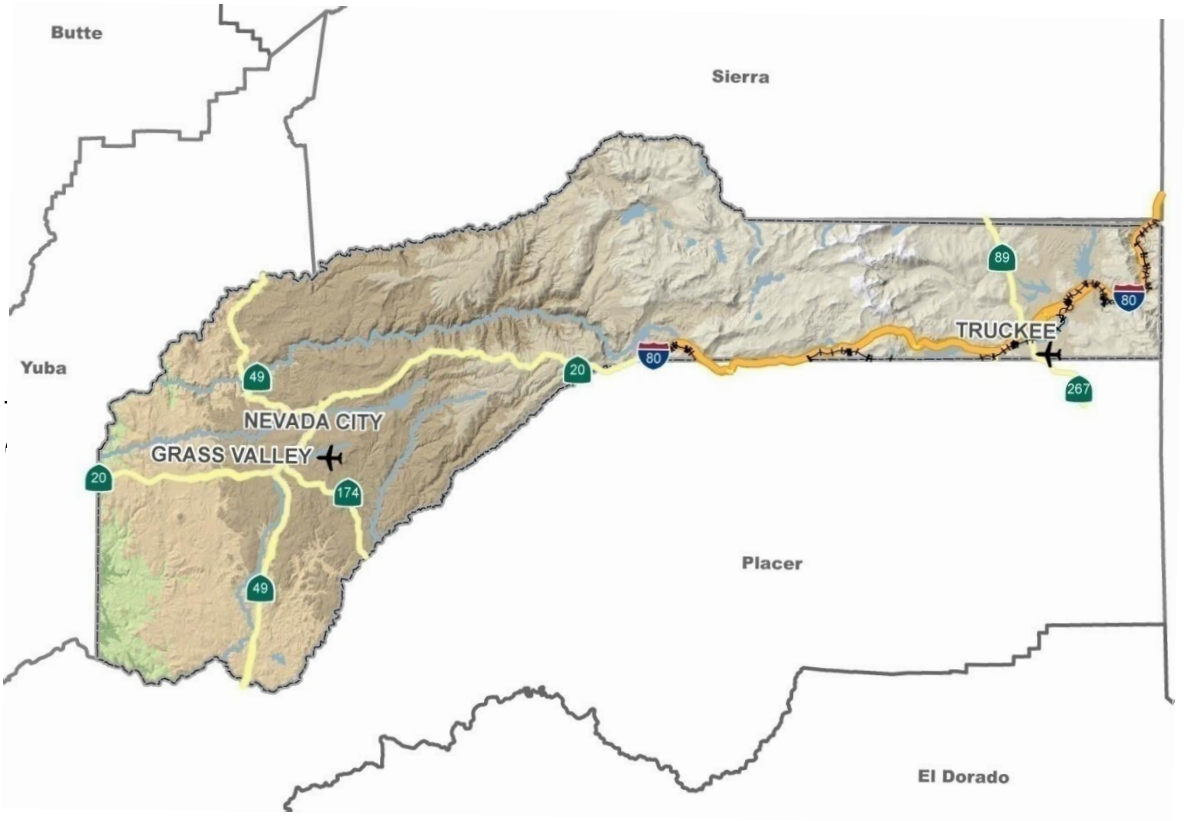
Local Hazard Mitigation Plan

for

Nevada County

2011-2016



1. Table of Contents

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3. Executive Overview

The Nevada County Operational Area Emergency Services Council (herein referred to as the **NC-ESC**) has prepared this Local Hazard Mitigation Plan (herein referred to as the **Plan**) on behalf of the County, its incorporated cities and towns and participating districts. A list of these districts can be found in section 12.1.

The **Plan** preparation process culminated in this document while providing the participants with a clear understanding of local risks and tangible mitigation plans for reducing or eliminating long-term risk to people and property from natural and human caused hazards and their effects. The **Plan** meets the requirements of the Disaster Mitigation Act of 2000 and maintains the eligibility of Nevada County and all other participants in the Plan for FEMA Pre-Disaster Mitigation (PDM) and Hazard Mitigation Grant Programs (HMGP).

The **Plan** preparation process followed a methodology recommended by FEMA. It began with the designation of a Hazard Mitigation Planning Committee (the **NC-ESC**) which is composed of key County and community stakeholder representatives. The planning process examined the recorded history of losses resulting from natural and selected human-caused hazards and analyzed the future risks to the county by these hazards. The planning effort undertaken for the Nevada County Fire Plan was an integral part of this **Plan**.

The greatest hazard risks and vulnerabilities to Nevada County are associated with wildland fire and flood. Hazardous materials incidents were found to be the greatest human-caused risk to the County.

The **Plan** names several mitigation goals and objectives that are based on the results of the risk assessment. The plan also contains specific recommendations, action items and projects that can mitigate future disaster losses.

The authors recognize that risks change over time and we believe that the **Plan** captures an accurate and complete assessment of risks at the time it was published. This **Plan** is one outcome from the formal continuing process that allows the **NC-ESC** to monitor events, emerging and evolving risks and adapt priorities over time. Our chapter on plan maintenance describes the ongoing process of hazard evaluation that occurs after the **Plan** has been published.

A significant premise of the **Plan** is that effective hazard mitigation is a cooperative process between the various stakeholders in Nevada County. Risks and vulnerabilities cannot respect jurisdictional lines and effective projects and actions will needed integrated efforts with effective communication channels for mitigation efforts to be meaningful and effective. All jurisdictions will need to remain vigilant to maintain communications and partnerships while finding new, deliberate methods of working together to ensure that the efforts of hazard mitigation can do the greatest good for the greatest number.

Nevada County jurisdictions seeking state and federal certification for eligible multi-hazard mitigations plans through this Local Hazard Mitigation Plan pursuant to the Disaster Mitigation Act of 2000 are listed below on page 41.

4. Introduction

The Disaster Mitigation Act of 2000 (DMA 2000), PL-106-390 requires that each State develop a hazard mitigation plan, in order to receive future disaster mitigation funding following a disaster. California completed its most recent “State of California Multi-Hazard Mitigation Plan” in 2010; this document can be found on the World Wide Web at http://hazardmitigation.calema.ca.gov/docs/2010_SHMP_Final.pdf. The requirements also call for the development of local or county plans for that particular county to be eligible for post-disaster mitigation funding. The purpose of these requirements is to encourage State and local government to engage in systematic and nationally uniform planning efforts that will result in locally tailored programs and projects that help minimize loss of life, destruction of property, damage to the environment and the total cost of disasters before they occur.

Nevada County specifically includes and adopts the most recent *State of California Multi-Hazard Mitigation Plan* where the State's plan relates to issues pertaining to Nevada County.

In the interest of not duplicating State efforts, Nevada County in its plan will refer to the State where the State has identified an issue or provided information that supplements Nevada County's plan.

The Code of Federal Regulations (CFR) Section 201.6(c)(3) outlines the process for localities in developing their mitigation strategies. Specifically, the Local Hazard Mitigation Plan must "include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools." These strategies should be built on an assessment of hazard risks and vulnerabilities.

The plans should include measures to mitigate hazard risks and demonstrate the benefits of these activities. They should also identify gaps in knowledge and data and a strategy to maintain and update the data, projects and information and the overall mitigation plan.

5. County Background Information

5.1. County Profile

Nevada County is located in the north central foothills of the Sierra Nevada Mountains approximately 60 miles northeast of California's capitol city of Sacramento. Nevada County shares common borders with Yuba County to the west, Placer County to the south, Sierra County to the north and the State of Nevada and Washoe County to the east. A map showing adjacent counties can be found on page 1 of this document. Major routes of access include Interstate 80 which nearly matches the County's southern border and traverses through Truckee to the Nevada state line and Reno; State Highway 49 which enters the County from the south (Auburn) at the Bear River and runs northerly through Grass Valley and Nevada City to Downieville in Sierra County; State Highway 174 which also enters the County at the Bear River from the east (Colfax) in Placer County and runs westerly to Grass Valley and junctions with State Highway 20 which enters the County from the west at the Yuba River and runs easterly through Grass Valley and Nevada City to its junction with Interstate 80 near Immigrant Gap. Please see the County Transportation Map on page 58. Nevada County is 974.3 square miles in size and ranges in elevation from nearly 800 feet above sea level in the south and west to over 10,000 feet above sea level in the east.

Nevada County's river systems are composed of the Bear River in the east and south, Yuba River in the west and Truckee River along the eastern border. The Truckee River collects from watersheds to the east and the Bear and Yuba rivers collect from watersheds to the west. Please see the Nevada County Watersheds Map, page 63.

The Truckee River originates in the outflow from Lake Tahoe and winds 105 miles through parts of Placer, Nevada and Sierra counties as it flows directly through the Town of Truckee and then on to the City of Reno, Nevada where it is the source of municipal water. It ends its flow into Pyramid Lake on the Pyramid Lake Paiute Indian Reservation lands in Nevada.

The Bear River has its headwaters in Placer County and forms much of the southern boundary of Nevada County with Placer County. The river is the water source for Combie Lake, around which, is Lake of the Pines, a planned community in Nevada County, before it continues its course to Camp Far West in Yuba County and then

ultimately joins the Feather River in Yuba County approximately 5 miles from the intersection of State Highway 99 South and State Highway 70 North.

The Yuba River has several forks and tributaries. The North Yuba has its headwaters at Yuba Pass and flows into New Bullards Bar Reservoir and Dam and thence into the Middle Yuba prior to Englebright Reservoir. The South Yuba has its headwaters at Donner Summit and Spalding Lake and also flows into Englebright Reservoir west of the entry of the North Yuba. The Middle Yuba has its headwaters at Jackson Meadows Reservoir and is the main channel of the Yuba River flowing southwesterly to Englebright Reservoir and thence through the cities of Marysville and Yuba City where its joins with the Feather River. This confluence of the Yuba and Feather Rivers in Marysville and Yuba City has been the scene of serious municipal flooding in 1955, 1964, 1986, 1995 and 1997.

5.2. History of County

Prior to the beginning of the gold rush, the region now known as Nevada County was primarily populated by Nisenan and Maidu Native Americans.

Gold was discovered at Coloma, Placer County in 1848 and by 1849 the streams and creeks of the Nevada County region counted miners who were searching for "placer" gold. The gold rush cities of Nevada and Grass Valley were well established by the time Nevada County was formed out of Yuba County in September 1851 with Nevada (city) as the "seat of justice". Nevada had to add the word "City" when (the state of) Nevada became the 36th State. Donner Summit entered into history in the winter of 1847-48 as the Donner Party met its cruel fate near the present day Town of Truckee. Come 1859, the end of available "placer gold" and the discovery of the Comstock Lode in Nevada nearly finished Nevada County's flash in history. Astoundingly, in 1850 a ledge of hard rock gold was discovered in Grass Valley, which gave rise to an underground gold mining industry that endured into the 1950's. In the mid-twentieth century the Empire and Northstar Mines closed their mining operations and one, the Empire became a famous California State Park. There was also, a less savory mining technique, hydraulic mining, which endured until the seminal Sawyer Decision. Large areas of alluvial sand and gravel deposits were washed away with hydraulic "monitors" while creating famous moonscapes at Malakoff Diggins State Park and Alpha/Omega diggings on the Yuba River. The muddy debris flowing into rivers, a byproduct of hydraulic mining was finally outlawed by Judge Lorenzo Sawyer by federal decision in January 1884.

Truckee, the site of a major construction camp of the Central Pacific Transcontinental railroad in the 1860's, continued strongly into the 20th century as a lumber, ice harvesting and snow skiing industry town. By the 1990's Truckee had become an incorporated town and the fastest growing area in the County.

Agricultural pursuits have traditionally been horse and cattle ranching, wine grape production, fruit production primarily in the Chicago Park-Peardale area, and timber production. While most of these pursuits have endured into the 21st century, timber production has declined from its historic high level.

In terms of population, Nevada County remained a small rural county with barely 26,000 residents until the boom years of the middle 1970's.

5.3. Population, Income and Growth Trends

The 2009 US Census estimate for the County's population is 98,751[1] people. The California Department of Finance similarly estimates the population for 2009 at 98,718 people down approximately 0.05% from the prior year[2]. The estimated 2050 County population by the CA Department of Finance is approximately 136,000[3].

The unincorporated portion of Nevada County's 2009 population is estimated at 66,617; Nevada City 3,043; Grass Valley 12,817; and Truckee 16,241 which represents a flat growth rate from 2005 except that Truckee has seen 3.7% growth over this time. The median household income reported by the US Department of Commerce

for 2008 for Nevada County was $56,890. County growth trends, economic indicators, industry profiles and comparisons to State trends can be found by following the links provided in the endnotes for this section.

5.4. History of Disasters

Nevada County has issued twenty two (22) disaster declarations and/or emergency declarations since 1950 of sufficient magnitude to warrant declarations of a State of Emergency by the Governor of California and thirteen (13) of these State declarations have progressed to a Presidential Disaster Declaration.

Table: State or Federally Declared Disasters in Nevada County 1950-2009

Hazard Type[4]	Year	State Declared & Disaster Number (if avail)	Federal Declared Date
Flood	1950	CDO 50-01	No
Flood	1955	DR-47	12/23/1955
Flood	1958	Yes	4/4/1958
Fire	1961	Yes	No
Severe Storm, Flood	1963	Yes	No
Flood	1963	Yes	2/25/63
Flood	1964	Yes	12/29/64
Severe storm, Freeze	1972	Yes	No
Drought	1976	Yes	No
Flood, Severe Storm	1982	DR-677	2/9/1983
Severe Storm, Flood	1986	DR-758	2/18/1986
Fire	1987	Yes	No
Fire	1988	DR-815	9/13/1988
Severe Storm, snow/Ice	1990	GP 989-06	No
Severe Storm, Flood	1995	DR-1044	1/13/95
Flood	1997	DR-1155	1/4/1997
Economic – Energy	2001	GP-2001	No
Economic-Hurricane Katrina Evacuations	2005	Yes	9/13/2005
Flood	2005/06	DR-1628	2/3/2006
Flood	2006	DR-1646	6/5/2006
Flood	2008	GP 2008-01	No
Fire – Yuba Fire	2009	FM 2825	8/15/2009

Thirteen of these twenty two past disasters (59%) were flood related, four (18%) were wildland fires, two were related to severe cold (9%), two were economic related (9%) and the one was related to drought (5%).

5.5. History of Risk Mitigation Assessments

The *2006 Nevada County Multi-Jurisdictional Multi-Hazard Mitigation Plan* identified a list of potential human caused hazards. The list was refined through evaluation and public input to only include those human caused hazards that could reasonably be mitigated. The following three items were what remained in order of diminishing perceived likelihood: Hazardous Materials Incidents, arson or commercial fires and airborne hazards.

The *2065 Nevada County Multi-Jurisdictional Multi-Hazard Mitigation Plan* identified the following natural hazards each evaluated for severity of hazard, vulnerability and exposure and then listed in order of diminishing perceived likely impact: Urban and wildland fire, Floods, Dam failure, Landslides, Avalanches, Earthquakes, Volcanoes, Agricultural hazards, Natural Health Hazards such as West Nile Virus, Earth Subsidence (due to mining activities) and Severe weather (heavy rain/thunderstorm/wind/lightning/hailstorm, snow and ice and drought).

An evaluation of declared disasters as found in 2006 looks similar in magnitude and frequency as was found in our 2010 declared disasters evaluation. Since the 2006 evaluation three flood and one wildland fire disasters involving Nevada County have been declared by the State of California with one of the floods and the fire having been declared at the national level as well.

Since we published our 2006 plan, the County has responded to a national call for pandemic flu response preparedness. County efforts have included procurement, installation and tasking of new equipment and the preparation and practice of new policies and procedures that allow the County to respond effectively to future pandemic flu outbreaks. This work was conducted outside the scope of the **Plan** and whereas the program is maintained by the County, this work will remain outside the scope of the **Plan**.

Since we published our last **Plan** the County has been affected by the worldwide economic downturn which has resulted in reduced government funding, leaving County departments with fewer staff and financial resources to respond to potential disasters.

Our systematic evaluation of the **Plan** and reassessment of risk prioritization has resulted in a realignment of risk mitigation priorities. Moving forward the **Plan** will list Severe Weather before Floods and Drought will be listed independently following Floods on our priority list. These revisions are based on our experience over the last few years of the logistical challenges due to power outages from severe weather like snow and high winds as well as localized flooding from heavy rains.

Our revised priority list is:

a) Urban and wildland fire
b) Severe weather (heavy rain/thunderstorm/lightning/hailstorm, snow and ice and wind)
c) Flood
d) Drought
e) Dam failure
f) Landslides
g) Avalanches
h) Earthquakes
i) Volcanoes
j) Agricultural hazards
k) Natural Health Hazards such as West Nile Virus
l) Earth Subsidence (due to mining activities)

5.6. 2006 Mitigations Strategy Status

Nevada County and its various communities have been very successful in implementing actions identified in the 2006 LHMP Mitigation Strategy, working diligently towards meeting their 2006 goals statement:

> To make Nevada County, its watershed, cities, town and unincorporated areas and its businesses, special districts and local, state and federal agencies less vulnerable to the effects of natural and man-made hazards through responsible application of hazard mitigation grants programs, hazard risks assessments, flood plan management and coordinated mitigation policies.

Nevada County and other participating jurisdictions, when possible, used existing plans and programs to implement the 2006 mitigation strategy. Examples include wildfire mitigation actions through Fire Safe Alliances and the existing ***Community Wildfire Protection Plan*** (CWPP).

The 2006 mitigation strategy contained 29 proposed mitigation actions benefiting one or more communities within the Nevada County Planning Area. Of these 29 actions 9 have been completed or are ongoing.

The following table provides a status summary of mitigation action projects from the 2006 **Plan**.

