rpierson@washoe.com

Washoe County RHMP
April 8, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
Karen Johnson	NDEM	687-0373	kijohnson@dps.state.nv.
John Dollar	IVGID	775-745-6970	jwd@IVGID.org
CHRIS KETRING	TMFPD	775-315-5805	cketring@TMFPD.US
Brian Allen	Sparks F.D	353-2220	ballen@cityofsparks.us
BOB DORSEY	NNRIC	321 4411	
ADAM SEARCY	W.C. - CSD	328.2192	asearcy@washoecounty.us
Dick Penniman	W.C. Avi Forecaster	530-587-0121	dpenniman@ snowbridge.org
Aaron Kenneston	Washoe Em	337-5898	

Handouts – Meeting No. 4

Washoe County Regional Hazard Mitigation Plan

Hazard Mitigation
Planning Committee Meeting
April 8, 2015

Agenda

- **Welcome & Introductions** – *Aaron Kenneston*
- **Hazard Profile Review** – *Stephanie Hicks*
  - *Severe Weather* — *Chris Smallcomb*
  - *Criminal Acts* — *Nate Parker*
  - *Energy Emergency* — *Stephanie Hicks*
  - *Hazardous Materials* — *Tom Garrison*
  - *Transportation of Radiological Materials & Waste* — *Scott Alquist*
  - *Terrorism/WMD* — *Nate Parker*

Agenda

- **Vulnerability Analysis** – *Stephanie Hicks*
- **Mitigation Action Items** – *Stephanie Hicks*
- **Overview of Plan Sections 1-5**– *Stephanie Hicks*
- **Public Outreach** – *Stephanie Hicks*
- **Announcement of Future Meetings** – *Stephanie Hicks*

Hazard Profile Review

- *Severe Weather* — *Chris Smallcomb*
- *Criminal Acts* — *Nate Parker*
- *Energy Emergency* — *Stephanie Hicks*
- *Hazardous Materials* — *Tom Garrison*
- *Transportation of Radiological Materials & Waste* — *Scott Alquist*
- *Terrorism/WMD* — *Nate Parker*

Vulnerability Analysis

Mitigation Action Items

Goals from 2010 HMP

- Goal 1: Minimize the Risk and Vulnerability from Identified Hazards
- Goal 2: Reduce Exposure to Hazard Related Losses
- Goal 3: Improve Communities' Capabilities to Mitigate Losses
- Goal 4: Increase Public Awareness/Education of Risk and Vulnerability to Identified Hazards

Mitigation Action Items

State Formatted Goals

1. Promote increased and ongoing County and City involvement in hazard-mitigation planning and projects.
2. Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
3. Reduce the possibility of damage and losses due to avalanches.
4. Reduce the possibility of damage and losses due to drought.
5. Reduce the possibility of damage and losses due to earthquake.

Mitigation Action Items

6. Reduce the possibility of damage and losses due to flood.
7. Reduce the possibility of damage and losses due to infectious disease.
8. Reduce the possibility of damage and losses due to severe weather.
9. Reduce the possibility of damage and losses due to wildland fire.
10. Reduce the possibility of damage and losses due to hazardous materials.

Mitigation Action Items

11. Reduce the possibility of damage and losses due to transportation of radiological materials and waste.
12. Reduce the possibility of damage and losses due to terrorism and weapons of mass destruction.

Overview of Sections 1- 4

- Section 3 - Community Description
  - Updates to Community Profiles
- Section 5 - Hazard Analysis
  - Wildland Fire

Public Outreach

- Public Questionnaire
  - Hard Copy
  - Online Survey
- Public Workshops

Future Meetings

- June 3, 2015
- Public Workshops in July

Washoe County Planning Area's Mitigation Actions

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Avalanche			
Develop plan for strategically placed snow fences to protect the Crystal Bay Subdivision (from 2005 objective titled "Construct Snow Fence (above Crystal Bay and Third Creek Area in Placer County)")	Washoe County	2005	Continue in update.
Mapping, Hazard Plans and Zoning/Land Use Codes for Areas Prone to Landslides and/or Avalanches	Washoe County	2010	Continue in update.
Biological Infection			
Pandemic Influenza (from the 2005 objective titled: Continued Public Health Emergency management trainings and exercise.)	Washoe County	2005	PODs occur in October – December every year.
Public notification for high risk disease events.	Washoe County	2005	Public information is distributed regularly.
Continued Public Health emergency management trainings and exercises.	Washoe County	2005	Completed on an annual basis.
Drought			
Connect into TMWA Water Supply System	Reno-Sparks Indian Colony	2010	No activity but will be continued in update.
Property Protection: Drought – improve water supply	Reno-Sparks Indian Colony	2010	Continued in update. Monitoring water levels.
Earthquake			
Public Awareness & Education - earthquake hazards, earthquake preparedness, building code adoption	Washoe County	2005	Continued in update. Participated in the NV shakeout.
Develop the Regional Earthquake Transportation Evacuation Routes into appropriate planning documents	City of Reno (All jurisdictions in 2009 update)	2005	Ongoing. Completed in the 2010 Regional Plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Encourage seismic strength evaluations of critical facilities in the city to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards	City of Reno	2005	Continued in plan. May have funding through DEM in the future.
Encourage non-structural mitigation by increasing public awareness of earthquakes through wide distribution of newspaper supplements, booklets, brochures, etc. on what to do before, during, and after an earthquake	Washoe County and the Cities of Reno and Sparks	2010	Continued in plan. May have funding through DEM in the future.
Strengthen building codes & land use planning:	Washoe County and the Cities of Reno and Sparks	2010	Continued in plan. Have adopted 2012 building codes.
Provide Incentives for Retrofitting or Eliminating Life-Threatening Buildings, particularly URMs.	Washoe County and the Cities of Reno and Sparks	2010	No progress. Continue in plan.
Assess, Repair, and/or Replace Infrastructure that may Fail During Earthquakes (e.g., Keystone Ave. Bridge)	Washoe County and the Cities of Reno and Sparks	2010	No progress. Continue in plan.
Energy Emergency			
Retrofit backup power systems for critical infrastructure	Washoe County	2005	Critical infrastructure has been identified and several are equipped with backed up generators. Treatment plants and supply stations are looking for grants funding for generators. Continued in update.
Flooding			
Stormwater Capital Improvement Project: CIP#A15-1 Village Parkway @ Mudsprings ("Village Parkway Wash") Culvert Improvements	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#A16-3 Cold Springs Drive Channel Improvements	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#A16-4 & A16-5 Cold Springs Drive Culvert Improvements	Washoe County	2010	20/Complete

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Stormwater Capital Improvement Project: CIP#A16-6 Cold Springs Drive to White Lake Channel Improvements	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#A16-7 Village Parkway Culvert Improvements	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-1 Sun Valley Drainage Improvements ("Amargosa Wash") @ Middle Fork Drive	Washoe County	New	20/Complete
Stormwater Capital Improvement Project: CIP#C17-2 Sun Valley Drainage Improvements ("Amargosa Wash") @ Amargosa Drive	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-3 Sun Valley Drainage Improvements ("Amargosa Wash") Utility Protection/Relocation and Existing Channel Erosion Protection between Amargosa Drive and Sun Valley Blvd.	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-4 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at Sun Valley Blvd.	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-5 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at Smokey Canyon Drive.	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-10 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at E. 9th Ave	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-15 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at E. 8th Ave	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#C17-16 Sun Valley Drainage Improvements ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive	Washoe County	2010	20/Complete

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Stormwater Capital Improvement Project: CIP#C17-17 Sun Valley Drainage Improvements ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#D16-1 Spanish Springs Kinglet Drive Drainage – Detention Basin	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#D16-2 Spanish Springs Nightingale Way Drainage – Detention Basin	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#D16-3 Spanish Springs Spanish Springs High School Area – Detention Basin	Washoe County	2010	20/Complete
Stormwater Capital Improvement Project: CIP#D16-4 Spanish Springs Spanish Springs High School Area – Channel and Culvert Improvements in Spanish Springs Village Subdivision	Washoe County	2010	20/Complete
Truckee River Flood Control Project: West Second Street to Booth Street	Washoe County	2010	-
Truckee River Flood Control Project: Booth Street to Ralston Street	Washoe County	2010	-
Truckee River Flood Control Project: Ralston Street to South Arlington Avenue	Washoe County	2010	-
Truckee River Flood Control Project: South Arlington Avenue to North Sierra Street	Washoe County	2010	-
Truckee River Flood Control Project: Sierra Street Bridge	Washoe County	2010	-
Truckee River Flood Control Project: North Sierra Street to North Virginia Street	Washoe County	2010	-
Truckee River Flood Control Project: Virginia Street Bridge	Washoe County	2010	-

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Truckee River Flood Control Project: Center Street Bridge	Washoe County	2010	-
Truckee River Flood Control Project: Lake Street Bridge	Washoe County	2010	-
Truckee River Flood Control Project: Virginia Street to Evens Avenue	Washoe County	2010	-
Truckee River Flood Control Project: Evans Avenue to Kuenzli Street	Washoe County	2010	-
Truckee River Flood Control Project: Kuenzli Street Ballpark	Washoe County	2010	-
Truckee River Flood Control Project: Kuenzli Street to Highway 395	Washoe County	2010	-
Truckee River Flood Control Project: Wells Pedestrian Bridge	Washoe County	2010	-
Truckee River Flood Control Project: Glendale Avenue to Greg Street	Washoe County	2010	-
Truckee River Flood Control Project: Greg Street to South Rock Boulevard	Washoe County	2010	-
Truckee River Flood Control Project: Rock Boulevard Bridge Extension	Washoe County	2010	-
Truckee River Flood Control Project: South Rock Boulevard to South McCarran Boulevard	Washoe County	2010	-
Truckee River Flood Control Project: South McCarran Boulevard Bridge Extension	Washoe County	2010	-
Truckee River Flood Control Project: UNR Mainstation Farm	Washoe County	2010	-
Truckee River Flood Control Project: South McCarran Boulevard to Steamboat Creek	Washoe County	2010	-
Truckee River Flood Control Project: Steamboat Creek to First Railroad Bridge	Washoe County	2010	-

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Truckee River Flood Control Project: Hidden Valley/Eastside Subdivision	Washoe County	2010	-
Truckee River Flood Control Project: Wadsworth Levee	Washoe County	2010	54/
Evaluate warning systems – Seiche	Washoe County	2010	Continued in plan.
Mitigation of Risk Related to Flood Damage to Public Infrastructure – Lawton Interceptor at Oxbow Park	City of Reno	2010	
Mitigation of Risk Related to Flood Damage to Public Infrastructure and Private Property – Dant Wash Drainage Improvements	City of Reno	2010	
North Truckee River Drain Replacement	City of Sparks	2010	Under construction and near completion.
Implement Stormwater Plan (e.g., projects for storm drains, catch basins, surveys, etc.)	City of Sparks	2010	-
Mitigate where water enters the reservoir to the dam (retention, dry basins)	Pyramid Lake Paiute Tribe	2010	18
Structural projects: Culvert Maintenance	Reno-Sparks Indian Colony	2010	-
Structural projects – Drainage System Maintenance	Reno-Sparks Indian Colony	2010	-
Multi-Hazard			
Develop, enhance, and implement education programs aimed at mitigating natural hazard, and reducing the risk to citizens, public agencies, private property owners, business, and schools.	City of Reno	2005 (2010 All Jurisdictions)	Continued in plan. Ongoing public awareness campaigns in schools.
Reinforce Technical Rescue Program	City of Reno	2005	Need to check with Jim Bolton
Enhance/Develop the Seasonal Multi-Hazard Public Awareness Program	Washoe County	2010	Ongoing. Continue in plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
~~Warning systems~~	~~Reno Sparks Indian Colony~~	~~2010~~	~~Completed. Disaster Com Box is a mobile EOC. Drills completed 3 times per year. Removed from plan.~~
~~Emergency Planning – Activating the EOC~~	~~Reno Sparks Indian Colony~~	~~2010~~	~~Completed. Disaster Com Box is a mobile EOC. Drills completed 3 times per year. Removed from plan.~~
~~Post Disaster Mitigation – Building inspections~~	~~Reno Sparks Indian Colony~~	~~2010~~	~~Completed. Disaster Com Box is a mobile EOC. Drills completed 3 times per year. Removed from plan.~~
Public Information – Outreach Projects	Reno-Sparks Indian Colony	2010	Ongoing distribution of fliers and community workshops on preparedness. Continued in plan.
Nuclear Waste Transport			
Monitor Radiological Shipping Campaigns that include Washoe County as an approved route. (from the 2005 action titled "Monitor progress on Yucca Mountain, and work with Nevada Department of Transportation to develop protocols"	Washoe County	2010	Ongoing; continued in plan. A subcommittee of the LEPC reports on this each meeting.
Severe Storms		2010	
Encourage the public sector to prepare and maintain 3-day preparedness kits	Washoe County	2010	Ongoing; continued in plan. Could be tied into StormReady.
Conduct outreach programs to build resilience to severe storm hazards. (formerly 2005 action - Encourage homeowners to storm proof their buildings)	Washoe County	2010/2005	Ongoing; continued in plan. Could be tied into StormReady.
Terrorism and Weapons of Mass Destruction			
Seek funding for basic terrorism training for community responders in relation to proximity to military bases and military transportation routes.	Washoe County	2005	Continued in plan. Funding has only become available in the last several years and training has been offered.
Provide training for the public and private sectors to improve response, management, and intervention of WMD terrorism incidents	Washoe County	2005	Ongoing by Fusion Center. Continued in plan.
Utilize Community Emergency Response Teams (CERT) as well as the Citizens Homeland Security Council (CHSC) to shift burden from sworn officers, where appropriate	Washoe County	2005	Ongoing. Continued in plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Seek funding to provide methodology and operational functionality to perform vulnerability analysis to determine areas of risk and/or vulnerability to pipeline. Leverage relationships with pipeline owner/operators to insure adequate maintenance and monitoring of pipeline infrastructure. (From the 2005 Objective titled "Analyze pipeline to determine areas of vulnerability")	Washoe County	2005	Discuss with Fusion Center to see if we want to add or eliminate.
Increase Law Enforcement Staff (from the 2005 objective titled "Double Law Enforcement Staffing)	City of Sparks	2005	Continued in plan.
Wildland Fire			
Increase communication, coordination, and collaboration between wildland/ urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.	City of Reno (Now All Jurisdictions)	2010/2005	Now discussed in staff report for Land Use applications. Online mapping is available. Continued in plan.
Mitigation of Risk of Fire Related to the Mt. Rose Wilderness Area	City of Reno	2010	
Defensible Space Creation and Hazardous Fuels Reduction	Washoe County	2010	Chipping program went away but NDF is still working on state property. Chipping will resume when funding is available. Continued in plan.
~~Hazardous Wood Roof Replacement Program~~	~~Washoe County~~	~~2010~~	~~Unable to get funding. Removed from plan.~~
Establish good access routes/signage	Washoe County	2010	Continued in plan. Check with Truckee Meadows Fire – they may have some in Caughlin Ranch & St James Village.
~~Identify the boundaries of the Wildland Urban Interface within the County.~~	~~Washoe County~~	~~2010~~	~~Completed. Removed from plan.~~
~~Encourage local chapters of the Fire Safety Council~~	~~Washoe County~~	~~2005~~	~~Fire Safety Council no longer exists. Removed from plan.~~
Property Protection: Create Defensible Space (DS)	Reno-Sparks Indian Colony	2010	Ongoing. Continued in plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	2014 Status
Fuel Management – Fire breaks	Reno-Sparks Indian Colony	2010	Ongoing. Continued in plan.

MITIGATION QUESTIONNAIRE

A county and city partnership has recently been formed to address natural hazards that may occur in Washoe County. A planning committee has been selected to oversee this process. In order to identify and plan for future natural disasters, we need assistance from the residents of Washoe County. This questionnaire is designed to gauge the level of knowledge local citizens have about natural disaster issues and areas vulnerable to any type of natural disaster. The information you provide will help coordinate activities to reduce the risk of injury or property damage in the future.

This survey consists of 10 questions and will take approximately 5 minutes to complete

GENERAL HOUSEHOLD INFORMATION

The following requested demographic information will aid the planning committee in determining the hazard mitigation needs of our community. For example, indicating whether you own a house or are a tenant will help determine the needs for both renters and homeowners. The answers provided in this action will be treated as confidential and will be used solely for the preparation of this plan and will not be provided to any other group or interest.

1. Please indicate your zip code: _____
2. Please indicate items registered in Washoe County:

☐ Home ☐ Business ☐ Vehicle

NATURAL HAZARD INFORMATION

The following requested demographic information will aid the planning committee in determining needs and desires for educating and preparing our community for a natural disaster. The answers provided in this action will be treated as confidential and will be used solely for the preparation of this plan and will not be provided to any other group or interest.

3. In the past 10 years which of the following types of natural hazard events have you or someone in your household experienced within Washoe County, and how concerned are you about the following natural hazards impacting Washoe County? (please check all that apply)

Natural & Man Made Hazards	Have Experienced Y/N	Low Concern	Moderate Concern	High Concern
Avalanche				
Drought				
Earthquake				
Flood				
Severe Weather				
Volcanic Ashfall				
Wildland Fire				
Infectious Disease				
Criminal Acts				
Energy Emergency				
Hazardous Materials				
Radiation Contamination				
Terrorism / WMD				
Other _____				

MITIGATION QUESTIONNAIRE

4. Prior to receiving this survey, were you aware of your county's Hazard Mitigation Plan (HMP)? ☐ Yes ☐ No

5. Prior to receiving this survey, were you aware that the Federal Emergency Management Agency (FEMA) requires your county to update the HMP every five years in order for your county to be eligible for federal pre- and post-disaster hazard mitigation funds? ☐ Yes ☐ No

PREPAREDNESS ACTIVITIES IN YOUR HOUSEHOLD

Households can do many things to prepare for a natural disaster or emergency. What you have in hand or are trained to do when a disaster strikes can make a big difference in your comfort and safety in the hours and day following a natural disaster or emergency. Basic services, such as electricity, gas, water, and telephones, may be cut off, or you may have to evacuate at a moment's notice. The following questions focus on your household's preparedness for a disaster event.

6. The following questions focus on your household's preparedness for a disaster event.

In your household, have your or someone in your household:	Have Experienced	Plan To Do	Not Done	Unable To Do
Attend meetings or receive written information on natural disasters or emergency preparedness?				
Talked with members in your household about what to do in case of a natural disaster or emergency?				
Developed a "Household/Family Emergency Plan" In order to decide what everyone would do in the event of a disaster?				
Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies)?				
In the last year, has anyone in your household been trained in First Aid, Cardio-Pulmonary Resuscitation (CPR) or AED?				

7. What steps, if any, have you or someone in your household taken to prepare for a natural disaster?

☐ Food
☐ Water
☐ Flashlight(s)
☐ Batteries
☐ Battery-Powered Radio
☐ Make a Fire Escape Plan
☐ Fire Extinguisher
☐ Prepared a Disaster Supply Kit
☐ Received First Aid/CPR/AED Training
☐ Medical Supplies (First Aid Kit)
☐ Developed a Reconnection Plan (where to go and who to call)
☐ Discussed Utility Shutoffs
☐ Smoke Detector on each level of the home
☐ Other (please specify): _____

8. Have you ever received information about how to make your household and home safer from natural disasters?

☐ Yes ☐ No (IF "**NO**" Skip to Question 9)

If "**YES**", how recently?

☐ Within the last 6 months
☐ Between 6 to 12 months
☐ Between 1 to 2 years
☐ Between 2 to 5 years
☐ 5 years or more

MITIGATION QUESTIONNAIRE

From whom did you receive information about how to make your household and home safer from natural disasters? (Please check all that apply)

- ☐ News Media
- ☐ University or Research Institution
- ☐ Insurance Agent or Company
- ☐ Utility Company
- ☐ American Red Cross
- ☐ Other Non-Profit Organization
- ☐ Emergency Manager
- ☐ Health District
- ☐ Other Government Agency
- ☐ Not Sure
- ☐ Other : _____

9. Who would you most trust to provide you with information about how to make your household and home safer from natural disasters? (Please check all that apply)

- ☐ News Media
- ☐ University or Research Institution
- ☐ Insurance Agent or Company
- ☐ Utility Company
- ☐ American Red Cross
- ☐ Other Non-Profit Organization
- ☐ Emergency Manager
- ☐ Health District
- ☐ Other Government Agency
- ☐ Not Sure
- ☐ Other : _____

10. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Please check all that apply)

Newspapers:
- ☐ Newspaper Stories
- ☐ Newspaper Adds

Television:
- ☐ Television Stories
- ☐ Television Adds

Radio:
- ☐ Radio Stories
- ☐ Radio Adds

Other Methods:
- ☐ School
- ☐ Outdoor Advertisements (billboards, etc.)
- ☐ Books
- ☐ Mail
- ☐ Fire Department/Rescue
- ☐ Internet
- ☐ Fact Sheet/Brochure
- ☐ Chamber of Commerce
- ☐ Public Workshops/Meetings
- ☐ Magazines
- ☐ University or Research Institution
- ☐ Other: _____

Other Comments:

Please return this questionnaire to: Aaron R. Kenneston, CEM, Washoe County Emergency Management & Homeland Security Program, 5195 Spectrum Rd., Reno, Nevada 89512

Meeting #5 –AGENDA

Washoe County

Regional Hazard Mitigation Planning Committee

Meeting Agenda

Wednesday ~ June 3, 2015 ~ 9:00 A.M.

REGIONAL EMERGENCY OPERATIONS CENTER

5195 SPECTRUM BOULEVARD

RENO, NEVADA 89512

PURSUANT TO NRS 241.020, THIS NOTICE HAS BEEN POSTED AT THE FOLLOWING LOCATIONS: Regional Emergency Operations Center, 5195 Spectrum Boulevard, Reno, Nevada; Reno City Hall, One East First Street, Reno, Nevada; Sparks City Hall, 431 Prater Way, Sparks, Nevada; Reno Sparks Indian Colony, 98 Colony Road, Reno, Nevada; Pyramid Lake Paiute Tribe, 208 Capitol Hill, Nixon, Nevada . This agenda is also posted on the Nevada Public Notice Website at: https://notice.nv.gov/

The Hazard Mitigation Planning Committee may consider items on the agenda out of order.

The Hazard Mitigation Planning Committee may combine two or more agenda items for consideration.

The Hazard Mitigation Planning Committee may remove an item from the agenda or delay discussion relating to an item on the agenda at any time.

The Hazard Mitigation Planning Committee's agenda and supporting materials may be obtained at the Washoe County Regional Emergency Operations Center, 5195 Spectrum Blvd., Reno NV 89512. Contact Cathy Ludwig 775-337-5859.

Time Limits - Public comments are welcomed during the Public Comment periods for all matters, whether listed on the agenda or not, and are limited to three (3) minutes per person. Additionally, public comment of three (3) minutes per person will be heard during individual action items on the agenda. Persons are invited to submit comments in writing on the agenda items and/or attend and make comment on that item at the Hazard Mitigation Planning Committee meeting. Persons may not allocate unused time to other speakers.

Forum Restrictions and Orderly Conduct of Business – The Hazard Mitigation Planning Committee conducts the business of Washoe County and its citizens during its meetings. The presiding officer may order the removal of any person whose statement

or other conduct disrupts the orderly, efficient or safe conduct of the meeting. Warnings against disruptive comments or behavior may or may not be given prior to removal. The viewpoint of a speaker will not be restricted, but reasonable restrictions may be imposed upon the time, place and manner of speech. Irrelevant and unduly repetitious statements and personal attacks which antagonize or incite others are examples of speech that may be reasonably limited.

Responses to Public Comments – The Hazard Mitigation Planning Committee can deliberate or take action only if a matter has been listed on an agenda properly posted prior to the meeting. During the Public Comment period, speakers may address matters listed or not listed on the published agenda. The Open Meeting Law does not expressly prohibit responses to public comments by the Hazard Mitigation Planning Committee. However, responses from Hazard Mitigation Planning Committee to unlisted public comment topics could become deliberation on a matter without notice to the public. On the advice of legal counsel and to ensure the public has notice of all matters the Hazard Mitigation Planning Committee will consider, Hazard Mitigation Planning Committee may choose not to respond to public comments, except to correct factual inaccuracies, ask for Washoe County staff action or to ask that a matter be listed on a future Hazard Mitigation Planning Committee meeting agenda. The Hazard Mitigation Planning Committee may do this either during the Public Comment item or during the following item: "**HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS, REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS*** (Non-action item)."

This facility is accessible to the disabled. Persons with disabilities who require special accommodations or assistance (e.g., sign language, interpreters or assisted listening devices) at the meeting should notify Regional Emergency Operations Center, 775-337-5859, 48-hours before the meeting.

1. **WELCOME AND INTRODUCTIONS** - *(Non-action item) – Aaron Kenneston,*

   Washoe County Emergency Manager

2. **PUBLIC COMMENTS -** *(Non-action item) - Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

3. **REVIEW DRAFT PLANS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

   ~ Sections 1-5

   ~ Sections 6 – Vulnerability Analysis

   ~ Section 7 – Capabilities Analysis

   ~ Section 8 – Mitigation Strategy

   ~ Section 9 – Plan Maintenance

~ References

~ Appendices

~ Annexes

4. PUBLIC OUTREACH - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

~ Workshop locations/dates

~ Questionnaire

5. FINAL STEPS - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

6. ANNOUNCEMENT OF FUTURE MEETINGS - *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

Future meetings are scheduled tentatively as follows:

~ July 2015

~ Public Workshops in July

7. HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS,*

REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS - *(Non-action item) - No discussion among committee members will take place on this item.*

8. PUBLIC COMMENT - *(Non-action item)* **-** *Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

9. ADJOURNMENT

Meeting No. 5 Sign In Sheet

Washoe County RHMP
June 3, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
Rick Martin	NDEM	775 687-0306	rmartin@dps.state.nv.us
Jim Reagan	NV Energy	834 7864	JReagan@nvenergy.com
Gary Zaepfel	WC	328-2349	gzaepfel@washoecounty.us
Rob Reeder	RTC	722-4037	rreeder@rtcwashoe.com
Joe Coudriet	City of Reno	334-2679	coudrietj@reno.gov
Brian Allen	Sparks F.D.	353-2220	ballen@cityofsparks.us
John Dollar	IVGID	745-6970	jwd@ivgid.org
Jim Hendricksen	WCSD	916 257 0860	jhendricksen@washoeschools.net
Kelly Boyd	Red Cross	856-1000	kelly.boyd2@redcross.org
Amy Ray	TMFPD	326-6005	aray@tmfpd.us
Dick Penniman	WC Avalanche	530 587-0121	dpenniman@snowbridge.org
Randall Lorenz	WC ARES	775 622 7305	pio@wcares

Washoe County RHMP
June 3, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
Debbie Tanaka	NDEM	775-687-0314	Debbie.Tanaka@dps.state.nv.us
Connor Long	NDEM	775-687-0307	clong@dps.state.nv.us
Bob Miller	ARES	775 843-5952	walmty@gbis.com
Kyle West	City of Reno	775-334-2364	westk@reno.gov
Tim Spencer	Reno FD	750-7976	SpencerT@Reno.gov
Nate Parker	RPD	334-2195	
Nicole Franklin	W.C. Medical Examiner	775-785-6114	NFranklin@washoecounty.us
Ron Hood	[illegible]	775-843-8007	[illegible]
Ed Evans	TRFMA	775-850-4756	eevans@washoecounty.us
[illegible]	WC CSD - Eng	328-2041	[illegible]@washoecounty.us
Tom McKnight	REOC / EMPRR LLC	775-316-6667	[illegible]
Cara Argall	WCHD	775-326-6052	cargall@washoecounty.us

Handouts – Meeting No. 5

Below is the STAPLE+E evaluation criteria developed by FEMA. Each of the potential actions will be scored by using rankings of 1 for the lowest and 5 for the highest priority, acceptance, feasibility, etc.

Please insert your numeric ranking in the separate STAPLE+E form and calculate the priority totals.

Table 8-3: STAPLE+E Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider..."	Considerations
Social	The public Support for the overall mitigation strategy and specific mitigation actions	Community acceptance; adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution	Technical feasibility; Long-term solutions; Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary	Staffing: Funding allocation; Maintenance/operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management	Political support; Local champion; Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations	Local, State, and Federal authority; Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit Cost Analysis	Benefit/cost of action; Contributes to other economic goals; Outside funding required; FEMA Benefit Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community	Effect on local flora and fauna; Consistent with community environmental goals; Consistent with local, State and Federal laws

Table 8-2: Mitigation Goals and Potential Actions

Please Note: Action 2A is applicable to all Hazards

Goals	Jurisdiction	Action	New or Existing	Description
Goal 1: ***Promote increased and ongoing involvement in hazard-mitigation planning and projects.***	All Jurisdictions	1.A	E	Enhance/Develop the Seasonal Multi-Hazard Public Awareness Program.
	All Jurisdictions	1.B	N	Review/update the Master Plan to incorporate the RHMP.
	All Jurisdictions	1.C	N	Adopt IBC 2018 code.
Goal 2: ***Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.***	City of Reno	2.A	E	Develop, enhance, and implement education programs aimed at mitigating natural hazard, and reducing the risk to citizens, public agencies, private property owners, business, and schools.
	City of Reno	2.B	E	Continue to reinforce/support the all-risk urban search and rescue program.
	City of Reno	2. C	N	Increase interagency coordination and corporation.
	Reno-Sparks Indian Colony	2. D	E	Obtain and implement community warning system.
	Reno-Sparks Indian Colony	2. E	E	Implement and activate an Emergency Operations Center (EOC).
Goal 3 ***Reduce the possibility of damage and losses due to avalanche.***	Washoe County	3.A	N	Develop plan for strategically placed snow fences to protect the Crystal Bay Subdivision and construct avalanche defense structure for Third Creek water tank.
	Washoe County	3.B	E	Develop mapping, hazard plans and zoning/land use codes for areas prone to landslides and/or avalanches.
Goal 4 ***Reduce the possibility of damage and losses due to drought.***	Reno-Sparks Indian Colony	4.A	E	Property Protection: Drought – improve water supply; Hungry Valley monitoring of water levels.
	All Jurisdictions	4.B	N	Implement current TMWA Conservation Plan including encouraging transition to less water-intensive landscaping on both public and private properties.

Goal 5: *Reduce the possibility of damage and losses due to earthquakes.*	All Jurisdictions	5.A	E	Review and update the regional Earthquake Transportation Evacuation Routes and incorporate into appropriate planning documents.
	Washoe County, Reno & Sparks	5.B	N	Encourage seismic strength evaluations of critical facilities in the jurisdiction to identify vulnerabilities for mitigation of schools and community college, public infrastructure, and critical facilities to meet current seismic standards.
	Washoe County, Reno & Sparks	5.C	E	Encourage non-structural mitigation by increasing public awareness of earthquakes through wide distribution of newspaper supplements, booklets, brochures, etc. on what to do before, during, and after an earthquake.
	Washoe County, Reno, Sparks, and Reno-Sparks Indian Colony	5.D	N	Identify "at risk" buildings for retrofitting or eliminating life threatening buildings, particularly URMs.
	Washoe County, Reno & Sparks	5.E	E	Assess, repair, and/or replace infrastructure that may fail during earthquakes (e.g., Keystone Ave. Bridge).
Goal 6: *Reduce the possibility of damage and losses due to floods.*	Washoe County	6.A	E	Stormwater Capital Improvement Project: Culvert Improvements, including: • CIP#A15-1 Village Parkway @ Mudsprings ("Village Parkway Wash"); • CIP#A16-4 & A16-5 Cold Springs Drive; CIP#A16-7 Village Parkway; • CIP#C17-1 Sun Valley ("Amargosa Wash") @ Middle Fork Drive; • CIP#C17-2 Sun Valley ("Amargosa Wash") @ Amargosa Drive; • CIP#C17-4 Sun Valley ("Amargosa Wash") Culvert Upgrade at Sun Valley Blvd; • CIP#C17-5 Sun Valley ("Amargosa Wash") Culvert Upgrade at Smokey Canyon Drive; • CIP#C17-10 Sun Valley ("Amargosa Wash") Culvert Upgrade at E. 9th Ave; • CIP#C17-15 Sun Valley ("Amargosa Wash") Culvert Upgrade at E. 8th Ave; and, • CIP#D16-4 Spanish Springs Spanish Springs High School Area - Spanish Springs Village Subdivision.

Goal 6: *(continued)* ***Reduce the possibility of damage and losses due to floods.***	Washoe County	6.B	E	Stormwater Capital Improvement Project: Channel Improvements, including; • CIP#A16-3 Cold Springs Drive; CIP#A16-6 Cold Springs Drive to White Lake; • CIP#C17-3 Sun Valley ("Amargosa Wash") Utility Protection/Relocation and Existing Channel Erosion Protection between Amargosa Drive and Sun Valley Blvd; and, • CIP#C17-16 Sun Valley ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive.
	Washoe County	6.C	E	Stormwater Capital Improvement Project: Detention Basin, including: • CIP#D16-1 Spanish Springs Kinglet Drive; • CIP#D16-2 Spanish Springs Nightingale Way; and, • CIP#D16-3 Spanish Springs Spanish Springs High School Area.
	TRFMA	6.D	N	New Floodwalls: Provide a berm with a buried floodwall, with the top of the floodwall set to the 100-year water surface elevation.
	TRFMA	6.E	N	Booth Street Bridge: Remove Booth Street Bridge which constricts flows and increases flood water elevations.
	TRFMA	6.F	N	Jones Street Signal Improvements: Construct signal at Jones and Keystone Ave.
	TRFMA	6.G	N	New Floodwalls (Geotechnical Recommendations): Drain trench along portions of the new floodwalls per Geotechnical Report.
	TRFMA	6.H	N	Pumping Station: Pumping station along Riverside Drive.
	TRFMA	6.I	N	Pedestrian Closure Gate Structures: Pedestrian gates are needed along the length of the floodwall to maintain the current pedestrian access points. A product such as FloodBreak or approved equivalent.
	TRFMA	6.J	N	Raise Pedestrian Bridge upstream and downstream of Arlington Ave.
	TRFMA	6.K	N	Floodproofing: Miscellaneous structures in Downtown Reno require floodproofing.
	TRFMA	6.L	N	Bridge protection at Arlington Ave Bridge.
	TRFMA	6.M	N	Replace Floodwalls: Replacement of old inadequate floodwalls from Arlington St. to Lake St.

Goal 6: *(continued)* ***Reduce the possibility of damage and losses due to floods.***	TRFMA	6.N	N	Sierra Street Bridge: Replace Sierra Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.
	TRFMA	6.O	N	Virginia Street Bridge: Recommendation unchanged.
	TRFMA	6.P	N	Center Street Bridge: Replace Center Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.
	TRFMA	6.Q	N	Lake Street Bridge: Replace Lake Street Bridge which constricts flows and increases flood water elevations, with a new bridge that is hydraulically efficient and capable of passing the 100-year flood.
	TRFMA	6.R	N	Remove existing pedestrian bridge at Wells Ave. Install new pedestrian bridge upstream of Wells Ave.
	TRFMA	6.S	N	Bank stabilization and bridge protection around Wells Avenue at Wells Ave Bridge.
	TRFMA	6.T	N	Reno-Sparks Indian Colony Levee: This was an early action project involving the construction of an approximately 2,300 ft levee and floodwall. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg)
	TRFMA	6.U	N	Grand Sierra Floodwall: On the south (right) bank of the Truckee River a 3,000 foot long, 6 feet high floodwall would be built from Glendale to Greg Street. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg.)
	TRFMA	6.V	N	Sparks Levees and Floodwalls Glendale to Greg: Replacement of the existing levee on the north bank with on-bank floodwalls to minimize construction and right-of-way impacts to the TMWA Glendale Water Treatment Plant. Trail can be incorporated into floodwall maintenance road.
	TRFMA	6.W	N	Mill Street Levee - Greg to Rock: Reduced south bank floodplain terracing with the associated levee move closer to the Truckee River. Reduces excavation costs and reduces impact the existing Pioneer Ditch. (Costs included in Element 19 Sparks Levees and Floodwalls: Glendale to Greg.)
	TRFMA	6.X	N	Terracing Greg to Rock: Reduced terracing to reduce the amount of excavation and avoid the existing Pioneer Ditch. The terracing and associated levee are moved northward toward the Truckee River and levee ties into the McCarran Blvd bridge.

Goal 6: *(continued)* ***Reduce the possibility of damage and losses due to floods.***	TRFMA	6.Y	N	Rock Blvd Bridge: No bridge modifications. Levees/floodwalls and terracing will confine flood flows to existing bridge opening. Abutment and pier scour countermeasures may be required.
	TRFMA	6.Z	N	Mill Street Levee - Rock to McCarran: Reduced south bank floodplain terracing with the associated levee move closer to the Truckee River. Reduces excavation costs and reduces impact the existing Pioneer Ditch. Pioneer Ditch will be piped to allow for use of the fill disposal area. (Cost included in Element 25 Sparks Levees and Floodwalls: Rock to McCarran)
	TRFMA	6.AA	N	Terracing Rock to McCarran: Reduced terracing to reduce the amount of excavation and avoid the existing Pioneer Ditch. The terracing and associated levees are moved northward toward the Truckee River and levee ties into the Rock Blvd bridge. The land between Mill Street and the relocated levee can be used as a fill disposal site and reserved for future recreational use.
	TRFMA	6.BB	N	Sparks Levees and Floodwalls - Rock to McCarran: Replacement of the north bank levee with on-bank floodwalls to minimize impacts to existing properties and railroad spurs. Some minor terracing on the north bank. Fill localized low lying areas on the landside of the floodwall. Trail can be incorporated into floodwall maintenance road.
	TRFMA	6.CC	N	Terracing - Rock to Steamboat: Benching on north bank at Living River Parkway. Minimized terracing on south bank along Treatment Plant. Remove existing buildings as necessary.
	TRFMA	6.DD	N	East McCarran Blvd. Bridge: No bridge modifications. Levees/floodwalls and terracing will confine flood flows to existing bridge opening. Abutment and pier scour countermeasures may be required.
	TRFMA	6.EE	N	Main Station Farm Protection: Will flood proof select buildings and elevate the existing pads under the hay storage barns to keep hay dry. Main processing building is sufficiently elevated above flood waters. (Costs included in "Lands and Damages".)
	TRFMA	6.FF	N	Sparks Levees and Floodwalls - McCarran to Vista: Replacement of existing levee with on-bank floodwalls for approximately 20,000 feet east of McCarran to reduce overall footprint. Construction of levees for most of the remainder of the reach. Floodwall will be used in the vicinity of Larkin Circle to eliminate impacts to the roadway.

Goal 6: *(continued)* ***Reduce the possibility of damage and losses due to floods.***	TRFMA	6.GG	N	North Truckee Drain: Relocation of the terminus to align with the East Truckee Canyon. The infrastructure will consists mostly of an underground box culvert.
	TRFMA	6.HH	N	Vista Narrows Widening: Expanded benching of the Narrows extending to the first railroad bridge.
	TRFMA	6.II	N	Hidden Valley: Voluntary home elevation. An alternative may include floodproofing for certain residences in Hidden Valley. The method of floodproofing would probably vary from structure to structure, but all would be raised to at least the 100-year flood elevation.
	TRFMA	6.JJ	N	Sparks Levees and Floodwalls - Rock to McCarran: Replacement of the north bank levee with on-bank floodwalls to minimize impacts to existing properties and railroad spurs. Some minor terracing on the north bank. Fill localized low lying areas on the landside of the floodwall. Trail can be incorporated into floodwall maintenance road.
	TRFMA	6.KK	N	Eastside Subdivision: Voluntary home elevation. Elevation of the buildings in the East Subdivision south of the Main Station Farm to above the 100-year floodwater level.
	TRFMA	6.LL	N	Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.
	TRFMA	6.MM	N	Rainbow Bend Home Elevation: Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.
	TRFMA	6.NN	N	Wadsworth Non-Voluntary Home Elevation/Mitigation: as required dependent upon further analysis.
	TRFMA	6.OO	N	Update Truckee River Flood Inundation Maps.
	Washoe County	6.PP	E	Evaluate warning systems – Seiche.
	City of Reno	6.QQ	E	Mitigation of Risk Related to Flood Damage to Public Infrastructure – Lawton Interceptor at Oxbow Park
	City of Reno	6.RR	E	Mitigation of Risk Related to Flood Damage to Public Infrastructure and Private Property – Dant Wash Drainage Improvements
	City of Reno	6.SS	N	Rosewood Wash Culvert and Channel Upgrades
	City of Reno	6.TT	N	Virginia Street Bridge Utility Protection
	City of Sparks	6.UU	E	North Truckee River Drain Replacement

Goal 6: *(continued)* ***Reduce the possibility of damage and losses due to floods.***	City of Sparks	6.VV	E	Implement Stormwater Plan (e.g., projects for storm drains, catch basins, surveys, etc.)
	Pyramid Lake Paiute Tribe	6.WW	E	Mitigate where water enters the reservoir to the dam (retention, dry basins).
	Reno-Sparks Indian Colony	6.XX	E	Structural projects: Culvert Maintenance
	Reno-Sparks Indian Colony	6.YY	E	Structural projects : Drainage System Maintenance
Goal 7: ***Reduce the possibility of threat to life and losses due to infectious disease.***	Washoe County	7.A	E	Pandemic Influenza (from the 2005 objective titled: Continued Public Health Emergency management trainings and exercise.)
	Washoe County	7.B	E	Public notification for high risk disease events.
	Washoe County	7.C	E	Continued Public Health emergency management trainings and exercises.
Goal 8: ***Reduce the possibility of damage and losses due to Severe Weather.***	Washoe County	8.A	N	Encourage the private sector to prepare and maintain 3-day preparedness kits.
	Washoe County	8.B	E	Conduct outreach programs to build resilience to severe storm hazards. (formerly 2005 action - Encourage homeowners to storm proof their buildings).
Goal 9: ***Reduce the possibility of damage and losses due to wildland fires.***	All Jurisdictions	9.A	E	Increase communication, coordination, and collaboration between wildland/ urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.
	City of Reno	9.B	E	Mitigation of risk of fire related to the Mt. Rose Wilderness Area.
	Washoe County; Reno-Sparks Indian Colony	9.C	N	Coordination of fuels mitigation and management programs to creation defensible and survivable space, fire/fuel breaks, and increase community wildland fire awareness and participation.
	Washoe County	9.D	E	Collaboration with residents in wildland fire prone areas to create evacuate plans for the community and hold evacuation drills at least every three years.

	All Jurisdictions	9.E	N	Adoption and enforcement of Fire, Building and Wildland Urban Interface Codes to provide ignition-resistant construction in medium, high and extra high fire hazard rating areas, fuels mitigation and maintenance on private property, and community safety features such as residential fire sprinklers, and fire department access/egress routes.
Goal 10: *Reduce the possibility of damage and losses due to hazardous materials.**	All Jurisdictions	10.A	N	Coordinate communication between state and local jurisdictions regarding hazardous materials.
Goal 11: *Reduce the possibility of damage and losses due to transportation of radiological materials and waste.*	Washoe County	11. A	E	Monitor radiological shipping campaigns that include Washoe County as an approved route.
	All Jurisdictions	11. B	N	Coordinate communication between state and local jurisdictions for the transportation of radiological materials and waste.
Goal 12: *Reduce the possibility of damage and losses due to terrorism/WMD and Civil Disorder.*	Washoe County	12. A	E	Provide training for the public and private sectors to improve response, management, and intervention of WMD terrorism incidents
	Washoe County	12. B	E	Utilize Community Emergency Response Teams (CERT) as well as the Citizens Homeland Security Council (CHSC) to shift burden from sworn officers, where appropriate
	Washoe County	12. C	E	Seek funding to provide methodology and operational functionality to perform vulnerability analysis to determine areas of risk and/or vulnerability to pipeline. Leverage relationships with pipeline owner/operators to insure adequate maintenance and monitoring of pipeline infrastructure. (From the 2005 Objective titled "Analyze pipeline to determine areas of vulnerability")
	City of Sparks	12. D	E	Increase law enforcement staff.

*Washoe County has a Hazardous Materials Response Plan which addresses additional strategies to reduce the possibility of damage and losses due to hazardous materials.

STAPLE + E Evaluation Table

Considerations ⇧ / Mitigation Actions ⇨	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)					PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
1.A Enhance/Develop Seasonal Multi-Hazard Public Awareness Program																								
1.B Review/update Master Plan																								
1.C Adopt IBC 2018 Code																								
2.A Develop, enhance, implement education programs																								
2.B Continue to reinforce/support the all-risk urban search and rescue program																								
2.C Increase interagency coordination and corporation																								
2.D Obtain and implement community warning system																								

STAPLE + E Evaluation Table

Considerations / Mitigation Actions	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)						PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
2.E Implement and activate an Emergency Operations Center (EOC)																								
3.A. Develop plan for strategically placed snow fences																								
3.B. Develop mapping, hazard plans																								
4.A Property Protection: Drought																								
4.B Implement current TMWA Conservation Plan																								
5.A Review and update the regional Earthquake																								
5.B Encourage seismic strength evaluations of critical facilities																								
5.C Encourage non-structural mitigation																								
5.D Identify "at risk" buildings																								
5.E Assess, repair, and/or replace																								

STAPLE + E Evaluation Table

Considerations / Mitigation Actions	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)						PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
infrastructure																								
6.A Stormwater Capital Improvement Project: Culvert Improvements																								
6.B Stormwater Capital Improvement Project: Channel Improvements																								
6.C Stormwater Capital Improvement Project: Detention Basin																								
6.D New Floodwalls																								
6.E Booth Street Bridge																								
6.F Jones Street Signal Improvements																								
6.G New Floodwalls																								
6.H Pumping Station																								
6.I Pedestrian Closure Gate Structures																								
6.J Raise Pedestrian Bridge																								
6.K Floodproofing																								

STAPLE + E Evaluation Table

Considerations ⇧ / Mitigation Actions ⇨	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)					PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
6.L Bridge protection																								
6.M Replace Floodwalls																								
6.N Sierra Street Bridge																								
6.O Virginia Street Bridge																								
6.P Center Street Bridge																								
6.Q Lake Street Bridge																								
6.R Remove existing pedestrian bridge																								
6.S Bank stabilization																								
6.T Reno-Sparks Indian Colony Levee																								
6.U Grand Sierra Floodwall																								
6.V Sparks Levees and Floodwalls Glendale to Greg																								
6.W Mill Street Levee																								
6.X Terracing Greg to Rock																								
6.Y Rock Blvd Bridge																								
6.Z Mill Street Levee																								

STAPLE + E Evaluation Table

Considerations / Mitigation Actions	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)						PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
6.AA Terracing Rock to McCarran																								
6.BB Sparks Levees and Floodwalls																								
6.CC Terracing - Rock to Steamboat																								
6.DD East McCarran Blvd. Bridge																								
6.EE Main Station Farm Protection																								
6.FF Sparks Levees and Floodwalls																								
6.GG North Truckee Drain																								
6.HH Vista Narrows Widening																								
6.II Hidden Valley																								
6.JJ Sparks Levees and Floodwalls																								
6.KK Eastside Subdivision																								
6.LL Non-Voluntary Home Elevation/ Mitigation																								
6.MM Rainbow Bend Home Elevation																								
6.NN Wadsworth Non-Voluntary Home Elevation/																								

STAPLE + E Evaluation Table

Considerations ⇑ / Mitigation Actions ⇒	S (Social)	T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)					PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
Mitigation																								
6.OO Update Truckee River Flood Inundation Maps																								
6.PP Evaluate warning systems – Seiche																								
6.QQ Mitigation of Risk																								
6.RR Mitigation of Risk																								
6.SS Rosewood Wash Culvert																								
6.TT Virginia Street Bridge																								
6.UU North Truckee River																								
6.VV Implement Stormwater Plan																								
6.WW Mitigate where water enters																								
6.XX Structural projects: Culvert																								
6.YY Structural projects: Drainage																								
7.A Pandemic Influenza																								
7.B Public notification																								
7.C Continued Public Health																								

STAPLE + E Evaluation Table

Considerations ⇑ / Mitigation Actions ⇒	S (Social)		T (Technical)			A (Administrative)			P (Political)			L (Legal)			E (Economic)			E (Environmental)					PT
	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/ Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/ Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Native Habitat	Consistent with Local / Federal Laws	Priority Total
8.A Encourage the private sector																								
8.B Conduct outreach programs																								
9.A Increase Communication																								
9.B Mitigation of risk of fire																								
9.C Coordination of fuels management																								
9.D Collaboration with residents																								
9.E Adoption and enforcement																								
10.A Coordinate communication																								
11.A Monitor radiological shipping campaigns																								
11.B Coordinate Communication																								
12.A Provide training																								
12.B Utilize CERT																								
12.C Seek funding																								
12.D Increase law enforcement staff																								

Meeting #6 –AGENDA

Washoe County

Regional Hazard Mitigation Planning Committee

Meeting Agenda

Wednesday ~ July 1, 2015 ~ 9:00 A.M.

REGIONAL EMERGENCY OPERATIONS CENTER

5195 SPECTRUM BOULEVARD

RENO, NEVADA 89512

PURSUANT TO NRS 241.020, THIS NOTICE HAS BEEN POSTED AT THE FOLLOWING LOCATIONS: Regional Emergency Operations Center, 5195 Spectrum Boulevard, Reno, Nevada; Reno City Hall, One East First Street, Reno, Nevada; Sparks City Hall, 431 Prater Way, Sparks, Nevada; Reno Sparks Indian Colony, 98 Colony Road, Reno, Nevada; Pyramid Lake Paiute Tribe, 208 Capitol Hill, Nixon, Nevada . This agenda is also posted on the Nevada Public Notice Website at: https://notice.nv.gov/

The Hazard Mitigation Planning Committee may consider items on the agenda out of order.

The Hazard Mitigation Planning Committee may combine two or more agenda items for consideration.

The Hazard Mitigation Planning Committee may remove an item from the agenda or delay discussion relating to an item on the agenda at any time.

The Hazard Mitigation Planning Committee's agenda and supporting materials may be obtained at the Washoe County Regional Emergency Operations Center, 5195 Spectrum Blvd., Reno NV 89512. Contact Cathy Ludwig 775-337-5859.

Time Limits - Public comments are welcomed during the Public Comment periods for all matters, whether listed on the agenda or not, and are limited to three (3) minutes per person. Additionally, public comment of three (3) minutes per person will be heard during individual action items on the agenda. Persons are invited to submit comments in writing on the agenda items and/or attend and make comment on that item at the Hazard Mitigation Planning Committee meeting. Persons may not allocate unused time to other speakers.

Forum Restrictions and Orderly Conduct of Business – The Hazard Mitigation Planning Committee conducts the business of Washoe County and its citizens during its meetings. The presiding officer may order the removal of any person whose statement or other conduct disrupts the orderly, efficient or safe conduct of the meeting. Warnings against disruptive comments or behavior may or may not be given prior to removal. The viewpoint of a speaker will not be restricted, but reasonable restrictions may be imposed upon the time, place and manner of speech. Irrelevant and unduly repetitious statements and personal attacks which antagonize or incite others are examples of speech that may be reasonably limited.

Responses to Public Comments – The Hazard Mitigation Planning Committee can deliberate or take action only if a matter has been listed on an agenda properly posted prior to the meeting. During the Public Comment period, speakers may address matters listed or not listed on the published agenda. The Open Meeting Law does not expressly prohibit responses to public comments by the Hazard Mitigation Planning Committee. However, responses from Hazard Mitigation Planning Committee to unlisted public comment topics could become deliberation on a matter without notice to the public. On the advice of legal counsel and to ensure the public has notice of all matters the Hazard Mitigation Planning Committee will consider, Hazard Mitigation Planning Committee may choose not to respond to public comments, except to correct factual inaccuracies, ask for Washoe County staff action or to ask that a matter be listed on a future Hazard Mitigation Planning Committee meeting agenda. The Hazard Mitigation Planning Committee may do this either during the Public Comment item or during the following item: "**HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS, REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS*** (Non-action item)."

This facility is accessible to the disabled. Persons with disabilities who require special accommodations or assistance (e.g., sign language, interpreters or assisted listening devices) at the meeting should notify Regional Emergency Operations Center, 775-337-5859, 48-hours before the meeting.

1. WELCOME AND INTRODUCTIONS - *(Non-action item) – Aaron Kenneston, Washoe County Emergency Manager*

2. PUBLIC COMMENTS - *(Non-action item) - Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

3. **REVIEW DRAFT PLANS FOR PUBLIC DISTRIBUTION -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

4. **PUBLIC OUTREACH -** *(For possible action) – Marie Hulse – R O Anderson*

~ Workshop locations/dates

~ Questionnaire

5. **REVIEW PRESENTATION FOR PUBLIC WORKSHOPS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

6. **FINAL STEPS -** *(For possible action) – Stephanie Hicks, Director of Grants & Hazard Mitigation Planning – R O Anderson*

7. **HAZARD MITIGATION PLANNING COMMITTEE *ANNOUNCEMENTS,***

REQUESTS FOR INFORMATION AND SELECTION OF TOPICS FOR FUTURE AGENDAS - *(Non-action item) - No discussion among committee members will take place on this item.*

8. **PUBLIC COMMENT -** *(Non-action item)* **-** *Comment heard under this item will be limited to three (3) minutes per person and may pertain to matters both on and off the Hazard Mitigation Planning Committee agenda. At the discretion of the chair or a majority of the members present during a meeting, the Hazard Mitigation Planning Committee may also hear public comment during individual agenda items, with such comment likewise limited to three (3) minutes per person.*

9. **ADJOURNMENT**

Washoe County RHMP
July 1, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
Cathy Ludwig	WCEM	337-5859	CLudwig@washoecounty.us
Elizabeth Paulsen	WCEM	337-5855	epaulsen@washoecounty.us
John Dodd	WCSO - S.M.A.R.T.	815-5115	J.d.dunn@sheriffdod.net
Nicole Franklin	WC Medical Examiner	775-785-6114	NFranklin@washoecanty.us
Bob Dorsey	ANRIC	321 4911	rdorsey@washoecounty.us
GARY ZAEPFEL	WASHOE COUNTY	328-2349	gzaepfel@washoecounty.us
Dick Penniman	" " AVI	530-587-0121	dpenniman@snowbird.org
Danielle Henderson	TRFMA	775-850-7461	dhenderson@washoecounty.us
BOB REEDER	RTC	775/722-4087	rreeder@rtcwashoe.com
MARK HUSE	ROANDELSON ENGINEERING	775-215-5045	mhuse@ROANDELSON.com
Jeff Whiteside	WCHD ~~jwhiteside@washoecounty.us~~	326-6057	jwhiteside@washoecounty.us
TAMMY KINSLEY	ROANDERSON	775 215-5013	tkinsley@ROANDAON.com

Washoe County RHMP
July 1, 2015
Hazard Mitigation Planning Committee Meeting

Name	Firm/Agency	Phone Number	Email
John Dollar	IVGID	775-745-6980	vwd@ivgid.org
Jim Reid	Sparks Fire	775-291-8616	jreid@cityofsparks.us
Andy Koski	Sparks Fire	775 353 2265	akoski@cityofsparks.us
Jim Hendrickson	WCSD	916 257-0860	JHENDRICKSON@WASHOESCHOOLS.NET
Kyle West	City of Reno	775-848-8909	westk@reno.gov
Cara Argall	WCHD	775-326-6052	cargall@washoecounty.us
Bob Webb	WCCSD	775-328-3623	bwebb@washoecounty.us
ADAM SEARCY	WC ROADS	775.328.2192	asearcy@washoecounty.us
TAMMI KNIGHT	EMPRR, LLC / REIC	775-318-6667	tammiknight@emprr.org
Kimble Corbridge	Washoe County CSD	775-328-2041	Kcorbridge@washoecounty.us
Tim Spencer	Reno	750-7976	spencerT@reno.gov
Stephanie Hicks	RO Anderson	775-215-5042	shicks@roanderson.com

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Appendix E
Plan Maintenance Documents

Sample Press Release for

Annual Maintenance Meeting

Washoe County, Nevada is meeting to review and maintain its Regional Hazard Mitigation Plan to assess risks posed by natural and manmade disasters and identify ways to reduce those risks. This plan is required under the Federal Disaster Mitigation Act of 2000 as a prerequisite for receiving certain forms of Federal disaster assistance. The plan can be found on the County's website at website address.

Public comments and participation are welcomed. For additional information or to request to participate, or to submit comments, please contact _____, Washoe County Emergency Management, at (775) _____ or email address

Annual Review Questionnaire

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action?			
	Are there procedures (e.g., meeting announcement, plan updates) that can be done more efficiently?			
	Has the Steering committee undertaken any public outreach activities regarding the HMP or implementation of mitigation actions?			
HAZARD PROFILES	Has a natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not bee addressed in this HMP and should be?			
	Are additional maps or new hazards studies available? If so, what have they revealed?			
VULNERABILITY ANALYSIS	Do any new critical facilities or infrastructure need to be added to the asset lists?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
MITIGATION STRATEGY	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Are the goals still applicable?			
	Should new mitigation actions be added to a community's Mitigation Action Plan?			
	Do existing mitigation actions listed in a community's Mitigation Action Plan need to be reprioritized?			
	Are the mitigation actions listed in a community's Mitigation Action Plan appropriate for available resources?			

Mitigation Action Progress Report

Progress Report Period:_____ to _____
(date) (date)

Project Title:_____ Project ID#_____

Responsible Agency:

Address:_____

City:_____

Contact Person:_____

Phone # (s): _____ email address:_____

List Supporting Agencies and Contacts:

_____

_____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase): _____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal(s) Address

Goal: _____

Indicator of Success: _____

_____

_____

_____

Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed*

*explain _____

_____

☐ Project Cancelled

Project Cost Status

☐ Cost unchanged

☐ Cost overrun*

*explain_____

_____

☐ Cost underrun*

*explain_____

_____

Summary of progress on project for this report:

A. what was accomplished during this reporting period?

_____

_____

_____

B. What obstacles, problems, or delays did you encounter, if any?

_____

_____

_____

C. How was each problem resolved?

_____

_____

Next Steps: What are the next step(s) to be accomplished over the next reporting period?

Other Comments:

Appendix F

2010 Mitigation Action Items

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Avalanche			
Develop plan for strategically placed snow fences to protect the Crystal Bay Subdivision (from 2005 objective titled "Construct Snow Fence (above Crystal Bay and Third Creek Area in Placer County)"	Washoe County	2005	Continue in update.
Mapping, Hazard Plans and Zoning/Land Use Codes for Areas Prone to Landslides and/or Avalanches	Washoe County	2010	Continue in update.
~~Biological Infection~~ Infectious Disease			
Pandemic Influenza (from the 2005 objective titled: Continued Public Health Emergency management trainings and exercise.)	Washoe County	2005	PODs and/or Flu Shot Clinics occur in October – December every year.
Public notification for high risk disease events.	Washoe County	2005	Public information is distributed regularly.
Continued Public Health emergency management trainings and exercises.	Washoe County	2005	Completed on an annual basis.
Drought			
Connect into TMWA Water Supply System	Reno-Sparks Indian Colony	2010	This is one potential solution to the action item below regarding improving the water supply. This should not be a separate action and will be combined with the action below.
Property Protection: Drought – improve water supply	Reno-Sparks Indian Colony	2010	Continued in update. Monitoring water levels.
Earthquake			
Public Awareness & Education - earthquake hazards, earthquake preparedness, building code adoption	Washoe County	2005	Continued in update. Participated in the NV shakeout.
Develop the Regional Earthquake Transportation Evacuation Routes into appropriate planning documents	City of Reno (All jurisdictions in 2009 update)	2005	Ongoing. Completed in the 2010 Regional Plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Encourage seismic strength evaluations of critical facilities in the city to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards	City of Reno	2005	Continued in plan. May have funding through DEM in the future.
Encourage non-structural mitigation by increasing public awareness of earthquakes through wide distribution of newspaper supplements, booklets, brochures, etc. on what to do before, during, and after an earthquake	Washoe County and the Cities of Reno and Sparks	2010	Continued in plan. May have funding through DEM in the future. FEMA Classes are being provided.
Strengthen building codes & land use planning:	Washoe County and the Cities of Reno and Sparks	2010	Continued in plan. Have adopted 2012 building codes.
Provide Incentives for Retrofitting or Eliminating Life-Threatening Buildings, particularly URMs.	Washoe County and the Cities of Reno and Sparks	2010	No progress. Continue in plan.
Assess, Repair, and/or Replace Infrastructure that may Fail During Earthquakes (e.g., Keystone Ave. Bridge)	Washoe County and the Cities of Reno and Sparks	2010	No progress. Continue in plan.
Energy Emergency			
Retrofit backup power systems for critical infrastructure	Washoe County	2005	Critical infrastructure has been identified and several are equipped with backed up generators. Treatment plants and supply stations are looking for grants funding for generators. Continued in update.
Flooding			
Stormwater Capital Improvement Project: CIP#A15-1 Village Parkway @ Mudsprings ("Village Parkway Wash") Culvert Improvements	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Stormwater Capital Improvement Project: CIP#A16-3 Cold Springs Drive Channel Improvements	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#A16-4 & A16-5 Cold Springs Drive Culvert Improvements	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#A16-6 Cold Springs Drive to White Lake Channel Improvements	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#A16-7 Village Parkway Culvert Improvements	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-1 Sun Valley Drainage Improvements ("Amargosa Wash") @ Middle Fork Drive	Washoe County	New	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-2 Sun Valley Drainage Improvements ("Amargosa Wash") @ Amargosa Drive	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-3 Sun Valley Drainage Improvements ("Amargosa Wash") Utility Protection/Relocation and Existing Channel Erosion Protection between Amargosa Drive and Sun Valley Blvd.	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-4 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at Sun Valley Blvd.	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-5 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at Smokey Canyon Drive.	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Stormwater Capital Improvement Project: CIP#C17-10 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at E. 9th Ave	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-15 Sun Valley Drainage Improvements ("Amargosa Wash") Culvert Upgrade at E. 8th Ave	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-16 Sun Valley Drainage Improvements ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#C17-17 Sun Valley Drainage Improvements ("Amargosa Wash") Channel Improvements along E. 8th Ave. from Middle Fork Drive to Leon Drive	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#D16-1 Spanish Springs Kinglet Drive Drainage – Detention Basin	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#D16-2 Spanish Springs Nightingale Way Drainage – Detention Basin	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#D16-3 Spanish Springs Spanish Springs High School Area – Detention Basin	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Stormwater Capital Improvement Project: CIP#D16-4 Spanish Springs Spanish Springs High School Area – Channel and Culvert Improvements in Spanish Springs Village Subdivision	Washoe County	2010	No progress. Continue in plan, but consolidate with other like projects.
Truckee River Flood Control Project: West Second Street to Booth Street	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Booth Street to Ralston Street	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Truckee River Flood Control Project: Ralston Street to South Arlington Avenue	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: South Arlington Avenue to North Sierra Street	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Sierra Street Bridge	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: North Sierra Street to North Virginia Street	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Virginia Street Bridge	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Center Street Bridge	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Lake Street Bridge	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Virginia Street to Evens Avenue	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Evans Avenue to Kuenzli Street	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Kuenzli Street Ballpark	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Kuenzli Street to Highway 395	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Wells Pedestrian Bridge	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Glendale Avenue to Greg Street	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Greg Street to South Rock Boulevard	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Truckee River Flood Control Project: Rock Boulevard Bridge Extension	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: South Rock Boulevard to South McCarran Boulevard	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: South McCarran Boulevard Bridge Extension	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: UNR Mainstation Farm	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: South McCarran Boulevard to Steamboat Creek	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Steamboat Creek to First Railroad Bridge	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Hidden Valley/Eastside Subdivision	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Truckee River Flood Control Project: Wadsworth Levee	Washoe County	2010	Replaced by current project list in the TRFMA Flood Protection Plan
Evaluate warning systems – Seiche	Washoe County	2010	Continued in plan.
Mitigation of Risk Related to Flood Damage to Public Infrastructure – Lawton Interceptor at Oxbow Park	City of Reno	2010	Continued in plan.
Mitigation of Risk Related to Flood Damage to Public Infrastructure and Private Property – Dant Wash Drainage Improvements	City of Reno	2010	Continued in plan.
North Truckee River Drain Replacement	City of Sparks	2010	Under construction and near completion.
Implement Stormwater Plan (e.g., projects for storm drains, catch basins, surveys, etc.)	City of Sparks	2010	Continued in plan.
Mitigate where water enters the reservoir to the dam (retention, dry basins)	Pyramid Lake Paiute Tribe	2010	Continued in plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Structural projects: Culvert Maintenance	Reno-Sparks Indian Colony	2010	Continued in plan.
Structural projects – Drainage System Maintenance	Reno-Sparks Indian Colony	2010	Continued in plan.
Multi-Hazard			
Develop, enhance, and implement education programs aimed at mitigating natural hazard, and reducing the risk to citizens, public agencies, private property owners, business, and schools.	City of Reno	2005 (2010 All Jurisdictions)	Continued in plan. Ongoing public awareness campaigns in schools.
Continue to reinforce/support the all-risk urban search and rescue program. ~~Reinforce Technical Rescue Program~~	City of Reno	2005	The program is ongoing and includes specialized training and specialized equipment for rescues in events other than fire events. Also has a hazardous materials component, structure collapses, trench rescue, heavy machinery rescue, and avalanche rescues. They are working on an urban search and rescue program. Largest technical rescue team in northern part of the state and wants to make into a regional program.
Enhance/Develop the Seasonal Multi-Hazard Public Awareness Program	Washoe County	2010	Ongoing. Continue in plan.
~~Warning systems~~	~~Reno-Sparks Indian Colony~~	~~2010~~	~~Completed. Disaster Com Box is a mobile EOC. Drills completed 3 times per year. Removed from plan.~~
~~Emergency Planning – Activating the EOC~~	~~Reno-Sparks Indian Colony~~	~~2010~~	~~Completed. Disaster Com Box is a mobile EOC. Drills completed 3 times per year. Removed from plan.~~
~~Post Disaster Mitigation – Building inspections~~	~~Reno-Sparks Indian Colony~~	~~2010~~	~~Completed. Disaster Com Box is a mobile EOC. Drills completed 3 times per year. Removed from plan.~~
Public Information – Outreach Projects	Reno-Sparks Indian Colony	2010	Ongoing distribution of fliers and community workshops on preparedness. Continued in plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
~~Nuclear Waste Transport~~ Transportation of radiological materials and waste			
Monitor Radiological Shipping Campaigns that include Washoe County as an approved route. (from the 2005 action titled "Monitor progress on Yucca Mountain, and work with Nevada Department of Transportation to develop protocols")	Washoe County	2010	Ongoing; continued in plan. A subcommittee of the LEPC reports on this each meeting.
Severe Storms		2010	
Encourage the private sector to prepare and maintain 3-day preparedness kits	Washoe County	2010	Ongoing; continued in plan. Could be tied into Storm Ready.
Conduct outreach programs to build resilience to severe storm hazards. (formerly 2005 action - Encourage homeowners to storm proof their buildings)	Washoe County	2010/2005	Ongoing; continued in plan. Could be tied into StormReady.
Terrorism and Weapons of Mass Destruction			
Seek funding for basic terrorism training for community responders in relation to proximity to military bases and military transportation routes.	Washoe County	2005	Continued in plan. Funding has only become available in the last several years and training has been offered.
Provide training for the public and private sectors to improve response, management, and intervention of WMD terrorism incidents	Washoe County	2005	Ongoing by Fusion Center. Continued in plan.
Utilize Community Emergency Response Teams (CERT) as well as the Citizens Homeland Security Council (CHSC) to shift burden from sworn officers, where appropriate	Washoe County	2005	Ongoing. Continued in plan.