Table: 2006 Plan Update: Mitigation Action Status Summary					
Jurisdiction/Project Title	**Complete**	**Ongoing / In Progress**	**Unknown**	**Not Yet Started**	**Project in 2011 Update**
Nevada County					
Community Assistance				X	Yes
Roadside Brush Clearing		X			Yes
Education and Training		X			Yes
Water Supply				X	Yes
North San Juan Fire District					
Firebreak				X	Yes
Nevada Cemetery District					
Emergency Mass Burial Site				X	Yes
Resource Conservation District					
Community Shaded Fuel Break	X				No
Sierra College District					
Fire Prevention Project			X		No
Crisis Response Training			X		No
City of Nevada City					
Brush clearing and ladder fuel reduction		X			Yes
Downtown Fire Suppression System				X	No
City of Grass Valley					
Downtown Conflagration Mitigation				X	Yes
Town of Truckee					
Trout Creek stream and floodplain restoration		X			Yes
Donner Lake Road Drainage Improvements				X	Yes
Tahoe Donner Access Road				X	Yes
Brushing and Debris chipping, various				X	Yes
South Shore Drive Drainage Improvements				X	Yes
Gregory Creek cleaning and creek bank restoration				X	Yes
Retrofit Dispatch Center for seismic			X		No
Drainage way rehab and culvert replacement				X	Yes
US Forest Service					
Fuel Mastication near Washington town site	X				No
Fuels treatment at Columbia Hill	X				No
Billy Project		X			Yes
Alder Creek Project	X				No
Joey Project				X	Yes
Truckee Sanitary District					
Alder Creek Lift Station			X		No
Outfall Sewer Line			X		No
Donner Creek Outfall Sewer Line			X		No

6. Planning Process

Beginning in November 2010, the Nevada County Office of Emergency Services began discussions with all identified local governments (See Section 12.1) covering interest, contact people and establishing a general policy and timeline for participation. As part of the Plan update, all sections of the 2006 Plan were reviewed and updated to reflect new data, processes, participating jurisdictions, and resulting mitigation actions.

The large amount of ongoing efforts towards wildland fire suppression, management, information distribution and reporting involving Federal, State, and multiple local government bodies and agencies all working within the region to include surrounding counties, result in a rich source of background information, current analysis and

overlapping objectives. Where possible the **Plan** will cite and reference or use existing published work to fulfill its objectives.

Nevada County recognized the need and importance of the update process for their local hazard mitigation plan and initiated its development. The Nevada County Office of Emergency Services served as the primary funding source providing staff time and expertise as well as the primary agency facilitating the process and development of the **Plan**.

6.1. Local Government Participation

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the planning area the risks differ from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

For the Nevada County Planning Area's Plan, "participation" meant the following:

- Attending and participating in planning meetings;
- Review of the 2006 Plan
- Collecting and providing other requested data;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts;
- Coordinating the formal adoption of the plan by their governing board.

The County and all jurisdictions seeking FEMA approval met all of these participation requirements. In most cases after an initial office meeting, all correspondence was via email and telephone. This was necessary due to the size of the County (975 square miles) making the coordination of a "face-to-face" meeting not always feasible. All jurisdictions who participated in the planning process for the 2006 Plan also participated in the planning process for the current plan. A listing of participating jurisdictions is listed in section 6.3.

6.2. Public Participation

Public involvement activities for the Plan update included press releases, website postings, and solicitation of direct input to the Nevada County Office of Emergency Services. All press releases and website postings are on file with the Nevada County OES (see Appendices 12.5.1 and 12.5.2 for two examples).

Nevada County OES established early during the planning process that the most efficient way to involve the public was to solicit input utilizing a survey that could be accessed electronically. This decision was based on low attendance numbers at public meetings during both the creation of the 2006 Plan and multiple public meetings hosted by OES addressing preparedness and mitigation issues during the past 5 years.

The availability of the survey and the solicitation of the draft for review were publicized via all local media outlets both print and radio. For those residents who did not have internet access, the option of contacting the Nevada County OES for a "hard copy" was offered.

Public comments were incorporated in the final plan, including the sections that address mitigation goals and strategies. The Plan is available on the Nevada County website. The public outreach activities described herein were conducted on behalf of all jurisdictions participating in this plan.

6.3. Descriptions of Participating Jurisdictions

6.3.1. Nevada County

See ***Section 5 County Background Information***.

6.3.2. City of Nevada City

Located approximately 2,500 feet above sea level with the Highway 49/20 North East junction at the city's northern edge, Nevada City is home to approximately 3,000 people, the County seat, a diverse economic landscape, a rich history and is listed on the National Registry of Historic Places.[5]

6.3.3. City of Grass Valley

Founded in 1850 out of the California gold rush, Grass Valley remains a center of commerce in the region. The city is home to approximately 13,000 people, 3,000 businesses, the Sierra Nevada Memorial Hospital, Sierra College - Nevada County Campus and the County fairgrounds.[6]

6.3.4. Town of Truckee

Truckee is located in the Sierra Nevada Mountains just west of the Nevada state line. Donner Lake is located within the town limits and Donner Pass is just west of town. Interstate 80, the major east-west trans-Sierra "all-weather" highway, passes through the Town on its way between California and Nevada. The Truckee community has existed for over 150 years and the Town incorporated as a municipality by a vote of the people in 1993. The incorporated boundaries are nearly 34 square miles and range in elevation from 5500 feet at the Town's eastern boundary to 7500 feet in the northwestern corner.[7]

6.3.5. Donner Summit Public Utility District

The Donner Summit Public Utility District is located in Soda Springs, California, and provides sewer collection and treatment, and water treatment and distribution to its customers. The District is governed by a five-member board of directors. District staff includes a general manager, office manager and an administrative assistant. The sewer and water department staff includes a chief plant manager and four licensed operators.[8]

6.3.6. Nevada Irrigation District

Formed in 1921, The Nevada Irrigation District (NID) is an independent special district headquartered in Grass Valley, California. NID provides service in an expansive geographic area that makes the district one of the largest in the State of California. The district is organized primarily to supply water for irrigation, municipal, domestic, and industrial purposes; however it also provides hydroelectric energy, public recreation and environmental stewardship. NID water is available in wide areas of Nevada and Placer counties; the district also has storage and distribution facilities in Sierra and Yuba counties. Unique in many respects, NID collects water on 70,000 acres of high mountain watershed, owns and operates an extensive reservoir and canal system and network of water treatment plants. The district produces hydroelectric energy and provides outdoor public recreation. As a state agency, NID operates under rules and regulations adopted under authority conferred by the California Water Code.[9]

6.3.7. Nevada Cemetery District

The Nevada Cemetery District operates 25 modern and historic public cemeteries in western Nevada County. Sixteen of the cemeteries are open and active, while the remaining nine are closed and inactive. One additional modern lawn cemetery is under construction and the transfer of an additional historic cemetery is pending. The mission of the District is to provide distinctive places of interment for residents of Nevada County; to expand and preserve the cemeteries in western Nevada County; to maintain the historic significance and character of the cemeteries; and to ensure that a physical connection to the past is available for all citizens to experience, enjoy and reflect upon.[10]

6.3.8. Truckee Cemetery District

This small special district oversees a 4 acre cemetery, employs one full time and two part time employees and serves approximately 15,000 residents in the Truckee region.

6.3.9. Tahoe National Forest

The Tahoe National Forest is located northeast of Sacramento in the central Sierra Nevada mountains and extends from Lake Tahoe to north of the prominent Sierra Buttes. Several highways, including Interstate Highway 80; State Highways 20, 49, 89, and 267; and Forest roads, provide access to most portions of the Forest. Elevations within the Forest vary from about 1,500 feet in the foothills to over 9,000 feet at the Sierra crest. The Forest is governed by the U.S. Forest Service, covers over 871,000 acres, is interspersed with over 400,000 acres of private land in a checkerboard fashion and spans across six counties including Nevada County which hosts the Forest's headquarters. The Tahoe National Forest was established in 1899 as the Lake Tahoe Forest Reserve and renamed Tahoe National Forest in 1905.[11]

6.3.10. California Department of Forestry and Fire Protection (Cal Fire)

Cal Fire was founded in 1905 and is dedicated to the fire protection and stewardship of over 31 million acres of California's privately-owned wildlands. The Department provides varied emergency services in 36 of the State's 58 counties via contracts with local governments. The Department's firefighters, fire engines, and aircraft respond to an average of more than 5,600 wildland fires each year. Those fires burn more than 172,000 acres annually.[12] The County of Nevada and its fire protection districts work closely with Cal Fire in managing the County's wildland fire risk.

6.3.11. Sierra Nevada Memorial Hospital

Sierra Nevada Memorial Hospital first opened in 1958, is located in Grass Valley and serves the residents of western Nevada County with a long list of emergency, diagnostic, outpatient, education and outreach services.[13] SNMH is the only hospital in the region and is an integral part of the County's disaster prevention and emergency response planning.

6.3.12. Nevada County Resource Conservation District

Founded in 1943, the Nevada County Resource Conservation District serves all of Nevada County and western Sierra County. Its mission is to promote responsible resource management within Nevada County through leadership, education, technical assistance, financial assistance and facilitation. Its vision/purpose is to offer assistance to landowners and land managers in establishing a balance between a high quality rural environment, a biologically diverse landscape and a healthy economy for the community.[14]

6.3.13. Sierra Community College District

The Sierra Community College District was founded in 1936, is fully accredited by the Western Association of Schools and Colleges, covers over 3,200 square miles (8,300 km2), and serves Placer, Nevada, and parts of El Dorado and Sacramento counties. Sierra College has its main campus located in Rocklin (Placer County), a 115-acre campus in Grass Valley, a campus center in Truckee, and a campus center in Roseville (Placer County). The district serves approximately 37,000 students and employs nearly 1,000 full and part-time employees.[15]

6.3.14. Tahoe Forest Hospital

Tahoe Forest Hospital is a not for profit rural health care facility and designated Critical Access Hospital that has been serving its community since 1952. It is fully accredited by the Healthcare Accreditation Facilities Program and licensed by the State of California Department of Health Services. Tahoe Forest Hospital has 25 acute care beds and 37 long-term care beds. The hospital's geographic area covers six rural counties, two states and approximately 3,500 square miles with primary services reaching the communities of Truckee, North Lake Tahoe, Donner Summit and the Sierra Valley in California and Incline Village in Nevada. Tahoe Forest Hospital serves a full-time population of approximately 40,000 residents with influxes of up to an additional 30,000 tourists during peak periods.[16]

6.3.15. Truckee Donner Public Utility District

The Truckee Donner Public Utility District offers electric and water service in the Truckee area. It is a non-profit, publicly owned utility governed by officials elected by the registered voters of the District. "All the benefits of public power remain in the District in the form of reliable electric service and high quality water."[17]

6.3.16. Tahoe-Truckee Unified School District

The TTUSD is located in the Sierra Nevada Mountains, 100 miles northeast of Sacramento, and 35 miles west of Reno, Nevada. The District serves more than 4000 students in California's Nevada, Placer and El Dorado Counties. District offices are located in Truckee, California. District boundaries stretch from Hobart Mills, eight miles north of Truckee to Emerald Bay, near South Lake Tahoe; and from Cisco Grove, twenty miles to the west, to Floriston, fifteen miles to the east. The District encompasses more than 720 square miles.[18]

6.3.17. Truckee Sanitary District

TSD boundaries currently encompass an area of approximately 39 square miles in Placer and Nevada Counties. TSD operates and maintains approximately 300 miles of gravity pipelines containing 3,927 manholes, 9 miles of pressure pipeline, 10 main lift stations, and 30 smaller lift stations. The entire collection system is closely monitored 24 hours a day through a computerized telemetry and flow metering system. The collection system primarily services residential customers. Small businesses and restaurants contribute only a small percent of TSD's total wastewater flow. TSD does not service any heavy industrial customers. At present, there are approximately 9,764 dwelling unit equivalents and 840 commercial accounts discharging into TSD's wastewater collection system. TSD operates with a full-time staff of approximately 36 employees.[19]

6.3.18. Truckee Donner Recreation and Park District

Truckee Donner Recreation and Park District is a special district of Nevada County, located in the Sierra Nevada Mountains of California, west of the Nevada state line. The area is the gateway to the North Lake Tahoe resort areas of Olympic Valley, Tahoe City, Kings Beach and Incline Village. Many major ski resorts are minutes away, including Squaw Valley, Alpine Meadows, Boreal Ridge, and Northstar at Tahoe. Donner Lake and Donner State

Memorial Park lie within the recreation district's boundaries. There are also several large reservoirs and Forest Service campgrounds in the immediate area. The mission of the Truckee Donner Recreation and Park District is "to enrich lives of all in our community by providing a wide variety of quality parks, facilities, programs, and recreational opportunities."[20]

6.3.19. Nevada County Superintendent of Schools

The Superintendent of Schools oversees ten school districts located in Western Nevada County. These districts include thirty four public schools, five charter school programs and list five private schools within its regional jurisdiction.

6.3.20. Fire Safe Council of Nevada County

The Fire Safe Council of Nevada County is a public benefit, non-profit 501(c)(3) corporation formed in 1998 by citizens concerned about the very high potential for catastrophic wildfire in our communities and adjacent forestland. The purpose of the Fire Safe Council is to work to reduce the risk of life and property loss from wildfire. The Fire Safe Council operates with a small staff and an all volunteer Board of Directors consisting of 15 residents representing various segments of the community with a vested interest in fire prevention. Fire Safe Council programs have been developed to educate, communicate and promote action to respond to the wildfire hazard in Nevada County.[21]

6.3.21. Nevada County Consolidated Fire District

The Nevada County Consolidated Fire District is a full-service emergency response agency. NCCFD is a combination of full-time paid staff and paid-call firefighters, covering 150 square miles of residential, commercial, industrial, and rural areas, through 5 service areas and 12 stations. There are 4 staffed District-owned stations, 2 jointly staffed city fire department stations, and 8 paid-call, unstaffed District-owned stations. The population within the district is 35,000+ and the assessed land value is approximately $2,831,336,778. The district has developed and maintains specialized programs and training to meet the unique needs within its community. These unique needs include wildland fire prevention and suppression, swift water rescue, urban search and rescue, mass casualty incident capability, large animal rescue and hazardous materials decontamination.[22]

6.3.22. Truckee Fire Protection District

Truckee Fire Protection District is officially responsible for 125 square miles and is one of the oldest fire districts in the Truckee Tahoe area of Northern California. The TFPD is an independent Special District.

"Our business is the protection of life and property through the provision of fire rescue and emergency medical services. This district offers a high level of service to our mountain community and outlying areas and is made up of 49 full time and 9 part time and/or volunteer members."[23]

In 2006 the Donner Summit Fire Protection District merged into the Truckee Fire Protection District. The combined district is responsible for and represents the needs of the full merged region.

6.3.23. Penn Valley Fire Protection District

The Penn Valley Fire Protection District was officially formed in 1974 succeeding the Penn Valley Volunteer Fire Department. The District serves 92 square miles in Western Nevada County including the Penn Valley, Lake Wildwood, Kentucky Flat, Mooney Flat and Big Oak areas. The District employs twelve full time career fire

personnel and relies on part time firefighters to augment the full time staff. The district also has several paid call firefighters to assist on major or multiple incidents. The Penn Valley Fire Protection District is an all risk department that provides many different services to the Penn Valley area and surrounding communities. Along with ALS emergency medical service, they also provide fire suppression, vehicle extrication, water rescue, technical rescue and hazardous material response.[24]

6.3.24. Higgins Fire Protection District

The Higgins Area Fire Protection District is a special district governed by an at-large board of directors and was established November 8, 1977. The goals and objectives of the Fire District consist of five equally important elements: fire prevention, fire protection planning, fire suppression/emergency incidents, emergency medical service/rescue, and training. The District provides fire protection and emergency services response to an estimated 12,000 permanent residents in southern Nevada County. The District's 90-square mile area is primarily rural zoning, with the exception of the Lake of the Pines gated community, and is served by three fire stations located geographically at six-mile intervals. The Fire District is a combination department, consisting of career staff and paid call firefighters. The District also maintains mutual and automatic aid agreements with surrounding fire districts and other fire agencies in Nevada and Placer counties.[25]

6.3.25. Peardale-Chicago Park Fire Protection District

The Peardale Chicago Park Fire Protection District provides fire and emergency medical response from two stations located on the Highway 174 corridor and serves the communities of Peardale, Chicago Park and You Bet/Red Dog. The Fire District is 21 square miles with approximately 3000 residents. Emergency services are also provided to three campgrounds on Rollins Lake: Orchard Springs, Greenhorn and Peninsula, whose summertime guests swell the district population to over 5000. On average, the department responds to 300 emergency incidents per year with 80% of the emergency calls being for medical assistance. The department is staffed by two full time firefighters, two summer seasonal firefighters and 15 paid call volunteer firefighters.[26]

6.3.26. North San Juan Fire Protection District

NSJFPD is the oldest volunteer fire department in Nevada County serving the town of North San Juan from 1862, and was incorporated as a Fire Protection District in 1986. Today the district covers the largest territory and with the smallest budget of all fire districts in Nevada County providing emergency services for 250 to 300 incidents per year. Like all fire departments, only a little over 10% of the emergency responses are related to fires. Over half of the responses involve medical emergencies, one-fourth are vehicle accidents, and the remainder are other miscellaneous emergencies. About 65% of the calls come from North San Juan or the San Juan Ridge area from Highway 49 to approximately Sages Road. In addition to Medical Aid, Vehicle Accident, Wild Land and Structure Fire Response, the District provides services for: Fire Prevention, First Aid Training, Search and Rescue, Hazardous Materials Response, Swiftwater Rescue, Safety and Injury Prevention, Public Assistance and Public Education.[27]

6.3.27. North San Juan Parks District

The North San Juan Parks District was voted into existence in early 2011. The district was formed to manage an 11.5 acre park located near the town of North San Juan.

6.3.28. Rough and Ready Fire Protection District

The Rough and Ready Fire Department is an all volunteer organization with one station and sixteen volunteer fire fighters. The fire department was officially formed in 1963 and the district formed in 1969. The district supports the township of Rough and Ready and surrounding area.[28]

6.3.29. Ophir Hill Fire Protection District

The Ophir Hill Fire Protection District is a mostly volunteer organization with one station, three career firefighters and sixteen volunteer firefights. The district supports the town and area surrounding Cedar Ridge in Nevada County California.[29]

6.3.30. Washington County Water District

WCWD is a public water utility district supporting the town of Washington.

6.3.31. Washington Volunteer Fire Department

The Washington Fire Department is an all volunteer department with one station and six volunteer firefighters. The department supports the town of Washington and surrounding area located in a remote part of Nevada County.[30]

6.3.32. Western Gateway Recreation and Park District

The park district was created partly from land deeded to the County from the developer of the Lake Wildwood community and grew to include approximately 123 square miles with boundaries roughly from the South Fork of the Yuba River on the north, Newtown and Sunset District on the east to a line near Clear Creek School on the south to the Yuba Nevada County line on the west.[31]

6.3.33. Bear River Recreation and Park District

Bear River Recreation & Park District has been serving south Nevada County and its surrounding communities since 1994. The district offers park areas, athletic fields and facilities, athletic leagues, after school enrichment programs, fun clubs, and a wide range of summer and school break camp programs and activities.[32]

6.3.34. US Bureau of Land Management

The western half of Nevada County is within the Central California division of the BLM which is managed through the Mother Lode field office. The eastern half of Nevada County is within the Northern California division which is managed through the Eagle Lake field office. The BLM land holdings within the County are fairly dispersed and relatively small in size compared to the US Forest Service holdings.

7. Vulnerability

7.1. Repetitive Loss Risks

The County's single largest risk for human life and financial loss is fire. Wildland fires and, in particular, fires that impinge on the wildland urban interface have cost County residents the most financially and in loss of life. The combined efforts of all involved parties maintain a tapestry of vigilance, preventative efforts and rapid response to the wildland fires threat. Residential developments in wildland areas and limited forestland management

resources have created and will perpetuate an environment of dense fuel reserves with seasonal wildland fire risk to the County's residents and their improvements. Our best strategy to date has been to thin fuel sources at wildland urban interfaces, educate residents, and provide a rapid response to wildland fires when they start.

Flooding in the Town of Truckee has been a recurring problem, occasionally leading to flood damage to businesses and residents in the impacted areas. Past, current, and proposed flooding abatement activities have been and remain focused on keeping the run-off water safely flowing through these developed areas.

Severe weather across the County routinely leads to regional power outages, isolation of vulnerable regions (single access road closures), and white-out conditions on roadways. Deep snow, strong winds and severe cold have also created unsafe living conditions for vulnerable members of our community. The County recognizes these risks and supports a number of education and outreach programs targeted and reducing the continuing risks of severe weather across the County.

7.2. Structures, Infrastructure(s) and Critical Facilities

The County has established business continuity plans designed to maintain or restore the County's critical functions in the event of foreseeable emergencies like fire, flood, power outage, severe weather, flu pandemic, or earthquake. One aspect of the County's business continuity plan is the systemic and periodic review of the plan; another is the periodic planning and practice of regionally coordinated disaster response exercises.

The County in coordination with other local governments has identified emergency evacuation shelters in each of the potentially impacted regions. Strategies are in place for providing beds, water and food for evacuees for a limited duration evacuation response. Communications of these locations to the general public have been systematically distributed at key times throughout the year and will again be provided through local news and information outlets throughout the County in the event of an emergency evacuation.

Other municipalities such as cities, townships, fire districts, school districts and water and sewer districts have also considered and/or established business continuity plans consistent with their charter, risks and available resources. These business continuity plans systematically address all infrastructure and critical facilities within their purview to ensure that appropriate response measures are in place.

Many of the County's residential and commercial structures predate recent seismic and fire safety standards. The cost of upgrading these facilities in most cases is cost prohibitive however there have been plans and projects considered to reduce the risk of fire loss (e.g. installation of fire partitions in Grass Valley downtown district) without requiring a full compliance upgrade. The building permit process is also a key instrument in the systematic upgrade of buildings and other improvements, but can only address those facilities whose owners are considering upgrades.

The County owns and operates a municipal airport located in Grass Valley, which in addition to providing access to both commercial and recreational flights is a critical refueling stop for fire prevention and suppression aircraft within the region.

Interstate 80 is a transcontinental highway that travels along the Southern edge of the County. As it travels over the Sierra Nevada mountain range, the roadway is exposed to high altitudes with seasonal exposure to severe weather resulting in hazardous conditions requiring a variety of limits up to and including occasional shutdown of the highway.

The Nevada County water supply includes both potable and agricultural water distribution systems. These systems move water from remote water reservoirs through woodlands, agricultural lands and residential centers. Much of the infrastructure is above ground. The wooden flumes and cement canals in particular are vulnerable to hazards like landslides, fallen trees and wildland fires. Portions of the system do not currently have redundant water supply.

7.3. Assessing Vulnerability, Potential Losses

Cal Fire is the regional authority that coordinates all involved local governments and municipalities in our fire prevention, suppression and response efforts. The County and other interested parties actively participate in a year around process of assessing wildland fire vulnerability and working to reduce risk of loss. Examples of these efforts include: education, fuel reduction, training and enforcement of setbacks, home maintenance and water storage requirements.

The risks of regional seasonal flooding are generally associated with annual drainage and runoff from rain storms. The regional jurisdictions provide maintenance to reduce the risk of water backing up during or after heavy rain falls. Certain areas in Nevada City, Grass Valley and Truckee have historically been vulnerable to periodic flooding. The execution of regular maintenance programs and the implementation of proposed improvements are expected to manage this risk.

Severe weather, especially at the higher elevations of the County will continue to pose risks to our residents. The County manages these risks through the use of seasonal outreach and education for our residents and response plans for use during severe weather events as they occur across the County. Typical hazards include road closures, power loss, whiteout conditions and extended severe cold which can co-occur increasing the risks of loss to human life and property.

The Nevada County water distribution channels are vulnerable to a number of natural hazards as well as acts of vandalism. The Nevada Irrigation District has identified a number of projects to provide redundant water supply to certain developed areas.

7.4. Assessing Vulnerability, Developing Trends

As the County's population continues to increase and people continue to build residential structures in wildland areas the risk to human life and structures from wildland fires will continue to increase.

It is not clear how global warming will impact Nevada County but it is possible that summers will be hotter and dryer increasing the risk of fire. Winter storms may become more frequent and/or severe resulting in increased vulnerability of our transportation systems (highways and airport) to damage and increasing the risk to travelers using the systems.

Air quality is subject in part to air quality upwind from the County and in part to local population density, use of automobiles and heating with wood stoves. The trend clearly points to more frequent and severe unhealthy air days.

Within the last few years the County has been asked to participate in a nationwide effort for a coordinated response to the risk of a pandemic flu outbreak. These efforts have resulted in increased infrastructure and communications channels between various local agencies and healthcare providers within the region. It is expected that this sort of response to national threats will continue and that local governments will need to continue to be vigilant to requests for integrated response.

8. Natural Risks Assessment

8.1. Urban Interface Wildland Fires

8.1.1. Past Occurrences

Nevada County has a long history of wildland fires and fire management. A map of all Nevada County's wildland fires since 1950 that were greater than 300 acres in size can be reviewed on page 62. The Map reports the fires by approximate size and by decade of occurrence. Notably all three urban population centers (Grass Valley, Nevada City and Truckee) have not received direct wildland fire damage in the period covered by this map however; all three urban population centers existed in the nineteenth century and have had significant fire history/damage prior to 1880. A *Wildland-Urban Fires Interface* map (page 61) shows the portions of the County where wildland fire risk mitigation efforts would most likely reduce risk to human life and property.

Significant fire history since 1900 has been located in three geographic areas of the County. The first is the northwestern corner bordering on Placer and Yuba Counties where there have been 15 fire events since 1900. The next is in the area of Dog Bar Road (39°15' north; 121°west) to Jackson Creek (39°23' north; 120°30' west) where there have been 91 fires greater than 300 acres since 1900. Sixteen of these sites have burned two or three times. The third area is on the eastern edge of Nevada County with its border on the State of Nevada from 39°23' north;120°15' west. This area has had 74 fires greater than 300 acres, of which 17 sites have burned twice, four sites 3 times and one site 4 times. This totals to 170 fires of greater than 300 acres since 1900.[33]

According to the California Department of Forestry and Fire Protection, within the last 10 years Nevada County has averaged 120 fire ignitions per year. The significant, recent fires include the Martis Fire (third area mentioned above, June 2001) 14,500 acres/4 structures; the Trauner Fire (second area mentioned above, August 1994) 500 acres/12 homes and the 49er Fire (first area mentioned above, September 1988) 33,500 acres/312 homes and structures. These three fires alone resulted in 33 million dollars damage and more than 27 million dollars in suppression costs.

Nevada County encompasses approximately 978 square miles of diverse and rugged rural lands in the Sierra Nevada foothills of Nevada County, California. Nevada County includes Grass Valley, Nevada City, Lake Wildwood, Alta Sierra, Penn Valley, Rough & Ready, North San Juan, Truckee, Cedar Ridge, Lake of the Pines, and rural areas of the Sierra Nevada foothills. This high fire threat zone is characterized as a classic interface area with significant history of large and damaging wildfires.

Nevada County has a diverse bio-system. The western border, located in the Sacramento Valley, contains grass-covered foothills with oak trees. Traveling eastward the landscape changes to a mix of deciduous and conifer forests with a mix of heavy brush. The forests turn to conifer with a brush under-story as the elevation goes high into the Sierra Nevada Range, approaching 8000 feet in elevation. Continuing further east and down the Eastern slope of the Sierras one finds conifers with a brush under-story mix with heavy brush fields, ending at the California/Nevada border with conifer forests and sagebrush.

The area consists of both public and private lands and contains a mix of land uses with a population of approximately 90,000 people and 45,000 housing structures in a wildland-urban intermix setting commonly referred to as the I-Zone. (The urban/wildland interface)

On the private lands within the County, over a recent 12 year period, the County experienced just over 120 wildland fires per year. Lightning caused fires actually account for very few fire starts on private lands as evidenced by the year 2002 in which the county experienced 133 wildland fires with only one being caused by lightning. 2003 had nine lightning caused fire starts. History shows that most fires in the County are caused by

the accidental, careless or intentional acts of the people who live in or visit Nevada County. Clearly, with the fuels, weather, topography and an increasing population, Nevada County is at significant risk from wildland fire.

Public lands include: 177,113 acres in the Tahoe National Forest; 2,475 acres in the Toiyabe National Forest; 10,485 acres of other Federal Lands, which include the Bureau of Land Management (BLM); Department of Fish & Wildlife (DF&W), and the Army Corps of Engineers. In addition, the Nevada Irrigation District controls 8,636 acres, Pacific Gas & Electric 10,882 acres and the State 11,394 acres, which may include, but not be limited to California State Parks, California Department of Forestry & Fire Protection (Cal Fire California Department of Fish and Game.

8.1.2. The Wildland Fire Problem

The fire problem in Nevada County is directly related to the amount of hazardous fuels that have accumulated since the disruption of the natural fire cycles that normally occurred prior to land use changes that began at about the turn of the 20th century. It was at this time that the effects of non-native American settlement of the region caused the land use to change and move away from being compatible with the natural fire regimes.

Fire history studies conducted in the Sierra Nevada, southern Cascades, and Klamath mountains point toward pre-European settlement fires (prior to 1849) burning, with mostly low to moderate severities within most of the vegetation types found in the County. Barbour and Majors (1977) and the Sierra Nevada Ecosystem Project (1996) indicate that the grassland areas had an average period between fires of 2-8 years; oak woodlands, 2-8 years; mixed conifer, 5-16 years; east-side pine, 5-16 years; various brush types; 5 to 30 years: and Red Fir, 16-26 years. These vegetation types evolved over time to adapt to these fire cycles. California's Mediterranean climate, dominated by wet winters and hot dry summers with lightning from frequent summer thunderstorms and Native American burning worked in harmony with our fire adapted ecosystems. The effect on fuels due to these frequent fires was a periodic consumption of relatively light amounts of vegetation and dead material. As a result, these conditions produced fires with mostly low to moderate severities and intensities that generated short flame lengths. Most of the larger trees survived these low to moderate intensity fires. The short flame lengths kept the fire on the ground. Studies and historical observations indicate that very few of the fires before the 1900's, except in small patches, burned into the crowns of the larger Conifers.

Based on written accounts from the late 1800's and the very early 1900's, in areas covered by the mixed conifer vegetation type, approximately 1-10 percent of the larger conifers perished during each fire event. Most of these low intensity fires burned in fuels that were not continuous from the ground into the upper layers of the forest. The periodic fires kept a natural separation from the ground fuels to the upper forest layers.

This natural cycle of periodic fire no longer occurs. Current land uses, i.e. the presence of people and their houses, dictate that wildland fires be suppressed due to risks to life, property, and the environment. A century of virtual elimination of natural and cultural fire has led to a buildup of fuels to today's current unnaturally high levels and has resulted in significantly higher intensity fires that are difficult to suppress. Today, many of our vegetation types have a continuous layer of live growing fuels from the forest floor to the upper tree layers that act as fuel for a wildfire. This, unfortunately, results in larger fires with more damaging effects to life, property, and the environment.

Today, people in Nevada County are attracted to live and build their homes in remote areas, on hillsides, and in and among the native woodlands. There is a misconception held by many of us that today's grasslands, oak woodlands, and forests are "natural" and as such, think if we just keep suppressing fires, these vegetation types will remain the same. This is a grave error. All of our fire-adapted ecosystems are complex entities. They are not like a photograph and non-changing over time; they are constantly changing. There is a tremendous amount of growth and in-growth every year. As a result, without periodic fire or treatment, these vegetation types have ever-increasing unnaturally high fuel loads that, over time, have created hazardous fire conditions.

We now understand that the extreme fire behavior we are witnessing is a result of the long-term interruption of the natural fire cycle. The combination of our topography, climate, and present day fuel conditions produces

large, high severity and intense wildland fires; e.g., the Forty-niner fire in September 1988, (33,500 ac/185 homes); the Martis fire, June 2001, (14,500 ac/4structures); the Trauner fire, August 1994 (500 ac/12 homes); and the Cottonwood, fire, August 1994, (46,800 ac). The Forty-niner fire, the Martis fire and the Trauner fire resulted in over 33 million dollars damage and more than 27 million dollars in suppression cost. The Cottonwood fire cost 12.5 million dollars to suppress.

We can never go back to the natural fire cycles as land use has changed dramatically since the mid-1800's and we now have life and property intermixed within the wildland environment. However, we can, with vegetation management, reduce fuels to those pre-settlement "natural" levels in target areas in and around our communities.

Statewide Fire Cause Summary Table (2006)

CAUSE[34]	PERCENT	TOTAL ACRES	TOTAL FIRES
Lightning	2.0%	4,458	96
Equipment Use	29.7%	66,200	1427
Smoking	2.3%	5,127	111
Campfire	1.7%	3,789	82
Debris	7.1%	15,826	341
Arson	11.6%	25,856	557
Misc & P.W.F	13.3%	29,645	639
Vehicle	11.5%	25,633	553
Power line & RR	2.4%	5,350	115
Undetermined	18.4%	41,013	884
TOTAL	100.0%	222,896	4805

8.1.3. LIKELIHOOD OF FUTURE OCCURRENCES

Accepting Nevada County's terrain, climate, rainfall, and forest land/urban mix, it is a certainty that significant wildland fires are going to continue as a threat. Contributing to the threat over the last 75 years have been the fire suppression techniques and policies that have allowed a large fuel load to accumulate.

Generally, the fire season extends from early spring to late fall. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions, when combined with high winds and years of drought, increase the potential for wildfire to occur. The wildfire risk is predominantly associated with Wildland-Urban Interface (WUI) areas. WUI is a general term that applies to development interspersed or adjacent to landscapes that support wildland fire. WUI areas have been a major focus of California Department of Forestry and Fire Protection's (CAL FIRE) fire management strategy since at least 1972. A fire along this wildland/urban interface can result in major losses of property and structures. Potential losses from wildfire include: human life, structures and other improvements; natural and cultural resources; the quality and quantity of the water supply; other assets such as timber, range and crop land, and recreational opportunities; and economic losses. In addition, catastrophic wildfire can lead to secondary impacts or losses such as future flooding landslides during the rainy season. Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

Fuel – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. 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. Also to be considered as a fuel source, are man-made structures, such as homes, and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. In addition, "ladder fuels" can spread a ground fire up through brush and into trees, leading to a devastating crown fire. The volume of available fuel is described in terms of Fuel Loading. Certain areas in and surrounding Nevada County are extremely vulnerable to fires as a result of dense grassy vegetation combined with a growing number of structures being built near and within rural lands. The presence of fine fuels, 1000hr fuels, and needle

cast combined with the cumulative effects of previous drought years, heavy vegetation mortality, tree mortality and lowdown of timber across Nevada County has added to the fuel loading in the area. Fuel is the only factor that is under human control.