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Seek funding to provide methodology and operational functionality to perform vulnerability analysis to determine areas of risk and/or vulnerability to pipeline. Leverage relationships with pipeline owner/operators to insure adequate maintenance and monitoring of pipeline infrastructure. (From the 2005 Objective titled "Analyze pipeline to determine areas of vulnerability")	Washoe County	2005	Continued in plan.
Increase Law Enforcement Staff (from the 2005 objective titled "Double Law Enforcement Staffing)	City of Sparks	2005	Continued in plan.
Wildland Fire			
Increase communication, coordination, and collaboration between wildland/ urban interface property owners, local and county planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs.	City of Reno (Now All Jurisdictions)	2010/2005	Now discussed in staff report for Land Use applications. Online mapping is available. Continued in plan.
Mitigation of Risk of Fire Related to the Mt. Rose Wilderness Area	City of Reno	2010	Continued in plan but changed to Washoe County responsibility.
Defensible Space Creation and Hazardous Fuels Reduction	Washoe County	2010	Chipping program went away but NDF is still working on state property. Chipping will resume when funding is available. Continued in plan.
~~Hazardous Wood Roof Replacement Program~~	~~Washoe County~~	~~2010~~	~~Unable to get funding. Removed from plan.~~
Establish good access routes/signage	Washoe County	2010	Continued in plan. Check with Truckee Meadows Fire – they may have some in Caughlin Ranch & St James Village.
~~Identify the boundaries of the Wildland Urban Interface within the County.~~	~~Washoe County~~	~~2010~~	~~Completed. Removed from plan.~~
~~Encourage local chapters of the Fire Safety Council~~	~~Washoe County~~	~~2005~~	~~Fire Safety Council no longer exists. Removed from plan.~~

Mitigation Action	Lead Jurisdiction	2005/2010 Action	Status
Property Protection: Create Defensible Space (DS)	Reno-Sparks Indian Colony	2010	Ongoing. Continued in plan.
Fuel Management – Fire breaks	Reno-Sparks Indian Colony	2010	Ongoing. Continued in plan.

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A.1 COMMUNITY PROFILE

A.1.1 Geography

The Reno-Sparks Indian Colony (RSIC) is a federally recognized Indian Tribe located near Reno and Sparks, Nevada. The reservation lands consist of the original twenty-eight acre residential Colony, located in downtown Reno, 82 acres of commercial property and a 1,960-acre Hungry Valley reservation, located nineteen miles north of the downtown Colony, in a more rural setting.

A.1.2 Population

The Reno-Sparks Indian Colony is comprised of three Great Basin Tribes: the Paiute, Shoshone, and Washoe. It is unique in that it occupies both an urban setting and a rural land base. The Colony's Reno Community, with 490 residents, is located between the cities of Reno and Sparks along a 4 block stretch next to a freeway. The Colony's Hungry Valley community, with 591 residents, is located 20 miles away. It consists of two tribal housing developments, a community center, emergency services, childcare, a cemetery, and pow-wow grounds. It covers 1,950 acres adjacent to BLM land. There are no commercial enterprises located in the valley. All the

surrounding roads are dirt, except those paved in the housing area and going to the Community Center.

The RSIC hired the independent firm of Tribal Data Resources in 1997 to conduct a Tribal Census. That Census showed a total of 1,081 residents (485 in the Colony, 596 in Hungry Valley), averaging 2.18 persons per household for a total of 467 households on the reservation. In addition, approximately 205 RSIC members live near the Colony due to lack of housing on Tribal lands, but receive services and participate in Tribal programs, activities, and resources. The Tribe deemed them eligible for services at the Tribal Clinic, education programs, social services, and other tribally funded programs such as the Seniors Program. Most members temporarily residing off Colony lands are on the waiting list for housing that becomes available on the reservation occasionally. Indians from other tribes residing on the reservation also receive governmental and tribal services as community residents. The Tribal resident and service area (on or near Colony) population profile in 1997 is shown in **Table A-1.**

Table A-1: Reno-Sparks Indian Colony Age Distribution

Age	0-5	6-12	13-15	16-20	21-25	26-30	31-35	36-40	41-45	46-49	50-54	55-59	60+	TOTAL
# of persons	133	192	72	91	75	87	95	88	84	41	32	18	73	1,081

Source: Reno-Sparks Indian Colony

The RSIC 2004 average household income for the entire Colony was $15,309. Breaking down the Colony household income between Hungry Valley and the Reno Trust lands shows the Hungry Valley householders with an average household income of $19,100 and Reno Colony with an average $8,400. In comparing the countywide household income to that of the Colony, the 2000 median household income (US Census Bureau) for Washoe County was $45,815.

The 2009-2013 U.S. Census American Community Survey estimated the population of the Reno-Sparks Indian Colony is 1,059. Select demographic characteristics for the Reno-Sparks Indian Colony from the 2009-2013 American Community Survey are shown in **Table A-2** below.

Table A-2: Reno-Sparks Indian Colony – Demographics

Characteristic	%
Gender/Age	
Male (%)	53.2
Female (%)	46.8
Under 5 Years (%)	7.1
65 years and Over (%)	6.8
Race/Ethnicity	
White alone (%)	4.1
Black or African American alone (%)	0.0
American Indian and Alaska Native alone (%)	88.6
Asian alone (%)	0.0

Hispanic or Latino (of any race) (%)	4.8
Native Hawaiian and Other Pacific Islander alone	0.1
Two or more races	2.5

Source: U.S. Census Bureau, www.census.gov

A.1.3 History

Organization

The Reno-Sparks Indian Colony is a federally recognized Indian Tribe organized under the provisions of the Indian Reorganization Act of 1934. The constitution was adopted in 1936 by the residents of the Colony. A Chairman and eight-member Tribal Council is elected to serve as the governing body and to act in accordance with the provisions of the newly adopted constitution. The constitution gives the Tribal Council authority and responsibility to raise revenues, incur expenses, enter into contracts, borrow money, administer funds, purchase land, and provide services for the general welfare and benefit of the Colony members.

The Colony is a growing organization, employing approximately two hundred people, and is progressively taking steps to provide for the needs of the people while, at the same time, maintaining tribal culture and protecting sovereignty.

A.1.4 Economy

The nine member Tribal Council, including its Chairman, oversees Colony affairs, acting as a sovereign government under its own constitution. The Tribal Council has final authority over all contracts, leases, and the business affairs of the Colony. Its excellent track record in dealing with commercial tenants is due to the Tribe's stable government, experienced staff, and consistency of purpose. The Colony's business development program is assisted by various Federal incentives and its compact with the State of Nevada covering the collection of tribal sales and excise taxes. All of the Colony's business sites are on federal land, held in trust for Tribal benefit, and are available on a ground lease basis. The Colony operates nine business sites with 21 commercial tenants and five Indian Smokeshops.

Many tribes outside of Nevada have the ability to build casinos for their economic benefit; Nevada Tribes are at a disadvantage in trying to compete in an already glutted gaming market within the state. The primary source of revenue is derived from the five Smoke shops scattered throughout Washoe Valley, on trust lands, and therefore under tribal jurisdiction. The Colony also leases land to commercial sector businesses in order to garner tribal sales and excise taxes.

The Colony's Economic Development Department has tentatively scheduled the following construction projects on Colony lands (see A.2.5 Growth and Development Trends for project details):

- Commercial nursery and other commercial buildings on the Colony's 24-acre site in Spanish Springs.
- Redevelopment of a 6-acre site that is contiguous and to the east of the Walmart located on East 2nd Street in Reno.

- 21,500 square foot Northern Nevada Transitional Housing Center for the Nevada Department of Corrections on the southeast corner of Kietzke Lane and East Second St.

Although the total number of buildings has not been determined yet, existing hazards have been considered for each of the above future development sites. Washoe County has already mitigated flood hazards through storm water channel improvements for the Spanish Springs commercial site. Additionally, flood hazard risks for the projects located off East 2nd Street have been mitigated by the RSIC Levee Floodwall project. Future development will be required to meet building code requirements and zoning ordinances which also mitigate other hazard impacts.

A.1.5 Planning Process

The planning process for the Washoe County RHMP began in August 2014 and continued through December 2015. Aaron Kenneston, Washoe County's Emergency Management and Homeland Security, formed the advisory body, known as the Planning Committee, utilizing staff from the Local Emergency Planning Committee (LEPC), relevant County and City agencies and community organizations. The Planning Committee members are listed in **Table 4-2**. The Planning Committee meetings are described in section 4.2.2. Meeting agendas and handouts are provided in **Appendix C**.

The County and all participating jurisdictions were adeptly represented in the regional planning effort by team members who perform multiple functions within the local jurisdiction. In most cases one or more representatives for each jurisdiction attended the RHMP meetings. Additionally, representatives from the City of Reno, City of Sparks, RSIC, PLPT and TRFMA reported back to their local jurisdictions and worked within their local government structures to collect data, identify mitigation actions and implementation strategies, and review and provide data on plan drafts.

For the Reno-Sparks Indian Colony, Dave Hunkup, Emergency Manager, provided information on the hazard profiles and the RSIC Annex. He met with Tribal Directors to review elements of the plan, as well as had meeting with the Tribal Economic Development Director and the Tribal Fire Department Chief. The consultant worked with Dave via phone and email in addition to the regional meetings. In July of 2015, a public workshop was held at the Reno Sparks Tribal Health Center and 23 people attended.

A.2 HAZARD PROFILES AND VULNERABILITY ASSESSMENT

The intent of this section is to assess the Reno-Sparks Indian Colony's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 6 Vulnerability Assessment in the main plan.

Data Deficiencies

The 2010 Plan updated noted that limitations in data did not allow for the determination of values associated with critical and special facilities located within the planning area. However, during the 2015 update, the Tribe did provide updated data for critical and special facilities.

For the 2015 update, there were some data limitations regarding GIS information readily available to Washoe County GIS department who was preparing the vulnerability analysis. Future iterations of the plan will work towards resolving this issue.

A.2.1 Hazard Identification

RSIC's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Colony (see **Table A-3**). In the context of the countywide planning area, there are no hazards that are unique to the Reno-Sparks Indian Colony. Only those hazards rated with a planning significance of moderate and high are profiled in this annex.

Table A-3: Reno-Sparks Indian Colony – Hazard Summary

Very High Risk	High Risk	Moderate Risk	Low Risk
Flood Earthquake Wildland Fire	Volcano	Hazardous Materials	Avalanche Drought Infectious Disease Severe Storms Civil Disorder Energy Emergency Nuclear Waste Transport Terrorism/WMD/ Acts of Violence

A.2.2 Community Asset Inventory

This section defines and quantifies populations, buildings, critical facilities, and other community assets at risk to natural and manmade hazards in the Reno-Sparks Indian Colony.

Table A-4 shows the total population, number of parcels, and assessed value of land and buildings in the Reno-Sparks Indian Colony.

Table A-4: Reno-Sparks Indian Colony – Maximum Population, Land/Building Exposure

Population 2007	Number of Parcels	Assessed Land Value ($)	Assessed Building Value ($)	Total Value ($)
900	49	16,889,156	1,529,891	18,419,047

Source: Washoe County Geographic Information Systems (parcels and assessed values)

Assets directly owned and controlled by the Reno-Sparks Indian Colony include a range of properties and equipment from each department. These may include RSIC-owned property, critical facilities and infrastructure, cultural and natural resources and others. An inventory of key city assets provided by the HMPC is listed in **Table A-5**. **Figure A-1** shows a photograph of one of the Reno-Sparks Indian Colony's most essential assets, the Tribal Health Center.

Table A-5: Reno-Sparks Indian Colony – Asset Inventory

Name of Asset	Type	Replacement Value	Occupancy/ Capacity #
Tribal Health Center	Essential	$18,400,903	80
Tribal Health Center Parking Lot		252,053	157 spaces
Tribal Police Stations	Essential	H.V. $5,300	10
Hungry Valley Fire Station	Essential	$305,000 (cost included with H.V. Community Center)	Volunteer
Hungry Valley Gym/Rec Center	High Potential Loss Facility	$1,511,656	500
Reno Gym	High Potential Loss Facility	$1,992,000	500
Hungry Valley Child Care Center	High Potential Loss Facility	$824,696	35
Reno Child Care Center	High Potential Loss Facility	$229,896	35
Hungry Valley Head Start Center	High Potential Loss Facility	$253,752	21
Reno Head Start Center	High Potential Loss Facility	Cost Included with Reno Gym	50
Reno Senior Center	High Potential Loss Facility	Cost Included with Reno Gym	
Tribal Administration	High Potential Loss Facility	$856,414	21
Records and Archives	High Potential Loss Facility	$253,752	2
Enrollment Office	High Potential Loss Facility	$346,080	1
Public Works	High Potential Loss Facility	$500,000	25
Planning	High Potential Loss Facility	$207,648	10
Housing	High Potential Loss Facility	$305,000 (cost included w/ H.V. Community Center)	10
Tribal Court	High Potential Loss Facility	$134,116	6
Hungry Valley Water Treatment Plant	Transportation	$380,629	Unmanned
Wastewater Lagoons	Transportation	$76,125	N/a

Name of Asset	Type	Replacement Value	Occupancy/ Capacity #
Water Storage Tank	High Potential Loss Facility	$126,876	N/a
Tribal Smoke Shops	Economic	I. $1,997,174 II. $691,353 III. $835,000 IV. $997,652 V. $1,394,479	4 3 3 3 4
Tribal Police Building Reno	Historic	RNO $134,489	10
Eagle Canyon Drive	Transportation	$602,787	
Wal-Mart Site	Economic	$2,070,000	
Hungry Valley Community Center	High Potential Loss Facility	$1,522,514 $1,046,729 (multi-room)	
Facility Building – Reno	High Potential Loss Facility	$4,530,925	
2 Public Works Buildings		$1,551,013	
Archeological Sites in Hungry Valley	Cultural	No assessed value	
1937 Prosperity Street	Tribal Government Offices	$1,068,715	
420 Old Hwy 40, Verdi	Economic	$548,000	
2A Sunshine Lane, Reno	Economic	$244,491	
690 Sunshine Lane, Reno	Economic	$62,109	
7655 Pyramid Hwy, Spanish Springs	Economic	$464,316	
Tuscarora Natural Gas Pipeline	Transportation	Non RSIC asset	
RSIC Floodwall/Levee	Transportation	$5.5 million	

Source: Reno-Sparks Indian Colony HMPC

Figure A-1: Reno-Sparks Indian Colony – Tribal Health Center

Source: Reno-Sparks Indian Colony HMPC

A.2.3 Critical and Special Facility Inventory

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. Such facilities include airports, fire stations, police stations and government buildings. There are not any critical facilities in the Reno-Sparks Indian Colony.

Special facilities are those which house or serve special needs or vulnerable/at-risk populations that cannot care for themselves during emergencies and/or require unique support services. Such facilities include schools and child care centers, health care facilities, and senior centers. An inventory of special facilities in the Reno-Sparks Indian Colony is provided in **Table A-6** and mapped in **Figure A-2**.

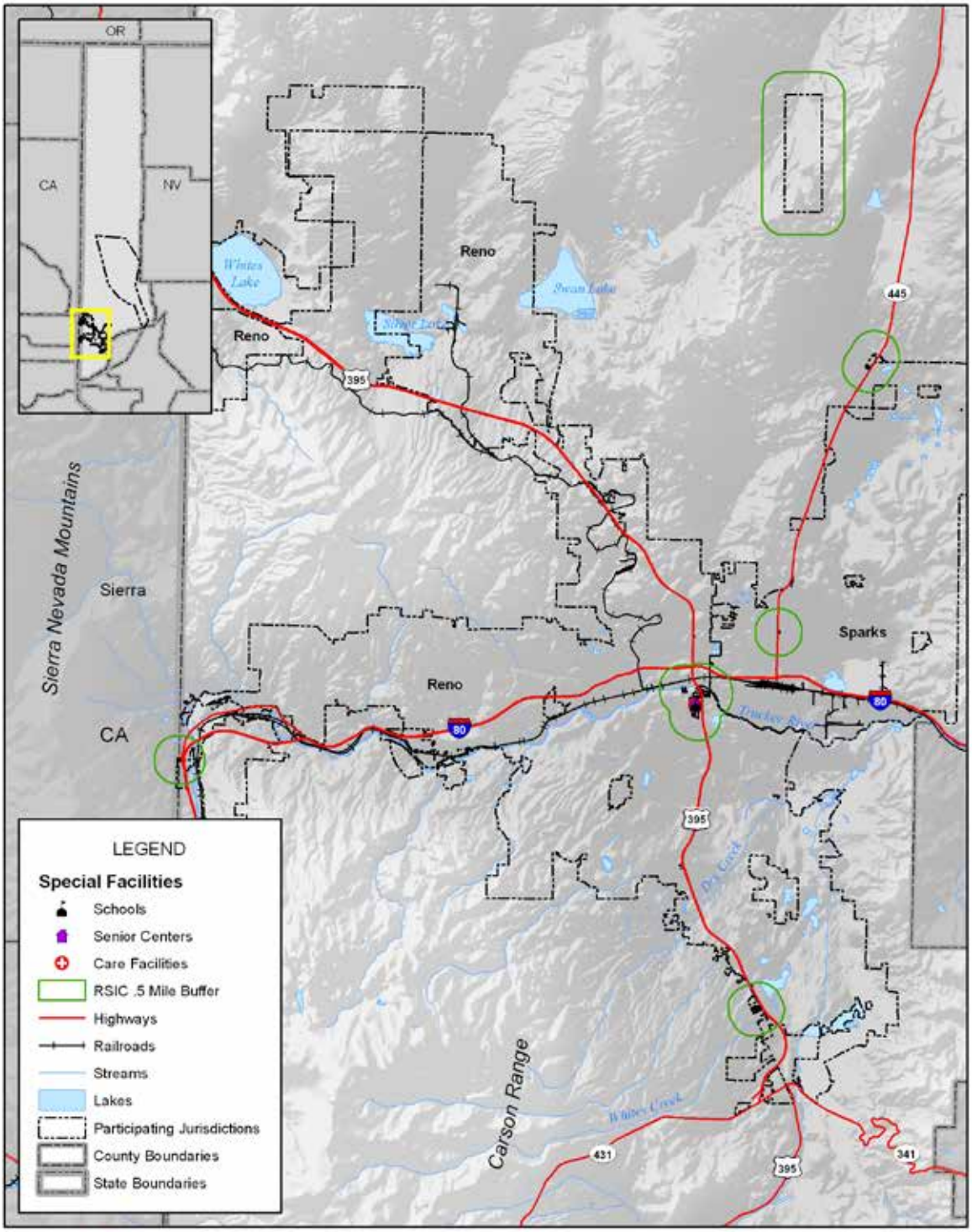
Table A-6: Reno-Sparks Indian Colony – Special Facilities Inventory

Type	Name	Address
Child Care Facility*	Reno-Sparks Indian Colony Child Care Program (Reno)	34 Reservation Road
Child Care Facility*	Reno-Sparks Indian Colony Child Care Program (Hungry Valley)	9055 Eagle Canyon Dr., Sparks, NV
Fire Station*	Reno-Sparks Indian Colony Fire Department	9055 Eagle Canyon Dr., Sparks, NV
Government Building	Tribal Offices	98 Colony Road
Health Care Facility	Reno-Sparks Indian Colony Tribal Health Center	34 Reservation Road
Police Station*	Tribal Police Department	1995 E. 2nd St., Reno, NV
Police Station	Tribal Police Sub-Station, Hungry Valley	9075 Eagle Canyon Drive Sparks, NV
School	Hungry Valley Head Start Center	9055 Eagle Canyon Dr., Sparks, NV
School	Reno Head Start Center	34 Reservation Road
Senior Center	Reno-Sparks Indian Colony Senior Center	34 Reservation Road

Source: Washoe County Geographic Information Systems.

* denotes properties that may or may not be on tribal property, but serve the Reno-Sparks Indian Colony. These properties were identified by the Reno-Sparks Indian Colony Emergency Services Manager

Figure A-2: Reno-Sparks Indian Colony – Special Facilities



*Only special facilities that exist in the Reno-Sparks Indian Colony are shown on this map; all 3 are located just south of the I-80 and Hwy 392 intersection.

A.2.4 Other Assets

Assessing a jurisdiction's vulnerability to disaster also involves inventorying the natural, historical, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Information on the natural, historical, and cultural assets specific to the Reno-Sparks Indian Colony was not available, with the exception of the following properties identified in **Table A-7**.

Table A-7: Reno-Sparks Indian Colony – Historic Properties

Property Name	Address	Date Listed
Field Matrons Cottage	1995 E. Second St.	5/16/2003

A.2.5 Growth and Development Trends

The Colony's Economic Development Department has recently completed the following construction projects on Colony lands:

- The Colony owns a 24-acre parcel in Spanish Springs at 7655 Pyramid Way. The Spanish Springs Infrastructure Project was completed at the site in December 2014. A storm water ditch was constructed along the western boundary of the site, directing storm water flows into the Washoe County storm water channel located at the north end of the parcel. A bridge was constructed across the Washoe County storm water channel. The road to the parcel's main entrance was reconfigured to align with the bridge. A cul de sac located to the north of Moana Nursery was extended to the west end of the site, and sanitary sewer and water lines were extended to the west end of the site. A 2.5 acre storm water detention pond, which was formerly used to contain overflow from the Colony's western neighborhood, was filled with compacted soil when the storm water ditch became operational. A reclaimed water line was extended from the northern end of the parcel to the southern end of the parcel.
- A Carmax Superstore was constructed on the Colony's South Virginia Street Parcel. In order to facilitate a workable configuration of the Carmax leased premises, it was necessary to reconfigure Auto Center Drive and to demolish a smoke shop on Virginia

Street. The smoke shop was reconstructed on Old Virginia Road. The project was completed in September 2014 and includes Carmax, Smoke Shop, Mercedes of Reno, Acura of Reno and Infiniti of Reno.

- A Walmart Superstore was constructed on Colony land at 2425 E. 2nd Street, Reno. The 189,000 square foot building opened for business in October 2010. Prior to construction, it was necessary to conduct a $1.3 million soil remediation project.
- Pursuant to the Development and Finance Agreement between the Colony, Wal-Mart Real Estate Trust and Washoe County, Washoe County Public Works constructed a floodwall/levee along the southern banks of the Truckee River between Route 395 and the Glendale Bridge. The levee project was funded through a public-private partnership between the Truckee River Flood Project, Wal-Mart, the Reno-Sparks Indian Colony, Washoe County and the State of Nevada. The site for the levee is along the south shore of the Truckee River in the Reno-Sparks Indian Colony, just southeast of the I-80 and Hwy 395 intersection.

Due to the economic downturn, development in the last 5 years has been minimal.

The Colony's Economic Development Department plans to complete the following construction projects on Colony lands:

- Spanish Springs (24 acres on southwest corner of Eagle Canyon Drive and Pyramid Highway): The 24-acre site is zoned general commercial by Washoe County and by the Colony. Staff is actively marketing the site and expects to construct a commercial development as soon as the real estate market strengthens.
- Pursuant to a revenue sharing agreement between the State of Nevada and the Colony, the Colony will share some of its tax revenues from the Walmart project. The State and Colony entered into a development and finance agreement that requires the Colony to finance the design and construction of the Northern Nevada Transitional Housing Center (NNTHC) for the Nevada Department of Corrections. The Colony hired Nevada Division of Public Works as the Colony's construction agent, and ground breaking took place in December 2014. Construction of the 21,500 square foot facility is scheduled to be completed in September 2015 at a cost of $8.0 million.
- Upon completing construction of the NNTHC in September 2015, the Colony and State will exchange lands. The State will receive the parcels located at 290 Kietzke Lane and 1840 E. 2nd Street, Reno. The Colony will receive the parcel located at 2595 E. 2nd Street, Reno. The Colony will demolish the existing Northern Nevada Restitution Center, and redevelop the parcel into a commercial development. The Colony is actively marketing the site.

A.2.6 Vulnerability Assessment by Hazard

The vulnerability assessment analyzes the population, property, and other assets at risk in the Reno-Sparks Indian Colony to hazards of significance that may vary from other parts of the planning area. For each hazard, there is a brief hazard/problem description, any past occurrences that have been provided by the Planning Committee, and a vulnerability overview for the hazard specific to the Reno-Sparks Indian Colony. The hazards included are listed in **Table A-8**.

Table A-8: Reno-Sparks Indian Colony Significant Hazards

Natural and Manmade Hazards	Planning Significance
Drought	Low
Earthquake	High
Flood: 100 and 500 –year Events	High
Flood: Localized Floods	High
Severe Storms: Extreme Heat	Moderate
Severe Storms: Severe Winter Storms	Low
Wildland Fire	High
Energy Emergency	Low

A.2.6.1 Drought

Planning Significance:	Low

The impact of a drought on the Reno-Sparks Indian Colony is primarily one of water supply; however, the impact to natural resources in the Colony is also a concern. A multiple year drought can severely compromise the water supply within the district and adversely impact natural resources. With the unknowns of drought and globally changing climate conditions, the RSIC continues to promote water conservation throughout the community.

The Hungry Valley community has a public water system that serves the community. The main and only source of water comes from groundwater aquifers that provide water to our wells. A drought of any lasting significance could impact the amount of water that recharges the aquifers and thus lowering the water levels, as this is our source of water for this community.

A.2.6.2 Earthquake

Planning Significance:	High

As previously stated in Section 5.3.3 of the base plan, the State of Nevada is one of the three most seismically active states in the U.S., and Washoe County is located in one the most seismically active areas in Nevada. **Figure B-8** in **Appendix B** identifies the major fault lines in Washoe County.

All of Washoe County is susceptible to the effects of earthquakes. The location of seismic activity in the State of Nevada from 1852-2005 is indicated in **Figure 5-13** in Section 5.3.3. Southern Washoe County has higher probabilities of occurrence and the built environments of Reno, Sparks, and areas north of Lake Tahoe make for severe potential impacts.

To assess risks and vulnerability to the state, the Nevada Bureau of Mines and Geology ran FEMA's loss-estimation model, HAZUS-MH, in August 2014.

Loss estimates were provided, using five earthquake scenarios located at an epicenter in downtown Reno (-119.81 longitude, 39.52 latitude) at magnitudes of 5.0, 5.5, 6.0, 6.5, and 7.0. Each of the earthquake scenarios can create surface offsets, may be of long duration, and can cause significant damage to the Cities of Reno, Sparks and surrounding areas. A magnitude 7 earthquake can cause widespread structural and nonstructural damage, and requires a significant "recovery period" for communities to get back to the way they were before the quake.

Table 6-14 and **6-15** in the earthquake vulnerability of Section 6.4.3 helps quantify the HAZUS-MH loss estimation for the City of Reno and City of Sparks. Damage estimates in the earthquake vulnerability discussion in Section 6.4.3 were created to show impacts to the County as a whole, and do not include any city specific data. Property damage would be greatest in City of Reno and the City of Sparks where development, specifically unreinforced masonry structures, is abundant. (See **Figure B-9** in **Appendix B**.)

A.2.6.3 Flooding

Planning Significance:	
100 and 500 –year Events	High
Localized Flood	High

Flood, particularly during the annual spring thaw, could present a hazard to those residents of the Reno-Sparks Indian Colony living in the flood-prone areas of the Truckee River.

Previous Occurrences of flood events are listed in Section 5.3.4 Flood, many of which affect the Reno-Sparks Indian Colony. The flood event of January 1997 resulted in 2 fatalities, 50 injuries and $640 million of damage. The Reno-Sparks Indian Colony representative for the Planning Committee described the following additional details about this event: The location affected within the Reno-Sparks Indian Colony is a 17-acre area near the Jensen Street property. There was erosion and debris damage to property and buildings and fences were downed. There were printing businesses operations open at the time in the Colony that suffered business/economic impacts from the flood. However, due to the early actions that tribal leaders initiated during the rising floodwaters, business and property suffered minimal damage.

The flood was caused by two years of above normal precipitation in the Sierras and Western Nevada, and a major winter storm in December 1996 that deposited 3 to 8 feet of snow in Western Nevada and the Sierras. During the following week into New Year's Day 1997, copious amounts of moisture and warm air flowed in the area. The resulting rain and snow melt caused severe flooding along the Truckee River drainage. **Figure A-3** shows photographs of the Reno-Sparks Indian Colony soon after that event.

Figure A-3: Reno-Sparks Indian Colony – Photos of Flood Event, January 1997

Source: Reno-Sparks Indian Colony Planning Committee Member

Other past efforts to reduce flood risk in the Reno-Sparks Indian Colony have been to replace and relocate six-inch and eight-inch water lines and a sewer line after the 1984 flood disaster. Following the methodology described in flood vulnerability discussion in Section 6, a flood analysis was performed on the Washoe County planning district; results were sorted by jurisdiction.

Table A-8 summarizes the values at risk in the Colony's floodplain; the detailed analysis shows the count and assessed building and contents values of parcels that fall in the 100–year floodplain by flood zone and property type. Loss estimates are calculated as 20% of total value, a guidance factor recommended by FEMA. There is not any Reno-Sparks Indian Colony land in the mapped 500-year floodplain.