Topography - An area's terrain and land slopes affect its susceptibility to wildfire spread. Fire intensities and rates of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

Weather - Weather components such as temperature, relative humidity, wind, and lightning also 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 a wind, the faster a fire will spread, and the more intense it will be. Winds can be significant at times in Nevada County. North winds in Nevada County are especially conducive to hot, dry conditions, which can lead to "red flag" days indicating extreme fire danger. Winds coming from the southeast have also been noted as a concern in the western third of the County. 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. Lightning also ignites wildfires, often in difficult-to reach terrain for firefighters. Related to weather is the issue of recent drought conditions contributing to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

Other factors contributing to the wildfire problem in Nevada County include:

- Overstocked forests, severely overgrown vegetation, and lack of defensible space around structures;
- Excessive vegetation along roadsides and hanging over roads, fire engine access, and evacuation routes;
- Conditions such as drought and overstocked forests contribute to increased beetle kill in weakened and stressed trees;
- Narrow and often one lane and/or dead end roads complicating evacuation and emergency response as well as subdivisions that have only one means of ingress/egress;
- Inadequate or missing street signs on private roads and house address signs;
- Nature and frequency of lightning ignitions; and
- Increasing population density leading to more ignitions.

Also very active have been three other organizations. The Fire Safe Council of Nevada County has been active in providing free public information and education for County residents as well as a free wood debris-chipping program on site for property owners. The Nevada County Resource Council and Soil Conservation Service have been sponsoring shaded fire breaks in conjunction with Tahoe National Forest in the area around Scotts Flat Lake. Tahoe National Forest has been working on strategically placed fire control points using thinning processes. Additional projects are proposed in this plan's mitigation measures.

8.2. Floods

8.2.1. Past Occurrences

As reported earlier, Nevada County has reported 13 flooding disasters since 1950 the most recent being in 2008. Fortunately these events have not resulted in loss of life or catastrophic property damage in Nevada County. Primarily due to the significant east to west elevation change in the western part of the county, most of the heavy storm rainfall moves quickly out of the watershed. In the eastern part of the County, higher elevation causes most precipitation to fall as snow during the first 4 months of the winter season. Flooding affecting Nevada County normally occurs when heavy rainfall combines with unseasonably warm temperatures that begin a pre-mature melt of the snow pack. This phenomenon is most dramatically seen on the Yuba River with its steep canyon walls and the Truckee River with its smaller river channel. The Bear River because of its lower elevations and shallow riverbed tends to be impacted more by heavy rain over an extended period. The following attached maps *Nevada City Flood Hazard* (page 64); *Grass Valley Flood Hazard* (page 65) and *Truckee*

City Flood Hazard (page 66) depict the 100 and 500 year flood plain information. See attached *Nevada County Watersheds* map (Page 63) for references to rivers, hydrologic units and to identify specific water sheds within the County.

In the early history (prior to 1885) of the County it was not uncommon for bridges and structures to be damaged or destroyed on the Yuba and its tributaries. On the morning of June 18, 1883, the English Dam on the Middle Fork of the Yuba River broke and released 650 million cubic feet of water. Water stored in the reservoir behind the dam served 80 miles of ditches to hydraulic mine operations in the area. Eight or nine men were drowned.

By the end of the 20th century, the floodplains of the Yuba, Truckee and Bear were better understood and flooding was much less common. What flooding that occurs now is related to the smaller streams and creeks of the watershed where these channels are dry or nearly dry much of the year and to clogged channels of the larger creeks. Unusually heavy rainfall for several days can cause some of these smaller sources to overflow their normal channels with the effects being localized to particular parcels or areas.

As identified in the Nevada County General Plan; “Areas within Nevada County subject to 100-year and 500-year flooding are as follows: Deer Creek west from Scott's Flat Reservoir through Nevada City towards Lake Wildwood; two tributaries bordering Alta Sierra and Highway 49 to the east and west; along Bear River to Rollins Reservoir; Little Greenhorn Creek; Greenhorn Creek; Steep Hollow Creek; the South Yuba River; the entire extent of the Truckee River through eastern Nevada County; and tributaries that run south into Prosser Creek Reservoir, Boca Reservoir, and Martis Creek Reservoir. Shorter stretches are located south of Nevada City; along Highway 20 near Penn Valley; and in the northwest area of the County. The flood hazard areas are generally confined to the areas adjacent to the County's local rivers and streams.”

Grass Valley identified the following flood hazards in its 2020 General Plan Update: “As indicated by Federal Emergency Management Agency Flood Insurance Rate Maps (FIRM), the City of Grass Valley and the General Plan Planning Area are relatively well drained. The 100-year flood designations are generally confined to narrow bands along local drainages. Few transportation corridors are susceptible to flooding in a 100-year flood event. Idaho-Maryland Road east of SR 49/20 and South Auburn Street south of Whiting Street will be flooded during a 100-year flood.” Some backyard flooding has occurred along Mill Street as it abuts Wolf Creek. “To the extent culverts and storm drains are not maintained, other localized flooding could occur. Structures located in the flood hazard areas would be subject to flooding in a 100-year flood event unless special mitigation is employed.”

Flooding as a result of dam failure can occur as a result of manmade or natural causes. Such causes include improper sitting, structural design flaws, erosion of the face or foundation, earthquakes, massive landslides, and rapidly rising flood waters. Inundation as a result of dam failure would most likely be the result of an earthquake. However, the area of Nevada County in which these dams exist is not located within an historical seismic zone. In fact, the western half of Nevada County is within the lowest earthquake intensity zone in California.

Nevada City has information from the 1986, 1995 and 1997 floods that provides indications of likely future flood damages. Deer Creek and Little Deer creek converge at the foot of the commercial district on Broad Street. The below grade level of a commercial building at the south- west corner of Broad Street has historically had approximately 3 feet of water intrusion during severe flood events. In 1995 and again in 2004 an underground culvert that connects Deer Creek and Little Deer Creek in a parking lot at the intersection of Sacramento Street and Broad Street has failed resulting in failure of the parking lot surface. In 1995 and 2005, Little Deer Creek overflowed its banks in Pioneer Park, a city owned park, with resulting damage to the tennis courts, baseball diamond and horse shoe pits.

Truckee in the eastern portion of Nevada County experienced flooding along West River Street during the flood of 1997. Of more concern in terms of mitigation however, has been the recurrent flooding (1995, 1997, and 2005) along Gregory Creek, Trout Creek, along Donner Lake Road and South Shore Road.

Gregory Creek travels south through Negro Canyon, under Interstate 80 and into the west end of Donner Lake. After the creek crosses under Interstate 80 the banks of the creek become less defined and intermittently clogged with debris. When the creek jumps its banks, the water course fans out and multiple homes and businesses are flooded.

Trout Creek originates near the crest of the Sierra Nevada and flows southeast for approximately 5.5 miles to its confluence with the Truckee River. A 6,600' stretch of Trout Creek has been severely diverted and hardened to support logging and railroad development over the past 140 years, such that, the current alignment experiences flooding and has damaged the floodplain and riparian habitat.

During heavy rain or rain on snow events, drainage ditches along South Shore Drive become plugged with debris and cause water to overtop South Shore Drive and cause flooding to adjacent and downstream homes (24) with erosion from this runoff going directly into Donner Lake. Multiple utility lines, including high-pressure gas lines, have been exposed due to uncontrolled drainage.

Drainage crosses Interstate 80 and under Donner Lake Road in under-defined drainage channels. During high water discharge events drainage exceeds the channel capacity and causes flooding to approximately 20 homes up to 18 inches in depth and then floods across Donner Pass Road.

8.2.2. Likelihood of Future Occurrences

The combination of deep snow and warmer rainfall will continue to challenge the Truckee Basin watersheds in particular and the County in general. The combination of past and proposed improvements, regular waterway clearing and maintenance will reduce the risk but even with these measures in place the potential for significant localized flooding events still exists.

8.2.3. Compliance with the National Flood Insurance Program (NFIP)

The NFIP is a FEMA program that makes flood insurance available to communities who have adopted and enforce floodplain management ordinances to reduce future flood damage. Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage.

As of the date of this Plan, the County of Nevada, Town of Truckee, City of Grass Valley, and Nevada City are listed by FEMA as Communities Participating in the National Flood Insurance Program.

Since the publication of the previous plan, the County of Nevada has enforced floodplain management with the following actions:

- Incorporating into the Safety Element of the Nevada County General Plan, goals to reduce the potential for injury, property damage, and environmental damage from flooding.
- Incorporating into the Land Use Element of the Nevada County General Plan, minimum standards for site development in the County to include floodplains as defined by FEMA.
- Upon receipt of updated digital Flood Insurance Rate Maps (FIRMS) from FEMA, the County of Nevada notified residents affected by any changes to the designation of flood-prone areas or Special Flood Hazard Areas (SFHAs).

The County of Nevada will continue to work with appropriate local, state and federal agencies in maintaining the most current flood hazard and flood plain information to ensure continuing participation in the National Flood Insurance Program.

8.3. Dam Failures

8.3.1. Past Occurrences

In 1883 the "English Dam" on the Middle Fork of the Yuba River broke and unleashed 650 million cubic feet of water. A wave 60 feet high went downstream at 10 miles per hour. Eight or nine men are thought to have been killed. There have been no recorded dam failures in the region since this last recorded event.

8.3.2. Likelihood of Future Occurrences

Dam failure is another form of flood hazard. Failure can occur as a result of manmade or natural causes. Such causes include improper siting, structural design flaws, erosion of the face or foundation, earthquakes, massive landslides, and rapidly rising flood waters. Nevada County has identified 21 regulated and non-regulated privately owned dams in Western Nevada County and 25 such dams in eastern Nevada County. Twelve of the 46 dams are regulated and owned by organizations such as the Nevada Irrigation District, Pacific Gas and Electric, the Army Corps of Engineers or other organizations. Regulated Dams have filed dam inundation plans with the State of California, the appropriate federal agency and the County. There are populated areas within the inundation zone of several of these dams; others have public property (such as roads) located down creek. Specifics of this information are considered confidential by the Federal Energy Regulatory Commission as are the specific dam safety plans. Such plans and information are maintained by the County in the County Emergency Operations Center.

Within the eastern portion of Nevada County, classified in a higher earthquake intensity zone, are three major dams: Prosser Creek Reservoir Dam, Stampede Reservoir Dam (located with Sierra County) and Boca Reservoir Dam. One of the two major faults believed to be potential seismic sources appears to be relatively active and of special significance due to its close proximity to the three dams noted above. However, the Truckee earthquake of 1966 had a magnitude of 5.4 but only relatively slight damage occurred to both Prosser and Boca earth fill dams[35].

Martis Creek Dam, found near the town of Truckee has been the subject of recent concern receiving national attention. The dam is managed by the Army Core of Engineers and has been listed by the Core as one of nation's six dams most at risk of failure. Three key risks of failure sited by the Core are: seepage under the dam leading to foundation failure, a too small spillway leading to overflowing events in heavy rains, and an earthquake fault-line located within 200 yards of the dam. The dam is on an active monitoring program, not in use for water storage and has extensive remediation work underway. The inundation zone includes portions of Reno, Sparks and Truckee Meadows, Nevada.[36]

In the western portion of the County, flooding in the event of failure of the Upper and Lower Scotts Flat Dams would inundate a wide area from east of Nevada City, through Nevada City and west to Lake Wildwood. The failure of such a dam would most likely be the result of a significant earthquake[37].

Also in western Nevada County is the Rollins Reservoir on the Bear River, which flows into Combie Lake. The Nevada Irrigation District owns both. Inundation plans are in place for both bodies of water. It is predicted that a collapse of the Rollins Reservoir may impact Camp Far West reservoir in Yuba County. Three dams are owned by PG&E in the Spaulding Lake complex. Collapse of the three dams would cause significant flooding at the 2700 foot level in the Town of Washington.

However, the area of Nevada County where these dams exist is not located within a historically seismically active zone. In fact, the western half of the County resides within the lowest earthquake intensity zone in California.[38]

8.4. Earth Quake

According to the U.S. Geological Service, Nevada County falls within five earthquake ground movement intensity zones. The western half of the County is in the lower intensity zones (8-20 % gravity), the middle portion is in the moderate zone (21-30% gravity) and the eastern edge is in the 31-40% gravity zone. No part of Nevada County is exposed to an earthquake probability of gravity 40% or more. See attached County Map Nevada County Fault Lines (page 69) for a graphic representation of the various levels of seismic hazard as represented in percent acceleration and a representation of Nevada County's known fault lines.

8.4.1. Past Occurrences

Since 1887, the Nevada County area has experienced 36 earthquakes. The latest earthquake to affect Nevada County was the Boca (also called the Truckee) earthquake of 1966, which had a Richter scale magnitude of 5.4. Twenty-one aftershocks at a magnitude of four or greater were felt in the area, with the Russell Valley generally believed to be the location of the earthquake epicenter. Although damage was extensive in the area, it was minor in scale, occurring almost entirely in unconsolidated natural fill. Relatively slight damage occurred to bridges along Interstate Highway 80 and both Prosser and Boca earth fill dams. The 1975 Oroville Earthquake (5.7) and the Loma Prieta earthquake of 1989 were felt in Nevada County but resulted in no reported damage.[39]

8.4.2. Likelihood of Future Occurrences

The western half of Nevada County is in the lowest Earthquake Shaking Potential for California. It is likely that the region will be impacted by future seismic activity and with the exception of the far eastern edge of the County, the magnitude of the incident is not likely to be severe.

Lake of the Pines is the primary community developed in the 8-10% peak ground acceleration zone of Nevada County. Developed primarily since the 1960's, Lake of the Pines would not be expected to suffer significant damage during a normal earthquake event for this area.

Grass Valley, Nevada City, Penn Valley, Cedar Ridge, Lake Wildwood, Rough and Ready, and North San Juan are the communities primarily in the 10-15% peak ground acceleration zone. Of these communities, Grass Valley, North San Juan, Rough and Ready and Nevada City are those, which have structures of un-reinforced masonry buildings in their older neighborhoods and commercial districts. While possible, it is not expected that normal seismic activity in this area would result in significant damage.

Truckee is the major community of Nevada County located in the 30-40% peak ground acceleration zone. Truckee is similar to Nevada City and Grass Valley in terms of the location of un-reinforced masonry buildings being located in the historic portions of town and the commercial district. Previous local earthquake history has not shown these structures to be at significant risk during normal events.

8.5. Avalanche

8.5.1. Past Occurrences

Avalanche hazard areas are generally located on high, mountainous slopes and terrain at elevations above 7,000 feet. The most important factor necessary to release an avalanche is heavy snowfall. A rapidly increasing snow layer is unable to stabilize or bond with the older layer of snow or the ground below it, so that after a certain amount of time the new snow layer will simply slide off as an avalanche. Four avalanche hazard zones are defined, ranging from no hazard (most of Nevada County) to high hazard. High hazard refers to those areas where avalanches that could damage standard wood frame structures and/or bury automobiles are expected to occur with a probability of one chance in twenty per year. Identified high hazard areas within Nevada County include portions of Donner Lake, Tahoe-Donner and the Soda Springs areas.[40] A map representing avalanche risk based on past activity along the eastern edge of Nevada County is attached on page 67.

8.5.2. Likelihood of Future Occurrences

Given the elevation, topography and annual snowfall in the eastern portion of Nevada County, avalanches will continue to occur. Rather than attempting to manage avalanches within the Nevada County wilderness areas, loss of life and property damage can be mitigated by keeping people out of dangerous areas during avalanche season. Avalanche warnings are posted after winter storms and there is an organized ski patrol monitoring high risk areas each year to reduce the risk to life and property.

Nevada County and the Town of Truckee have established mitigation measures in their General Plans to identify avalanche hazard areas and to control new development in identified avalanche areas.[41]

8.6. Land Slides

8.6.1. Past Occurrences

A landslide can be defined as an event in which surface masses of slope-forming earth move outward and downward from their underlying and stable floors in response to the force of gravity. Unstable or potentially unstable slopes are those areas susceptible to slides, falls, creeps, or flows. Topography, climate, geology, and hydrology are factors contributing to slope instability. The degree of severity of these factors and their interactions is what determines potential hazard. Although slope movements can occur in any type of rock material, certain bedrock formations exhibit a high susceptibility to such movement. This type is found in the central portion of the County. However, most of the County's soils are underlain with dense bedrock formations and lack the characteristics contributing to landslide susceptibility.[42]

There are other factors such as steep topography, past hydraulic mining, and large amounts of precipitation (as in 1997, 2004 and 2005) that create the potential for landslide activity. According to the Soil Conservation Service, any area adjacent to a hydraulically mined area is subject to landslide activity. The mining removes the toe of the slope resulting in slope instability uphill or upstream. Triggering devices such as an earthquake or heavy rainfall would set a slide in motion. Within Nevada County are many hydraulic mining sites, one of which, located east of Nevada City is an area of over 20,000 acres containing the majority of these sites.[43]

The Spring (March and April) of 2006 saw limited landslides and damage to roadways (Allison Ranch Road, Pleasant Valley Road and I-80/SR49) caused by ground saturation from unusually heavy and prolonged rainfall. Ground slippage has also occurred in the Cascade Shores area.

In the heavy rain season of the winter of 2004-2005, Cascade Shores, a community northeast of Nevada City, was the site of a landslide of the nature described above. A hillside above the community’s sewer treatment plant, owned by Nevada County Sanitation District #1, slid to within a couple of feet of the treatment plant facilities rendering the plant unusable for a period of one week. Directly destroyed was an above ground sewer collection main. 178,000 gallons of partially treated sewage were released into Gas Canyon Creek which is a minor tributary of the Bear River and Rollins Lake. The landslide site was approximately 400 feet long and 300 feet high. The total hillside runs for about a mile but does not endanger any other facilities. The mitigation measures installed after this event consisted of a debris wall and wire screen contour on the face of the slide material.

8.6.2. Likelihood of Future Occurrences

Given that Western Nevada County was the site of extensive hydraulic mining in the mid-19th century and has resulted in some large acreage of potentially unstable soil conditions we can expect that landslides will continue to occur. Mitigating in favor of the County is the generally poor soil stability and condition in these hydraulic mining areas, which precludes their future use and development.

8.7. Severe Weather (Wind, Lightning, Snow, Freezing, Heavy Rain)

8.7.1. Past Occurrences

Records show that there have been 69 severe weather incidents affecting Nevada County in the period 1960 to 2000. 28 were incidents related to high wind; 8 incidents were related to freeze or extreme cold ; lightning was the issue in 5 incidents; 21 incidents were reported as heavy rain; and 24 were incidents related to winter storm or snow[44]. Some incidents included more than one cited cause.

The Sierra Nevada foothills and mountains traverse Nevada County. Between latitude 120°, 43' west, and longitude 121°, rainfall is between 55 inches to greater than 75 inches annually.

The National Oceanic and Atmospheric Administration-Western Regional Office provided the following statistics in October 2005. Grass Valley data was available from 1965, Nevada City from 1914 and Truckee from 1948. Specific year-by-year data is available from the Nevada County Office of Emergency Services and the Sacramento Office of the National Weather Service.

NEVADA COUNTY RAINFALL AND SNOW FALL STATISTICS AS OF 2005

	Precipitation/Inches			Snowfall/Inches		
Location	Mean	High	Low	Mean	High	Low
Grass Valley	52.98	94.77	16.52	9.08	27.10	0.00
Nevada City	54.76	101.97	27.30	22.0	104.80	0.00
Truckee	31.31	54.62	16.04	210.91	444.30	91.30

Source: National Weather Service, Sacramento Office 11/2005

8.7.2. Likelihood of Future Occurrences

Rain, snow, lightning and high winds are likely to continue as one of the natural threats to Nevada County. Not specifically mentioned above were blizzards, which are the combination of wind and blowing snow. Closure of roads and highways due to blowing snow is a common and annual event above 5,000 feet in the Sierra Nevada. The Town of Truckee and CALTRANS annually hold a pre-winter season community meeting in Truckee to review winter blizzard plans. The exact and full extent of global warming may become more evident over the next few decades, which will conceivably have an effect on County weather related incidents.

8.8. Volcano

8.8.1. Past Occurrences

Of approximately 20 volcanoes in the State of California, only a few are active and pose a threat. Of these, the Long Valley Caldera and Mt. Lassen are the closest to Nevada County. Mt. Lassen most recently erupted in 1914 and some ash-fall was reported in Truckee. Research of the records of the Board of Supervisors for that time shows no Declaration of Emergency or any other official notice taken.

8.8.2. Likelihood of Future Occurrences

Nevada County could be susceptible to ash fall from either the Long Valley Caldera or Mt. Lassen but it would most likely be minimal in severity. Nevada County is not likely to be significantly impacted by lava or debris material flows. See the attached United States Geological Survey (USGS) map USGS Volcanic Hazards Maps (page 68) for maps of local volcanoes and potential hazard regions from future eruptions.

8.9. Land Subsidence

Subsidence consists of surface land sinking into below-surface holes or fissures. Subsidence may be caused by a variety of natural conditions, some in combination with human activity. The primary cause of actual and potential subsidence in the Grass Valley and Nevada City areas is previous underground withdrawal of material from mining. Less hazardous and generally better controlled is improper burial of organic materials during land development.

Subsidence hazards in Grass Valley, Nevada City and vicinity are principally man-made rather than natural geologic phenomena, and are addressed under Mine-Related Hazards.

8.10. Mine Related Hazards

Despite its colorful contribution to local history, past mining activities present a serious "downside" to the community with respect to environmental health and safety. The magnitude of potential mine-related problems in the Sierra foothills is just starting to be recognized. That recognition includes an admission by State Mining and Geology experts that little is known about the locations of mine-related hazards, a factor inhibiting comprehensive solutions.[45]

Mine-related hazards include the presence of open holes at ground surface; inadequately covered/shored up shafts and tunnels below ground level; tailings, and other abandoned mining features. Safety and hazard concerns resulting from old mine operations include the risk of falling into open shafts, surface collapse/subsidence into old shafts, and the presence of residual toxic materials generated in mining processes.

A substantial portion of the Grass Valley and Nevada City area is underlain by a deep, extensive labyrinth of abandoned mine tunnels. The Empire Mine tunnels alone extend some 365 miles beneath the City of Grass Valley. Literally dozens of mining claims were "worked" in the Grass Valley and Nevada City area during the heyday of gold mining. Some were large, mechanized operations. Most were small and more labor-intensive.

Hard- rock mining, as historically practiced in western Nevada County, was also characterized by 1) one or more angular shafts from surface to underground tunnels for transporting miners, equipment, and ore and 2) vertical air shafts from tunnels up to the surface, whose functions were to admit fresh air to the otherwise depleted atmosphere below. Tailings piles (ore storage) and tailings ponds (used in ore processing) were also typical surface features of deep mines.

Mines and mining, always dangerous while in operation, posed new dangers when abandoned. Airshafts were left exposed or covered by a few boards. They are typically holes of 4 to 10 feet in diameter on the surface, extending hundreds of feet down to the mine tunnels below. Access shafts were often covered hurriedly by closing off the mine mouth (entrance) with logs, then backfilling with rock and earth. In time, the forgotten-but-"reclaimed" site sprouted vegetation, hiding a large hole lurking perhaps as little as 8 to 10 feet below the surface.

The susceptibility of mine shafts to subsidence or cave-ins depends on a number of factors, particularly water content of the soil above and the depth and physical condition of the shaft. The Division of Mines and Geology believes that septic systems contribute to subsidence by keeping otherwise dry soil overburden wet and heavy, thus triggering collapses that might otherwise not occur.

The greatest problem regarding mine-related surface hazards is the absence of information about the locations and physical characteristics of abandoned tunnel entrances and shafts. Some are known, cataloged and marked, while others are not. Most are on privately owned property. Without current, comprehensive information, it is difficult to assess the magnitude of the problem or to devise remedial programs.

8.10.1. Past Occurrences

In 1986 there was a subsidence ground collapse on County owned property immediately adjacent to Wet Hill Road. This collapse was due to an air vent that had been capped over in prior decades but which had eroded away due to wet soil conditions. This hole was filled with more than 60 yards of rock and soil and has not been the source of further issues.

The collapse of the Old Brunswick shaft of the Idaho-Maryland Mine Complex near Grass Valley during the 1998 storm season dramatized the danger to persons and property presented by abandoned mines. In that May, 1998 incident, the sudden subsidence of land above a long-hidden mine entrance claimed property and undercut the foundation of a new home near Grass Valley.

8.10.2. Likelihood of Future Occurrences

Soil subsidence due to mining activity has historically been seen as an outcome of the extensive mining activity that was the mainstay of the early economy of western Nevada County. While there have been anecdotal stories of mineshaft cave-ins, we do not have solid information of the location and condition of the various shafts and vents that do exist. In conjunction with the California Division of Mines and Geology, a project and methodology needs to be developed that can provide this information. Certainly, as development projects are proposed, attention needs to be placed on identifying and cataloging the existence of shafts and vents within development project boundaries.

8.11. Agricultural Hazard

Following the gold rush, settlers began agricultural pursuits including fruit production, cattle and horse ranching. These agricultural pursuits are still important to the region. For example, wine grape production was reported at 281 acres under cultivation in 2007 placing Nevada County in 37th ranking among the 58 California Counties and the County's market value of products sold has increased 33% from 2002 to $9,468,000 in 2007, the most recent year that the agricultural census was taken. Approximately 55% of this reported revenue was from crop sales with the remainder livestock. Nevada County was ranked in 2007 as 53rd of California's 58 counties in terms of agricultural production. This number is up slightly from the 2002 report.[46]

Located on the western slope of the Sierra Nevada between 1,000 and 6,000 feet in elevation, the agricultural lands of Nevada County have historically been affected by weather related events such as heavy rain, freezing temperatures (including late spring frosts and early fall frosts) and drought. The severe weather events can have devastating effects on fruit set and harvest causing losses in yield and affecting quality.

Like most counties across the state, Nevada County agriculture has come to embrace land friendly agricultural practices including organic farming and ranching certifications across the County. The net effect of this trend is that although agricultural revenues are increasing across the County overall, pesticide use and contamination issues remain low.

Sudden Oak Death syndrome has become a concern across California and Nevada County has intercepted infected plants while inspecting shipments into the County.

8.11.1. Past Occurrences

Agricultural interests in Nevada County have also been periodically impacted by severe weather usually in the form of freezing (1972, 1990, 1998 and 2005) and late heavy rainfall (1958, 1963, 1972, 1982, 1986, 1990, 1995, 1997, 2003 and 2005). The nature of severe weather events are such that many of the micro-climates across the County will suffer a severe weather event while remaining portions of the County are unaffected. These micro-climate events are largely unreported to government but still harm the agricultural industry.

8.11.2. Likelihood of Future Occurrences

Agricultural disasters are likely to continue in Nevada County due to its geographic location on the west slope of the Sierra Nevada. The potential effects of global warming on the County's agriculture industry is not clear but recently disseminated information[47] regarding the effects of global warming suggest that temperature extremes and storm intensities will likely increase, thereby increasing the likelihood of crop damaging events.[48]

The **Plan** has not identified any specific mitigation measures to reduce the effects of global warming on the County's agricultural industry; however, the County recognizes that and the County Agricultural Commissioner concurs that measures like shaded fuel breaks, ample sources of fire suppression water and selection of climate appropriate crops is consistent with sound agricultural risk mitigation practices.

8.12. Human Health Hazards

The impact to human health that wildlife, and more notably, insects, can have upon an area is substantial. The feared avian flu pandemic initially predicted in 2006 and again in later years would be expected to have serious consequences to human health and economics worldwide. Nevada County due to its relatively dispersed population may be impacted differently than the states' major urban areas and their compacted human population.

8.12.1. West Nile Virus

A recent natural hazard to affect California is the West Nile Virus (WNV). Mosquitoes transmit this potentially deadly disease to livestock and humans alike. WNV first struck the northern hemisphere in Queens, N.Y., in 1999 and killed four people. In 2003, all 50 states warned of an outbreak from any of the 30 mosquito species known to carry it. From 62 severe cases in 1999, confirmed human cases of the virus spread to 39 states in 2002, and killed 284 people. Less than 1% of those infected develop severe illness. People over 50 years of age appear to be at high risk for the severe aspects of the disease.

Nevada County recognizes the potential for WNV to occur within the County and has initiated a public outreach campaign and a limited control program. The Nevada West Nile Virus task force has managed the risk of WNV through focused efforts at reducing the mosquito population and educating the public.

8.12.2. WNV - Past Occurrences

WNV was detected on a very limited basis in horses and humans in California in 2003. San Diego County reported 1 veterinary case; Imperial County and Riverside County each reported 1 human case.

By July of 2005, WNV had arrived in Nevada County. In 2005 Nevada County reported 29 cases of infected dead birds, 3 infected dead squirrels, 5 equine cases, 3 died; and 4 human cases with no deaths.[49] In 2006 Nevada County reported 4 cases of infected dead birds and 1 human case. From 2007 through 2010 no more human cases have been reported in the County, however testing has confirmed the presence of the virus in avian samples in the years 2007 and 2008 but not 2009 or 2010.

8.12.3. WNV - Likelihood of Future Occurrences

The state continues its surveillance for the disease. Nevada County will continue its monitoring and proactive treatment program. It is possible that environmental factors affecting bird migration and mosquito populations will change over time and require modified responses to this threat.

8.13. Pandemic Flu

Every few decades an influenza outbreak occurs with a virus that is particularly virulent and contagious resulting in national or even international concerns for human health and welfare. The influenza virus is particularly

dangerous to the very young and old, people with a suppressed immune response or have a susceptibility to respiratory disease from a pre-existing condition(s).

A great deal of recent attention has been focused on the possible transformation of avian or swine influenza virus strain making it contagious in and between humans. The possibility of this transformation occurring has become a point of scientific debate, but luckily the facts surrounding influenza risk and practices of epidemic containment and treatment remain the same or similar regardless of the source of the virus.

One positive result of this recent attention on pandemic flu risks is that state and local governments have been compelled to revisit their proactive practices and procedures to ensure an appropriate response in the face of the pandemic flu risk. Key improvements to Nevada County's infrastructure and communication channels have been deemed confidential however the results of these efforts can be seen in improved epidemiological surveillance capabilities, more efficacious responses to anomalies and aberrations in both the healthcare and educational systems, and improved communication between public entities, with healthcare providers, and to the public at large.

8.13.1. Pandemic Flu - Likelihood of Future Occurrences

Increasing population densities and more frequent travel will likely increase the speed and frequency of pandemic flu events.

9. Man Made Risks Assessment

9.1. Hazardous Materials

Hazardous materials incidents may occur anywhere and at any time in Nevada County. The potential for a hazardous materials incident in Nevada County depends on the volume, distribution, and/or use of chemicals and other hazardous substances in a particular area. An assessment of the known hazardous material threats within Nevada County has been developed. In general, the likelihood of a hazardous materials incident is greatest in the following areas:

1. Transportation Routes

Highways, railways, and commercial and military aviation routes constitute a major threat because of the multitude of chemicals and hazardous substances transported along them. Interstate 80 and State Routes 20, 49, 89, 174, and 267 are areas of concern, as are the Union Pacific railroad tracks, which roughly parallel I-80, the underground pipelines which provide natural gas to various parts of Nevada County and the underground hydrocarbon pipelinewhich runs adjacent to the Union Pacific railway tracks.

2. Business and Industry

The manufacturing and light industrial firms located in the un-incorporated portions of the County and businesses in each of the incorporated cities (Grass Valley, Nevada City, and the Town of Truckee) offer the potential for hazardous materials incidents.

3. Agriculture

Accidental releases of pesticides, fertilizers, and other agricultural chemicals may be harmful to human health and the environment. The majority of the agricultural industry in Nevada County consists of ranching and orchard operations in the western portion of the County.

4. Illegitimate Business

Illegitimate businesses, such as clandestine meth-amphetamine laboratories, are a threat to human health, property, and the environment. Chemical residues have been discharged into a public sewer or private sewage

disposal systems, dumped or buried in remote areas of the County or along the side of the road, posing an acute health threat to the person who might stumble across it and a threat to the water watershed and the surrounding wildlife.

5. Previous Military Ordnance Uses

Beale AFB, located in Yuba County on our western border, was previously a military ordnance and test firing range. There have been some instances of exploded and unexploded materials being found in Nevada County as part of the firing range. Since 2000, Beale AFB has been engaged in a comprehensive identification and cleanup of the firing range but there are still instances of materials being found in Nevada County.

9.2. Arson and Commercial Fires

Ten percent of all fires in Nevada County are believed to be arson related fires, either wildland interface or commercial. While both types of fire related incidents are of extreme concern to Nevada County, the commercial fire has a potential for great destruction and economic loss. A commercial fire within the business districts of Nevada City, Grass Valley, Truckee, Penn Valley, Lake of the Pines, or Lake Wildwood would result in serious losses of sales inventory, sales tax, property tax reduction, and loss of employment or loss of life. Secondary effects could be felt in the transient occupancy tax and in the vibrancy of related businesses. In a worst case scenario, multiple businesses could be involved as well as the loss of housing stocks that are sometimes found as "over the store" units.

The commercial districts of smaller foothills cities are normally found within one or two well-defined areas in each city. These areas are usually only a few blocks wide and a few blocks long but encompass much of the employment opportunities and commercial activity of the city.

Table of Commercial Centers found in Nevada County	
City/Town	**Commercial Area**
Nevada City	Historic Downtown
Nevada City	Old Seven Hills
Nevada City	Gold Flat/New Mohawk Industrial area
Grass Valley	Historic Downtown
Grass Valley	Glenbrook
Grass Valley	Pine Creek
Grass Valley	Whispering Pines
Grass Valley	Loma Rica Industrial Park
Lake of the Pines	Combie Center
Lake Wildwood	Wildwood Center
Truckee	Historic Downtown/Brickletown
Truckee	Gateway Center
Truckee	Albertson's Center
Truckee	Airport Industrial Complex
Truckee	The Factory Outlet Mall
Truckee	Gateway Center, East and West
Truckee	Pioneer Industrial/Commercial Park
Penn Valley	Penn Valley Center

9.2.1. Past Occurrences

In 2001, a commercial fire started in the kitchen of Friar Tucks, a highly successful and well-known restaurant in downtown historic Nevada City. By its conclusion, the restaurant, offices of the County Probation Department,

the Off Broad Street live theatre, and The Herb Shop had been completely destroyed. The Earth Store, Java Johns and other nearby businesses suffered lesser damages.

In November 1993, a restaurant in downtown historic Truckee exploded due to a natural gas leak, which resulted in one death, serious life threatening injury to a small child, and the complete destruction of the restaurant, businesses on both sides and damage to the Old Truckee Hotel.

Neither of these events happened at the height of the business day. Both were in the center of the commercial district. Both events threatened the economic vitality of the city, business activity of the region, and the historic assets of the County. A timely and well executed suppression of the fires mitigated what might otherwise have been staggering losses.

9.2.2. Likelihood of Future Occurrences

Arson and or commercial fires will continue to remain as serious threats to the commercial and business vitality of developed commercial areas within the County. Enforcement of the County and municipal building, hazardous materials and fire codes will greatly mitigate the risk of future losses of this type.