Table A-8: Reno-Sparks Indian Colony – 100 & 500 Year Flood Estimated Building Losses

100-year					
Property Type	**Parcels**	**Improved Value ($)**	**Contents Value ($)**	**Total Value ($)**	**Loss Estimate ($)**
Residential	-	0	0	0	0
Commercial	1	1,330	665	1,995	399
Industrial	4	284,689	142,345	427,034	85,407
Agricultural	-	0	0	0	0
Open Space	-	0	0	0	0
Other	3	6,001	3,001	9,002	1,800
Unidentified	1	0	0	0	0
TOTAL	**9**	**292,020**	**146,010**	**438,030**	**87,606**

Source: AMEC; Washoe County Geographic Information Systems

There are not any critical or special facilities within the Reno-Sparks Indian Colony that intersect the mapped floodplain.

National Flood Insurance Program

The Reno-Sparks Indian Colony does not participate in the National Flood Insurance Program.

A.2.6.4 Severe Weather

Planning Significance:	
Extreme Heat	Low
Severe Winter Storms	Low

Extreme heat and severe winter storms are both rated as a moderate hazard in the Reno-Sparks Indian Colony.

Extreme Heat Emergencies

These emergencies are somewhat uncommon in the community, but could have impacts. Specific populations are more affected by the heat than are others such as the elderly and the very young as well as the sick and infirmed. Other effects of the heat waves include buckled roadways and an increased demand on the electric infrastructure.

Severe Winter Storms

The location of Reno and Hungry Valley in relation to the Sierra Nevada Mountain Range provides it with the potential for many severe storm types. The typical winter storms come from the frigid Gulf of Alaska. These storms are usually associated with the Pacific Jet Stream usually located very close in latitude to Reno. High winds, blowing snow, blizzard conditions, and extremely low temperatures are common and may often result in road closures and hardship to citizens. Thunderstorms can wreak havoc in many different ways. The unstable atmosphere can spawn winds in excess of 50 mph on the leading edge. Hail and lightning, as well as torrential rains are by-products of these types of storms. Most consider it a price of life in this picturesque part of Nevada and are prepared for the eventualities of severe storms. There could be limited access to emergency equipment and first responders due to severe storm conditions.

Heavy snowfall can lead to a paralysis of transportation. People that need medication or who need to reach doctors can be problematic. The weight of the snow can lead to collapse of roofs of commercial buildings. The main access road to the Hungry Valley community needs to be plowed and sanded to provide residents safe access in out of the community. If the City is difficult to get around, the transportation corridors to the West will usually be completely shut down.

Previous occurrences of severe storm events are listed in Section 5.3.6 Severe Weather profile, many of which affect the Reno-Sparks Indian Colony. The Planning Committee identified the following two events, as additional data to include in their annex:

- A severe snowstorm hit the Reno and Hungry Valley communities of the RSIC in 1992. The event deposited levels of 2.5 feet of snow in the Truckee Meadows and surrounding areas (Hungry Valley), and severely impacted budget for snow removal. The snowstorm happened the year after the Hungry Valley community was developed and occupied. The severity of the storm was such that people that moved from Reno to Hungry Valley had

never experienced this level of extreme weather and a result there was a lot of difficulty in adjusting to the associated hazards.

- Winds gusting up to 80 mph struck Hungry Valley in 1998 and caused significant damage to infrastructure in the Truckee Meadows area. In Hungry Valley, the high winds tore through the area damaging roofs from outbuildings and blowing debris everywhere.
- A severe snowstorm deposited levels of 5-6 feet of snow in the Truckee Meadows and surrounding valleys (Hungry Valley). The event happened in 2004/2005. The Colony suffered loss of business in the Tribal Smoke shops as a result. The RSIC is responsible for snow removal on the main access road into the community and plowed and sanded for 3 days before the storm finally subsided. The event was a major weather related emergency and stretched tribal resources to the limit.

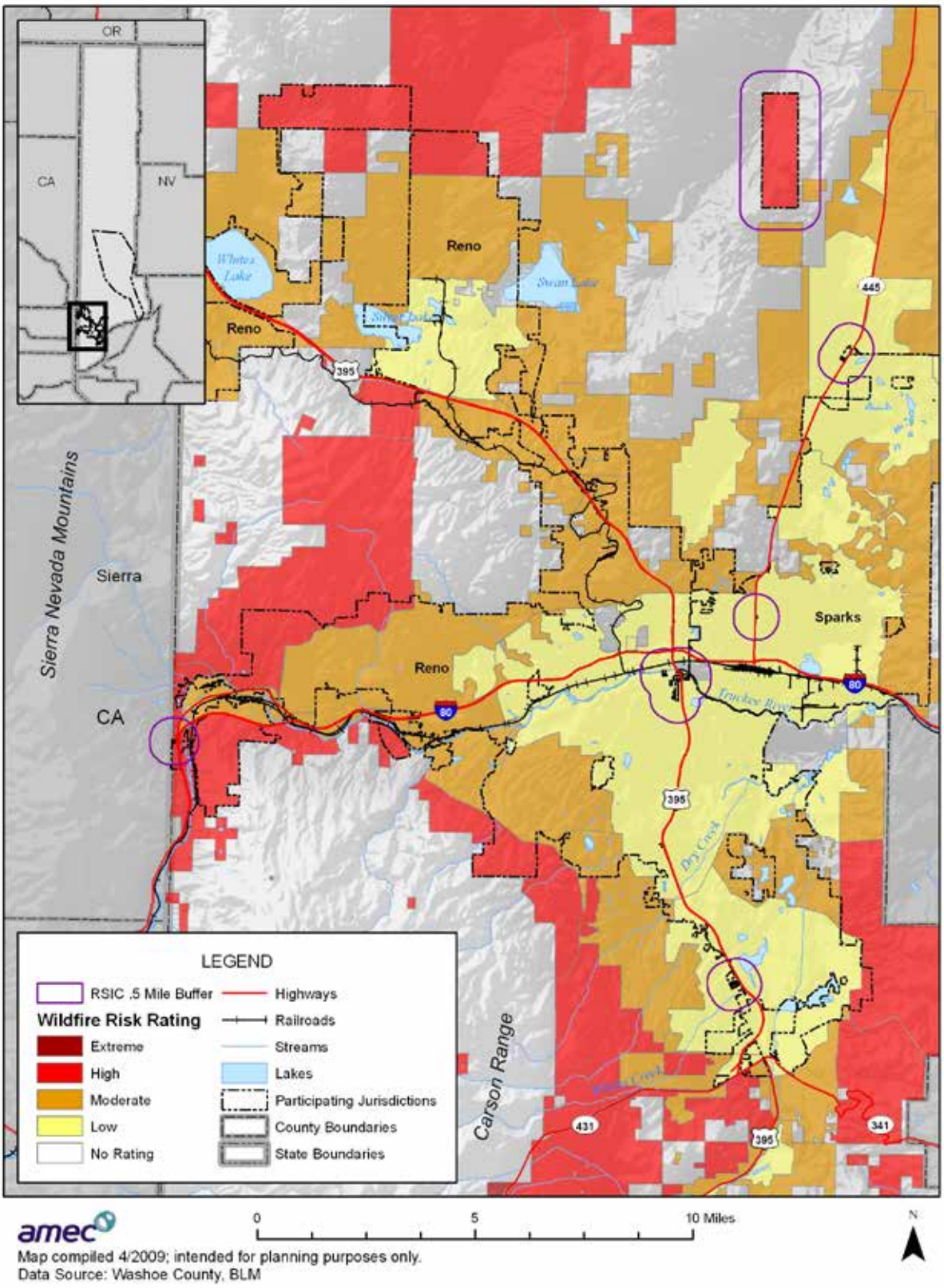
A.2.6.5 Wildland Fire

Planning Significance:	High

The Hungry Valley property of the RSIC lies within the defined Wildland Urban Interface and is more vulnerable to wildfires. That land in and around the Reno/Sparks area is mostly safe from wildfire threat. See **Figure A-4** for a map of the wildfire classifications within the Reno-Sparks Indian Colony.

The Hungry Valley community, within Colony property, is characterized by a classic wildland-urban interface condition. There is a clear line of demarcation between wildland fuels and residences in the community, except that there are unmaintained corridors of common property with wildland vegetation 100 to 200 feet in width between rows of houses. All residences are located on lots of less than one acre in size. Hungry Valley can be seen in the northeast corner of **Figure A-4**.

Figure A-4: Reno-Sparks Indian Colony Wildland Fire Threat



Following the methodology described in the wildfire vulnerability discussion in Section 6, a wildfire analysis was performed on the Washoe County planning district using the county's wildfire severity data; results were sorted by jurisdiction.

The acreage of each wildfire risk classification within the community was determined. **Table A-9** summarizes the acreage at risk in the Reno-Sparks Indian Colony. Only 4 acres fall into the high wildfire threat classification. 92.6% of RSIC land is has a No Risk classification, and most of the remaining land is in a Low Risk classification.

Table A-9: Reno-Sparks Indian Colony Wildland Fire Threat Classification by Acreage

	No Risk	Low	Moderate	High	Extreme	Total
Acreage	1,397	107	0	4	0	1,509

Source: AMEC; Montrose Interagency Fire Management Unit (MIFMU)

Analysis was also performed to determine total values at risk and critical and special facilities located within the community's wildfire threat zones. **Table A-10** summarizes the values at risk in the Reno-Sparks Indian Colony by wildfire classification and by property type. There are 3 parcels, with a total building and contents value of $183,048, that are classified as being in a High Risk area. There are 42 parcels, with a total building and contents value of $1,952,927, that are classified as being in a Low Risk area. And there are 4 parcels in the RSIC with an improved value of $105,908 that are classified as having no risk.

Table A-10: Reno-Sparks Indian Colony Wildfire Threat—Estimated Building Loss by Property Type

Property Type	Low				Moderate			
	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Residential	2	11,874	5,937	17,811	-	0	0	0
Commercial	31	1,063,216	531,608	1,594,824	-	0	0	0
Industrial	4	181,202	90,601	271,803	-	0	0	0
Agricultural	1	0	0	0	-	0	0	0
Open Space	-	0	0	0	-	0	0	0
Other	4	45,659	22,830	68,489	-	0	0	0
Unidentified	-	0	0	0	-	0	0	0
TOTAL	**42**	**1,301,951**	**650,976**	**1,952,927**	-	0	0	0

Property Type	High				Extreme			
	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Residential	1	0	0	0	-	0	0	0
Commercial	2	122,032	61,016	183,048	-	0	0	0
Industrial	-	0	0	0	-	0	0	0
Agricultural	-	0	0	0	-	0	0	0
Open Space	-	0	0	0	**-**	0	0	0
Other	-	0	0	0	-	0	0	0
Unidentified	-	0	0	0	-	0	0	0
TOTAL	**3**	**122,032**	**61,016**	**183,048**	**-**	**0**	**0**	**0**

Source: AMEC; Montrose Interagency Fire Management Unit (MIFMU); Washoe County GIS

Based on GIS analysis, there are no critical or special facilities in the Reno-Sparks Indian Colony located in moderate, high or extreme wildfire threat classification.

GIS analysis was completed with the county's wildfire severity data, and indicates that there is very little wildfire risk to the Reno-Sparks Indian Colony. However, the Hungry Valley Community Wildfire Protection Plan classifies Hungry Valley in a High Hazard Category, based on a hazard rating outlined in the Draft Community Wildland Fire Assessment for Existing and Planned Wildland Residential Interface Developments in Nevada.

A.2.6.6 Energy Emergency

Planning Significance:	Low

An energy emergency may affect the Reno-Sparks Indian Colony with an electricity outage or a fuel, coal or gas supply shortage. These incidents may be caused by electrical blackouts, pipeline malfunctions, fuel shipment disruptions or an unanticipated surge in demand.

The Hungry Valley community is especially vulnerable to energy emergencies. The community is located in a fringe area of the power grid and it is not uncommon to have power outages from time to time. Severe storms often cause the community to experience brief power outages. Also, wildfires have burned the power poles leading to the community and caused power outages. During severe storms emergencies such as snow storms where the nightly temperature can drop below freezing for long periods of time a power outage could have severe impacts to the community. The elderly and young children could be especially vulnerable to the freezing temperatures. The Reno community does have shelter facilities, but none have emergency back-up power at this time. The Hungry Valley community does have a shelter facility with back-up power and would be opened and utilized as a shelter for the residents in the event the power was out for a significant period of time. Two of the main productions wells that provide drinking water to the community have emergency back-up power and would still provide water to the community in the event of a power outage.

A.2.6.7 Hazardous Materials

Planning Significance:	Low

The Reno-Sparks Indian Colony is vulnerable to a hazardous materials release incident as there are fixed facilities within Colony property, much of the community is in proximity to major transportation corridors, and there are pipelines carrying hazardous materials close to the Colony land.

In addition to the past occurrences described in Section 5.4.3, Hazardous Materials that may have affected the RSIC, the following incident occurred (provided by RSIC Planning Committee member):

An explosion at the Maaco Paint Shop in the Reno-Sparks Indian Colony occurred in late April, 1999. There was significant damage to the building, but fortunately the business was completely shut down at the time. Two people were hurt; one died from injuries. The RSIC Emergency

Response Coordinator happened to be driving by at the time, and assisted the workers out of the building before the arrival of professional responders. One of the men was admitted to nearby Washoe Medical Center in critical condition with head injuries and later died from injuries. He was trapped under part of the collapsed ceiling and fire crews had to use power equipment to cut through the timbers to free him, KOLO-TV reported. The second man received cuts and scratches. Black smoke still was pouring from the building more than four hours after the blast as paint and solvents burned off. Cans of volatile liquids continued to explode into the morning. The explosion reduced the two-story building alongside U.S. 395 to rubble. Impacts of the explosion were handled at the city level.

Fixed Facilities

Many facilities and businesses within and in close proximity to the RSIC carry small amounts of hazardous materials that could adversely impact the population, property, and environment of the Colony.

Bulk storage areas within the Hungry Valley Reservation carry a wide range of flammable and combustible products listed as (1) petroleum products (e.g., gasoline, diesel, and kerosene), (2) liquefied petroleum gases (e.g., propane, butane), and (3) agricultural products (e.g., pesticides, caustics, and acids). This bulk storage can be at fixed facilities or can be in mobile containers; often, especially in agricultural applications, a container may be used for several different products.

The four main types of hazardous material transported adjacent to RSIC are flammable liquids, corrosives, oxidizers, and gases. A release of an extremely hazardous chemical on Hwy 395, such as Chlorine, would require immediate evacuation of all of the adjacent RSIC population. Secondary effects of a release might be fire, environmental damages, and airborne contamination.

A fixed facility analysis was performed to determine which critical and special facilities, as well as how much population, land in each of the fixed facilities' 'Level of Concern' radius. The 'Level of Concern' radius indicates approximated distances which the hazardous material spill will travel and harm people and property. See Section 3.4.4 Hazardous Materials for a detailed description of the analysis.

Based on that analysis, there were not any critical facilities in the Reno-Sparks Indian Colony that are within the 'Level of Concern' radii of the fixed facilities listed for the planning area. **Table A-10** lists those special facilities that are at risk to the fixed facilities.

Table A-10: Reno-Sparks Indian Colony Critical Facilities at Risk to Hazardous Materials Release Incidents – Fixed Facilities

Type	Name	Address	Alta Gold Company Olinhouse Project	Amerigas	Bayshore Truck Equipment Company	Berry Hinkley Terminal	Crumrine MFG Jewelers	Granite Constr. Co. Lockwood Hot Plant	Granite Constr. Co. Wadsworth Facility Cell	Henry Schein Company	Industrial Sterilization of Nevada	Model Dairy	Precision Rolled Products	R. R. Donnelly and Sons	SEA Corporation	7-Up Bottling Plant	Sierra Chemical Company	Sierra Sid's 76 Inc.	Sun Chemical	Time Oil Company	Union Pacific Railroad Sparks Yard	Washoe Medical Center
Senior Center	Reno-Sparks Indian Colony Senior Center	34 Reservation Rd.		■								■				■			■			■
Schools	Reno Head Start Center	34 Reservation Road		■								■				■			■			■
Care Facilities	Reno-Sparks Indian Colony Tribal Health Center	34 Reservation Rd.		■								■				■			■			■

According to the population analysis described above, there is the following Reno-Sparks Indian Colony population in the respective fixed facility 'Level of Concern' radii:

- 404; Amerigas
- 405; Model Dairy
- 405; 7-Up Bottling Plant
- 357; Sun Chemical
- 405; Washoe Medical Center

Transportation Corridors

The largest single threat to the life safety of the Reno-Sparks Indian Colony citizens is a chemical or hazardous material release along Highway 395, adjacent to trust lands located on both the east and west sides of Highway 395.

A transportation corridor analysis was performed to determine which critical and special facilities, as well as how much population, is located in key transportation corridors. The transportation corridor is a 1 mile buffer that was applied to Highways 80 and 395, as well as the Union Pacific Railroad. See Section 3.4.4 Hazardous Materials for a detailed description of the analysis.

RSIC critical & special facilities in transportation corridors will be listed here.

According to the analysis described above, there are a total of 485 Reno-Sparks Indian Colony citizens located in the transportation corridor.

A.2.6.8 Terrorism and Weapons of Mass Destruction

Planning Significance:	Low

A Weapons of Mass Destruction (WMD) vulnerability assessment was conducted for the Reno-Sparks Indian Colony All Hazard Mitigation Draft Plan in 2006 in order to review the potential effects of a hazardous material release on the population and on the environment. **Table A-10** reflects the list of targets that were assessed. Ranking Numbers and other specific threat information is confidential and not provided herein.

Table A-10: Reno-Sparks Indian Colony—Potential Weapons of Mass Destruction Targets

Target
Tribal Offices
Clinic
Smoke Shops
Hwy 395
Hwy 80
Water Storage Tanks Hungry Valley
Pump Houses – Hungry Valley

Target
HW Community Center Buildings
Main Power Lines – Hungry Valley

Source: Reno-Sparks Indian Colony All Hazard Mitigation Plan

A.3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. The Reno-Sparks Indian Colony reviewed the capabilities as listed in the 2010 plan update. Since the last plan update, there have been two changes in the Tribe's capabilities. One was completion of the Emergency Operations Plan in 2011. The other was completion of the Tribe's Continuity of Operations Plan in 2013.

A.3.1 Regulatory Mitigation Capabilities

Table A-11 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Reno-Sparks Indian Colony.

Table A-11: Reno-Sparks Indian Colony—Regulatory Mitigation Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Master plan	Yes	RSIC Land Use Plan 2000
Zoning ordinance	No	There are areas identified in the plan
Subdivision ordinance	No	There are areas identified in the plan
Growth management ordinance	No	
Floodplain ordinance	No	
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	No	Version: Use whatever versions of applicable codes
Fire department ISO rating	None	Rating: Use Reno Fire per Fire Agreement
Erosion or sediment control program	No	
Stormwater management program	Yes	Permits by Projects
Site plan review requirements	Yes	Project Specific
Capital improvements plan	Yes	Planning prepares the annual CIP
Economic development plan	Yes	ED dev prepares the annual ED plan & budget
Local emergency operations plan	Yes	Completed in 2011.
Other special plans	Yes	Continuity of Operations Plan completed in 2013.

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Flood insurance study or other engineering study for streams	Yes	Preliminary studies for Hungry Valley
Elevation certificates	No	

Reno-Sparks Indian Colony Plans/Documents

The following plans and documents pertain to the natural and manmade hazards that pose a threat to the Reno-Spark Indian Colony:

- RSIC All Hazards Mitigation Plan, 2006 (draft plan never approved or adopted by tribe)
- Hungry Valley Wildfire Community Protection Plan, July 2006
- Hazardous Material Plan
- General Reservation-Wide Disaster/Emergency Response Plan (2000)
- Emergency Operations Plan (EOP) (2011)
- Continuity of Operations Plan (2013)
- RSIC THIRA (2014)

A.3.2 Administrative/Technical Mitigation Capabilities

The Reno-Sparks Indian Colony Emergency Management Program operates under the direction of the RSIC Tribal Council. Day to day operations and direction for the program is conducted under the management of the Tribal Chairman who has delegated coordination actions to the RSIC Emergency Coordinator.

The final responsibility for all emergency management belongs to the Tribal Chairman. The Tribal Chairman and Council are responsible for all policy-level decisions. They are also required to be the approving body for public information releases to the public. During response operations, the elected officials will be available to their constituents to handle non-routine problems.

The Reno-Sparks Indian Colony Coordinator of Emergency Management has responsibility for coordinating the entire emergency management program, within the boundaries of the Reservation, and can make routine decisions within the limits of disaster authority. During emergency operations, the Coordinator ensures that all parties are working in a concerted, supportive effort to overcome the disaster. Specific people or departments are responsible for fulfilling their obligations as presented in the basic plan.

Table A-12 identifies the personnel responsible for activities related to mitigation and loss prevention in the Reno-Sparks Indian Colony.

Table A-12: Reno-Sparks Indian Colony—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	Tribal Planner	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	No		
Planner/engineer/scientist with an understanding of natural hazards	No		
Personnel skilled in GIS	No		Indian Health Service
Full time building official	Yes	Public Works Director	
Floodplain manager	No		
Emergency manager	Yes	Emergency Services Manager	
Grant writer	Yes		
Warning systems/services (Reverse 9-11, cable override, outdoor warning signals)	Yes		Washoe County Notification system per Emergency Management

Reno-Sparks Indian Colony Agencies/Boards/Commissions/Committees/Districts/Services

The following agencies and services provide support to the Reno-Sparks Indian Colony in the event of a natural or manmade hazard:

- 911 Dispatch Center
- Hungry Valley Response
- Emergency Operations Center
- Hungry Valley Volunteer Fire Department. The Hungry Valley Volunteer Fire Department provides fire suppression services for the Hungry Valley community and is associated with the Truckee Meadows Fire Protection District. Truckee Meadows Fire Protection District responds with additional resources according to their standard wildland fire dispatch. The closest career staffed fire station is Station #17 in Spanish Springs, approximately seven miles from Hungry Valley.

A.3.3 Fiscal Mitigation Capabilities

Table A-13 identifies financial tools or resources that the Reno-Sparks Indian Colony could potentially use to help fund mitigation activities.

Table A-13: Reno-Sparks Indian Colony—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Yes	

Capital improvements project funding	Yes
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric services	Yes
Impact fees for new development	Yes
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	Yes
Incur debt through private activities	Yes
Withhold spending in hazard-prone areas	Yes

Reno-Sparks Indian Colony Partnerships

The following partnerships exist to protect the Reno-Sparks Indian Colony against natural or manmade hazards:

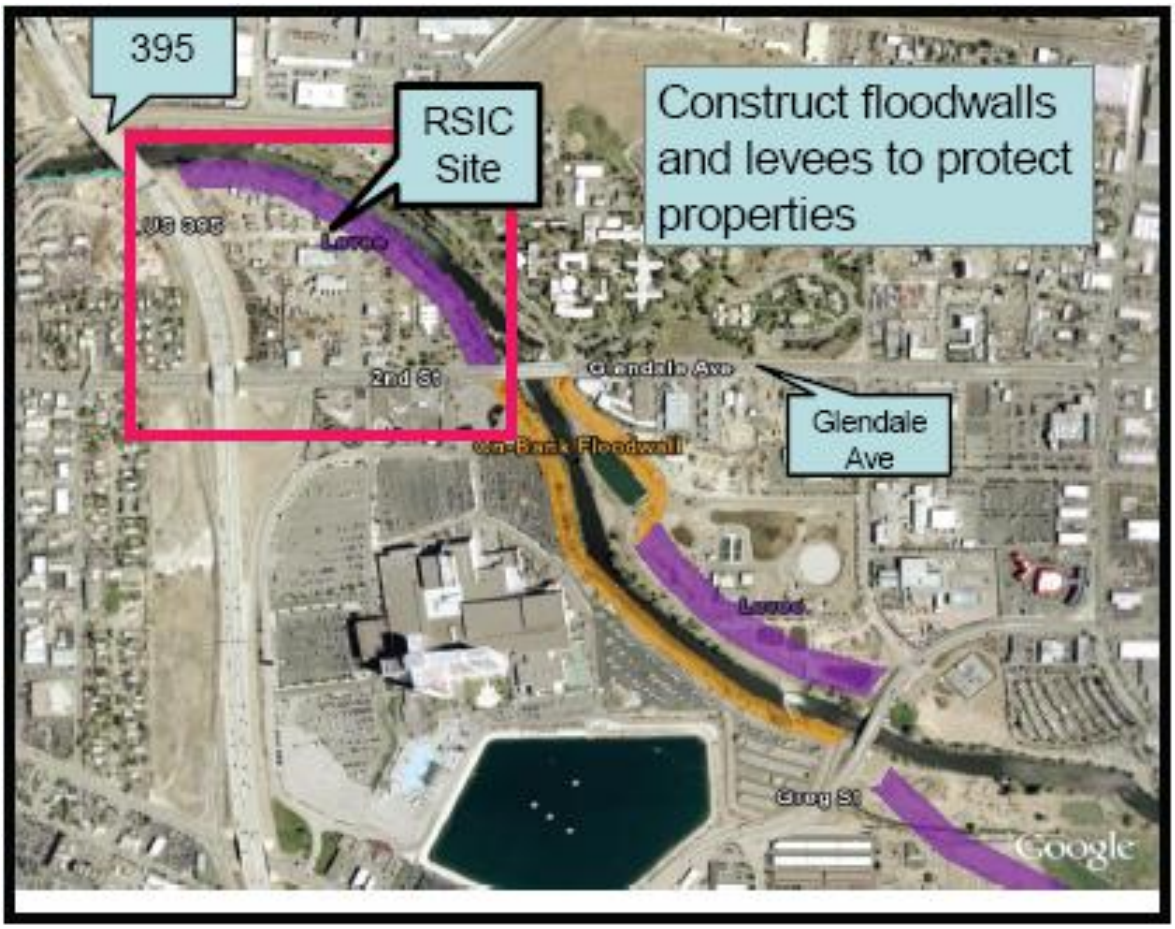
- Cooperative Agreement: RSIC and the City of Reno/Truckee Meadows Consolidated Fire Department. The RSIC emergency response capability, except for law enforcement, was strengthened with the signing of the Cooperative Agreement between the RSIC and the City of Reno/Truckee Meadows Consolidated Fire Department in December 2003. Since that time, the Tribe has made great progress in interfacing with the City and Fire District not only in Reno proper, but also in Hungry Valley.

A.3.4 Other Mitigation Efforts

The following mitigation programs and projects are in place to protect the Reno-Sparks Indian Colony against natural and manmade hazards:

- Reno-Sparks Indian Colony Levee/Floodwall Project. The RSIC Levee/Floodwall Project (also known as the TRAction Project) is a unique public-private partnership between the Truckee River Flood Project, Reno-Sparks Indian Colony, Washoe County, State of Nevada, and Wal-Mart to build the very first of more than 40 Truckee River Flood Project features. The floodwall and levee system was constructed in 2010 along the south bank of the Truckee River, from US 395 to Glendale Avenue (approximately 2300 feet). The levee/floodwall varies in height from 6-feet high starting near the US-395 Bridge and 11.5-feet high where it ends at the Glendale Bridge. The floodwall was partly concealed by a landscaped berm up to 5 feet high on the river side. The project features a path along the river side that will become part of a regional trail system. See Figure A-5 for the levee's position along the Truckee River. Benefits of this Project might include the following: managing flood waters and floodplains to protect life and property, improving access to the river for recreation, enhancing redevelopment of an area and achievement of Colony goals, and leveraging private dollars to achieve public community goals.

Figure A-5: Location of RSIC Levee/Floodwall Project along Truckee River

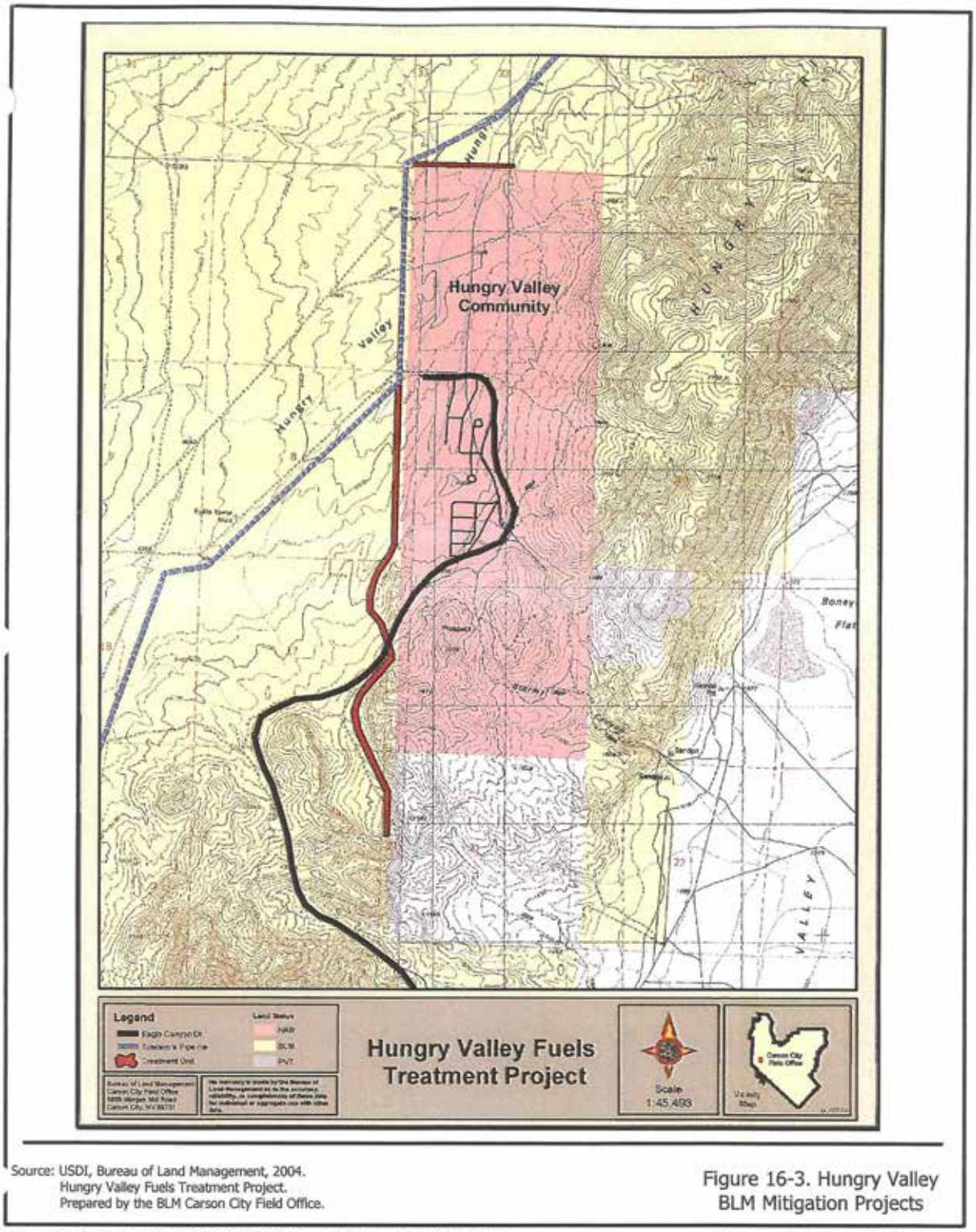


Source: Truckee River Flood Project;
http://truckeeflood.us/uploads/files/File/Fact%20Sheets/RSIC%20Fact%20SheetREVISED1.09.pdf

- Fuels Reduction Project. The Reno-Sparks Indian Colony's Hungry Valley Community and the Bureau of Land Management's Carson City Field Office jointly conducted a fuels reduction project on public lands in Hungry Valley, Nevada in order to reduce the threat of wildfire damage to homes and property in the community. The fuels treatment targeted a five-mile long strip of sagebrush, juniper trees, and native bunch grasses on the edge of the colony. A buffer 150 feet wide will provide protection from a large unburned area of vegetation. See 0 for the location of that buffer (colored in red). The colony, located 10 miles north of Sparks, has been threatened by wildfire in 1985, 1999, and 2000. The tribal council passed a resolution approving the project in November 2003. (Hungry Valley CWPP)

All mitigation projects or activities performed by the Tribe in the last 5 years have completed through funding from the Tribe's general fund. The Public Works Department has incorporated mitigation activities, such as cutting fire fuel breaks or cleaning out culverts into their regular maintenance.

Figure A-6: Hungry Valley Fuels Treatment Project Map



*Black line on map is Eagle Canyon Rd. Blue dotted line is the Tuscarora Pipeline. Red area is the Treatment Unit.