9.3. Airborne Hazards

9.3.1. Past Occurrences and Discussion

The most recent Annual Report (2005) of the Northern Sierra Air Quality Management District[50] Executive Summary states:

> Overall air quality in most areas of the Northern Sierra Air Quality Management District (NSAQMD or District) during 2005 was good. Ozone levels in the Broader Sacramento Area (BSA) were quite high at times and unfavorable winds blew those high ozone levels toward the Grass Valley area for numerous exceedance days. Air pollution transport impacts were, as is typical in the western foothill region of the Sierra Nevada, still significant. The NSAQMD is classified as being impacted by overwhelming transport from upwind areas. The primary source of the District's ozone pollution is from the BSA, and to a small degree the San Francisco Bay area. Due to a cool spring and an unusually warm July and August, Grass Valley experienced a very typical ozone year, albeit a bit on the cleaner side. In Grass Valley, there were only 20 days that exceeded the National 8-hour standard for ozone. Typically, we would expect to see 22 such days in Grass Valley.
>
> On the few hot, stagnant days that did occur during 2005, the BSA was the major and primary contributor to the high ozone levels in Grass Valley. This ozone was transported into the District on the predominant southwest winds. There were only 20 days with exceedances of the 8-Hour National Ambient Air Quality Standards (NAAQS). Additionally, there were only 53 hours on 15 separate days exceeding the California Ambient Air Quality Standard (CAAQS) for ozone. 2005 was a very typical year.
>
> Carbon Monoxide (CO) was not monitored during 2005 within the NSAQMD. However, CO was monitored within the District during the early months of 2004. Specifically, in response to the concerns of some citizens in Loyalton, the District did some short term CO monitoring. Ambient CO in Loyalton was found to be insignificant. This does not preclude the possibility of future CO monitoring studies both there and elsewhere within the District.
>
> PM10 (particulate matter with an aerodynamic diameter of 10 microns or less), once the primary particulate of concern within the District, has been supplanted by PM2.5 (particulate matter with an aerodynamic diameter of 2.5 microns or less) as the pollutant of concern. The District operated 4 sites with PM2.5 samplers and 5 sites with PM10 samplers. Major contributors to both the PM10 and PM2.5 levels are woodstoves, forestry management burns, residential open burning, vehicle traffic and windblown dust. These problems can be relieved or exacerbated by meteorology, e.g. winds dispersing or temperature inversions concentrating air pollutants. The Truckee basin (aka the Martis Valley), Portola,

and especially Quincy (located within the American Valley), are subject to strong inversions and stagnant conditions in the wintertime. Those conditions, coupled with intensive residential wood burning, can result in very high episode PM2.5 levels.

PM10 levels in Quincy were their highest in three years, but still well below the all-time high values of the early 1990s. In Quincy, county ordinance requires that when a residence is sold, any non-EPA-certified wood fired appliance must be either removed or rendered inoperable. It is up to the new owner to choose whatever source of heat he/she wants, as long as it is Environmental Protection Agency (EPA) certified and a Building Department-approved device. District staff conducts closeof-escrow Certificate of Compliance inspections. Additionally, residential open burning in the downtown area is completely banned, while burning is greatly curtailed within the outlying areas of the American Valley. The result of such controls has been marked, steady air quality improvement – a real air quality success story.

The Town of Truckee has recently enacted similar controls on woodstoves. The District has seen an increasing drop in particulate levels starting in 2000, unfortunately, those levels flattened out in 2003 and started to rise sharply in the last two years. Possible explanations are the weather and increased growth offsetting the gains of increased controls. The increased PM10 levels are very likely due in part to a more accurate reflection of actual PM10 levels as recorded by the new BAM. Additionally, the longstanding Wedding Hi-Volume sampler was replaced with an Andersen 1200 Hi-Volume sampler. Both the BAM and the Andersen show a dramatic increase in PM10 levels. However, PM2.5 levels continued to drop. A possible explanation for a reduction in fine particles versus an increase in coarse particles could be the reduction in combustion particles versus windblown dust. Nevertheless, the PM10 levels are still much lower than those levels measured during the previous decade.

In summation there are four key points relevant to the NSAQMD's existing air quality:

1. The District's state and federal non-attainment status for ozone is due to overwhelming air pollution transport from upwind urban areas, i.e. the Sacramento and Bay areas.

2. Improvements in air quality, with respect to ozone, will depend largely on the success of air quality programs in upwind areas.

3. Anticipated growth in local population will add to locally generated pollution levels. Therefore, local mitigations are needed to prevent further long-term air quality degradations. Otherwise, the local contribution may increase to the point where the transport excuse will become less viable and more emphasis will then be placed on mandated local controls.

4. State and Federal Land Managers anticipate a marked increase in prescribed burning within the next 5 years. This may have a tremendous impact on local PM10 & PM2.5 levels, unless appropriate mitigations are employed.

9.3.2. Likelihood of Future Occurrences

In as much as the airborne pollution present in Nevada County is caused from upwind migration from the greater Sacramento and to a lesser degree the San Francisco Bay areas, there are few mitigation methods available to us.

The conflicting priorities of wildland fuel reductions and air quality must be balanced and to this end air quality during fuel reduction periods (burn season) will continue to present particulate pollution and air quality concerns to the region. Population increases in the unincorporated areas of the County will also drive up particulate levels as wood furnaces are used for winter heating.

10. Mitigation Strategy

10.1. Overview

The results of the planning process, the identification of mitigation actions and the work of the Planning Committee led to the mitigation strategy and mitigation action plan for this **Plan** update. As part of the plan update process, a comprehensive review and update was conducted by the Planning Committee and some of the initial goals and objectives from the 2006 plan were refined and reaffirmed, some goals were deleted, and others were added.

To support the **Plan** goals, a Projects Committee consisting of 6 members representing government agencies, first responders, NGO's, and private citizens was convened. This committee was tasked to review mitigation actions from 2006 as well as new mitigation actions (proposals) submitted by local jurisdictions for inclusion into the 2011 plan. Each proposal was assessed for its value in reducing risk and vulnerability and based on this assessment was either included in the **Plan**, sent back for clarification or rejected.

10.2. Goals and Objectives

During initial meetings with each participating jurisdiction, there was a review of hazard identification, vulnerability assessment, and capability assessment. Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desire of the community;
- Encompass all aspects of community, public and private;
- Are future-orientated, in that they are achievable in the future.

Goals from the 2006 plan were reviewed as a precursor to discussions on developing our current goals. Based on the risk assessment review and goal setting process, the Planning Committee identified the following goals and objectives, which provide the direction for reducing future hazard-related losses within the Nevada County Planning Area.

10.2.1. Goal 1: Prevent Future Hazard Related Losses of Life and Property

Objective 1.1: Provide protection, to the extent possible, for existing and future development.

Objective 1.2: Provide protection for critical public facilities, utilities, and services.

Objective 1.3: Promote/maintain coordination and interoperability among all Nevada County public agencies.

Objective 1.4: Promote agricultural planning and animal health.

10.2.2. Goal 2: Increase community awareness and involvement to promote participation and voluntary compliance.

Objective 2.1: Inform and educate residents and businesses about the types of hazards they are exposed to, where they occur, what they can do to mitigate exposure or damages.

Objective 2.2: Emphasize preparedness and self responsibility to residents.

Objective 2.3: Develop an outreach program and provide educational resources for all hazards included in the plan.

10.2.3. Goal 3: Improve Community Emergency Services/Management Capability

Objective 3.1: Develop/improve warning and evacuation procedure and information for residents and businesses.

Objective 3.2: Continue to coordinate jurisdictional responsibilities for various hazards through County and community disaster/emergency response plans and exercises.

10.2.4. Goal 4: Reduce the threat of flooding in Nevada County

Objective 4.1: Review appropriate flood protection infrastructure improvements and implement where feasible and economically viable.

Objective 4.2: Prepare public information materials concerning the risk associated with creek, stream and river flooding.

10.2.5. Goal 5: Reduce fire severity and intensity through fuels management

Objective 5.1: Improve awareness and understanding of the Nevada County fire adapted ecosystem.

Objective 5.2: Develop a fuels management implementation strategy focusing on education and assistance.

Objective 5.3: Provide fuels management consulting for private homeowners.

Objective 5.4: Develop, organize and fund a property owner assistance program.

10.2.6. Goal 6: Implement and complete identified high priority projects listed in the plan.

Objective 6.1: Monitor and report on implementation of previous goals, priorities, and projects.

Objective 6.2: Collect and review lessons learned, results of applicable research, and other scientific, technical data and knowledge to strengthen mitigation.

10.2.7. Goal 7: Maintain FEMA Eligibility for Grant Funding

Objective 7.1: Monitor and communicate available grant programs, timelines, and processes to all communities.

10.3. Identification and Initial Characterization of Mitigation Actions

Each proposed mitigation action whether brought forward from the last **Plan** or newly proposed was initially characterized by assigning one or more of the natural or manmade risks described within the **Plan**, and evaluated for potential alignment with each of the goals and objectives listed above.

10.3.1. Initial Prioritization

In accordance with the DMA requirements, the Projects Committee reviewed each of the proposed projects with an emphasis on applying a benefit-cost analysis in determining action priority. To this end, the following questions were applied to each proposed mitigation action.

- Does the action address hazards or areas with the highest risk?
- Does the action protect lives?
- Does the action protect infrastructure, community assets or critical facilities?
- What will the action cost?
- What is the possible source of funding?

With these criteria in mind, the Projects Committee members were requested to rank each project in priority (High, Medium, Low, or Not Applicable), list reasons a project should or should not be included in the plan and provide any comments on each project.

The responses were tabulated and all 31 Mitigation Actions were grouped and ranked in order of priority, 15 of which had carried over from the 2006 **Plan**. All 31 actions were recommended for inclusion in the 2011 plan of which 15 were considered high priority.

10.3.2. Further Benefit – Cost Prioritization

All high priority projects were recommended for further evaluation using the most current Benefit Cost Analysis module. A representative from the Nevada County Office of Emergency Services will attend the next schedule FEMA sponsored BCA Training and adjustments will be made to project priorities as appropriate.

10.3.3. Mitigation Action Plan

This action plan was developed to present the recommendations developed by Projects Committees for how the Nevada County Planning Area can reduce the risk and vulnerability of people, property, infrastructure, and natural and cultural resources from future disaster losses. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented.

It is important to note that Nevada County and the participating jurisdictions have numerous existing, detailed actions descriptions, which include benefit-cost estimates, in other planning documents, such as community wildfire protection plans. The Nevada County Projects Committee also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this **Plan**.

Table: Nevada County Planning Area's Mitigation Actions

Action	Lead Jurisdiction	New vs. 2006 Action	Priority
Multi-Hazard Mitigation Actions			
Banner Taylor Water Storage Replacement	Nevada Irrigation District	New	High
Brushing and Debris Chipping	Town Of Truckee	2006	Medium
Chlorine Gas System Replacement	Nevada Irrigation District	New	Medium
Emergency Mass Burial Site	Nevada Cemetery District	2006	Low
Fire Hydrant Installation	Nevada Irrigation District	New	Medium
Generator for Networked Computer System	Nevada Joint Union High School District	New	Low
Grass Valley Conflagration Mitigation	City of Grass Valley	2006	High
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Nevada County and all Incorporated Communities	New	High
Intertie - Cascade Shores	Nevada Irrigation District	New	Low
Intertie - Grass Valley	Nevada Irrigation District	New	Low
Pioneer Trail Extension	Town Of Truckee	New	High
Tree Management	Nevada Joint Union High School District	New	Low
Waterline Installation	Nevada Irrigation District	New	Low
Wildfire Mitigation Actions			
Billy Project Vegetation Management	USFS	2006	High
Community Assistance Program	Nevada County	2006	High
Deer Creek Community Fuel Break	Nevada County	New	High
Defensible Space Chipping	Nevada County	New	High
Fire Break - North San Juan	North San Juan Fire District	2006	High

Table: Nevada County Planning Area's Mitigation Actions			
Action	Lead Jurisdiction	New vs. 2006 Action	Priority
Fuel Break - Deer Creek Environs	City of Nevada City	2006	High
Joey Project Vegetation Management	USFS	2006	High
Public Education and Training	Nevada County	2006	High
Roadside Brush Clearing	Nevada County	2006	High
Sugar Loaf Mountain	City of Nevada City	New	High
Water Storage and Supply	Nevada County	2006	Medium
Flood Mitigation Actions			
Diversion Reinforcement - Newtown Canal	Nevada Irrigation District	New	Medium
Drainage Culvert - Donner Lake	Truckee Donner Public Utility District	New	Medium
Drainage Improvements - Donner Lake Road	Town Of Truckee	2006	Medium
Gregory Creek Debris Clearing and Restoration	Town Of Truckee	2006	Medium
Relocate Trout Creek Power Lines	Truckee Donner Public Utility District	New	High
South Shore Drainage	Town Of Truckee	2006	Medium
Trout Creek Restoration	Town Of Truckee	2006	High

11. Plan Implementation and Maintenance

Implementation and maintenance of the **Plan** is critical to the overall success of hazard mitigation planning. The following section provides an overview of the strategy for **Plan** implementation and maintenance.

11.1. Implementation

While this **Plan** contains many worthwhile actions, the participating jurisdictions will need to decide which action(s) to undertake first and how much urgency to place on implementation. Many of the proposals in this **Plan** build upon the momentum developed through previous and related planning efforts and mitigation programs. Nevada County OES recommends implementing the proposed mitigation actions, where possible, through these other program mechanisms or otherwise within the proposing agency.

Nevada County OES will monitor and advocate for the implementation efforts through the routine actions of monitoring agendas, attending meetings, identifying where the proposed actions (within this Plan) could support current needs, looking for unmet needs and generally promoting a safe, sustainable community.

Simultaneous to these efforts, the Nevada County OES and the other participating agencies will monitor funding opportunities that can be leveraged to implement the recommended actions. Funding opportunities to be monitored include pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

11.2. Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

The Nevada County Office of Emergency Services is responsible for initiating plan reviews and consulting with other participating jurisdictions and soliciting continuing input from the general public. Nevada County OES and

the individual jurisdictions will revisit this plan annually and following a hazard event. The Planning Committee will submit a five-year written update to the State and FEMA Region IX, unless a disaster or other circumstances require a change to this schedule.

12. APPENDICES

12.1. Identified Local Governments

Local Governments	Participation
County of Nevada	Yes
City of Nevada City	Yes
City of Grass Valley	Yes
Town of Truckee	Yes
Donner Summit Public Utility District	Yes
Nevada Irrigation District	Yes
Nevada Cemetery District	Yes
Truckee Cemetery District	Yes
Tahoe National Forest	Yes
CA. Department of Forestry and Fire Protection	Yes
Sierra Nevada Memorial Hospital	Yes
Nevada County Resource Conservation District (USDA)	Yes
Sierra Community College District	Yes
Tahoe Forest Hospital	Yes
Truckee Donner Public Utility District	Yes
Tahoe-Truckee Unified School District	Yes
Truckee Sanitary District	Yes
Truckee Donner Recreation and Park District	Yes
Nevada County Superintendent of Schools	Yes
Fire Safe Council of Nevada County	Yes
Nevada County Consolidated Fire District	Yes
Truckee Fire Protection District	Yes
Penn Valley Fire Protection District	Yes
Higgins Fire Protection District	Yes
Peardale-Chicago Park Fire Protection District	Yes
North San Juan Fire Protection District	Yes
North San Juan Parks District	Yes
Rough and Ready Fire Protection District	Yes
Ophir Hill Fire Protection District	Yes
Washington County Water District Washington Volunteer Fire Department	Yes
Western Gateway Recreation and Park District	Yes
Bear River Recreation and Park District	Yes
U. S. Bureau of Land Management	Yes
44CFR 201.2 defines **local governments** as: any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments, regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or public authority.	

12.2. Multi-Hazard Mitigation Actions - Detailed Project Descriptions

12.2.1. Banner Taylor Water Storage replacement

Hazards Addressed: Multi Hazard

Issue/Background: The Banner-Taylor Water Storage reservoirs #1 and #2 provide drinking water to over 15,000 residents in Nevada County and are located in an area classified as a high fire severity area. NID proposes to replace the existing structures made of hypalon-covered, earthen reservoirs with large storage tanks that have a long term life expectancy and the ability to better withstand a catastrophic fire, earthquakes, and the threat of contamination due to terrorist activities.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation District

Priority: High

Cost Estimate: $12,000,000

Potential Funding: Grants and revenue-based monies.

Schedule: 6 months after funding is secured.

Cost Benefit: Alleviates vulnerability to several hazards, has a long term life, and lower maintenance costs.

12.2.2. Brushing and Debris Chipping

Hazards Addressed: Roadside debris for fire, drainage and snow removal mitigation.

Issue/Background: The Town of Truckee maintains approximately 150 miles of roadway. Approximately 30 miles of roadway are in need of maintenance to remove debris from the areas adjacent to roadways. The areas requiring this maintenance have been designated as “Fuel Modifications Zones” per the Nevada County and Town of Truckee Standard Specifications.

Other Alternatives (including No Action): No Action.

Responsible Office: Town of Truckee Public Works

Priority: Medium

Cost Estimate: $500,000

Potential Funding: None identified.

Schedule: Approximately one year after funding is secured.

Cost Benefit: Numerous roads throughout the Town of Truckee would be involved, thus providing an additional measure of safety to hundreds of homes. Fire protection from roadside ignition fire to an average of 3 homes @ $350,000 each = $1,050,000.

12.2.3. Chlorine Gas System Replacement

Hazards Addressed: Hazardous Materials Leak

Issue/Background: Chlorine gas is highly toxic and dangerous and an accidental release would place thousands of people at risk. The existing gas chlorine systems at four water treatment plants have the potential of a chlorine gas release and this potential would be mitigated by replacement with a liquid bleach system.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation District- Engineering Department

Priority: Medium

Cost Estimate: $300,000

Potential Funding: None Identified.

Schedule: Six months after funding is secured.

Cost Benefit: First responder agencies response costs for a chlorine gas release could exceed $500,000.

12.2.4. Emergency Mass Burial Site

Hazards Addressed: Natural Health Hazards

Issue/Background: There is a lack of any available facility/resource to handle and inter a large number of victims in the event of a future catastrophic event in Nevada County. This project would develop and secure an emergency mass interment burial site in Nevada County for use during and following a major disaster.

Other Alternatives (including No Action): There are two alternatives to the proposed project. The first alternative would be to hastily prepare an appropriate site during or after a catastrophic disaster occurs. The second alternative would be to use existing public and private cemeteries of which there may not be a suitable number of sites/plots.

Responsible Office: Nevada Cemetery District - Manager

Priority: Low

Cost Estimate: $81,000

Potential Funding: Federal Grants and private funding.

Schedule: 2 years after funding is secured.

Cost Benefit: There is currently no existing centralized mass burial site/resource to accommodate the need to bury large numbers of corpses in the event of a catastrophic natural or manmade disaster. The cost to create a site as the event is in progress would be in the hundreds of thousands.

12.2.5. Fire Hydrant Installation

Hazards Addressed: Multi-Hazard

Issue/Background: Currently there is a need for additional fire hydrants in the western portion of Nevada County to provide better access to water for urgent situations such as fire emergencies. The installation of 15 new hydrants throughout Nevada County within the boundaries of the Nevada Irrigation District (NID) will reduce response time by fire agencies to fire-related incidents.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation District

Priority: Medium

Cost Estimate: $200,000

Potential Funding:. Federal Mitigation Grants

Schedule: 1 year after funding is secured.

Cost Benefit: Fire agency costs would significantly decrease with additional water resources available.

12.2.6. Generator for Networked Computer System

Hazards Addressed: Multi-Hazard

Issue/Background: In the event of a power outage coincident with a regional disaster the educational data system would not be available to provide/support critical communication and accountability procedures. The purchase and installation of a power generator would provide power during power outages.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Joint Union High School District

Priority: Low

Cost Estimate: $30,000

Potential Funding: None identified

Schedule: 60 days after funding is secured.

Cost Benefit: The Nevada Joint Union High School District houses the data system that services all K thru 12 public schools in Western Nevada County. The District has a judiciary responsibility to maintain this system in an active and available status during a regional disaster and failure of the system would increase costs indirectly through the loss of needed information.

12.2.7. Grass Valley Conflagration Mitigation

Hazards Addressed: Multi-Hazard

Issue/Background: Most of the buildings in the historic downtown area of Grass Valley were constructed prior to the establishment of fire codes and before fire prevention design measures were developed. As a result, these beautiful old buildings are highly vulnerable to the kind of fire extension that is most difficult for firefighters to control.

This project proposes a strategy not unlike what is used in the wildland by the creation of fuel breaks to mitigate the hazard of contiguous vegetation fuels. The approach would be to implement “sprinkler breaks” in strategically selected downtown buildings with the idea being that an otherwise conflagration fire would at most destroy the “zone” between sprinkled buildings rather than an entire city block.

Other Alternatives (including No Action): 1) Implement an ordinance requiring sprinkler systems in all connected downtown buildings. 2) Increase firefighter staffing. 3) No Action.

Responsible Office: City of Grass Valley Fire Department

Priority: High

Cost Estimate: $500,000

Potential Funding: None Identified.

Schedule: 3 years after funding is secured.

Cost Benefit: Although the likelihood of total downtown loss is low, a scenario involving the loss of 10 connected buildings could exceed $20,000,000. If the fire was stopped by sprinkler breaks at just 5 buildings, a $10,000,000 benefit would have been realized from a $500,000 project cost.

12.2.8. Integrate Local Hazard Mitigation Plan into the Safety Element of General Plan

Hazards Addressed: All

Issue/Background: Local jurisdiction reimbursement for mitigation projects and cost recovery after a disaster is guided in part, by AB 2140. Specifically, this bill requires that each jurisdiction adopt a local Hazard Mitigation Plan in accordance with the Federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan. Adoption into the safety element of the general plan may be by reference or incorporation.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County Office of Emergency Services, Planning Departments for each incorporated jurisdiction.

Priority: High

Cost Estimate: Staff time

Potential Funding: County and jurisdictional budgets.

Schedule: As soon as possible.

Cost Benefit: Adoption and coordination of planning documents will help jurisdictions maximize potential for state reimbursement.

12.2.9. Intertie – Cascade Shores

Hazards Addressed: Multi- Hazard

Issue/Background: The Cascade Shores Water Treatment Plant is remote and not connected to another water treatment plant. The existing system does not provide for a backup water supply. A failure of the plant by a natural or human caused disaster would result in water not being available for public health, safety, and welfare as well as fire protection.

This project would construct an intertie to the E. George System which would then provide backup water for the Cascade Shores water system.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation District - Engineering

Priority: Low

Cost Estimate: $1,200,000

Potential Funding: Grants

Schedule: Two years after funding is secured.

Cost Benefit: The project will provide a redundant water system to provide water to a remote community.

12.2.10. Intertie – Grass Valley

Hazards Addressed: Multi-Hazard

Issue/Background: A failure of the Loma Rica Water Treatment Plant by natural or human caused disasters would cause risks to the public with a lack of treated water and fire protection for this area.

The existing E. George Water Treatment Plan has significant capacity to meet the needs of other facilities.

This project would provide a pump station and intertie to pump water from the E. George Water Treatment Plan to the Loma Rica Water System.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation District - Engineering

Priority: Low

Cost Estimate: $2,000,000

Potential Funding: Water sale revenues, bond proceeds and grants.

Schedule: 1 year after funding is secured.

Cost Benefit: No other water treatment plant and system is within reasonable and economical distance.

12.2.11. Pioneer Trail Extension

Hazards Addressed: Multi Hazard

Issue/Background: Access into and out of the 7,000 lot Tahoe Donner subdivision is limited to two access roads. In an emergency situation, evacuation of this subdivision would be difficult. The Town is proposing to construct an additional access road into and out of this subdivision.

Other Alternatives (including No Action): No Action

Responsible Office: Town of Truckee – Public Works

Priority: High

Cost Estimate: $22,000,000

Potential Funding: Developer Impact Fees.

Schedule: 2 years after funding is secured.

Cost Benefit: Emergency Responder access and citizen access to and from the 7,000 lots would be improved.

12.2.12. Tree Management

Hazards Addressed: Multi Hazard

Issue/Background: Annually, tree and/or branches fall from trees located on school properties due to severe storm damage. This project would fund the assessment by a certified arborist; an annual maintenance plan would be created and followed to prevent trees and branches from falling unexpectedly.

Other Alternatives (including No Action): No Action or remove trees from campuses.

Responsible Office: Nevada Joint Union High School District

Priority: Low

Cost Estimate: $18,200

Potential Funding: Grants.

Schedule: 90 days once funding is secured.

Cost Benefit: Trees and/or branches falling put children, staff, community members, and property at risk.

12.2.13. Waterline Installation

Hazards Addressed: Multi-Hazard

Issue/Background: The Lake of the Pines Water Treatment Plan does not have a redundant system if failure is experienced during a disaster. If the facility experiences a failure and reserves are depleted, no water would be available for customers or fire protection.

This project would construct a waterline of approximately 20,000 LF from the existing Loma Rica system to the Lake of the Pines system and provide redundancy for the Lake of the Pines system.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation Department - Engineering

Priority: Low

Cost Estimate: $3,600,000

Potential Funding: None Identified

Schedule: 18 months after funding is secured.

Cost Benefit: The project would provide an equivalent of two water treatment plants as redundancy from the Loma Rica and E. George Water Treatment Plants.

12.3. Wildfire Mitigation Actions - Detailed Project Descriptions

12.3.1. Wildfire Mitigation Actions - Billy Project – Vegetation Management

Hazards Addressed: Wildfire

Issue/Background: The Billy project was initiated to increase fire protection capability around the communities of Tahoe Donner, Klondike, Tahoe Timber Trails, and Prosser Lakeview Estates and within the general forest. To date 1,000 acres have been mechanically treated with contract labor and appropriated funding.

This project would hand treat sensitive feature zones (areas that will not allow mechanized equipment) with Forest Service and contracted work force.

Other Alternatives (including No Action): No Action; currently many of the sensitive feature areas have been avoided (no action) due to lack of funding required for the intensive hand labor needed to complete the work.

Responsible Office: United State Forest Service – Tahoe National Forest

Priority: High

Cost Estimate: $70,000

Potential Funding: If available, District fuels and fire suppression programs. This funding is limited and has not been available for this project during the past 5 years.

Schedule: 3 years after funding is secured.

Cost Benefit: Loss estimates (based on 50 structures) in the listed communities from a difficult to control wildfire would be approximately $25,000,000 while suppression costs would be $1,200,000 per day.

12.3.2. Community Assistance Program

Hazards Addressed: Wildfire

Issue/Background: The intent of this project is to reduce the impacts of wildland fires to life, property and natural resources in Nevada County. The Public Resource Code (PRC) 4291 is the state's minimum requirement for defensible space. However, many property owners will need additional assistance to treat more acreage and greater volumes of vegetation by either manual or mechanical treatment methods.

The overall goal of this project is to provide cost assistance needed to meet property owners' needs for meeting the requirements of PRC 4291.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County – Fire Marshal's Office

Priority: High

Cost Estimate: $3,000,000

Potential Funding: Federal Grants are the key desirable funding sources.

Schedule: Program could begin 1 year after funding is secured.

Cost Benefit: The program will result in effective wildland fire control that minimizes the number of homes and buildings suffering property damage losses and a reduction in wildland fire suppression costs.

12.3.3. Deer Creek Community Fuel Break

Hazards Addressed: Wildfire

Issue/Background: Wildland fires endanger significant Grass Valley, Nevada City, and surrounding unincorporated Nevada County facilities and residents by direct fire involvement and/or fire brands or spot fires.

This project consists of understory ladder fuels removal, thinning of small diameter trees for community wildfire protection in the wildland interface. The fuel break is positioned with a 100 foot setback from Deer Creek below where property owners have met their defensible space requirements.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County Office of Emergency Services in collaboration with the Fire Safe Council of Nevada County

Priority: High

Cost Estimate: $168,000

Potential Funding: Federal Mitigation Grant Funds.

Schedule: 6 months after the funding is secured.

Cost Benefit: The project would mitigate the wildfire hazard by implementing treatment with landowners agreeing to maintain effectiveness of the treatment long term which retains the value of

the mitigation effort. If no action is taken, there is the extreme fire hazard within firebrand distance to over 20,000 residents.

12.3.4. Defensible Space Chipping

Hazards Addressed: Wildfire

Issue/Background: Current vegetation conditions in Nevada County are extremely hazardous, and will likely produce a major wildfire that will result in unacceptable cost and losses to people, homes, community infrastructure, and valued resources.

This project would create a Defensible Space Chipping program to provide disposal of hazardous wildfire vegetation. This project would encourage residents to be in compliance with PRC 4291 by providing a low cost-share partnership utilizing landowners' in-kind labor to clear hazardous fuels and provide drive-by chipping services.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County Office of Emergency Services in collaboration with the Fire Safe Council of Nevada County

Priority: High

Cost Estimate: $125,000

Potential Funding: Federal Mitigation Grant Funds.

Schedule: Project could begin immediately after funds are secured (weather dependent).

Cost Benefit: The project would result in the ability to leverage funding to incite landowner actions to mitigate wildfire. Once defensible space is created, landowners are more likely to work to maintain the condition long term.

12.3.5. Fire Break – North San Juan

Hazards Addressed: Wildfire

Issue/Background: The historic town of North San Juan is located upslope and downwind from dangerous north wind driven potential wildfires originating in the middle fork of the Yuba River canyon.

This project would create a firebreak approximately 5000' X 100' on two Bureau of Land Management parcels just north of the unincorporated town of North San Juan.

Other Alternatives (including No Action): No Action

Responsible Office: North San Juan Fire Protection District

Priority: High

Cost Estimate: $30,000

Potential Funding: Federal Mitigation Grant Funds.

Schedule: Completion within 1 year of secured funding.

Cost Benefit: The town contains approximately 50 residences as well as historic downtown buildings. The total loss by an uncontained wildfire would be approximately $7,000,000.

12.3.6. Fuel Break – Deer Creek Environs

Hazards Addressed: Wildfire

Issue/Background: Rural Nevada County has experienced major fire damage during the last 50 years. Current records indicate that Nevada City has not had a major wildland fire within city limits in the 20th and 21st century. Deer Creek environs is the location of the city's only wastewater treatment plant and is heavily overgrown with brush, blackberries and other low ladder fuels making it vulnerable to fire damage.

This project would provide brush clearing and provide a shaded fuel break.

Other Alternatives (including No Action): No Action

Responsible Office: City of Nevada City

Priority: High

Cost Estimate: $33,053

Potential Funding: This project has been approved for PDM Funds and is in final environmental review with anticipated approval NLT March 2012.

Schedule: Work will commence once final approval is received.

Cost Benefit: This project will clear an ignition source to better protect the commercial heart of Nevada City from a potential $70,000,000 in damages.

12.3.7. Joey Project – Vegetation Management

Hazards Addressed: Wildfire

Issue/Background: Years of drought, dense tree cover and increasing levels of bark beetles have resulted in high levels of stressed and weakened trees with significant tree mortality throughout a 30 acre area in the Truckee area. The forest stands are considered imminently susceptible to both insect attack and fire.

This project would hand treat older mountain pine beetle infestations material using Forest Service and contracted workforce to fall, buck, and stack dead timber and logs. Material will be prepared for removal via a public fuel wood program.

Other Alternatives (including No Action): No Action. Repeated attempts to remove salvage material from the parcels via commercial fuel wood sale have failed.

Responsible Office: United States Forest Service – Tahoe National Forest

Priority: High

Cost Estimate: $41,000

Potential Funding: District Fuels and Fire Suppression Program. However, due to the number of other projects vying for the same funding, opportunities will be limited.

Schedule: 1-2 years after funding is secured.

Cost Benefit: The project will enhance fire protection effectiveness around the communities of Tahoe Donner, the Armstrong Subdivision Tract and within the general forest. Loss estimates would be based upon the total loss of 50 structures in a difficult to control wildfire. Dollar estimate is based upon $400,000 median cost of structure in Truckee region x 50 = $20,000,000.

12.3.8. Public Education and Training

Hazards Addressed: Wildfire

Issue/Background: The intent of this project is to reduce the impacts of wildland fires to life, property and natural resources in Nevada County through public education and training programs targeted at informing property owners, the fire abatement industry and the public of the risk of wildland fires and how to mitigate the wildland fire hazards through defensible space prescriptions.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County - Fire Marshal's Office

Priority: High

Cost Estimate: $315,000

Potential Funding: Federal Grants are the key desirable funding sources.

Schedule: 5 year program once funding is secured.

Cost Benefit: The cost benefits will result in effective wildland fire control that minimizes the number of homes destroyed or damaged during a wildfire.

12.3.9. Roadside Brush Clearing

Hazards Addressed: Wildfire

Issue/Background: Nevada County would like to reduce fire danger and loss of life and property caused by wildfire ignitions along County roads by removing hazardous roadside vegetation along 523 miles of County maintained rights of way. This program would have its primary focus in the area south and west of the community of Washington to the Nevada County border with Placer and Yuba counties.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County - Public Works

Priority: High

Cost Estimate: $422,200

Potential Funding: Federal Mitigation Grant Funds.

Schedule: Work could begin immediately after funding is secured.

Cost Benefit: For estimating purposes, calculating four (4) homes per year could be lost as a result of not having this comprehensive program. These would be homes directly adjacent to the roadway and lost prior to intervention of firefighting equipment. Calculation: $300,000 median value of home times 4 = 1,200,000.

12.3.10. Sugar Loaf Mountain - Brush Clearing and Fuel Reduction

Hazards Addressed: Wildfire

Issue/Background: Significant fuel load accumulations on 40 acres of Nevada City owned property on Sugar Loaf Mountain has increased the wildland fire threat endangering Nevada County, Nevada City, Nevada County Consolidated Fire District and US Forest Service facilities.

This project would result in the removal of brush and understory ladder fuels on the 40 acres owned by Nevada City.

Other Alternatives (including No Action): No Action

Responsible Office: City of Nevada City

Priority: High

Cost Estimate: $80,000

Potential Funding: Federal Mitigation Grant Funds.

Schedule: 4 months after funding is secured.

Cost Benefit: This property raises 600 feet in elevation over incorporated Nevada City and its immediate environs. Within the immediate environs of Sugar Loaf Mountain is the Nevada County Government Center and associated offices to include the Wayne Brown Correctional Facility. Also located in this environ are a Fire Station (Nevada County Consolidated Fire District) and USFS Ranger Office for the Tahoe National Forest. A wildfire could potentially threaten approximately $111 million in facility improvements.

12.3.11. Water Storage and Supply

Hazards Addressed: Wildfire

Issue/Background: The current system is a rural fire protection system, which includes private, community and public water storage systems in the form of individual water storage tanks, cisterns, lakes, ponds and pressurized hydrant systems.

This project is a water storage study in the unincorporated area of Nevada County, excluding city, state and federal lands. Additionally, a water storage tank compliance program needs to be developed and implemented to ensure water tanks are maintained to original approved conditions.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada County – Fire Marshal's Office

Priority: Medium

Cost Estimate: $55,000

Potential Funding: Federal Grant Funds.

Schedule: 2 years after funding is secured.

Cost Benefit: If the water storage and supply system is effective and efficient, then the cost of implementing the project would be offset by properly maintained fire suppression improvements resulting in fewer, smaller and less damaging fires.

12.4. Flood Mitigation Actions - Detailed Project Descriptions

12.4.1. Diversion Reinforcement - Newtown

Hazards Addressed: Flood

Issue/Background: The Newtown Canal provides raw water for the Lake Wildwood Water Treatment Plant. The urbanization of Nevada City has caused storm water flows to increase. This increase has changed the maximum probability flood characteristics at the diversion structures. The loss of the

diversion structure during a storm could adversely affect the Nevada Irrigation District's ability to provide treated water from the Lake Wildwood Water Treatment Plan to approximately 2,900 homes.

This project will improve the structure by reinforcing with retaining walls for diversion, and reducing the impact of a maximum probability flood.

Other Alternatives (including No Action): No Action

Responsible Office: Nevada Irrigation District – Engineering Department

Priority: Medium

Cost Estimate: $100,000

Potential Funding: NID Revenues.