A.4 MITIGATION STRATEGY

A.4.1 Mitigation Goals and Objectives

The Reno-Sparks Indian Colony adopts the hazard mitigation goals and objectives developed by the HMPC and described Chapter 4 Mitigation Strategy.

A.4.2 Mitigation Actions

The planning team for the Reno-Sparks Indian Colony identified and prioritized prioritized mitigation actions based on the risk assessment. Table 8.2 in Section 8 Mitigation Strategy provides mitigation actions that are applicable to all jurisdictions. The following mitigation are specific to the Reno-Sparks Indian Colony. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Mitigation Action:

1. Fuel Management – Fire Breaks

Jurisdiction: Reno-Sparks Indian Colony (RSIC)

Priority: High

Issue/Background: The Hungry Valley Community has been designated as a high risk community for wildfire. There is a need to create fire breaks within the community to reduce the risk of fire. There are areas within the community that pose a high risk to fire; these areas are located behind residences, tribal buildings, and parks within the exterior boundaries of the Hungry Valley lands. A past project involving the BLM on creating a fuels reduction area on the outside of the exterior boundaries was well received by the tribal council and the residents. There is now a need to extend fuels management within areas of the community to provide protection closer to existing structures. The fire breaks once created would require annual periodic maintenance of these areas by ensuring these areas are kept cleared of combustible fuels.

Ideas for Implementation: The RSIC could with the appropriate funds implement a project by outsourcing the specified work to an independent contractor to perform the required work. Another option is purchase the equipment and conducts the work ourselves by utilizing existing workforces such as our Public Works and Housing personnel to perform the work. This option could be a cost saving if the workforce is structured in an efficient manner.

Responsible Office: Public Works

Partners: Housing Department, Emergency Services, Volunteer Fire Department

Potential Funding: Block grants, BLM and BIA funds

Cost Estimate: 50 to 100k

Benefits (Losses Avoided): The benefits would be that the tribe would have the capacity to implement and manage this type of project. The end result is that the risk of wildfire is reduced within the community.

Timeline: 1 to 2 years as funds become available.

2. Warning Systems

Jurisdiction: Reno-Sparks Indian Colony

Priority: Moderate

Issue/Background: The Hungry Valley community has a need for some type of community warning system. In the 2000 "Disaster/Emergency Response Plan" a community alert/siren warning system was identified as a method to alert to community in the event of a disaster/emergency such as a wildfire of earthquake, and that plans for a possible future system would be underway. Of course a system was never implemented because of the high cost of these devices. The use of the Emergency Alert System (EAS) was also identified as well as the National Weather Radio (NOAA) as sources that would be utilized during a disaster scenario.

Ideas for Implementation: The Hungry Valley community is a rural community and in the event of a major disaster such as a wildfire, earthquake or weather related emergency or critical incident such as pandemic flu could find itself isolated from the outside. The community would benefit from some type community warning system that used a loud horn or siren to alert the public of emergencies. There are rural areas that do utilize audible warning devices to alert residents during emergencies. The devices could be programmed to sound different levels and series of sounds for different types of emergencies. The residents would have to be educated on the use of the system and community drills would have to be practiced periodically. The use of NOAA weather radios by community residents would also be encouraged.

Responsible Office: Office of Emergency Services

Partners: Fire Department, Police

Potential Funding: Block grants

Cost Estimate: 20 to 25k

Benefits (Losses Avoided): The benefit would be an alert system that would alert the community in the event of emergencies.

Timeline: 1 to 2 years depending on funding source availability.

3. Emergency Planning – Activating the EOC

Jurisdiction: Reno-Sparks Indian Colony

Priority: High

Issue/Background: There is a need to have the necessary resources available in implementing and activating an Emergency Operations Center (EOC). The emergency response plan requires that areas for setting up an EOC be identified in the event of a major disaster/emergency. The RSIC has identified areas and locations for an EOC, but these areas currently lack the necessary amenities for an effective EOC such as uninterruptable power, communications, etc. because

RSIC is composed of two communities that are separated by distance, logistics has always proven to be a challenge. The Hungry Valley area has a facility that has stand-by power consisting of back-up generators, but the Reno area has no facility at this time that can provide these resources.

Ideas for Implementation: The options are to install back-up power in a facility in Reno that has the required amenities for an effective EOC. The other alternative and one that deserves consideration is to have a mobile EOC or command post that could be utilized in any location if situation required it.

Responsible Office: Office of Emergency Services

Partners: Tribal Police, Fire Department

Potential Funding: Block Grants, Assistance to Firefighters grant

Cost Estimate: 100 to 250k

Benefits (Losses Avoided): The RSIC would have the facilities and resources it needs to activate and locate the EOC.

Timeline: 1 to 3 years as determined by funding availability

4. Post Disaster Mitigation – Building Inspections

Jurisdiction: Reno-Sparks Indian Colony

Priority: Medium

Issue/Background: The RSIC has a need to have all of the buildings inspected for structural integrity prior to any major disaster event. The RSIC has essential, historic and economic facilities that need to be inspected and prioritized as to there ability to withstand any significant stress and impact that different disasters pose to them. The end result would be a report on all of the structures located on the RSIC. This report would be essential if RSIC were to seek funding to retro fit any buildings to meet more stringent codes for building integrity.

Ideas for Implementation: The current situation is the availability of funding to get any type of post inspection completed. If RSIC wants to get this done they have to make it a priority and go after funding to complete this project. The Public Works Director had requested an inspector position in his budget for this year, but it was denied because of budget reductions per the Tribal council.

Responsible Office: Public Works

Partners: Emergency Services, Planning Department

Potential Funding: Block grants

Cost Estimate: 40 to 50k

Benefits (Losses Avoided): A post inspection of all RSIC buildings would certainly be beneficial from the standpoint of having vital information on all of the building stock. Having

this information might be important for purposes of general liability insurance on all RSIC facilities; it might even prove to save the tribe money in the end.

Timeline: 1 to 3 years depending on funding availability

5. Property Protection: Drought – Improve Water Supply

Jurisdiction: Reno-Sparks Indian Colony

Priority: High

Issue/Background: The RSIC Hungry Valley community is in an area of high desert with limited rainfall and no available surface water resources. All of the drinking water is supplied by groundwater wells that pump water through transmission lines to an elevated storage tank on a hill above the community. The storage tank in turn supplies water to the community via a water distribution system which in turn supplies the homes and commercial facilties with water. The Hungry Valley community is classified as a public water system and must all of the drinking water regulations as required under the US EPA for public water systems. The water system utilizes four (4) production wells that serve the community with its drinking water needs. The system has in the past had problems with low pumping water levels in two of its main production wells. These wells also provide all of the water fire flows necessary for fire suppression for both structure and Wildland. On-going efforts to drill additional wells and increased storage capacity have been considered for future expansion needs. These projects are being considered, but due to limited funding are only at the planning stage. Another idea to explore is to partner with other agencies i.e. TMWA on tapping into their existing sources such as transmission lines and importing water to our community.

Ideas for Implementation: There have been pumping studies on all of the wells to date. These studies will be vital when applying for grants or low interest loans as a public works type project. Up to date capital improvement plans also need to be completed and ready for submission.

Responsible Office: Public Works Department

Partners: Planning dept.

Potential Funding: Block grants. Rural assistance grants, State Revolving funds, EPA for planning studies.

Cost Estimate: 400 to 500k per well

Benefits (Losses Avoided): The direct benefit to the RSIC would be an increase in the water supply for community needs for consumption, and fire suppression.

Timeline: 1 to five years depending on funding availability

6. Property Protection: Wildfire: Create Defensible Space (DS)

Jurisdiction: Reno-Sparks Indian Colony

Priority: High

Issue/Background: The Hungry Valley Community has been designated as a high risk community for wildfire (2006 Hungry Valley Wildfire Assessment). There is a need to create "Defensible Space" or zones of protection around all residential and commercial structures in Hungry Valley. Defensible space was identified as the most important mitigation action effort as identified in the "2006 Hungry Valley Community Wildfire Protection Plan". The need to create defensible space zones is an on-going effort that involves educating the residents on the benefits of having all vegetation and combustible materials cleared away from their homes to least a minimum distance of 50 ft. or more.

Ideas for Implementation: The implementation of a project would include getting the community to buy in to the benefits and validity of creating DS around their homes. Community workshops and demonstration projects seem to be the most effective methods of doing this. Also, educational information in the community newsletter is helpful in communicating this as well. Once areas of high hazard have been identified a scope of work would be prepared that would include community education efforts as well as costs for fuels reduction removal.

The RSIC would with the appropriate funds implement a project by outsourcing the specified work to an independent contractor to perform the required work. Another option would be to purchase the equipment and perform the work ourselves by utilizing existing RSIC staff, such as our Public Works and Housing personnel

Responsible Office: Emergency Services

Partners: Fire Department, Housing program, Planning, Environmental and Public Works and the Nevada Fire Safe Council.

Potential Funding: Community Block grants, Department of Agriculture Rural grants, Nevada Fire Safe Council.

Cost Estimate: 50 to 60k

Benefits (Losses Avoided): The benefits of this program would be life safety and property protection. Another benefit would be demonstrating to residents that DS is a safety measure in the protection of their homes in the event of a wildfire. Also, having a DS around their home would bring added piece of mind knowing that their homes and property would have added protection. It is much less expensive to create DS than it is to build or repair a home damaged by wildfire.

Timeline: 1 to 2 years depending on funding

7. Structural Projects: Culvert Maintenance

Jurisdiction: Reno-Sparks Indian Colony

Priority: Medium

Issue/Background: The Hungry Valley community has a need to have the culverts in this area maintained. The housing area and the roads are built on a slope as a result the culverts under the roads received a lot of run-off and they get blocked with silt and sediment. Our maintenance staff has periodically cleaned them out, but it seems as if they don't have the time or the proper equipment to maintain them on regular basis. We are aware that if the culverts aren't maintained they could spill over during high flows and damage the roadway and possibly structures.

Ideas for Implementation: One idea is to have the proper equipment such as the County or the State has to properly maintain the culverts i.e. vacuum trucks or high pressure water devices to flush them out.

Responsible Office: Public Works

Partners: Emergency Services, Planning

Potential Funding: Block grants

Cost Estimate: 150 to 200k

Benefits (Losses Avoided): The direct benefit would be realized during high flood periods. The culverts would work as designed and channel the water efficiently under the roadways.

Timeline: 1 to 3 years depending on funding availability

8. Structural Projects – Drainage System Maintenance

Jurisdiction: Reno-Sparks Indian Colony

Priority: Medium

Issue/Background: The Hungry Valley community has a need to have the drainages maintained. There are natural drainages crossing the roadways and the homes these areas do need to be maintained just like the culverts. The drainages receive a lot of run-off during rainstorms and everything finds its way into the drainage areas and into the culverts and roadway ditches. Our maintenance staff has periodically cleaned them out, but it seems as if they don't have the time or the proper equipment to maintain them on regular basis. The drainage areas need to be cleared of sediment and material at least once a year.

Ideas for Implementation: Develop maintenance schedules to inspect and maintain the drainages and culverts at least once a year. Hire a consultant to perform drainage studies on the watershed to determine flows.

Responsible Office: Public Works

Partners: Planning, Housing

Potential Funding: Block grants

Cost Estimate: 15 to 20k

Benefits (Losses Avoided): The direct benefit would be to have the watershed areas identified for flows.

Timeline: 1 to 2 years depending on funding

9. Public Information – Outreach Projects

Jurisdiction: Reno-Sparks Indian Colony

Priority: Medium

Issue/Background: The need to disseminate information to the public is always beneficial. The Reno-Sparks Indian Colony programs do provide information to the community. The RSIC would like to initiate a more comprehensive outreach project to our communities utilizing all forms of media i.e. mailings, media, web, speakers bureau and displays.

Ideas for Implementation: The RSIC does have web-site and it could be updated to include information on hazards, fire safety, environmental and other relevant info. Create displays for community events. Create brochures and hand-outs. Have workshops and seminars and invite speakers who have expertise in specific areas of interest.

Responsible Office: Emergency Services

Partners: Environmental Department, Housing, Fire Department

Potential Funding: Fire Prevention grants, State grants

Cost Estimate: 5 to 10k

Benefits (Losses Avoided): The benefit to the community is to keep them informed on various subject areas i.e. Public safety, Personal safety, Hazards, etc.

Timeline: 1 to 2 years – on-going

A.4.3 Monitoring Progress of Mitigation Activities

The Reno-Sparks Indian Colony has not completed any mitigation actions from the 2010 plan. Mitigation actions are either ongoing or not completed due to funding limitations.

While there was no method discussed in the previous plan regarding how mitigation measures and projects closeouts would be monitored, the RSIC does have a system in place for monitoring grant funding. The Reno-Sparks Indian Colony maintains control over Grant Projects with Accufund Accounting Software. Budgets are created and input into the software after being approved by the Tribal Council and signed off by the Tribal Chairman, Secretary, CFO, Administrator Department Head and the Contracts and Grants Manager. Once grant funding is received, the Contracts and Grants office works the Department Manager to make sure all grant program requirements are met. Financial information is tracked separately for each grant. All costs are verified by Grant managers, Contracts and Grants manager, Payroll, and Accounts Payable before entering the system. The expenditures are posted to the system and reports are routinely printed and verified by Grant Manager and Fiscal Staff. Features of the software include:

- Grant Status - approval status, awarding agency, beginning, ending and extension dates
- Grant Budget - last revision date, amount, indirect and fringe rate and a history of all changes

- Grant Reporting - history of all submissions - required date and when actually sent, plus the ability to attach an image of the report for reference
- Grant Tasks - Define each required task, staff assigned and status
- Financial Query - Get inception-to-date financial data summarized to match the grant reporting categories with our "Quick Reports" function and export to MS Excel

A.5 PLAN ADOPTION AND ASSURANCES

The Reno-Sparks Indian Colony will adopt this plan in accordance with FEMA requirements for plan adoption requiring formal adoption by the governing body of the Indian Tribal government prior to submittal to FEMA for final review and approval. A sample adoption resolution is included in Appendix E.

With the formal adoption of this plan by the tribal governing body, the Reno-Sparks Indian Colony assures that their tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.1(c) and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR 13.11 (d).

B.1 COMMUNITY PROFILE

B.1.1 Geography

The Pyramid Lake Paiute Tribes' Reservation is located thirty five miles northeast of Reno, in a remote desert area. The reservation contains about 510,000 acres, of which approximately 112,000 acres cover the surface of a terminal desert lake, Pyramid Lake. Pyramid Lake is one of the most valuable assets of the Tribe and is entirely enclosed within the boundaries of the reservation. Pyramid Lake is approximately 15 miles long and 11 miles wide. The lake measures 350 feet at its deepest point.

B.1.2 Population

The estimated 2007 population of the Pyramid Lake Paiute Tribe is 1,714. The 2009-2013 American Community Survey for the U.S. Census Bureau reports a population of 1,619. 45% of the population resides in Wadsworth, Nevada; and 15% of the population resides in Sutcliffe, Nevada. The Pyramid Lake Paiute Tribe has approximately 2,253 enrolled members. The membership statistic is an approximate number as this total changes from month to month based on membership approvals and other action taken by the Tribal Council. The majority of enrolled Tribal members reside on the reservation; approximately 12% of this membership resides in other areas throughout the Western United States. The Pyramid Lake Paiute Tribe has a 56%

employment rate and a 44% unemployment rate. The majority of the reservation resident population is young, comprised of individuals under age thirty-five (35) years. The median age is twenty-two (22) years.

B.1.3 History

The reservation land was first set aside for the Northern Paiute by request of the Bureau of Indian Affairs in 1859. The reservation was not surveyed until 1865. The status of the reservation was very uncertain until President Ulysses S. Grant affirmed its existence by executive order on March 23, 1874. At that time the creation of reservations by the executive branch was novel - most previous reservations were created by treaty or congressional legislation. Subsequent court decisions have affirmed the validity of reservations created by the executive branch, and have set the establishment date for the Pyramid Lake Reservation at 1859, not 1874. This earlier date is important both with regards to the priority date of tribal water rights, and the status of non-tribal claims to land within the reservation. The tribe has fought a long series of legal battles on both these issues.

B.1.4 Economy

Much of the economy on the Pyramid Lake Reservation is centered on fishing and recreational activities at Pyramid Lake. In addition to permit fees for fishing, day use and overnight camping, the Tribe also receives lease revenue, and tax revenue. Several Tribal members belong to the Pyramid Lake Cattleman's Cooperative Association and the Association utilizes the reservation desert open range to operate and manage the individual cattle herds.

B.1.5 Planning Process

The planning process for the Washoe County RHMP began in August 2014 and continued through December 2015. Aaron Kenneston, Washoe County Emergency Management and Homeland Security, formed the advisory body, known as the Planning Committee, utilizing staff from the Local Emergency Planning Committee (LEPC), relevant County and City agencies and community organizations. The Planning Committee members are listed in **Table 4-2**. The Planning Committee meetings are described in section 4.2.2. Meeting agendas and handouts are provided in **Appendix C**.

The County and all participating jurisdictions were adeptly represented in the regional planning effort by team members who perform multiple functions within the local jurisdiction. In most cases one or more representatives for each jurisdiction attended the RHMP meetings. Additionally, representatives from the City of Reno, City of Sparks, RSIC, PLPT and TRFMA reported back to their local jurisdictions and worked within their local government structures to collect data, identify mitigation actions and implementation strategies, and review and provide data on plan drafts.

Don Pelt, Emergency Manager, provided information on the hazard profiles and the PLPT Annex. He reported back to his supervisor, the Tribal Programs Officer, who kept the Tribal Council apprised of the planning process. The consultant worked with Don via phone and email as well. In June of 2015, Aaron Kenneston, Washoe County Emergency Manager, and the consultant met with Done Pelt and other tribal members to discuss the critical facilities and infrastructure, vulnerability assessment, mitigation actions, and Tribal Annex. Attendees of that meeting included Cassandra Darrough, Emergency Management Services; Donna Noel, Natural Resources Director; and Bonnie Akaka-Smith, Interim Environmental Director. They reviewed the entire draft document of the Tribal Annex and provided input.

B.2.1 HAZARD PROFILES AND VULNERABILITY ASSESSMENT

The intent of this section is to assess the Pyramid Lake Paiute Tribe's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 6 Vulnerability Assessment in the main plan.

Data Deficiencies

The 2010 Plan updated noted that limitations in data did not allow for the determination of values associated with critical and special facilities located within the planning area. However, during the 2015 update, the Tribe did provide updated data for critical and special facilities.

For the 2015 update, there were some data limitations regarding GIS information readily available to Washoe County GIS department who was preparing the vulnerability analysis. Future iterations of the plan will work towards resolving this issue. Additionally, there is no FEMA mapped floodplain within the Pyramid Lake Paiute Tribe even though there is known flooding. It is anticipated that the Truckee Meadows Flood Control Project being prepared by the U.S. Army Corps of Engineers will provide floodplain data that can be used in future updates.

B.2.1 Hazard Identification

PLPT's planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific to the Tribe (see **Table B-1**). In the context of the countywide planning area, there are no hazards that are unique to the Pyramid Lake Paiute Tribe. Only those hazards ranked of moderate, high, or very high significance that vary from the risks facing the entire planning area are profiled in this annex.

Table B-1: Pyramid Lake Paiute Tribe Hazard Ranking

Very High Risk	High Risk	Moderate Risk	Low Risk
Drought Earthquake Flood Wildland Fire	Infectious Disease Energy Emergency Nuclear Waste Transport Terrorism/WMD/Acts of Violence	Hazardous Materials Severe Storms	Avalanche Volcano Civil Disorder

B.2.2 Community Asset Inventory

This section defines and quantifies populations, buildings, critical facilities, and other community assets at risk to natural and manmade hazards in the Pyramid Lake Paiute Tribe.

Table B-2 shows the total population, number of parcels, and assessed value of land and buildings in the Pyramid Lake Paiute Tribe

Table B-2: Pyramid Lake Paiute Tribe—Maximum Population, Land/Building Exposure

2009-2013 American Community Survey	Number of Parcels	Assessed Land Value ($)	Assessed Building Value ($)	Total Value ($)
1,619	250	73,704,196	2,579,774	76,283,970

Source: Washoe County Geographic Information Systems (parcels and assessed values) ; 2009-2013 American Community Survey, U.S. Census

Assets directly owned and controlled by the Pyramid Lake Paiute Tribe include a range of properties and equipment from each department. These may include PLPT-owned property, critical facilities and infrastructure, cultural and natural resources and others. An inventory of key city assets provided by the Planning Committee is listed in **Table B-3**.

Table B-3: Pyramid Lake Paiute Tribe—Community Assets Inventory

Name of Asset	Type	Replacement Value ($)	Occupancy/ Capacity #	Hazard Specific Info
Pyramid Lake Police Department	CF	$250,000	12 persons	Flooding Fire
Pyramid Lake Fire Department	CF	$700,000	30 persons & Equipment	Flooding Fire
Pyramid Lake Health Clinic	CF	$750,000	25 persons & Equipment	Flooding Fire
Pyramid Lake Tribal Offices	CF	$900,000	40 to 200 persons	Fire
Wadsworth Day Care	CF	$450,000	35 to40 persons	Fire Flooding
Natchez Elementary School	CF	$2.0 Million	500 people	Fire Flooding

Name of Asset	Type	Replacement Value ($)	Occupancy/ Capacity #	Hazard Specific Info
Lincoln Highway Bridge in Wadsworth	CF	$2.0 Million		Flooding
Pyramid Lake Gym Nixon alternate EOC	CF	$400,00	250 people	Flooding Fire
Sewer Lagoon and Lift Stations Wadsworth	CF	$45,000	Serves Community	Flooding
Paiute Pipe Line	CF	Unknown	Extends All The Way Through Reservation	Fire, Earthquake, Severe Flooding
Nixon Day Care	CF	$450,000	35 to 40 people	Fire Flooding
Highway's 447 & 446 445	CF	$50.0 Million	Serves all three communities	Flooding Fire
Sewer Plant and Lift Station Sutcliff	CF	$45,000	Serves Community	Flooding Power Loss
Wells In Nixon, Wadsworth and Sutcliffe	Critical Infrastructure	$400,000	Serves Communities	Flooding Power Loss
Traditional Hunting and Gathering Places	Cultural and Historical	Unknown	None	Flooding Fire
Cui Qui	Endangered Species	Unknown	Limited Number in Pyramid Lake Only	Flood, Drought
Lahonton Cut Throat Trout	Endangered Species	Unknown		Flood, Man Caused Disease
Needles, Stone Mother and Pyramid in the Lake	Cultural and Historical	Unknown	Only Exist at Pyramid Lake	Flood, Earthquake, Man
Petroglyphs	Cultural and Historical	Unknown		Flood, Man
Alfalfa Fields	Economic	$700,000	Agricultural Product	Flood, Fire

Source: Pyramid Lake Paiute Tribe

B.2.3 Critical and Special Facility Inventory

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. Such facilities include airports, fire stations, police stations and government buildings. An inventory of critical facilities in the Pyramid Lake Paiute Tribe is provided in **Table B-4** and mapped in **Figure B-1**.

Special facilities are those which house or serve special needs or vulnerable/at-risk populations that cannot care for themselves during emergencies and/or require unique support services. Such facilities include schools and child care centers, health care facilities, and senior centers. An inventory of special facilities in the Pyramid Lake Paiute Tribe is provided in **Table B-5** and also mapped in **Figure B-1**.

Table B-4: Pyramid Lake Paiute Tribe —Critical Facilities Inventory

Type	Name	Address
Fire Stations	Pyramid Lake Fire Station 241	675 Sutcliffe Dr.
Government Buildings	Wadsworth Justice Court	390 W. Main St.

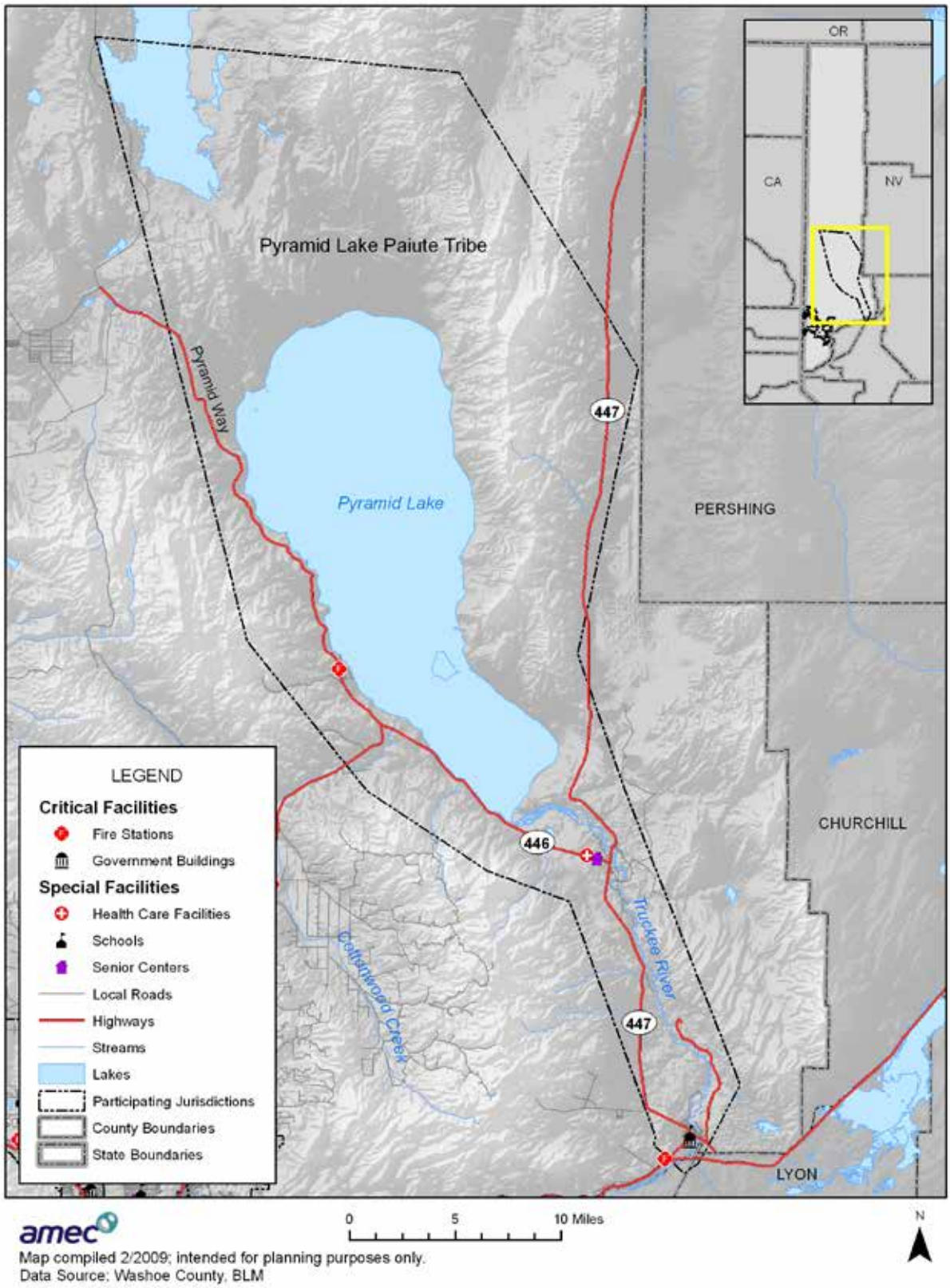
Source: Washoe County Geographic Information Systems

Table B-5: Pyramid Lake Paiute Tribe —Special Facilities Inventory

Type	Name	Address
Health Care Facility	Pyramid lake Paiute Tribe Health Clinic	705 Highway 446
School	Natchez Elem	1 SR 447
Senior Center	Numaga Senior Center	705 Hwy 446

Source: Washoe County Geographic Information Systems

Figure B-1: Pyramid Lake Paiute Tribe Critical and Special Facilities



B.2.4 Other Assets

Assessing a jurisdiction's vulnerability to disaster also involves inventorying the natural, historical, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Information on the natural, historical, and cultural assets specific to the Pyramid Lake Paiute Tribe that are affected by hazards are listed in Table B-3 above.

B.2.5 Growth and Development Trends

Table B- 6 illustrates how the PLPT has grown in terms of population between 1993 and 2009.

Table B-6: Pyramid Lake Paiute Tribe — Change in Population, 2007-

1993 Population	2007 Population Estimate	2009-2013 American Community Survey	Estimated Percent Change 1993-2009
1,603	1,714	1,619	1

Source: Pyramid Lake Paiute Tribe; U.S. Census

Due to the economic downturn, development in the last 5 years has been minimal. The tribe is in the process of developing an economic development plan that will expand commercial businesses into the Wadsworth area. They are in the early stages of replacing all sewer lines in the Wadsworth area to accommodate this anticipated commercial growth. The water lines have been replaced and updated to better serve the community. The Wadsworth area sits in a low area that has experienced flooding in years past. The 1997 flood sent a large amount of water down the river which runs through the Wadsworth community causing extensive flooding in the Wadsworth area. Prior to development of this area, a mitigation project will need to be developed and then completed to protect this community in the future.

Additionally, new housing developments are proposed in the Sutcliffe area. Existing hazards have been considered for each of the above future development sites. Future development will be required to meet building code requirements and zoning ordinances which will mitigate hazard impacts.

The next issue would be wildland fires. Pyramid Lake Reservation is the largest reservation in the State of Nevada with 475,000 acres constituting 742.2 square miles of land. Wildland fires are common on the reservation and continue to become more frequent and larger. Fire protection is another mitigation issue that has to have a plan and then be executed to reduce the increasing wild land fire threat. As more people discover Pyramid Lake for recreational use, this threat will continue to increase while resources and manpower continue to decrease.

B.2.6 Vulnerability by Hazard Methodology

The vulnerability assessment analyzes the population, property, and other assets at risk in the Pyramid Lake Paiute Tribe to hazards ranked of moderate, high, or very high significance that may vary from other parts of the planning area. For each hazard, there is a brief hazard/problem description, any past occurrences that have been provided by the Planning Committee, and a vulnerability overview for the hazard specific to the Pyramid Lake Paiute Tribe. The hazards included are listed in **Table B-7**.

Table B-7: Pyramid Lake Paiute Tribe Significant Hazards

Natural and Manmade Hazards	Planning Significance
Drought	Very High
Earthquake	High
Flood: 100 and 500 –year Events	High
Flood: Localized Floods	High
Flood: Dam/Levee Failure	High
Severe Storms: Severe Winter Storms	Moderate
Wildland Fire	Very High
Hazardous Materials	Moderate
Energy Emergency	High
Terrorism and Weapons of Mass Destruction	High

B.2.6.1 Drought

Planning Significance:	Very High

Drought is an event that the tribe deals with each and every year. There are a number of alfalfa farms on the reservation that rely on their allotment of water each year. Droughts seem to run in five to ten year cycles with the Tribes share of crop water being reduced as the overall water within Washoe County is reduced. Drought also affects the tribe number one source of income, Pyramid Lake. As water levels are reduced the flow from the Truckee River is reduced. The river flow cannot keep up with the evaporation rate of the lakes water and the water levels of the lake

go down by feet each year. This affects both the summertime recreation as well as the fishing season at Pyramid Lake.

B.2.6.2 Earthquake

Planning Significance:	High

As previously stated in Section 5.3.3 of the base plan, the State of Nevada is one of the three most seismically active states in the U.S., and Washoe County is located in one the most seismically active areas in Nevada. **Figure B-8** in **Appendix B** identifies the major fault lines in Nevada.

All of Washoe County is susceptible to the effects of earthquakes. The location of seismic activity in the State of Nevada from 1852-2005 is indicated in **Figure 5-13** in Section 5.3.3 Southern Washoe County has higher probabilities of occurrence and the built environments of Reno, Sparks, and areas north of Lake Tahoe make for severe potential impacts.

To assess risks and vulnerability to the state, the Nevada Bureau of Mines and Geology ran FEMA's loss-estimation model, HAZUS-MH, in August 2014.

Loss estimates were provided, using five earthquake scenarios located at an epicenter in downtown Reno (-119.81 longitude, 39.52 latitude) at magnitudes of 5.0, 5.5, 6.0, 6.5, and 7.0. Each of the earthquake scenarios can create surface offsets, may be of long duration, and can cause significant damage to the Cities of Reno, Sparks and surrounding areas. A magnitude 7 earthquake can cause widespread structural and nonstructural damage, and requires a significant "recovery period" for communities to get back to the way they were before the quake.

Table 6-14 and **6-15** in the earthquake vulnerability of Section 6.4.3 helps quantify the HAZUS-MH loss estimation for the City of Reno and City of Sparks. Damage estimates in the earthquake vulnerability discussion in Section 6.4.3 were created to show impacts to the County as a whole, and do not include any city specific data. Property damage would be greatest in City of Reno and the City of Sparks where development, specifically unreinforced masonry structures, is abundant. (See **Figure B-9** in **Appendix B**.)

B.2.6.3 Flooding

Planning Significance	
100 and 500 –year Events	High
Localized Flood	High
Dam/Levee Failure	Moderate

Flood: 100 and 500-year Events. The tribe has a plan for a 100-year event but has not done planning for a 500-year flood. The tribe has experienced a 100-year flood event that caused extreme damage on the reservation. The tribe has planned for this level of flooding but is at the mercy of nature as they have not been able to implement a mitigation plan to address this hazard.

Flood: Localized Floods. The tribe experiences small local events that they are able to manage on at their level. Most of these types of floods are caused by heavy rains which flood the irrigation canals that plug up with small debris from the rain waters.

Flood: Dam/Levee Failure. The tribe has noted that there are a number of issues with one dam up river from the tribe. We have factored that into the 100 and 500-year flood plan for the tribe.

The Pyramid Lake Paiute Tribe is at risk to both 100 and 500–year events, and to localized flooding events.

The final segment of the lower Truckee River Basin lies below Wadsworth and includes a 25-mile long broad, alluvial valley stretching to Pyramid Lake. This portion of the basin also includes the Pyramid Lake Basin, and to the east over the Lake Range, the Winnemucca (dry) Lake Basin.

There is not a mapped floodplain in the Pyramid Lake Paiute Tribe area. Pyramid Lake and the Truckee River are likely to flood in the event of heavy precipitation. Because the area has not been included in the DFIRM analysis, a vulnerability assessment was not conducted for this jurisdiction.

The Pyramid Lake Paiute Tribe planning team contributed the following information of past flooding occurrences. This serves as additional information to the past flooding occurrences that may have affected the reservation listed in Section 5.3.4.

- In January 1997, the 100-year flood affected the PLPT near Wadsworth and Nixon. Six houses, two trailer parks and the fisheries building suffered major flood damage. Several roads and water lines were compromised. There was extensive highway repair needed to Lincoln Highway, Natchez Elementary, Highway 447, Highway 445 following this event.

All lake facilities such as restrooms, shops, campgrounds, and underground septic systems were destroyed and most fishing and recreational activities on the lake halted for several months. Disaster relief funding was provided for the trailer parks and for the homes that sit on lower ground.

- In April 2006, a localized flood occurred in the Nixon and Wadsworth area causing flooding of homes on the lower plain area and damage to roads and power poles. FEMA arrived on site for property damage evaluation after the PLPT had requested financial aid for damage to their roads and homes.
- In February 2008, a flash flood occurred near the Nixon Nevada Highway 447 in the area of the court and the post office. The flood damaged the northbound lane of the highway and washed weeds and brush into an irrigation canal, plugging an important culvert along the road. Water entered the courthouse and caused damage to its floor.

National Flood Insurance Program

The Pyramid Lake Paiute Tribe does not participate in the National Flood Insurance Program.

B.2.6.4 Severe Weather

Planning Significance:	
Extreme Heat	High
Severe Winter Storms	High
Windstorms	Moderate

Severe Winter Storms

The tribe experiences these types of storms on an average of one or two a year. Being isolated, the tribe has purchased a truck with a plow and sanding capabilities to keep the main roads leading in and out of the reservation open. The State also responds quickly keep these roads open. The tribe experiences high winds with blowing snow quite often and has not planned for these types of events as of this date. The all hazards plan addresses high winds but has not combined both high winds and winter storms into a hazard.

Thunderstorms are common types of severe storms in the State of Nevada. The main threats from thunderstorms are lightning, flooding, straight-line winds, hail and tornadoes. High winds can accompany severe storms and thunderstorms in the State.

The Pyramid Lake Paiute Tribe planning team contributed information of a past windstorm occurrence. This information is in addition to the past windstorm occurrences that may have affected the reservation listed in Section 5.3.6.

- A windstorm with gusts in excess of 80 mph hit the PLPT on January 8, 2008. The roofs and walls of tribal offices, two daycare centers and a tribal clinic were damaged. In addition, there was water damage from rain being pushed through window frames. There was a reported $13,000 of insured losses.

B.2.6.5 Wildland Fire

Planning Significance:	High

The tribe deals with this hazard for six to eight months each year. Planning for wildfires is difficult. There are procedures in place for response and attack as well as mitigation but for overall planning the tribe refers back to the Incident Command plan. The tribe spends a considerable amount of time on fire watches as well as standing up stations when the possibility of lighting-caused fires exists. The tribe has addressed this hazard in the EOC plan, but that plan refers to response more than mitigation of these type of incidents.

Following the methodology described in the wildfire vulnerability discussion in Section 3.5.3, a wildfire analysis was performed on the Washoe County planning district; results were sorted by jurisdiction.

The acreage of each wildfire risk classification within each community was determined. **Table B-8** summarizes the acreage at risk in the Pyramid Lake Paiute Tribe. See **Figure B-2** for a map of the wildfire classifications within the Pyramid Lake Paiute Tribe.

Table B-8: Pyramid Lake Paiute Tribe—Wildfire Threat Classification by Acreage

No Risk	Low	Moderate	High	Extreme	Total
448,086	341	73	14,407	0	462,907

Source: AMEC; Montrose Interagency Fire Management Unit (MIFMU)

Analysis was also performed to determine values at risk and critical and special facilities located within Washoe County's wildfire threat zones. **Table B-9** summarizes the values at risk in the Pyramid Lake Paiute Tribe by wildfire classification and by property type. Although most of the tribe's land is classified as 'no risk', 75% of the Pyramid Lake Paiute Tribe's parcels are in a High wildfire threat zone.

Based on GIS analysis, there are not any critical or special facilities within the Pyramid Lake Paiute Tribe located in a wildfire threat zone.

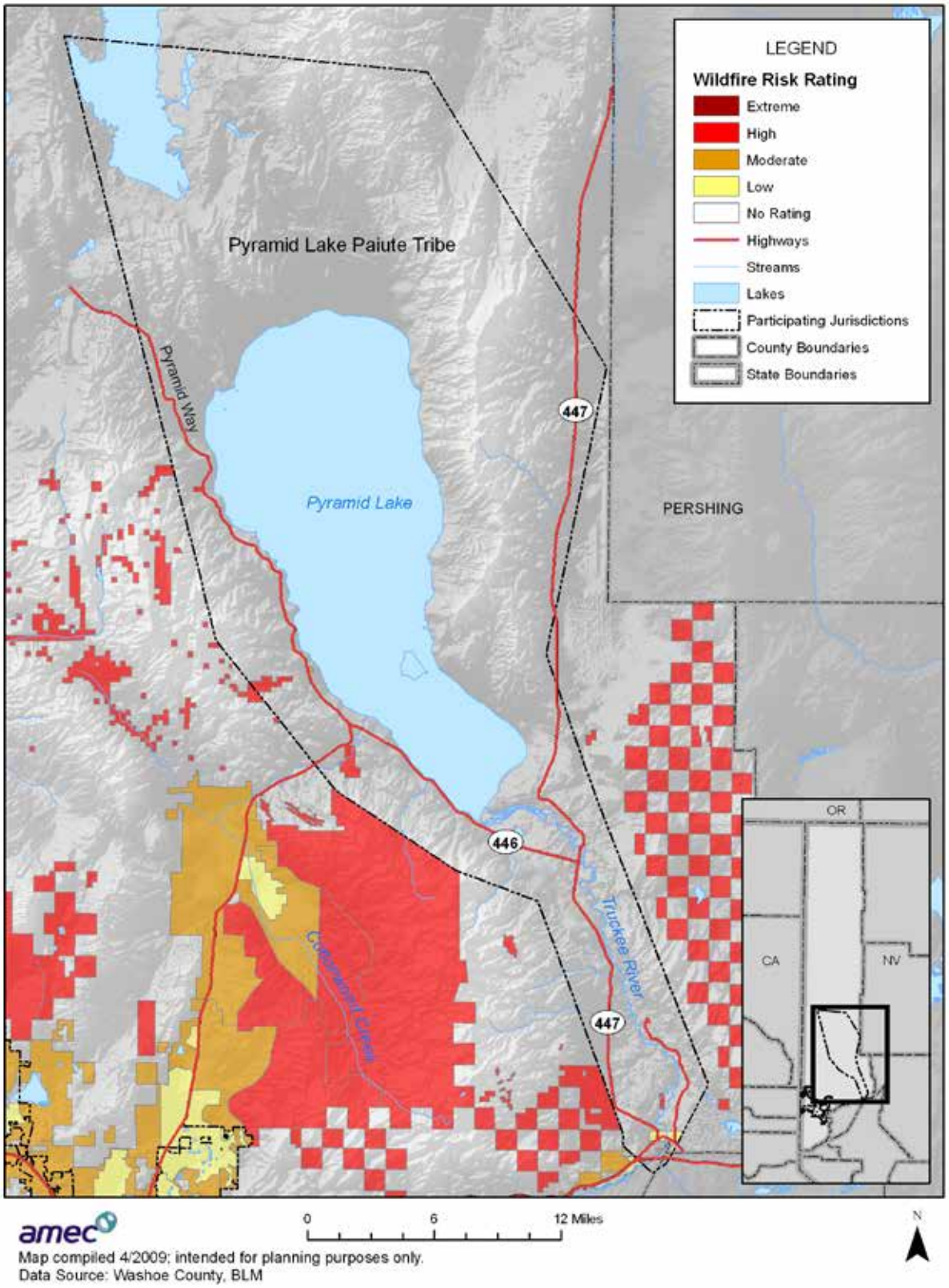
Table B-9: Pyramid Lake Paiute Tribe Wildfire Threat—Estimated Building Loss by Property Type

Property Type	Low				Moderate			
	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Residential	149	875,131	437,566	1,312,697	6	85,411	42,706	128,117
Commercial	14	686,942	343,471	1,030,413	2	216,143	108,072	324,215
Industrial	10	307,392	153,696	461,088	-	0	0	0
Agricultural	-	0	0	0	-	0	0	0
Open Space	-	0	0	0	-	0	0	0
Other	13	10,445	5,223	15,668	1	0	0	0
Unidentified	1	0	0	0	-	0	0	0
TOTAL	**187**	**1,879,910**	**939,955**	**2,819,865**	**9**	**301,554**	**150,777**	**452,331**

Property Type	High				Extreme			
	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)	Parcels	Improved Value ($)	Contents Value ($)	Total Value ($)
Residential	3	13,884	6,942	20,826	-	0	0	0
Commercial	-	0	0	0	-	0	0	0
Industrial	-	0	0	0	-	0	0	0
Agricultural	3	83,409	41,705	125,114	-	0	0	0
Open Space	-	0	0	0	-	0	0	0
Other	-	0	0	0	-	0	0	0
Unidentified	-	0	0	0	-	0	0	0
TOTAL	6	**97,293**	**48,647**	**145,940**	**-**	**0**	**0**	**0**

Source: AMEC; Montrose Interagency Fire Management Unit (MIFMU); Washoe County GIS

Figure B-2: Pyramid Lake Paiute Tribe Wildfire Threat



The Pyramid Lake Paiute Tribe planning team contributed information of past wildfire occurrences. This information is in addition to the past wildfire occurrences that may have affected the reservation listed in Section 5.3.8.

- In August 2007, a wildland fire in excess of 8,000 acres burned the north end of the reservation. There was damage to the landscape and cultural resources, but not to people or property. PLPT and BLM fire fighters all contributed to the controlling and putting out the fire.

B.2.6.6 Hazardous Materials

Planning Significance:	Moderate

The tribe has a plan for these types of incidents with our first responders trained to the technician level of hazmat operations. The plan is written for that type of specific response and then to evacuation and creation of a safe containment area until the regional hazmat team arrives.

Fixed Facilities

Table 5-18 in Section 5.4.3 Hazardous Materials lists the fixed facilities and associated details in the Washoe County planning area that have reported the presence of one or more extremely hazardous substances.

A fixed facility analysis was performed to determine which critical and special facilities, as well as how much population, land in each of the fixed facilities' 'Level of Concern' radius. The 'Level of Concern' radius indicates approximated distances which the hazardous material spill will travel and harm people and property. See Section 6.4.5 Hazardous Materials for a detailed description of the analysis. Limitations in data did not allow for an updated analysis for the population or critical and special facilities within the Pyramid Lake Paiute Tribe. Future iterations of the plan will work towards resolving this issue.

According to the analysis completed during the 2010 update, there are a total of 948 citizens of the Pyramid Lake Paiute Tribe that are within the Granite Construction Company Wadsworth Facility Cell 'Level of Concern' Radius. The Wadsworth Justice Court at 390 W. Main Street in the Pyramid Lake Paiute Tribe is within the 'Level of Concern' buffer for the Granite Construction Company Wadsworth Facility Cell. According to this analysis, there is one special facility that is in the Granite Construction Company Wadsworth Facility Cell. That facility is Natchez Elementary School, at 1 SR 447 in the Pyramid Lake Paiute Tribe.

Transportation and Pipeline

The Reno, Sparks and Washoe County area is dissected by two main transportation corridors, Interstate 80; the east-west route and US highway 395; the north-south route. The Union Pacific

Railroad maintains a main line track that travels east and west along the Truckee River Corridor starting about the Town of Truckee, California and continues east through Pyramid Lake Paiute Tribe land. The railroad is often within 100 yards of the Truckee and crosses the river and its tributaries at several locations. Any release from the aforementioned transportation routes may have severe consequences to population and the environment.

A transportation corridor analysis was performed to determine which critical and special facilities, as well as how much population, is located in key transportation corridors. The transportation corridor is a 1 mile buffer that was applied to Highways 80 and I580/395, as well as the Union Pacific Railroad. See Section 6.4.5 Hazardous Materials for a detailed description of the analysis. Limitations in data did not allow for an updated analysis for the population or critical and special facilities within the Pyramid Lake Paiute Tribe. Future iterations of the plan will work towards resolving this issue.

According to the 2010 analysis described above, there are a total of 886 Pyramid Lake Paiute Tribe citizens located in the transportation corridor.

B.2.6.7 Energy Emergency

Planning Significance:	Moderate

The tribe has a plan for energy emergencies and is in the process of developing a comprehensive GIS identification of special needs tribal members. When this is complete the tribe will have identified and placed these people within the plan, as well as identified the preparation needs for this type of incident.

B.2.6.8 Terrorism and Weapons of Mass Destruction

Planning Significance:	Moderate

The tribe has a small plan for this event since the tribe is quite isolated. The tribe has tasked the Police Department with a comprehensive plan to address this issue.

B.2.6.9 Additional Vulnerabilities

The Pyramid Lake Reservation has a 30 to 40% unemployment rate with a large part of the population being low-income. The tribe has a large elderly population as tribal families tend to be extended. Approximately 30% of the population would be classified as elderly or disabled with diabetes being one of the biggest health concerns that the tribe has to be concerned about in any emergency. A number of the elderly are on oxygen or may need some other type of specialized medical care that would have to be addressed in and emergency. The loss of

electricity would put a large number of the elderly at risk especially if the event were to occur in the winter months. The tribe does have an Incident Command Plan as well as an Emergency Operations Plan that they would refer to in an emergency but due to the rural nature of the reservation itself, the tribal members would have to depend on themselves for and extended period of time. The loss of critical infrastructure such as highways would have a crippling affect on emergency operations and in the end most likely would lead to the loss of life.

B.3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

The Pyramid Lake Paiute Tribe reviewed the capabilities as listed in the 2010 plan update. Since the last plan update, there have been no changes in the Tribe's capabilities.

B.3.1 Regulatory Mitigation Capabilities

Table B-10 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Pyramid Lake Paiute Tribe.

Table B-10: Pyramid Lake Paiute Tribe—Regulatory Mitigation Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General plan	Y	Chairman's office
Zoning ordinance	N	
Subdivision ordinance	Unknown	Possibly with Housing
Growth management ordinance	N	
Floodplain ordinance	N	
Other special purpose ordinance (stormwater, steep slope, wildfire)	Y	Open burning Permits through Environmental Department
Building code	Y	Version: Housing
BCEGS Rating	Unknown	
Fire department ISO rating	N	
Erosion or sediment control program	Y	Environmental Department
Stormwater management program	Y	Public Utilities Department
Site plan review requirements	Unknown	Possibly Housing
Capital improvements plan	Y	Chairman's Office

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Economic development plan	Y	Economic Planner
Local emergency operations plan	Y	Emergency Response
Other special plans	Unknown	
Flood insurance study or other engineering study for streams	Y	Washoe County Flood Management Plan
Elevation certificates	Unknown	Possibly GIS

B.3.2 Administrative/Technical Mitigation Capabilities

Table B-11 identifies the personnel responsible for activities related to mitigation and loss prevention in the Pyramid Lake Paiute Tribe.

Table B-11: Pyramid Lake Paiute Tribe—Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with knowledge of land development/land management practices	Y	Economic Planner	
Engineer/Professional trained in construction practices related to buildings and/or infrastructure	Y	Water Resources Dept Infrastructure Engineer	
Planner/Engineer/Scientist with an understanding of natural hazards	Y	Emergency Response Coordinator	
Personnel skilled in GIS	Y	Environmental Department GIS Specialist	
Full time building official	N		
Floodplain Manager	Y	Water Resources Director	
Emergency Manager	Y	Emergency Response Coordinator	
Grant writer	Y	Grants and Contracts Grants Administrator	
Other personnel			
GIS Data – Hazard areas	N		
GIS Data - Critical facilities	Y	Environmental Department GIS Specialist	
GIS Data – Building footprints	Y	Environmental Department GIS Specialist	
GIS Data – Land use	Y	Environmental Department GIS Specialist	
GIS Data – Links to Assessor's data	N		
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	N		

B.3.3 Fiscal Mitigation Capabilities

Table B-12 identifies financial tools or resources that the Pyramid Lake Paiute Tribe could potentially use to help fund mitigation activities.

Table B-12: Pyramid Lake Paiute Tribe—Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	Eligible to Use	
Capital improvements project funding	Yes	
Authority to levy taxes for specific purposes	No	
Fees for water, sewer, gas, or electric services	Yes Public Utilities District just created	
Impact fees for new development	N	
Incur debt through general obligation bonds	Eligible to Use	
Incur debt through special tax bonds	N	
Incur debt through private activities	Accessible/Eligible	
Withhold spending in hazard-prone areas	N	

B.3.4 Other Mitigation Efforts

Pyramid Lake has a Firewise Community Certification and participates yearly in Firewise as well as Fire Safety Community projects.

The Tribe has a designated Emergency Operations Center (EOC) located on the tribal headquarters campus. It consists of a portable command center that, in the future, will be equipped with command vests, communications equipment, emergency plans, checklists, and forms. Once the center is completed, training will begin to staff the EOC during large-scale emergency events.

The Tribe has several formal mutual aid agreements and memoranda of understanding with surrounding local, state, and federal jurisdictional agencies. These include:

- The Washoe County Sherriff's Department
- Nevada Shared Radio System
- Truckee Meadows Fire Protection District
- Reno Emergency Medical Authority (REMSA) Pending
- North Lyon Fire Protection District
- Storey County Fire Department

All mitigation projects or activities performed by the Tribe in the last 5 years have completed through funding from the Tribe's general fund.

B.4 MITIGATION STRATEGY

The Pyramid Lake Paiute Tribe will continue participation in and compliance with the NFIP. Specific activities that the Tribe will undertake to continue compliance include the following:

- Participating with Washoe County and FEMA in the map modernization program and adopting new DFIRMs when effective.
- Reviewing the flood damage prevention ordinance and identifying opportunities for strengthening the ordinance at the same time it is updated to adopt new DFIRMs.

B.4.1 Mitigation Goals and Objectives

The Pyramid Lake Paiute Tribe adopts the hazard mitigation goals and objectives developed by the Planning Committee and described Section 8 Mitigation Strategy.

B.4.2 Mitigation Actions

The planning team for the Pyramid Lake Paiute Tribe identified and prioritized mitigation actions based on the risk assessment. Table 8.2 in Section 8 Mitigation Strategy provides mitigation actions that are applicable to all jurisdictions. The following mitigation are specific to the Pyramid Lake Tribe. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

Mitigation Action:

1. Pyramid Lake Flood Mitigation & Prevention Plan

Priority: High

Background/Issue: Continued Flooding. Pyramid Lake Paiute Tribe is a federally recognized Indian Tribe. Over the last fifteen years it has experienced three flood events that have caused property damage to buildings and homes on the reservation.

Ideas for Implementation: Mitigation for this hazard would consist of three catch basins prior to the Truckee River entering the reservation. The river would be diverted into the first catch basin with debris rakes in the basin. These rakes would catch large and heavy debris. A excavator would be permanently placed next to this basin to remove heavy debris that came down the river both during flooding events and non flooding periods.

The second catch basin would be placed further downstream of the first basin. The river would again enter this catch basin which would also have rakes but smaller and closer together. This basin would be designed to catch medium to smaller debris such as branches and partially

submerged items that were too small for the first basin to catch. This basin would also have an excavator permanently placed next to it to remove the debris that was caught in this basin.

The third catch basin would be places further downstream again from the first and second basins. The river would also be diverted into this catch basin which would be designed to catch floating materials as well as well as smaller submerged items that made it through the first two basins. The rakes in this basin would be smaller and closer that the first two and designed to catch anything three inches or larger. It would also be designed with a surface skimmer to remove any floating debris such as barrels that were abundant in the 1997 flood. The bottom rakes would have to be cleaned when necessary and a drag system could be utilized for this purpose.

Responsible Agency: Army Corp of Engineers, Department of the Interior

Partners: Washoe County, Reno and Sparks

Potential Funding: Washoe County Flood Management Program

Cost Estimate: $5,000,000

Benefits (Losses Avoided): This mitigation plan would save both property owners as well as FEMA and other government agencies 5 to 8 million dollars should another flood event such as the 1997 flood occur again. It is likely that this will indeed happen again as evidenced by the 2002 flooding in Washoe County as well as the 2006 flooding that the tribe experienced.

Timeline: This project would take approximately a year from start to completion provided all funding is in place and a qualified contractor can be found.

B.4.3 Monitoring Progress of Mitigation Activities

Other than multijurisdictional mitigation actions, the Pyramid Lake Paiute Tribe only had one mitigation action specific to the Tribe listed in the 2010 update which is listed above. This project has not been completed due to funding limitations; however it is still a valid mitigation action.

While there was no method discussed in the previous plan regarding how mitigation measures and projects closeouts would be monitored, the PLPT does have a system in place for monitoring grant funding. The Pyramid Lake Paiute Tribe maintains control over Grant Projects with Abila MIP Fund Accounting Software Ver. 15.1.1.0. All grant applications must be approved by the Tribal Council and where it is applicable it is signed by the Tribal Chairman. An internal review is conducted after the application is completed by the Department Head; the review is conducted by the Contracts and Grants Administrator, the Tribal Comptroller and the Tribal Executive Team. Once grant award is received, all budgets are created and input into the financial software. The Contracts and Grants office works the Department Head to make sure all grant program/project requirements are in compliance. Financial information and compliance activity

is tracked separately for each grant. All costs are verified by the Comptroller, Grants Accounting Specialist Contracts and Grants Administrator, Tribal Payroll, and Tribal Accounts Payable before expenditures are entered into the system. The expenditures are posted to the system and reports are routinely printed and verified by the Tribal Financial Department.

Features of the Abila MIP Fund Accounting Software Ver. 15.1.1.0 include:

- Grant Status - approval status, awarding agency, beginning, ending and extension dates. MIP has the capability to track grants by inputting information such as the award number and the start and end date. The Grants Accounting Specialist also tracks all grants utilizing a grant list which contains all vital information for each budget.
- Grant Budget - last revision date, amount, indirect and fringe rate and a history of all changes. Modifications in excess of 10% are required to be submitted to the awarding agency for approval prior to presentation to the Tribal Finance Department. These budget modifications are entered at least weekly by the Grants Accounting Specialist after approval is given by the Comptroller, the appropriate member of the executive team and/or the Tribal Chairman.
- Grant Reporting - history of all submissions - required date and when actually sent, plus the ability to attach an image of the report for reference. Most grant reporting is done quarterly. The general ledger and statement of revenue & expense reports are generated each quarter. An SF425 is prepared to report expenditures and the amount of indirect cost charged to the budget by quarter. Draw down of reimbursement funds is done shortly thereafter.
- Grant Tasks - Define each required task, staff assigned and status. A copy of the scope of work approved by the awarding agency is included with the department's budget submission. Quarterly progress reports are created to inform the agency of the program's status and note activities. These reports are compared to the original scope of work to ensure compliance.
- Financial Query - Get inception-to-date financial data summarized to match the grant reporting categories with all report functions and export to MS Excel or in PDF format. All reports generated from MIP can be either exported in Excel or PDF format. A program director can request a report for any period of time.

B.5 PLAN ADOPTION AND ASSURANCES

The Pyramid Lake Paiute Tribe will adopt this plan in accordance with FEMA requirements for plan adoption requiring formal adoption by the governing body of the Indian Tribal government prior to submittal to FEMA for final review and approval. A sample adoption resolution is included in **Appendix A**.

With the formal adoption of this plan by the tribal governing body, the Pyramid Lake Paiute Tribe assures that their tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.1(c) and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 44 CFR 13.11 (d).

Table C-1: HIRA – Public; Continuity of Operations; Property, Facilities, Infrastructure; and Environment

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
Natural Hazards/HIRA				
Avalanche	Public impacts related to avalanche include the injury and possibly death to persons in the affected area. Death may result from suffocation from being buried by the avalanche or traumatic injury from the impact of sliding material, or the collapse of structures by the avalanche. The other impact could result because of people driving on the mountain highways when an avalanche occurs and their car gets buried or pushed off the side of the mountain. This is the same for skiers on the mountain when an event occurs and is taken down the hill with the snow.	Due to the very limited terrain covered by any individual avalanche in Washoe County, unless the avalanche has a major effect on some portion of the infrastructure in or around Lake Tahoe, its impacts to the continuity of operations for any jurisdiction should be limited. The interruption in the delivery of services should be localized, if at all, and in most circumstances, of short duration. Individual departments or organizations, especially ones with infrastructure tied to the landscape like sewer utilities, water purveyors, and others could have their delivery of services compromised on a very local level but seldom on a large scale. There is the potential for a limited number of areas to be temporarily cut off from the rest of the County by avalanches. The majority of these are located in towns surrounding Lake Tahoe. The overall effects would be limited and the roads should be opened within a short period of time, depending on the size and	Due to their probable location in the less settled portions of Washoe County, many of the avalanches will have minimal effect on the developed property. However, in the developed areas there is a danger of roads, railroad tracks, gas, water, and sewer lines either being buried, or broken. Private property has the same problem when they are in the direct line of the avalanche. While many of the avalanches will not be large enough to affect large numbers of homes or businesses, many could affect individual parcels of private property.	The impacts are generally local and would not include large scale damage to the environment. Generally, the slides will affect individual hillsides. Any avalanche that breaks pipelines, sewer lines, etc. or impacts the transportation or storage of hazardous chemicals could cause considerable environmental damage that could take decades to correct.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		location of the avalanche. Generally, during normal years, most avalanches are taken care of quickly, however in the advent of an earthquake generating a number of avalanches throughout the County, as well as other damage affecting the infrastructure; it could be weeks before some areas are accessible for emergency vehicles and crews.		
Drought	In Washoe County, based on historical precedent, drought will not by itself cause a decrease in the health and safety of its citizens. Rather damage will be done to the environment, business, agriculture, etc. However, problems frequently associated with drought can cause a decrease in the health and/or safety of local citizens. These would include: • High temperatures leading to heat related injuries including some deaths, • Mental and physical stress which can lead to a susceptibility to other diseases such as heart disease, • Low moisture content in the forest leading to an increase in the number of forest fires threatening homes, citizens and	Drought on the scale experienced in Washoe County should not affect the ability of agencies to continue operations. While services to the public for some operations may have to be cut back, the actual ability of agencies to continue operations in some form should not be compromised. Delivery of services to the public will probably not be considered a problem for most local law enforcement agencies. Any increase in public tension regarding limiting the use of water or caused by layoffs from industry dependent on water should be within the ability of departments to handle. For fire operations, however, it would be dependent on two factors: 1) the actual quantity of water available and 2) the dryness of the environment. If the	Drought is a slowly developing problem with little immediate impact on any property, public facilities or the infrastructure. Many built up properties, such as buildings, highways, transmission towers, and so on will not be adversely affected by drought in any form. As a drought progresses however, from a short term inconvenience to a long term problem, certain portions of the infrastructure will begin to be affected. The lack of water in the reservoirs, streams and rivers will restrict its uses. For example, the need to use it for agriculture will conflict with the need to maintain an adequate flow for fish that will also conflict with the needs of some industries for a continuous supply and the need of the public for drinking, cooking and bathing water.	The environment that makes Washoe County an enjoyable place to live, work, and play has its basis in the rainfall that supports the diverse ecosystems that exist across the County. Based as it is on an abundance of water, the environment could be the most adversely affected portion of the area by a drought, especially long term drought. Impacts on the County environment include: • A reduction in viable habitat for fish and wildlife, • As the environment becomes more stressed, there will be an increase in both plant and animal diseases, and • An increase in wildfires. The impact of drought on the environment and Washoe County will follow a sequence of events. These begin with

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	firefighters, • Conflicts between citizens and government over water usage, and • Conflicts between citizens over water usage.	drought is extreme enough and long lasting to the point that fire flow is affected, fire departments and districts will not be able to fulfill their mission in relation to fire suppression. Related, is the general dryness of the environment. As the water supply decreases, the probability of large scale fires, wildland, urban, or on the wildland/urban interface become more probable. An increase in the number of fires as well as their size could tax the ability of departments to respond, causing them to rely on mutual aid or going to state mobilization. In either case, their operations will continue, albeit with support from outside agencies and possibly at a reduced level.	The water distribution system could also be impacted. Water purveyors may find their normal sources drying up. As the water table drops, shallow wells distributed throughout the region mostly with small water purveyors may begin to dry up. Most of these do not have interties with other purveyors. The result could be that they will have to bring in outside resources to assist with getting an adequate supply to citizens.	relatively minor inconveniences and as time progresses can get much worse leading to major environmental degradation. This can eventually lead either directly or as a result of fire to major changes in the local ecosystems that exist within Washoe County.
Earthquake	Depending on the size and location of the earthquake the effect on persons in the impacted area is expected to range from a large transient population in downtown Reno, to no one in the outskirts of Washoe County. In previous large earthquakes, the potential for an outbreak of disease appears to increase. This can be caused by polluted water sources, the eating of spoiled food, and the inhalation of dust kicked up by the quake. In addition, there could be	For a large earthquake impacting Washoe County, continuity of operations will be severely taxed for many if not most of the agencies and jurisdictions located therein. The impacts affecting continuity of operations include: • Death or injury to staff limiting the number of staff able to fill normal operational duties, • Inability of staff to respond to their work sites due to road closures from debris on the roads, liquefaction or lateral spreading damaging the roads, and bridges or overpasses	Any large earthquake in Washoe County will create damage to the property, facilities, and infrastructure either owned by the city or needed to support our economy and citizens. This includes damage to buildings, electrical grids, telephone service, including cell operations, water and sewer utilities, port facilities, transportation systems, and both natural gas and liquid fuel pipelines. The weather previous to the	Impacts, or damage, to the environment may be thought of as two different processes. There is direct change to the environment caused by the earthquake. This incorporates all the natural damages such as landslides. In contrast, the other process involves the pollution that becomes endemic in the aftermath of an earthquake that strikes an urban area or some part of the infrastructure today. Concerning traditional environmental changes due to earthquakes, while many times

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	environmental injuries such as hypothermia if the earthquake happened during the winter months.	damaged closing arterials in particular, • Staff absenteeism while checking on or taking care of family and handling damage to home or other personal property, • Damage to communications systems will limit organizations' ability to coordinate their own resources, and it will also limit their ability to pull together a full picture of the damage suffered in their jurisdiction and to request assistance if needed, • Damage to facilities and equipment, and • Damage to the water, energy, and sewer systems connected to agency facilities will not allow operations to continue in their normal manner. Due to the limitations mentioned above, delivery of services will be heavily impacted by a large earthquake. Infrastructure damage or destruction combined with lack of staff will retard delivery of normal governmental services. Law enforcement operations will be taxed to the maximum. Road closures, prevention of citizens entering hazardous areas, control of looting, responding to search and rescue operations, etc.	earthquake will have an effect on the eventual outcome. Rain saturating the ground can increase both the potential for earthquake generated landslides and the probability that liquefaction or lateral spreading will occur. This could increase the probability that pipes could break. Lateral spreading under roads, railroad tracks and port facilities would increase disrupting transportation and there could be an increase to building damage due to liquefaction. The other area that could cause damage is actual surface disruption either from surface faulting, or subsidence and uplift. Fault ruptures breaking the surface can rip buildings apart, destroy bridges, offset roads, break pipelines, destroy sewer lines, and stretch or break transmission lines. The same can be said for subsidence and uplift. Having a building, road or any other piece of infrastructure where a portion of it either rises or falls in relation to the rest will break or destroy it. Actually, any piece of infrastructure either in the ground or on its surface can be broken or destroyed by any of these three effects. Changes in the ground can	damaging in the short term, many of the changes caused by them are overcome with time as the local ecosystem absorbs them. These types of environmental effects have been happening for as long as the land that is now Washoe County has been around. These types of impacts include: • Landslides will sometimes block streams or rivers forcing them to reroute, occasionally causing lakes that swamp the local vegetation leaving a ghost forest standing in the water. Landslides can increase erosion affecting fish habitats. • Today, however, there is another type of environmental damage that is the result of human intervention. That is the damage caused by the release of hazardous chemicals and/or large quantities of sewage. These can be released from many different sources including but not limited to industrial plants, pipelines, overturned trucks, damaged ships or barges, railcars and even school chemistry labs. These impacts to the environment include: • Air pollution: some chemicals released as gasses can cause

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		combined with a decrease in available staff due to all the factors listed above will severely limit normal day-to-day operations. Most individual law enforcement officers operate independently of others in their jurisdiction. Since many of them have their equipment with them, including cars, they may be able to assist at least in the area they are at when the earthquake happens. Fire response will be impacted in a similar vein, however for many of them they will have to report to a station where they can respond from. Between the inability to get to their station and the possibility that the stations and equipment may be damaged or destroyed the response will be compromised. Many fire stations, especially the older ones, even though they have survived previous moderate quakes may not survive a large one. Even if a station is not destroyed or collapsed, a racking of the walls could jam the bay doors closed. Public works and utilities will not have the ability to have services back up and operational in many cases for days, weeks or, in some	affect the water table. Wells may change their water levels or go dry. Stream flows may be altered and on a macro scale landslides or other ground deformation may change the course of streams or rivers.	immediate damage to plants, animals and humans. Tanks filled with, for example, chlorine, ammonia or any other hazardous gas can harm or kill animals, birds, and plants, not just in the area of the spill but for some distance downwind depending on the chemical involved and the size of the release. The damage will usually be temporary and physical recovery to the environment will begin as soon as the gas dissipates. • Chemicals that spill either directly into or that have the ability to drain into lakes, ponds, streams, rivers, or even drainage ditches could kill or create birth defects in fish and marine mammals. In some areas they would pollute drinking water. Depending on the chemicals involved and their ability to be either absorbed by the environment, or break down quickly the environment may either recuperate quickly or be impacted for years or even decades. Damage to port facilities could create spills into the waterways. • Damage to wastewater treatment facilities, sewers, pump stations, etc. could lead to spills of sewage or the inability of the treatment plant to process

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		cases, for months. Repair of roads, bridges, water and sewer lines, the electric grid and telephone lines and towers will tax these utilities to the maximum. Even with the importation of mutual aid and other assistance from other portions of the state and other states, the service delivery will be slow to develop and spotty at best for some time. Schools will be unable to fulfill normal expectations. Damage to schools' infrastructure as well as the public infrastructure of roads and utilities will close down schools at least temporarily. Those that might be able to be operational will, in many cases, have to act as temporary shelters for those displaced by the earthquake. Immediately after the earthquake, if school is in session, they may have to house students for days until parents are able to retrieve them.		waste allowing it to flow untreated into the local environment. This would have the same effect as many other hazardous chemicals, polluting the environment for possibly weeks, but also creating conditions that could with bacterial contamination lead to disease in both animals and humans. • Spills onto land can, depending again on the type of chemical, either temporarily, as with the case with many caustics or acids or permanently, as with spills of heavy metals or many radioactive materials damage soils. Related to this is the absorption of material by the soil may allow it to pollute groundwater and be transferred for some distance causing damage. Depending on the ability of water and the chemical to leach through the underlying layers of soil, clay, rock, etc., it could eventually reach and pollute the aquifer.
Flood	Flooding kills individuals throughout the United States every year. During the fall and winter flood season, rivers and streams are comprised largely of cold rain and some snow, depending on preexisting conditions. They are, therefore,	Continuity of operations for most jurisdictions within Washoe County will not be compromised due to flooding. However, those that have their main administration or critical components of their operations within the flood zone could find	Flooding is one of the major causes of damage to and destruction of property, facilities, and infrastructure throughout the country and it is no different in Washoe County. Individual property has been damaged or destroyed in most major floods	The impacts to the environment from a major flood could include: erosion of stream or river banks; loss of plants and animals; and contamination from chemicals, sewage, etc. picked up, transported and deposited by the flood. The contamination of both

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	very cold. In addition, air temperature in the winter during flood season can also be in the thirty degree range, although not usually below that during floods. The result is that persons caught in flood waters can drown not just from direct action of the flood but also as a complication of hypothermia. Other problems that can compromise a person's health can develop after the flood waters have receded. Mold will grow in wet material, be it clothing, bedding, the walls of a house or the insulation under a floor. Sewage and hazardous chemicals may be present in homes, cars, or just as a layer coating peoples' property. Water and food may be contaminated. Heat and electricity may be off for some time. All of these will contribute to a decrease in not just the quality of life for individuals, but also their current and long-term health.	their operational continuity at risk. If files, paper or electronic, are damaged or destroyed, an organization may not be able to: contact clients; assign work; complete scheduled jobs; meet deadlines; access, track, and pay accounts; or pay staff. Without a Continuity of Operations (COOP) Plan that takes these issues into account, they may not be able to operate in their normal mode. The delivery of services by the local departments within Washoe County is directly related to the degree of damage by the floods, to improved property, the infrastructure, and the areas in which the damage occurs. A flood that closes roads, either with water over the road or a washout, temporarily eliminates the ability of a local jurisdiction to repair other damaged infrastructure, respond to emergencies in the affected area, or deliver the other normal goods and services expected of it. Flooded electric substations, downed lines, contaminated wells, and broken pipelines all have the same impact. In all of these cases the delivery of services will be at least temporarily halted. Damage to facilities, equipment, or files all could impact the delivery of	to hit the County. Over time this has included homes, equipment, and transportation vehicles of various types. Flood waters can damage or destroy a jurisdiction's facilities. Buildings can be flooded. Equipment, electronic or mechanical, can be ruined or in some cases made inaccessible due to flood waters. Files, electronic or paper, can be destroyed. Both water and the contaminants it carries can either damage or permanently ruin equipment. Flood waters can erode land containing infrastructure such as roads, power lines, natural gas, fuel, water pipelines, and sewage control facilities. It can breach levees, erode revetments, and destroy bridges. Water overtopping dams can cause damage to the dam's structure. Material carried by the flood waters, if not screened out or removed can cause damage to the hydroelectric generating components of a dam.	the river and the flooded landscape from the various chemicals and debris picked up from farms, homes, and businesses along the river is a serious problem. Industrial chemicals, oil and gas, sewage, old tires, etc. can all pollute the landscape where they come to rest as the water recedes. Some of these materials may take years, decades or even longer to break down and become harmless. Until that happens they can continue to degrade the environment where they have come to rest, in some cases leaching back into the water course or into ground water spreading contamination away from the site. Without cleanup, this may continue for years.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		services to citizens from individual jurisdictions or agencies.		
Infectious Disease	In most cases, biological agents cause isolated illnesses that result in relatively few deaths (e.g., annual seasonal influenza) and medical care can be effectively provided at the local level. If the disease calls for specific therapies such as antibiotics, instructions for obtaining and administering drugs should be disseminated through local health care systems. In rare cases, biological agents can cause disease with high mortality rates and no specific remedies (e.g., Yellow Fever or Avian Influenza). In these cases, instructions should also be disseminated for general supportive care that may be provided by non- medical personnel. In addition, those exposed to contagious biological agents intentionally introduced or novel viruses, could remain functional and asymptomatic for a period of several days, but still be contagious to others. This would limit the ability to track and contain the spread of the disease and could lead to a mass surge of patients inundating hospital	Depending on the severity of the pandemic continuity of operations and the delivery of services could be impacted. Washoe County staff may remain at home due to illness or they are caring for others or because they fear contracting the disease. Therefore, the ability of Washoe County to maintain delivery of services to their constituents could be severely limited. As the incidence of disease increases there could be a loss of operational continuity within individual departments.	There should be no direct impact to property, facilities, or the physical infrastructure. Indirect impacts could develop due to lack of maintenance on equipment, property or facilities. However, with severe illness or disease symptoms, many people requiring skilled nursing or hospital care would overwhelm the medical infrastructure.	Pandemics do not normally disrupt the environment. As a human disease they infect humans, and in some cases, certain animals. The avian flu H1N5 attacked certain bird populations with a high rate of morbidity and mortality. This is also the case with West Nile Virus which is now moving through the bird population in Nevada. It is possible that other diseases might make the jump between humans and animals, increasing animal illness and death.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	systems seeking care once symptoms present themselves, which could have disastrous effects to the delivery of medical care due to shortages of supplies and staff.			
Severe Weather	The impacts from severe weather can be largely dependent on the type of incident. Since the severe weather can range from snowstorms to tornadoes each one is factored out in this section. *Hail* Over the years, hail has not been a major factor in Washoe County. While injury and even death to people and animals that are in the wrong spot at the wrong time can occur, the size of hail that impacts Washoe County is usually too small for that to happen. While the damage to cars and other items out in the weather can be dramatic, direct impacts to people are usually limited to minor stings and bruises. However, should a hailstorm with large hail stones occur, individuals could be injured and in rare instances killed. *Ice Storms* Direct impacts on the general public from ice storms can include cold related injuries like	*Hail* Hail has not traditionally caused more than the most minor slowdown of any public services within the boundaries of Washoe County. Due to the shortness of the normal hailstorm and the size of the normal hailstones, it is not expected to disrupt any organizations continuity of operations or the delivery of services to the public for more than a short period of time. Should there be an increase in size of the hail stones and an increase in the length of the storms, damage might begin to appear on equipment, facilities and people. *Ice Storms* While ice storms themselves tend to last only a few hours at the most, the after effects can last for days. The actual problem with iced roads, falling branches, and other types of damage will continue until the temperature warms enough for the ice to melt. In a situation where the temperature remains below	*Hail* Large hailstones can damage property, facilities, and some infrastructure like electrical transformers, etc. However, in Washoe County, the size of hail that has fallen historically has caused minimal damage, if at all, to any of the jurisdictions' facilities or infrastructure in the County. *Ice Storms* Ice storms can cause damage to public and private property, jurisdictions' facilities and local infrastructure. Overloaded tree limbs breaking off and landing on cars, buildings, and equipment can cause significant damage. Overloaded wires can break causing fires. Ice on roofs adding extra weight can cause damage, especially on lightly built structures. A 50-foot conifer can accumulate as much as 99,000 pounds of ice during a storm, and when combined with wind, may topple causing much more damage than it would have otherwise.	*Hail* Environmental impacts are some of the more serious effects resulting from hailstorms in Washoe County. Hail tends to cause extensive damage to crops and other plants. It can abrade or tear leaves; break stalks, stems or branches; destroy blossoms; and bruise fruit. All this will cause short-term environmental damage. However, due to the normally small size of hail in Washoe County, this damage seldom lasts more than one year. *Ice Storms* Ice storms cause environmental damage by placing an excess amount of weight on plants that can break the limbs off large trees, crush small shrubs, and injure or kill animals. Conifers are a little more resilient to the effects of the ice than are deciduous trees and can accumulate large quantities of ice. When combined with wind, however, they then can topple with considerable force. Icing

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	hypothermia, or injury and death from accidents. Accidents can occur either through falls due to ice on walkways or on the ground, or auto accidents due to the ice on the roads. In addition, overloading on trees or utility wires can cause limbs or wires to break. These can fall either on individuals, automobiles, or homes causing damage or traumatic injuries or in the case of downed utility wires fires could start or individuals could be electrocuted. Individuals on home based life support systems could be adversely impacted by the power outages if they do not have a backup power system. A combination of cold and lack of power will force many people to find alternate ways of cooking and heating. Those who attempt to cook or heat with barbecue grills or hibachis run the risk of carbon monoxide poisoning. *Snowstorms* Direct impacts on the general public from snowstorms can include cold related injuries like hypothermia or frostbite. This can be especially prevalent in the older population and those who lose heat and power for extended	freezing for a long period of time, there may be continuity of operations problems for some local jurisdictions or agencies. The inability of agencies that have a very small staff to staff their operations if roads are closed due to ice or downed power lines could cause their operations to lapse for short periods. For most jurisdictions, however, the closing of roads and the related damage will slow down rather than stop normal operations. An ice storm can slow down, and in some cases, halt the delivery of services over the entire county and for any jurisdictions or agencies located within its borders. The loss of power from the breaking of lines has in the past, and will again, affect thousands of customers. Ice coated streets do not allow the normal movement of emergency vehicles of any type within their normal response times, so the delivery of all types of services will be slower than normal or even non-existent until such time as the streets are once again passable. Delivery of services will rapidly improve once the temperature warms and the ice begins to melt.	*Snowstorms* Typical Washoe County snowfall of a couple of inches does not normally cause much damage to the facilities, property, or infrastructure, around the County. It slows down traffic and causes an increase in traffic accidents, but little more. In contrast, an unusually heavy storm could cause extensive damage to facilities, equipment and infrastructure. In a case like this, power lines could come down, equipment could be damaged, and facilities could have extensive damage from excessive weight on roofs. *Tornadoes* Depending on the track and size of the tornado, it could devastate the facilities and infrastructure. The most likely tornado scenario of a EF0 impacting facilities would result in some light damage that would likely be repaired quickly. In the highly unlikely event a tornado the size of the Greensburg Kansas tornado of May 4, 2007 were to strike Washoe County, we would have extensive damage to property, facilities, and infrastructure.	can further damage plants by sealing the leaves, stems, and buds from the air, suffocating these parts. When the ice sheet covering the ground persists for a lengthy period it can also suffocate some plant species. Animals that are accustomed to snow cannot dig through the ice to reach their normal food supply and so starve. Some become encased in ice themselves and die. With enough time, the environment will regain its normal vitality, but depending on the amount of damage done it could take from a few months to several years. *Snowstorms* Light snowstorms have very little impact on the environment. The plants and animals that are endemic to the area are used to this type of winter weather. With a heavy snowfall, broken limbs from trees will be one of the most visible signs of damage. If the snow remains deep for an extended period of time, some large animals may starve to death being unable in deep snow to cover enough terrain to find food. Regardless of the initial damage done by the storm, the scars on the environment will usually disappear in a matter of

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	periods of time. Access to normal businesses, health facilities, government offices, etc. can all be compromised due to snow. In many cases the hills and slopes of many of the roads and streets restricts individuals' movements. This remains the case until such time as road crews are able to either plow or sand the roads and streets. There is an increase in injuries and deaths from accidents and in some cases increases in heart attacks from individuals attempting to shovel snow away from walkways and driveways. Depending on the depth of the snow, the length of time it stays around, and the number of downed tree limbs, or trees in lines, road closures could isolate some individuals; possibly for days. Individuals on home based life support systems could be adversely impacted by the power outages if they do not have a backup power system. A combination of cold and lack of power forces many people to find alternate ways of cooking and heating. Those who attempt to	*Snowstorms* Normal amounts of snow in the populated portions of Washoe County have a limited effect on the continuity of operations of most Departments in the County. Most, if not all, are able to maintain operations of some sort through the few inches of snow that is normal in the County. A snowstorm or even multiple storm system snow incidents inhibits movement enough that some organizations would be totally unable to operate. Such a storm can almost shut down the entire county, and depending on the ensuing temperatures, governmental agencies, schools, businesses and services might be shut down for days. Snow covered streets do not allow the normal movement of vehicles of any type. For light snow, there could be minor slowdowns in the delivery of services. For heavy snow, jurisdictions and agencies could all get behind in their normal operations. With a very heavy snow fall, especially when combined with wind, the delivery of all types of services will be slower than normal or even non-existent until such time	*Windstorms* The impacts to facilities, property and infrastructure include downed power lines, closed roads, damaged or destroyed equipment and facilities can be extensive from major windstorms. Power loss may occur to portions of the Washoe County for over a week after a major windstorm. This means that traffic lights will be out at crossings and emergency facilities without generator backup will not be able to function. Having many roads covered with debris would virtually shut the County down. Response vehicles and facilities may have trees or branches fall on them. Blowing debris, such as parts of roofs, fences, metal signs, and even sand can all cause damage to property and equipment. Strong wave action from windstorms can erode shoreline areas. *Extreme Heat* Extreme heat can cause electrical equipment to overheat and potentially fail. If this were to happen it could affect property, facilities, and infrastructure, but it would most	months. *Tornadoes* Tornadoes, by their very nature, can destroy everything in their path. During a tornado the environment can suffer the loss of many trees, it begins to repair itself immediately. New vegetation would have filled in the open areas and eventually the forest would have recovered. A tornado that touches down in the wrong area could destroy oil storage tanks, and hundreds of other hazardous chemical storage sites. All the material, especially hazardous materials that are transported on the highway system or through the rail, would be at risk of being spilled. Many of these could cause drastic long term environmental damage possibly lasting for many decades. Spills into the rivers could decimate fish populations for years. *Windstorms* The impacts include downed trees and limbs. In some cases, entire stands of trees can blow down in a single windstorm. A single tree falling at any one point is a very minor environmental problem that will

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	cook or heat with barbecue grills or hibachis run the risk of carbon monoxide poisoning. *Tornadoes* The results of any tornado can be devastating to those caught in one. However, the number of people injured or killed and the number of houses, businesses, community facilities, etc. destroyed or damaged varies dramatically depending on the size of the tornado, where it touches down, and how long it is in contact with the ground. Members of the community caught in a tornado can expect that many of them could have major injuries or be killed by the tornado. Flying debris and collapsing buildings are the main cause of injury and death. *Windstorms* Windstorms are one of the emergencies that impact all of Washoe County on a regular basis. Some are much more damaging than others, and can leave citizens without power for hours or even days. Individuals can be hit by flying debris or falling limbs and trees. During past windstorms cars	as the streets are once again passable. Delivery of services will rapidly improve once the temperatures have risen and the roads have been plowed and are open to traffic. Even with the roads opening up, the electric utilities could take several days to get all the lines back up in all the outlying areas of the county. *Tornadoes* A small tornado touching down in Washoe County should not impact the continuity of operations for any of the entire County. It is possible that a small tornado could directly damage a County facility, including County Hall. In that case, their continuity of operations would be impacted. This is, however, unlikely. If there were a large tornado to touch down in Washoe County that could either physically or administratively limit continuity of operations. Having the administrative offices destroyed, possibly along with the staff being injured or killed, would make the normal day-to-day operations difficult to maintain. Combining this with broken pipes in the destroyed buildings, phone and electric lines down, streets	likely not create structural damage. Extreme heat causes more damage to citizens than it does to buildings and structures.	not even be noticed. However, a full stand of trees falling together leaves a scar that will take decades to regrow. Loss of forest increases erosion, and increased erosion leads to more silt in the rivers. Fallen trees can block streams or cause log jams on rivers that can cause the water to back up with possible flood consequences. Wind damage to homes, businesses or industry can cause further environmental damage through the release of hazardous chemicals. Natural gas lines can be broken, leading to fire. Very strong winds can tip over trucks or cause the driver to have an accident leading to a spill. Depending on the quantity and type of chemical the spills will be more or less damaging. *Extreme Heat* Extreme can cause vegetation and wildlife to die because of the lack of shade or ability to get out of the sun. Extreme heat mixed with drought can increase the chance for wild fires to start because the trees and sage brush will be dry. The vegetation being so dry allows for fires to

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	have been crushed and houses split by falling trees. Individuals can suffer injury or death. Downed wires have been known to electrocute individuals. Large numbers of power lines down, combined with trees and limbs on roads can keep fire, medical and law enforcement personnel from responding to individual incidents. During heavy wind first responders may have to wait until the wind abates before being able to respond to calls. Individuals on home based life support systems without a backup power system could be adversely impacted by the power outages. With power outages sometimes lasting for days there are individuals who attempt to cook or heat their homes with a barbecue or hibachi. For these individuals and families the buildup of carbon monoxide can be fatal. *Extreme Heat* During extreme heat citizens in Washoe County can become ill and in some severe cases be killed because of extreme heat. Extreme heat can cause heat exhaustion and is a relatively	covered with debris and possible fires from broken gas lines would increase the difficulty of maintaining the continuity of operations. Within the area directly impacted by the tornado the delivery of services is directly related to the size of the tornado. Small tornadoes will have little to no effect on service delivery, while a large one, because of the amount of damage done, could completely take out service delivery to the impact area. This would include blocking roads, and breaking gas, water and electric lines. Within the damaged area, it would take time to rebuild the damaged homes and businesses and begin to reconnect them to the damaged utilities. Due to the localized nature of the tornado, the delivery of services to the rest of the County should be minimally impacted. The main exception to this could be electric. The damage to the power infrastructure could have a direct effect on surrounding neighborhoods, businesses, and jurisdictions, all of which could experience power outages over a very broad area, until such time as the power companies can		start more easily and spread much quicker.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	common reaction to severe heat and can include symptoms such as dizziness, headache and fainting. People without shelter or adequate shelter can become victim to heat exhaustion because they are exposed to high temperatures for long periods of time. Extreme heat can cause an influx in EMS calls and hospitalizations.	make repairs and restore services. *Windstorms* Operations for most if not all of the departments of the County should be able to continue, albeit at a reduced level in some cases. Damage to the administration, infrastructure and a reduction in response are very possible consequences of a major windstorm. However, its operational structure would probably not entirely shut down for any department. Damage to administrative facilities and operational equipment would put various organizations in a bind in so far as maintaining their normal support to the public, but would not totally shut down their operations. The impacts to the delivery of services could impact the entire County or in some cases, only a portion of it. Some wind events impact the entire region while others focus the intense winds in foothill areas. This is largely dependent on wind direction. With heavy winds there could be extensive debris on the roads, broken lines and if some buildings are damaged, there could be broken water or gas pipes.		

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		In previous similar events, there was major damage to the trees and power lines. Many roads were totally closed and some people were without power for over 10 days. In situations like this, the local jurisdiction is not capable of maintaining an adequate delivery of services. In order to bring the services back up to their normal level, they will possibly have to staff the recovery operations for weeks. *Extreme Heat* Unless there is a heat advisory or warning issued asking people to stay inside than there should be minimal to no effect on the continuity of operations or delivery of services in Washoe County.		
Volcano	Thick depositions of ash can collapse buildings. This is especially true if it is raining. A one inch layer of ash weighs between five and ten pounds per square foot. This weight can increase dramatically with rain, because ash will hold the water. The weight can increase to 10 to 15 pounds per square foot, leading to collapse in some cases. Persons inside those	Delivery of services will probably not be curtailed by a volcanic eruption in the area. There can, however, be some differences between the delivery of services, due to cut off transportation and high levels of regional communities needing assistance. Small ash explosions should not have an effect on the continuity of operations for jurisdictions or	Ash can collapse roofs, destroy engines, make roads slippery, clog both water and air filtration systems, clog drains, and short out electrical systems. All these can affect the city and its ability to operate on a day to day basis. Depending on the depth and distribution pattern of the ash, individual departments will be more or less impacted by it. With more than one cm of ash having	Environmental impacts will be dramatic and in some cases long lasting. Small ash eruptions will have limited environmental impacts. Large ash eruptions could have dramatic impacts on the environment or ecology. Damage will partly depend on the size of the particles. Large pieces, one to two inches or

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	buildings have a significant chance of being killed or at least injured by the collapsing structure. Persons located in areas with falling ash can experience eye, nose, and throat problems. Patients with bronchitis, emphysema, and asthma may have increased problems beyond the rest of the population. Breathing similar material in mines and quarries by workers can lead to silicosis over many years. Short term breathing of small quantities of ash particles is not known to cause long term problems. The decrease in visibility and increase in darkness in those areas heavily impacted by the ash will disrupt outdoor activities and in some cases cause psychological distress. Thin ash layers can make roads slick leading to an increase in accidents. It can also clog up air intake systems for automobiles and destroy the engine rendering the car useless for evacuation if necessary.	agencies in the county unless the wind patterns are perfect for dropping it directly on their service area. Large ash eruptions are different. Due to the amount of material dropped on an area, operations can be strained. Damage to communications equipment, roofs of buildings collapsing, roads closed, etc. can all limit the ability of an agency to maintain day-to-day operations. If the volcano has a large ash eruption and conditions are right to deposit the ash across portions of the area, there could be difficulty finding alternate facilities, getting staff to work and having necessary equipment in operational shape.	the ability to disrupt traffic by closing down roads combined with the other damage listed above, it could take weeks for the departments to get their individual infrastructures back to normal.	greater in diameter, can be very damaging. However, lethal impact from falling ash is likely only in the immediate vicinity of the volcano, generally within about six miles of the vent. Animals not protected in this area could be severely injured or killed by the large particles. Further away the finer grains begin to fall and can cause respiratory and eye irritation to animals, burying plants and robbing the animals of their natural food supply. Ash washed down by the rain will tend to add to the rest of the silt in the rivers and some of it will settle out downstream possibly affecting the fish resources. A large ash eruption that blows in other than an easterly direction could cause extensive long term environmental damage to much of the region. Having the same types of damage mentioned above but spread over much of the area could take years for some of it to wear off.
Wildland Fire	The health and safety of persons in the affected area at the time of the fire could be much compromised. Burns, smoke inhalation, psychological trauma,	Depending on the area impacted by a wildland fire, the continuity of operations for multiple jurisdictions or agencies might all be affected at the same time.	Within the geographic area covered by a wildland fire there will be considerable damage to the facilities and infrastructure. These fires can become hot	Environmental impacts from a major wilderness fire can be extreme, and may be exacerbated even further if the fire becomes a wildland fire.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	and death are all some of the impacts on the population living, working, recreating, or visiting within the impacted area. The Southern California wildfires of 2003 and 2007 and the Oakland Hills fire of 1991 are perfect examples of major wildland fires that can not only cause damage, but death as well. The Oakland Hills fire killed 25 people, the 2003 Southern California fire 22, and the 2007 fires a dozen. This does not count the dozens who were injured in each of these fires. In some ways, the psychological damage can be as traumatic as some of the physical injury. Both adults and children can present long term psychological changes due to the incident. Children may manifest through regression or other actions. This can include: • Fear of injury or death; • Fear of separation; • Inability to sleep; • Afraid of the dark; • Afraid of closed spaces; • Afraid of outdoors; • Regression of toilet training/bed wetting or other outgrown childish behavior; • Withdrawal from normal activities; • Fear of sudden noises;	Another problem is the isolation of certain areas. Many areas exist with their only access is the narrow two lane roads that connect them to the more populated portions of the county.	enough to burn asphalt, which can render the roads impassable for some time. Utility poles and wires will be totally gone. Many buildings of individual jurisdictions can be destroyed just as individuals' homes can be burned. Cars, trucks, busses, and equipment caught in the path of a fire can be a total loss.	Normal environmental damage includes deforestation, death of animals, pollution of streams and rivers with burnt material, increased erosion and later landslides. This damage may take decades to reverse. If the fire happens in an area of old growth forest, which may have been in existence for hundreds of years, it could take centuries for the environment to regain its original form and biodiversity. However, even with the damage done, not everything about the damage is detrimental. The damage done to the environment and the destruction of the forest opens up areas for colonization by new plants and animals. These burned areas allow sunlight to reach the ground. In doing so, plants that have not been able to survive in the heavily shaded understory that normally exist in old growth forests will thrive. As they do so, they will attract animals that thrive on them. Over time, the remnants of the original forest will encroach on the open area and it will once again return to forest. With a fire that affects the interface between the forest and the developed areas of the city,

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	• Refusing to eat, nightmares, hyperactivity and irritability; and • Aggressive episodes with other children Adult Stress Symptoms include: Anxiety, depression, insomnia, irritability, impairment in concentration, loss of productivity, feelings of sadness and gloom, and the tendency to link the fire to other traumatic events in their life.			there is the problem of further pollution. The burning of materials used in construction, the rupturing of oil, gas, or other hazardous materials tanks, the melting and burning of tires, and the distribution of firefighting chemicals across the landscape. Over the past few years, an increase in the knowledge of the effects from firefighting chemicals has shown that there can be long term detrimental impacts on the environment, especially on water features and areas where the groundwater may become contaminated. This is particularly relevant when there are repeat uses of the chemicals to control fires.
Manmade Hazards/HIRA				
Criminal Acts	The impacts to personnel in the area of a criminal act will depend greatly on the type and size of the incident. Criminal acts may only cause a few injuries (depending on the scope of the action). Because of the unpredictable nature of criminal acts, it is difficult to predict how and to what extent Washoe County would be impacted.	For a large criminal act impacting Washoe County, continuity of operations will be impacted for many of the agencies and jurisdictions located therein. The impacts affecting continuity of operations include: • Death or injury to staff limiting the number of staff able to fill normal operational duties, • Inability of staff to respond to their work sites due to road	Criminal acts have numerous impacts to property, facilities, and infrastructure based on data from past events. The scope and size of criminal acts dictates the amount of damage to a county's property, facilities, and infrastructure. If a criminal act occurred in Washoe County, the county could sustain considerable impacts and damage, especially in the	The damage to the environment will usually be temporary and physical recovery to the environment will begin as soon as the method of destruction stops. Because of the unpredictable nature criminal acts, it is difficult to predict how and to what extent Washoe County and its environment would be impacted.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		closures from debris or damage to the roads and bridges or overpasses damaged closing arterials in particular, • Damage to communications systems will limit organizations' ability to coordinate their own resources, and it will also limit their ability to pull together a full picture of the damage suffered in their jurisdiction and to request assistance if needed, • Damage to facilities and equipment, and • Damage to the water, energy, and sewer systems connected to agency facilities will not allow operations to continue in their normal manner. Because of the unpredictable nature of criminal act, it is difficult to predict how and to what extent Washoe County would be impacted.	downtown neighborhood given the close proximity of high-rise structures (both commercial and residential) and the high number of citizens in the area during the day.	
Energy Emergency	The health and safety of the people affected by an energy emergency will have many factors contributing to their safety. One of the factors is the length of time the power will be out. If it is out for a short period of time the health and safety of people in Washoe County will be limited. On the other hand, if the power is	Continuity of operations and delivery of services could be put on hold depending on the location of the services and the need for energy. Some services will continue if the energy emergency is short, but could be discontinued if the emergency continues for a long period of time. If the outlying areas of Washoe	Property and infrastructure would only be affected if a hazard or flooding occurred because of the energy emergency. If there was an energy shortage that caused a building or infrastructure to catch fire then there would be damage to that building and potentially surrounding buildings. Also, an energy emergency could be a result of flooding and areas	There are no impacts to the environment because of an energy emergency. There would only be an impact if the energy emergency caused a wildland fire.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
	out for long periods of time the health and safety of the citizens in Washoe County could be greater. Things that could happen are heat exhaustion or hypothermia depending on the time of year. This is caused because household and business HVAC unit will be nonoperational. Another side effect of an energy emergency is safe drinking water and food for Washoe County. Citizens should have a preparedness kit with water and food for a few days, but any more than that there could be severe issues surrounding food and water.	County were without energy but the building and business downtown still had power then series would not be interrupted, same goes for if the situation was reversed. Then if the whole County was without power then services would halt until power was returned.	affected will also have flooding and potential building damage. If it is just a simple energy outage with no electrical fires or blown generators then the property damage will be minimal with a quick start-up once power is restored.	
Hazardous Materials	A release or spill of bulk hazardous materials could result in fire, explosion, toxic cloud or direct contamination of people and property. The effects may involve a local site or many square miles. Health problems may be immediate, such as corrosive effects on skin and lungs, or be gradual, such as the development of cancer from a carcinogen. Damage to property could range from immediate destruction by explosion to permanent contamination by a persistent hazardous material.	Hazardous materials incidents may require large-scale evacuations or shelter-in-place actions. These operations may present significant challenges in terms of warning and notification, logistics, and agency coordination. Hazardous materials may generate widespread media and public interest. The media must be considered an ally in these emergencies; they can provide considerable assistance in emergency public information and warning.	Property in Washoe County is at risk and vulnerable to the impacts of hazardous materials. Chemical spills impact our property and infrastructure. A single explosion could devastate a facility or cluster of facilities. Homes and businesses could receive damage or even collapse. Hazardous materials can erode or corrode infrastructure as well.	Hazardous materials incidents may pose long-term threats to public health, property, or the environment. The proximity of a hazardous materials release to the Truckee River, its inlets and outlets, signifies a potential threat to the water system. All of the communities located along the Truckee River draw their water supply from the river or form wells that are directly affected by any hazardous materials release in the river. Environmental damage, including the potential for wildland fire, is an additional consideration.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
Terrorism/Weapons of Mass Destruction	The impacts to personnel in the area of a terrorist event will depend greatly on the type and size of the incident. Most terrorist events have the capability to cause large-scale or mass casualties and injuries, whereas civil actions may only cause a few injuries (depending on the scope of the action). Because of the unpredictable nature of terrorist events or civil actions, it is difficult to predict how and to what extent Washoe County would be impacted.	For a large terrorist event impacting Washoe County, continuity of operations will be impacted for many of the agencies and jurisdictions located therein. The impacts affecting continuity of operations include: • Death or injury to staff limiting the number of staff able to fill normal operational duties, • Inability of staff to respond to their work sites due to road closures from debris or damage to the roads and bridges or overpasses damaged closing arterials in particular, • Staff absenteeism while checking on or taking care of family and handling damage to home or other personal property, • Damage to communications systems will limit organizations' ability to coordinate their own resources, and it will also limit their ability to pull together a full picture of the damage suffered in their jurisdiction and to request assistance if needed, • Damage to facilities and equipment, and • Damage to the water, energy, and sewer systems connected to agency facilities will not allow operations to continue in their normal manner. Because of the unpredictable nature of terrorist events, it is	Terrorist activities have numerous impacts to property, facilities, and infrastructure based on data from past events. The scope and size of the terrorist activities dictates the amount of damage to a county's property, facilities, and infrastructure. If a terrorist event occurred in Washoe County, the county could sustain considerable impacts and damage, especially in the downtown neighborhood given the close proximity of high-rise structures (both commercial and residential) and the high number of citizens in the area during the day. Cyberterrorism impacts a different type of infrastructure, and Washoe County currently has preventative measures in place. A cyber attack could impact property and facilities should a utility service be targeted.	Air pollution: some chemicals released as gasses can cause immediate damage to plants, animals, and humans. Tanks filled with, for example, chlorine, ammonia, or any other hazardous gas can harm or kill animals, birds, and plants, not just in the area of the release but for some distance downwind depending on the chemical involved and the size of the release. The damage will usually be temporary and physical recovery to the environment will begin as soon as the gas dissipates. Because of the unpredictable nature of terrorist events, it is difficult to predict how and to what extent Washoe County would be impacted.

Consequences (4.3.1)	Public	Continuity of Operations	Property, Facilities, Infrastructure	Environment
		difficult to predict how and to what extent Washoe County would be impacted.		
Transportation of Radiological Materials and Waste	A release or spill of bulk radiological materials could result in fire, explosion, toxic cloud or direct contamination of people and property. The effects may involve a local site or many square miles. Health problems may be immediate, such as corrosive effects on skin and lungs, or be gradual, such as the development of cancer from a carcinogen. Damage to property could range from immediate destruction by explosion to permanent contamination by a persistent radiological material.	Radiological materials incidents may require large-scale evacuations or shelter-in-place actions. These operations may present significant challenges in terms of warning and notification, logistics, and agency coordination. Radiological materials may generate widespread media and public interest. The media must be considered an ally in these emergencies; they can provide considerable assistance in emergency public information and warning.	Property in Washoe County is at risk and vulnerable to the impacts of radiological materials. Radiological materials spills, impact our property and infrastructure. A single event could devastate a facility or cluster of facilities. Homes and businesses could receive damage or even collapse. Hazardous materials can erode or corrode infrastructure as well.	Radiological materials incidents may pose long-term threats to public health, property, or the environment. The proximity of a radiological materials release to the Truckee River, its inlets and outlets, signifies a potential threat to the water system. All of the communities located along the Truckee River draw their water supply from the river or form wells that are directly affected by any hazardous materials release in the river.

Source: Washoe County Emergency Management and Homeland Security Program

Table C-2: HIRA – Responders; Economic Conditions; and Public Confidence

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
Natural Hazards/HIRA			
Avalanche	Personnel responding to the scene of an avalanche must be aware of the potential for more land to collapse while they are attempting to respond to or rescue persons from the slide impact area. With the conditions being cold and damp, responders can be put at risk for environmental risks such as hypothermia and other extreme cold exposures.	Due to the very limited terrain covered by any individual avalanche in Washoe County, the impacts to the economy for any jurisdiction affected should be limited. The biggest potential problem economically could come from a major slide taking out a section of State Route 431, State Route 51, or I-80. This could impact the transportation of goods into and out of Washoe County for a short time until a work around is established.	Avalanches that occur in Washoe County do not affect homes, businesses, or infrastructure to the extent that there is any lasting impact noticed by the public. That could take a turn in another direction if Washoe County has an avalanche that destroys a number of homes or a major arterial that could take months to reopen. If a number of homes are destroyed and, in particular, if people are killed or injured, there will be questions asked as to why people were allowed to build on unstable slopes.
Drought	There should be no extra health or safety impacts from drought beyond those for the general public. In extreme heat, caution should be exercised for first responders. Responders must be sure to maintain adequate hydration. Individual hazards exacerbated by the drought, such as an increase in wildfires, by themselves threaten the health and safety of responders; however they are not a direct result of the drought.	Drought will impact the population in Washoe County. Most previous periods of drought have been, at their worst, an inconvenience. However, a prolonged severe drought could impact the agricultural and industrial basis of the local economy. Economic impacts become apparent as we move from a strictly meteorological drought to an agricultural drought. Crops are damaged due to lack of water. Damaged crops and closed national forests mean that retailers begin to lose business. Layoffs can begin leading to financial and mental, stress on individuals and families. Damaged crops may lead to a decrease in food quality as well quantity, causing more food importation. This yields higher costs for the distributors and therefore higher food	Public dissatisfaction with government regarding drought response can erode confidence in local governments. This is especially true if a portion of the public feels that it is being denied a legitimate share of the water available. Required rationing, while necessary, must be scrupulously carried out to ensure that no bias is felt by others, especially the low or middle income portions of the population. If this is not done, it can lead to a lack of confidence in either local utilities or local government or both. Eventually, this can lead to unrest.

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
		prices for consumers. Washoe County services and companies that rely on a large supply of water for manufacturing goods could have a similar predicament in that as supplies of water dwindle they may have to cut back some processes and also lay off workers with consequences down the chain of distribution. A lack of water in the rivers and streams will result in lower levels behind dams used for hydroelectric power generation. Power bought from other sources will be more costly than that locally generated. These costs will eventually be passed on to the consumer. Recreation will also be affected. As a drought intensifies, recreation resources will be closed to the public. Dry conditions creating fire danger will limit the use of National Forest and both State and National Park lands. Communities acting as entry points to the recreation areas would be affected by the National Forest and Park closures. As lakes dry up and the flow in rivers and streams decrease, water recreation will also diminish. Boat ramps and docks may be high and dry. Recreational fishing could be curtailed.	
Earthquake	Responders are subject to a number of hazards in the response phase of the emergency. Damaged fire stations could prevent fire personnel from utilizing all the equipment with which they are used to responding. Already damaged structures could collapse during search and rescue operations, especially during aftershocks. Response personnel, by the very nature of their work are putting themselves in harm's	The economic effects from a large damaging earthquake will be extensive and the overall financial condition of most businesses, as well as local governments in Washoe County, will be compromised. Economic factors will be impacted first by the direct damage to homes, businesses and the infrastructure. A number of factors come into play here. First, the housing stock will be affected, and while some people have	How the after effects of the earthquake are handled will have a great deal to do with the public's confidence in the jurisdiction. For smaller size quakes, there should be little or no decrease in the public's confidence about government's ability to act. However, as the size of the earthquake increases and as the parameters that could lead to major damage increase, such as depth, epicenter, rainy weather, etc., the possibility of the public

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	way, not just from structural collapse during aftershocks but also from further landslide activity and respiratory problems due to the inhaling of quantities of dust and microbes stirred up by the earthquake. In addition, they can be exposed to bacteria and chemicals in the environment they are working in, sometimes without realizing what the particular dangers are. First responders frequently have adverse psychological reactions to trauma. Divorce and suicide rates are higher than the normal population in the first responder community and even greater after a major event. Ill health effects can include high blood pressure, sleep disorders, alcohol or sleeping aid abuse, anger, withdrawal from family members, over protectiveness for family members, and even paranoia.	earthquake insurance, the majority people do not. Most home construction built to contemporary earthquake standards will probably not collapse, however, damage could be extensive to older structures, especially those not connected to their foundations. While assistance will help with reconstruction, there could still be a large gap in what is needed to get families back into their homes. Looking at the results of other earthquakes both in the Pacific Northwest and California, it can be seen that many businesses' building stock will be damaged. This will be especially prevalent in the areas of soft soils and older building stock. Combining this with the loss of water, electricity, and natural gas means that much of the local industry and businesses will not be able to continue operations in their normal manner. Most will be closed for at least a nominal portion of time. This will mean lost wages. In an escalating sequence of events the wage earner will not be able to buy necessities or pay bills that come due, including mortgages. This can lead to foreclosures and the further displacement of the population. The loss of the transportation corridors including roads and rail transport will make it nearly impossible to both import needed supplies and to ship goods to market in the near term. Some of these facilities may take years to recover. Other economic factors impacting	finding fault with local jurisdictions or agencies increases. Local agencies and governments must be able to respond quickly to revive any portions of the infrastructure that have been impacted by the earthquake. The longer the delay in service restoration, the more the public loses confidence in an agency's or government's ability to handle the situation. Since many of the long-term effects of an earthquake have social and economic consequences, the more the public perceives that government is ignoring their plight or unable to respond to it, the more the public will lose confidence in it. Eventually, any perceived lack of ability, or slow response will result in finger pointing and acrimony.

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
		businesses include loss of inventory, or for those businesses that operate on a "just in time" re-supply schedule and do not have an inventory, the loss of their ability to be re-supplied may denote the end of their business. A contributing factor includes the inability of staff to report to their work. This will be due in some cases to injury, while for others they could be looking after their own homes and families. Another factor leading to staff absenteeism is the damage done to the transportation corridors. The damage to homes, industry, and other businesses will also have a direct impact on the long term operation of government and the public infrastructure. With the loss of a percentage of the tax base due to damage, and the exorbitant cost of bringing the infrastructure back to normal, there will not be funds available for many of the services that citizens have grown to expect. This will have a compounding effect of not attracting other business to the County which then continues to limit the tax base.	
Flood	Response to flooding is response in hazardous conditions. Whether one is attempting swift water rescue, adding sandbags to dikes, or cleaning up debris after the waters have receded, an individual is working in a hazardous environment. Impacts to responding personnel are similar to what can affect the citizens residing or working in the flood area. They include death from drowning and/or hypothermia, and	Economically, the after effects will depend directly on how much damage was done to local businesses, the local tax base, and the local infrastructure. While an individual home damaged by a flood can be devastating to an individual or family, it has very little effect on the overall economic condition of the community. However when a large number of homes and businesses are damaged or destroyed it can negatively alter the tax base	The reputation of any individual department within Washoe County or the public's confidence in the county is highly dependent on the public's perception on how well the response and recovery were handled during and after the flood. A response that either shows or gives the impression that the county is prepared and responsive to the public's needs and that it manages a recovery to get services back and damage

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	either death or injury from trauma. Long-term environmental hazards such as hazardous chemicals, sewage, etc. can cause illness, either acute or chronic.	decreasing the ability of the local jurisdiction to pay, not just for infrastructure repair and community restoration, but also for the normal day to day programs that make the community a viable area in which to live and work. Related to this is the possibility that people may need temporary relocation assistance. If homes are not repairable, families may have to look for alternate housing. Damage to the business and industry sector does not only affect the tax base, but also removes jobs from the local economy. The loss of jobs can escalate into other problems. The unemployed may either move away, go on unemployment, or be forced to take a lower paying job, all of which further decreases the financial stability of the community. If the loss of financial stability is not corrected, there are other social problems that arise. Those out of work can develop a loss of self-esteem that can lead to an increase in crime, alcohol and drug abuse, spouse abuse, and an increase in medical problems. Flooding may damage the infrastructure by undercutting and washing out transportation corridors such as roads, bridges and train tracks, downing power poles, damaging pipelines, filling sewer lines with silt, and damaging levees and revetments. The time taken to repair these can take from weeks to years depending on the amount of damage and the available resources to repair them. This damage to the infrastructure will slow	repaired in a timely manner will enhance a county's reputation. If, however, the perception develops that the response is incompetent, slow to react, or ignores the needs of its citizens, then the reputation of the county and the confidence in its abilities will decline.

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
		down the economic recovery for the jurisdiction. It can limit the reopening of businesses. It can force those that may have had no damage and operate on a just-in-time supply system but cannot get inventory, to close, at least temporarily. For some of these, the lack of commerce and therefore loss of income can prove critical. With creditors needing pay and no revenue stream, some may not be able to recover and could close permanently. Grocery stores, restaurants and food delivery systems may lose product because of the lack of power. Large chains can recover, but small independent businesses may not. Those that have a system of backup power should do much better than those that do not. In summary, the economic viability of the community will depend on not just how much damage is done, but also on how quickly the infrastructure can be repaired, how prepared businesses are to operate in the post disaster environment, how prepared citizens are for the flood and its after effects, and how well local governments and organizations can respond to the needs of the public for support, cleanup, and, if necessary, relocation.	
Infectious Disease	Protective clothing, including garments, gloves and booties, are necessary for the response to a suspected act of biological terrorism to reduce exposures to potential dermal, chemical, and physical hazards. Protective clothing must have physical performance properties adequate for the	Seasonal flu by itself causes considerable economic hardship due to lost productivity, high medical costs, and lost wages. During a pandemic, if the symptoms of the disease are severe, including long periods of illness, or residual, debilitating effects, it could impact the economy of Washoe County. The	A pandemic can shake the confidence of the public across all social groups. As a large portion of the population becomes ill, demands for limited and controlled medical supplies could cause questions to arise concerning the methods of distribution.

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	mission (e.g. tensile strength, puncture resistance, seam breaking strength, abrasion resistance). Protective clothing is used to prevent skin exposures and/or contamination of other clothing. The type of protective clothing needed will depend upon the biological agent, concentration, route of exposure, and anticipated work operations. Proper decontamination of protective equipment and clothing will ensure that any particles that might have settled on the outside of protective equipment are removed before taking off gear. Decontamination sequences currently used for hazardous material emergencies should be used as appropriate for the level of protection employed and agent encountered.	need to alter or prevent the normal social contacts, called "social distancing," will lead to a further temporary decrease in the financial condition of the community.	Inadequate response to the public's concerns about the supplies or the method of distribution could lead to not only lack of confidence, but outright hostility towards both those in power and those who hold the reins of distribution. An essential element of medical management in such a situation would be to allay panic. This could be done using Public Service Announcements to address the concerns of the public and keep them inform and updated of the changing situation. Immediate use of the media to provide information about the normal course of the disease, the specific signs or symptoms, the situations requiring immediate medical attention or advice, and the procedures for obtaining essential medical supplies would be crucial in maintaining calm and avoiding a mass surge event at local hospitals.
Severe Weather	*Hail* First Responders have very similar safety and health concerns to those of the general public regarding hail. While injury and even death to people and animals that are in the wrong spot at the wrong time can occur, the size of hail that impacts Washoe County is usually too small to cause major damage. Hail storms here will result in first responders seeking shelter for the short period of time the hail is falling. There should not be any different result for the first responders than for the general public. Just as the general public injuries are usually limited to minor stings and bruises, so are the first responders.	*Hail* Economic impacts from hail, even the relatively small hail that occasionally falls here in Washoe County, can be dramatic. Economic damage may come about if the hailstones are large enough to damage cars, or equipment being used outside and building exteriors. *Ice Storms* The economic or financial impact of an ice storm can be extensive. Damage to facilities due to the weight of the ice can be in the millions of dollars. Closed roads and power outages, either due to ice and debris on the road, downed power lines, or damage to	*Hail* Hailstorms should not cause any loss of confidence in Washoe County. *Ice Storms* The reputation of local jurisdictions and agencies in the wake of an ice storm is partly dependent on the weather itself. A heavy ice storm that maintains below freezing temperatures for a long period of time will continue to tax local resources throughout that period. Citizens will become more adamant in demanding relief from power outages and other storm related problems. In contrast, an ice storm that does its damage and then melts quickly allowing for a rapid

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	Ice Storms First Responders can expect similar injuries as the general public. These could include cold related injuries like hypothermia, or injury and death from accidents. Accidents can occur either through falls due to ice on walkways or on the ground, or in response vehicles due to the icy roads. In addition, over loading on trees, utility wires, etc. can cause breaks and limbs or wires can fall either on individuals, automobiles, or buildings causing damage or traumatic injuries, or in the case of downed utility wires fires could start or individuals could be electrocuted. Road crews will have to be careful of downed lines and work in conjunction with utility workers to open roads. *Snowstorms* First responders operating in the hazardous environment of a snowstorm, have the potential to get cold related injuries if they are not adequately protected from the elements. Due to the amount of time spent on snow covered roads responding to storm related problems, they also have a potential for traffic accidents. *Tornadoes* During the actual tornado itself, responders are like any other citizen. They are as likely as anybody else to be injured or killed by the storm. Once the tornado has passed, however, they will enter the area where the damage has occurred. With a large tornado	electrical power facilities will cause closure of businesses. This can lead to lost revenue for the business and lost income for employees. Damage to homes and personal property can also be high, leading to citizens incurring increased debt. *Snowstorms* Most snowstorms to strike Washoe County have a very limited impact on the local economy. They are more of a short-term inconvenience than anything else, melting off in a few hours or a day. However, a major storm that knocks out electricity and closes roads, schools, and businesses could have a major impact on the local economy. The inability of retail outlets to maintain a certain level of commerce, restock, and in some cases lose stock from either damage from the cold or exceeding expiration dates on perishables could cost them millions of dollars. When employers close their business even for a few days, the ripple effects include not just lost goods but lost wages for employees. With lost wages, the employee becomes unable to pay bills. If this goes on for very long, the lost wages make it difficult for the worker to pay the normal day-to-day bills, much less support the retail economy. *Tornadoes* A small tornado hitting the unpopulated areas of Washoe County would have negligible economic or financial consequences for the County. In contrast, a large tornado moving through an industrial	recovery will not damage the confidence of citizens in the local jurisdictions or agencies. *Snowstorms* Small snowstorms will have little if any impact on the citizens' confidence in local agencies or jurisdictions. With large storms depositing a great deal of snow throughout Washoe County, two factors will affect peoples' perceptions on the competency of the local jurisdiction. The first is how fast the roads are brought back to being passable and the second is how quickly their electricity is returned. If these two things are brought back to normal quickly, confidence in the local entity will be high. If, on the other hand, things are slow and the perception develops that not enough is being done, then confidence in the local jurisdiction will falter and it will develop a reputation for either incompetence or not caring about the citizens it serves. *Tornadoes* In the wake of a tornado the confidence in any individual entity will be based on how quickly it responds to the needs of the affected community. People know that tornadoes are extremely damaging and there are not many of them that actually form in Washoe County. A tornado, by its very nature, is more localized in its damage. Rather than being a county-wide phenomenon, the path of destruction will be well defined. Any jurisdiction directly impacted by the wind should be able to begin recovery operations immediately. If

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	this puts them in a hazardous area. They could be exposed to live electric wires, hazardous chemicals, and unstable debris. *Windstorms* First responders will be putting themselves in harm's way throughout windstorm incidents. They can be hit by flying debris or falling limbs and trees as well as coming in contact with downed power lines. Their response vehicles have been crushed and over the years there are the occasional injuries. In the aftermath of the windstorm, first responders by the nature of their work are putting themselves in harm's way by clearing roads, restringing wire, and cutting trees. *Extreme Heat* During extreme heat first responders in Washoe County can become ill and in some severe cases be killed because of extreme heat. Extreme heat can cause heat exhaustion and is a relatively common reaction to severe heat and can include symptoms such as dizziness, headache and fainting. First responders are going to be putting themselves at risk during hot days responding to individual incidents. Many times spending long hours outside with minimal breaks or protection from the sun and heat.	area, a populated area, or an area with a concentration of businesses could devastate the local economy. This would be especially true if a large number of businesses or the industrial base of the county were affected. Homes and some businesses could be rebuilt and be up and running within a year or so. Larger scale projects like malls or the port industrial complex could take many years to rebuild and re-staff. *Windstorms* The economic and financial aspects of a windstorm can be extensive. Local damage to homes and businesses can run into the millions of dollars. When business or industry is damaged there can be extensive loss of employment. This leads to individuals and families not being able to make their bill payments, including rent or house payments. People unable to work will need assistance, which puts a burden on the taxpayer. If the situation does not resolve itself the jurisdiction could eventually have some people leave the area. *Extreme Heat* When individuals are ill because of extreme heat there can be extensive loss of employment. This leads to individuals and families not being able to make their bill payments, including rent or house payments. People unable to work will need assistance, which puts a burden on the taxpayer. If the situation does not resolve itself the jurisdiction could eventually have some people leave the area.	assistance is needed, and it hasn't been for the last few tornadoes, it would be available from nearby agencies and jurisdictions on short notice. If the perception, real or not, is that any agency or jurisdiction is not responsive to the needs of the community affected by this incident, then there will be a decrease in confidence in that organization. If, on the other hand, the entities involved act quickly to get the community back on its feet, its reputation should not be hurt. *Windstorms* Initially, the public is very supportive of the actions of first responders. However, as time goes on and there are still pockets of homes or businesses without electricity or phone service, the people who live in these areas will begin to lose faith in the abilities of the local entity. They begin to wonder why they do not have services and while other people do. Eventually, they begin to feel that the local jurisdiction has either forgotten about them or that they are considered to not be important enough to warrant a quick response. If a jurisdiction cannot overcome these fears, they can escalate into confrontations between individuals and those working to restore services. *Extreme Heat* There is should be no loss in confidence in Washoe County because of extreme heat.

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
Volcano	Thick depositions of ash can collapse buildings and this is especially true if it is raining. Persons inside those buildings have a significant chance of being killed or at least injured by the collapsing structure. Responders may wind up working for long periods of time in areas with ash. The problems of eye, nose, and throat irritation could impact their ability to work in those conditions. It is not known if this has long term negative consequences. Similar to the effects on citizens caught in it, there is no knowledge about the limited quantities inhaled and their long term effects on the health of rescuers. Personnel responding to incidents will find that thin ash layers can make roads slick leading to an increase in accidents. Emergency equipment will break and ash can clog up air intake systems and destroy engines for rescue vehicles like helicopters, fixed wing aircraft and automobiles. This is not just a maintenance problem because it could lead to serious crashes of response vehicles.	Economic and financial affects will be of two parts. First, is the damage to property, buildings, inventories and equipment if there is a large ashfall that affects the area. Second, is the loss of revenue due to the inability to get supplies through the damaged area, the loss of markets, the decrease in population and, in some cases, the loss of infrastructure to economically support the area.	The reputation of the county will probably not be affected by a volcanic eruption. It can be improved by the open distribution of information to the public regarding what is, could, and will happen during a volcanic event. Good information regarding what needs to be done to prevent or limit damage to property and individuals will allow homeowners, businesses, and other local organizations to prepare for and limit the damage from ash. Any additional programs to assist them in alleviating the problem, such as a community program to clean the ash off roofs, will help.
Wildland Fire	The impacts to personnel responding to a wildland fire include burns, trauma, smoke inhalation, psychological trauma and death. Injury and death can occur from equipment failure or not wearing the proper equipment. Deaths can occur from falling snags, burnover, or even a bulldozer rolling over on steep terrain.	The economic and financial condition of any individual jurisdiction will depend on the size of the wildland fire and which parts of the community are directly affected. A fire that burns a couple of thousand acres of previously logged but not regrown terrain and destroys a dozen homes will have a relatively benign long-term economic impact for the larger community. In comparison, one	The reputation of the entity will be directly related to the perception of competence in handling the fire threat and how well it was handled. The more damage caused by the fire that is shown to have been preventable by some action of the agency or jurisdiction, the lower the resulting reputation will be and the greater the decrease in confidence in the entity's ability to handle future situations. A

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	Long-term effects can include heart disease, emphysema, and other environment- caused disease.	that destroys an area the same size, but burns an entire small community, will have long term lasting effects, if the community is able to rebuild at all. The long term- effects include: a loss of economic vitality because of the destroyed businesses and wilderness jobs associated with recreation and logging; a loss of tax revenue; and, possibly the permanent loss to the community of the people that lived in the homes either due to death from the fire or moving away in the aftermath of the disaster.	rapidly handled fire with little damage to homes or businesses will enhance the jurisdiction's reputation while a fire that burns many homes or businesses, even if it was well handled may allow a lack of confidence to develop. Visuals of teams working to protect the homes and property of individuals will help to shore up this image.
Manmade Hazards/HIRA			
Criminal Acts	Depending upon the type of incident, responders may face a variety of hazards in the response phase of the emergency, including structural collapse issues, chemical/biological/radiological environments, and mass casualty situations. First responders frequently have adverse psychological reactions to trauma. Divorce and suicide rates are higher than the normal population in the first responder community and even greater after a major event. First responders might be affected by rioters throwing or getting aggressive during an event, so physical harm is considered when considering the health and safety of our first responders.	Criminal act has an adverse effect on local economy and financial status. The damage to consumer confidence in an area of a criminal act further impacts the region's economy, and travel advisories would limit the number of tourists in a given area.	Negative criminal acts may cause potentially long-term psychological effects. After serious riots in America, research found that significant proportions of the local populations reported a long-term improvement in their mental well-being. A public's confidence can be affected by how the riot was responded to, the extent of the riot, and areas affected.
Energy Emergency	The health and safety of responders to the incident are the same as the general public.	The economic and financial condition of Washoe County will depend on the severity	The reputation of any individual department within Washoe County or the public's

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	Responders could be working in harsh conditions and will need safe drinking water and food in order to continue responding to events and incidents. With an energy emergency there could be downed electrical lines, blown generators, and other electrical hazards. This is an added hazard to responders and should be considered when responding to incidents. Proper safety precautions should be taken by emergency personnel during an energy emergency to prevent further incidents.	of the energy emergency. It could range from no economic loss with a small energy emergency to completely losing everything is the emergency is large enough to shut a business down for days. This could be greatly impact places that have to refrigerate food and other consumer goods, for example, grocery stores, restaurants, and other markets where food is kept. Other places can feel the financial impact of an energy emergency because they will have to close operations while the power is out, and even a week of not bringing in revenue can hurt a small local business.	confidence in the county is highly dependent on the public's perception on how well the response and recovery were handled during and after the energy emergency. A response that either shows or gives the impression that the county is prepared and responsive to the public's needs and that it manages a recovery to get services back and damage repaired in a timely manner will enhance a county's reputation. If, however, the perception develops that the response is incompetent, slow to react, or ignores the needs of its citizens, then the reputation of the county and the confidence in its abilities will decline.
Hazardous Materials	Hazardous materials incidents, even minor ones, usually require a mulit-agency, multi-jurisdictional response. It is essential that the Incident Command System be implemented immediately by responding agencies. Hazardous materials incidents may pose significant risks to emergency response personnel. It is imperative that all emergency response personnel and potential first responders be properly trained in appropriate hazardous materials emergency response procedures. Significant hazardous materials incidents may require an extended commitment of personnel and resources from involved agencies and jurisdictions.	Depending on the size of the incident, the County's economy could experience enormous consequences. More common incidents such as HAZMAT spills on highways or releases at chemical facilities impact the economy if an industry or transportation routes are shut down.	Public confidence in governance may be impacted by a HAZMAT incident. In small, localized events, Washoe County does not believe there would be any impact on public confidence. These events happen on a regular basis. In a major chemical release, radiological release, or terrorist incident, citizens may be inclined to lose confidence in governance. In these instances, Washoe County is prepared to draft and issue media products for distribution on their webpage and through social media outlets.
Terrorism/Weapons of Mass Destruction	Depending upon the type of incident, responders may face a variety of hazards in	Terrorism has an adverse effect on local economy and financial status. The economic	Terrorism may cause potentially long-term psychological effects. Frequent warnings

Consequences (4.3.2)	Responders	Economic Conditions	Public Confidence
	the response phase of the emergency, including structural collapse issues, chemical/biological/radiological environments, and mass casualty situations. First responders frequently have adverse psychological reactions to trauma. Long term psychological impacts were noticed years ago, such as after the collapse of the Hyatt Regency Hotel walkway in Kansas City, Missouri in 1981, and eventually led to the development of Critical Incident Stress Management. Divorce and suicide rates are higher than the normal population in the first responder community and even greater after a major event5. "(S)tress is not like a light switch—the images of such tragic events often haunt the responder into his or her home life, piling more pressure on other events. Ill health effects can include high blood pressure, sleep disorders, alcohol or sleeping aid abuse, anger, withdrawal from family members, over protectiveness for family members, and even paranoia.6,7 " Post Traumatic Stress Disorder may be common in responders to a terrorist incident, especially if the responders must remove and identify casualties from the incident location.	impact of terrorism can be calculated from a variety of perspectives. There are direct costs to property and immediate effects on productivity, as well as longer term indirect costs of responding to terrorism. The damage to consumer confidence in an area of a terrorist event further impacts the region's economy, and travel advisories would limit the number of tourists in a given area.	without actual attacks (highlighting the rare and unpredictable nature of a terrorist attack) pose more negative psychological effects and lack of confidence in governmental systems, and— ironically—an attack can bring about enhanced support and a sense of community. Terrorist violence – and the threat of such violence – can work to bind communities together with a sense of common purpose and common outrage. Not only do terrorist attacks give a perception that there is a shared enemy out there, such attacks also bolster an individual's ties to their local community, deepening their sense of belonging and their identification with others living in the area. This is a powerful social effect which has been witnessed many times before. For example, during the London Blitz in World War II, many people noted the widespread camaraderie and closeness of what became known as the Blitz Spirit. Some aspects of this effect have already been seen in the US after 9/11. While many commentators talked about the sense of fear and panic sweeping the country, it was equally clear that there was a massive and widespread sense of shared community. Sales of American flags rocketed and millions of homes flew flags in a very public display of shared identity. Similar trends have been seen in Israel, where relentless terrorist attacks, rather than shattering society psychologically, have instead witnessed a remarkable resilience effect.
Transportation of Radiological	Radiological materials incidents, even minor ones, usually require a multi-agency, multi-	Depending on the public's reaction to a radiological emergency, there could be	In a radiological release citizens may be inclined to lose confidence in governance. In

Materials and Waste	jurisdictional response. It is essential that the Incident Command System be implemented immediately by responding agencies. Radiological materials incidents may pose significant risks to emergency response personnel. It is imperative that all emergency response personnel and potential first responders be properly trained in appropriate Radiological materials emergency response procedures. Significant Radiological materials incidents may require an extended commitment of personnel and resources from involved agencies and jurisdictions.	significant adverse effects on the economy. The public may move away from or avoid an effected area.	these instances, It is imperative that in these instances the public be provided understandable and consistent information from official sources. The public needs a plain language explanation of the hazards and associated risks and protective actions to be taken to reduce the risks, to ensure public safety and to protect the public's interests. It is important to realize that this applies to any event perceived as a serious emergency by the public or the media.