Schedule: 6 months after funding is secured.

Cost Benefit: The project will reduce the risk of failure at the Lake Wildwood Water Treatment Plan.

12.4.2. Drainage Culvert – Donner Lake

Hazards Addressed: Flood

Issue/Background: During flood events the current open drainage overflows causing erosion to the surrounding area and flooding to the Truckee Public Utility District's Donner Lake Substation.

This project would install a drainage culvert under the access road and extend to a point downhill of the existing high voltage substation directing storm water runoff through the culvert and into an existing drainage ditch.

Other Alternatives (including No Action): No Action

Responsible Office: Truckee Donner Public Utility District

Priority: Medium

Cost Estimate: $100,000

Potential Funding: None Identified.

Schedule: 90 days after funding is secured.

Cost Benefit: Installation of a culvert will mitigate the risk of erosion and damage to the substation infrastructure.

12.4.3. Drainage Improvements – Donner Lake Road

Hazards Addressed: Flood

Issue/Background: Drainage crosses under Interstate 80 and under Donner Lake Road in under defined drainage channels. During high water discharge events drainage exceeds the channel capacity and causes flooding to approximately 20 homes at 18" depth and then floods across Donner Pass Road.

This project would complete design and construction of drainage improvements along the drainage courses adjacent to Donner Lake Road and downstream from I-80, to the intersection with Donner Lake.

Other Alternatives (including No Action): No Action

Responsible Office: Town of Truckee – Public Works

Priority: Medium

Cost Estimate: $100,000

Potential Funding: Measure V Funds.

Schedule: 1 year after funding is secured.

Cost Benefit: The project would protect 20 homes from water damage and/or structural damage.

12.4.4. Gregory Creek Debris Clearing and Restoration

Hazards Addressed: Flood

Issue/Background: Gregory Creek has traditionally experienced flooding during high water events. When the creek jumps its banks, the watercourse fans out and multiple homes and businesses are flooded.

This project would restore the creek bank at its less defined areas as well as remove the debris currently in place.

Other Alternatives (including No Action): No Action

Responsible Office: Town of Truckee – Public Works

Priority: Medium

Cost Estimate: $450,000

Potential Funding: None Identified.

Schedule: 2 years after funding is secured.

Cost Benefit: An appropriately sized creek channel would minimize the risk of flooding to the approximately one dozen homes and five businesses at the west end of Donner Lake.

12.4.5. Relocate Trout Creek Power Lines

Hazards Addressed: Flood

Issue/Background: The Town of Truckee's Trout Creek Restoration Project once completed will create the requirement for the local utility district to relocate the existing power lines that presently run adjacent to, and parallel with a section of the existing creek.

This project will allow the Trout Creek Restoration Project to proceed and prevent further power outages due to the flooding of Trout Creek.

Other Alternatives (including No Action): No Action which would result in not restoring Trout Creek.

Responsible Office: Truckee Donner Public Utility District

Priority: High

Cost Estimate: $200,000

Potential Funding: Rate Increases

Schedule: 6 to 9 months once funding is secured.

Cost Benefit: Trout Creek as it currently exists causes substantial flood issues in the Historic Downtown area of Truckee.

12.4.6. South Shore Drainage

Hazards Addressed: Flood

Issue/Background: During heavy rain events, drainage ditches along South Shore Drive in the Donner Lake area become plugged with debris causing water to overtop South Shore Drive causing flooding to homes adjacent to South Shore Drive. Multiple utility lines, including high-pressure gas lines also are exposed to uncontrolled drainage.

This project would improve numerous cross culverts and the associated outlet channels between South Shore Drive and a 1900 acre watershed.

Other Alternatives (including No Action): No Action

Responsible Office: Town of Truckee – Public Works

Priority: Medium

Cost Estimate: $500,000

Potential Funding: None Identified.

Schedule: 2 years after funding is secured.

Cost Benefit: Dozens of homes would be better protected from flooding related issues, and erosion into Donner Lake would be reduced.

12.4.7. Trout Creek Restoration

Hazards Addressed: Flood

Issue/Background: A 6,600 foot stretch of Trout Creek has been severely diverted and hardened to support logging and railroad development over the past 140 years such that the current alignment experiences flooding and has damaged floodplain and riparian habitat.

This project would assist Town efforts to reconstruct Trout Creek to reduce flooding in downtown Truckee, reduce flooding in the downtown Truckee Railroad yard, and restore the natural creek habitat where possible.

The project has been broken into 6 phases. Phase 2 has been completed with the 100% designs of phase 1, 3, 4, and 5 scheduled for completion by the summer of 2011. Construction of phase 3 is also schedule for completion by the summer of 2011. No additional funds have been secured for the remaining phases requiring construction.

Other Alternatives (including No Action): No Action

Responsible Office: Town of Truckee – Public Works

Priority: High

Cost Estimate: $13,000,000

Potential Funding: Proposition 1E, Grants.

Schedule: Dependent on when funding is secured

Cost Benefit: Damage to structures in the downtown area during a major flood event could far exceed the costs associated with completing this project.

12.5. Public Outreach Examples

12.5.1. EXAMPLE OF PRESS RELEASE USED TO INVOLVE THE PUBLIC

Survey Press Release.pdf - Adobe Reader

File Edit View Document Tools Window Help

Information and General Services Department

950 Maidu Avenue
Nevada City CA 95959
Phone: 530-265-1238
Fax: 530-265-7112

Information Systems
Geographic Information Systems
Cable Television
Central Services
Facilities Management
Purchasing
Emergency Services

PRESS RELEASE
June 30, 2011

Office of Emergency Services
Contact: Victor Ferrera 265-1515

Local Hazards Survey

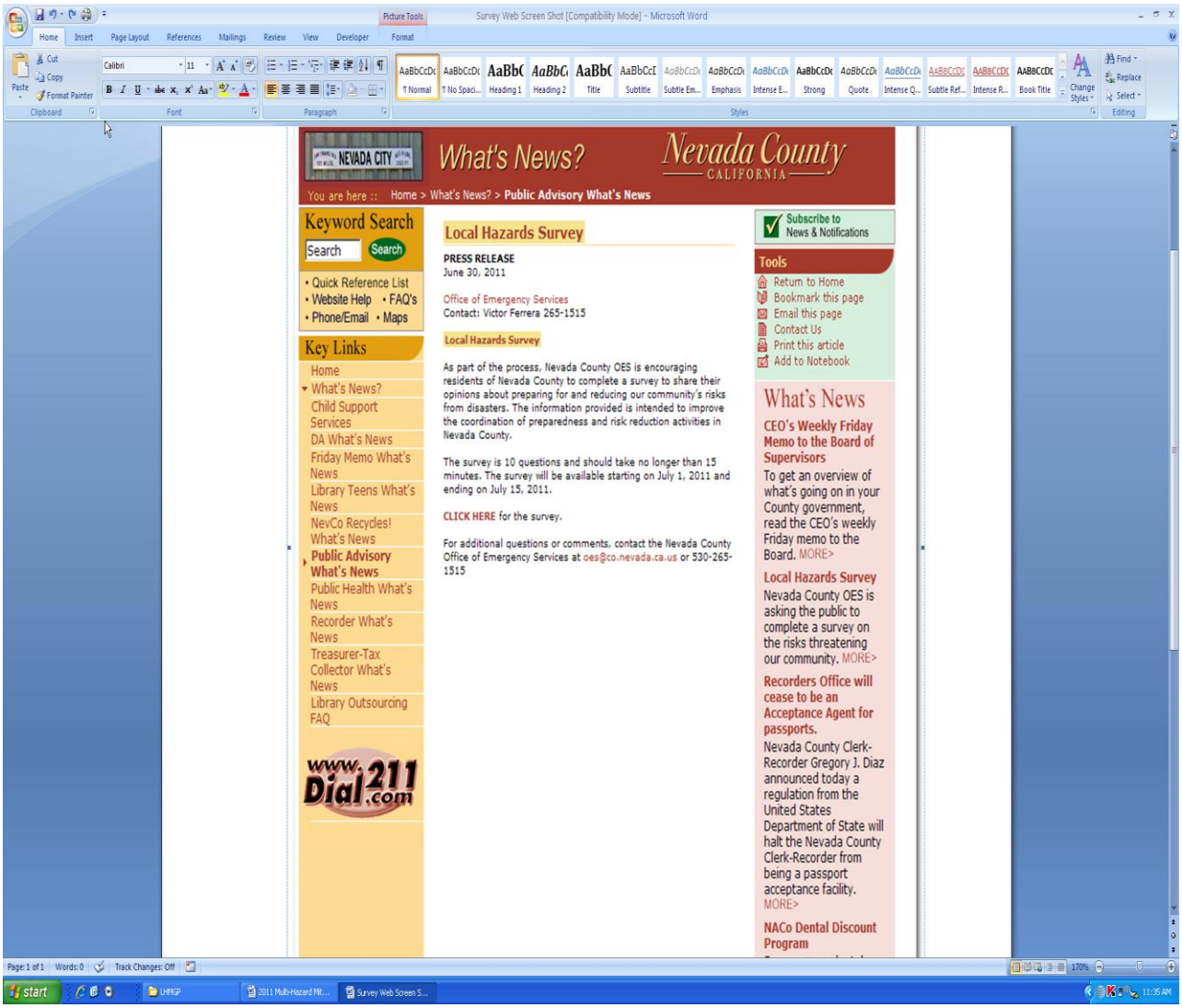
The Nevada County Office of Emergency Services (OES) is asking for public input as they are currently engaged in the planning process to update the Nevada County Multi Jurisdiction, Multi-Hazard Mitigation Plan. This plan when completed will provide county residents with a clear understanding of local risks caused by natural and human hazards and plans for reducing or eliminating long-term risk and their effects on people and property from natural and human caused hazards and their effects.

As part of the process, Nevada County OES is encouraging residents of Nevada County to complete a survey to share their opinions about preparing for and reducing our community's risks from disasters. The information provided is intended to improve the coordination of preparedness and risk reduction activities in Nevada County.

The survey is 10 questions and should take no longer than 15 minutes. The survey will be available starting on July 1, 2011 and ending on July 15, 2011. The survey is located at http://www.mynevadacounty.com/oes/

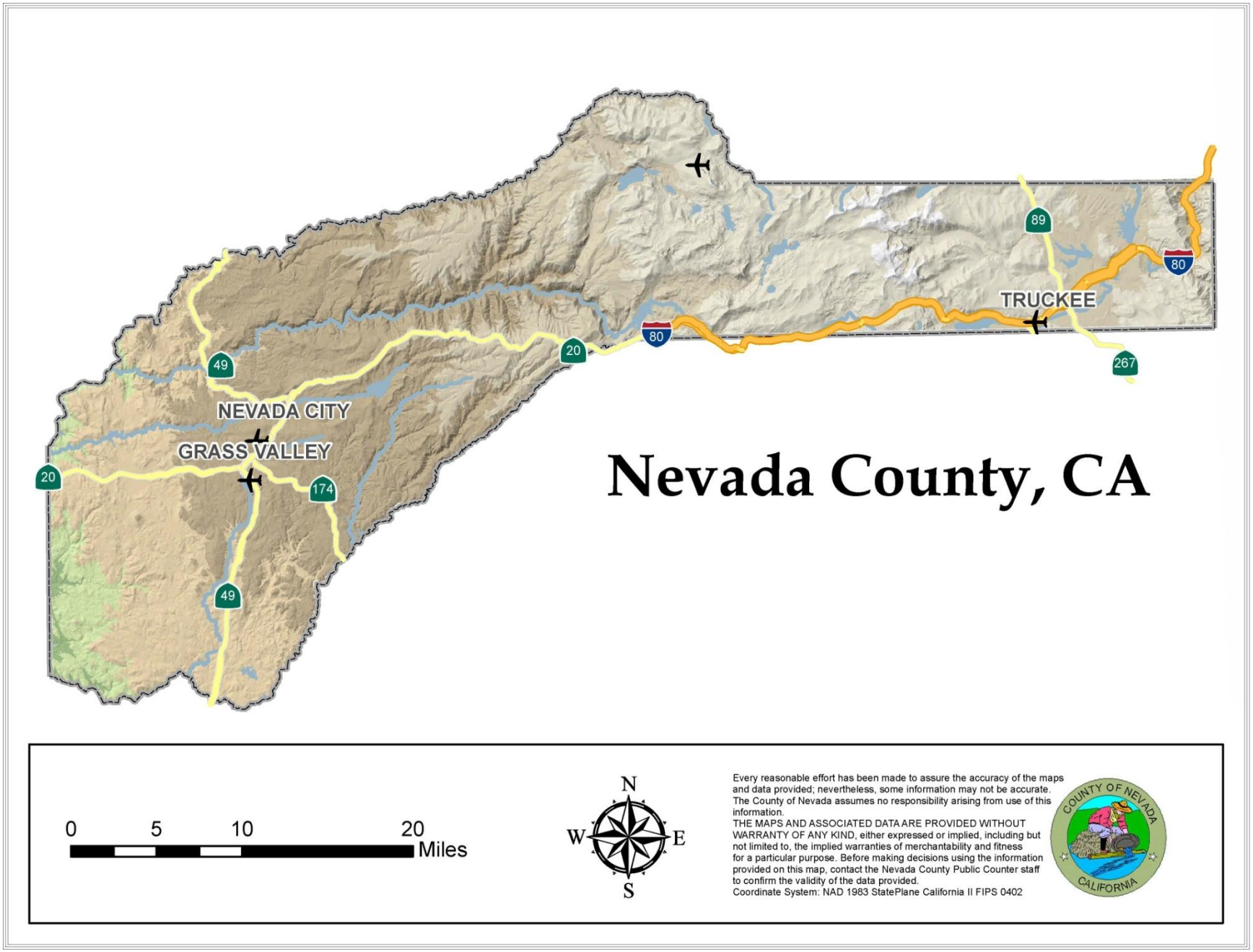
For additional questions or comments, contact the Nevada County Office of Emergency Services at oes@co.nevada.ca.us or 530-265-1515

12.5.2. EXAMPLE OF WEB PAGE USED TO INVOLVE THE PUBLIC

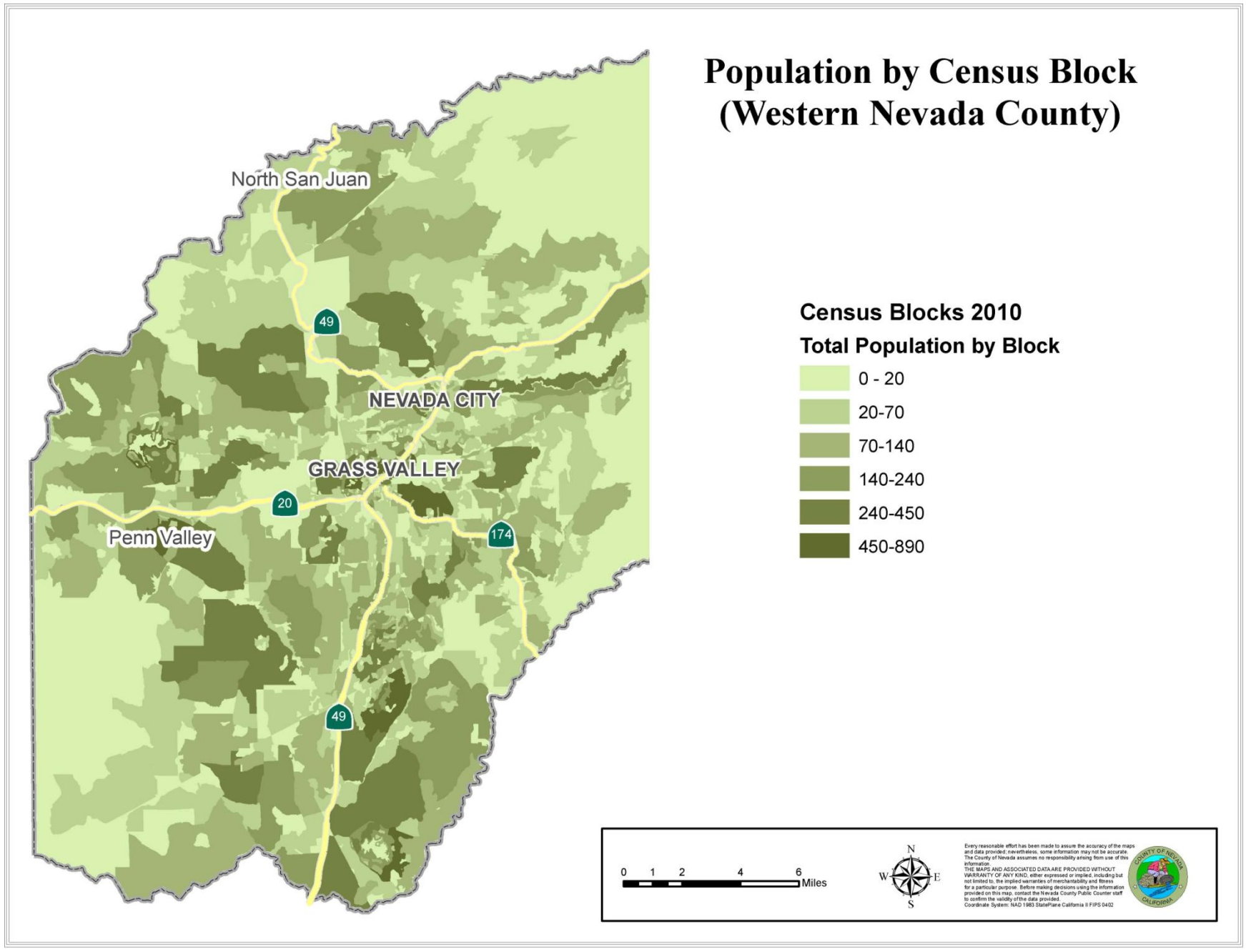


12.6. MAPS

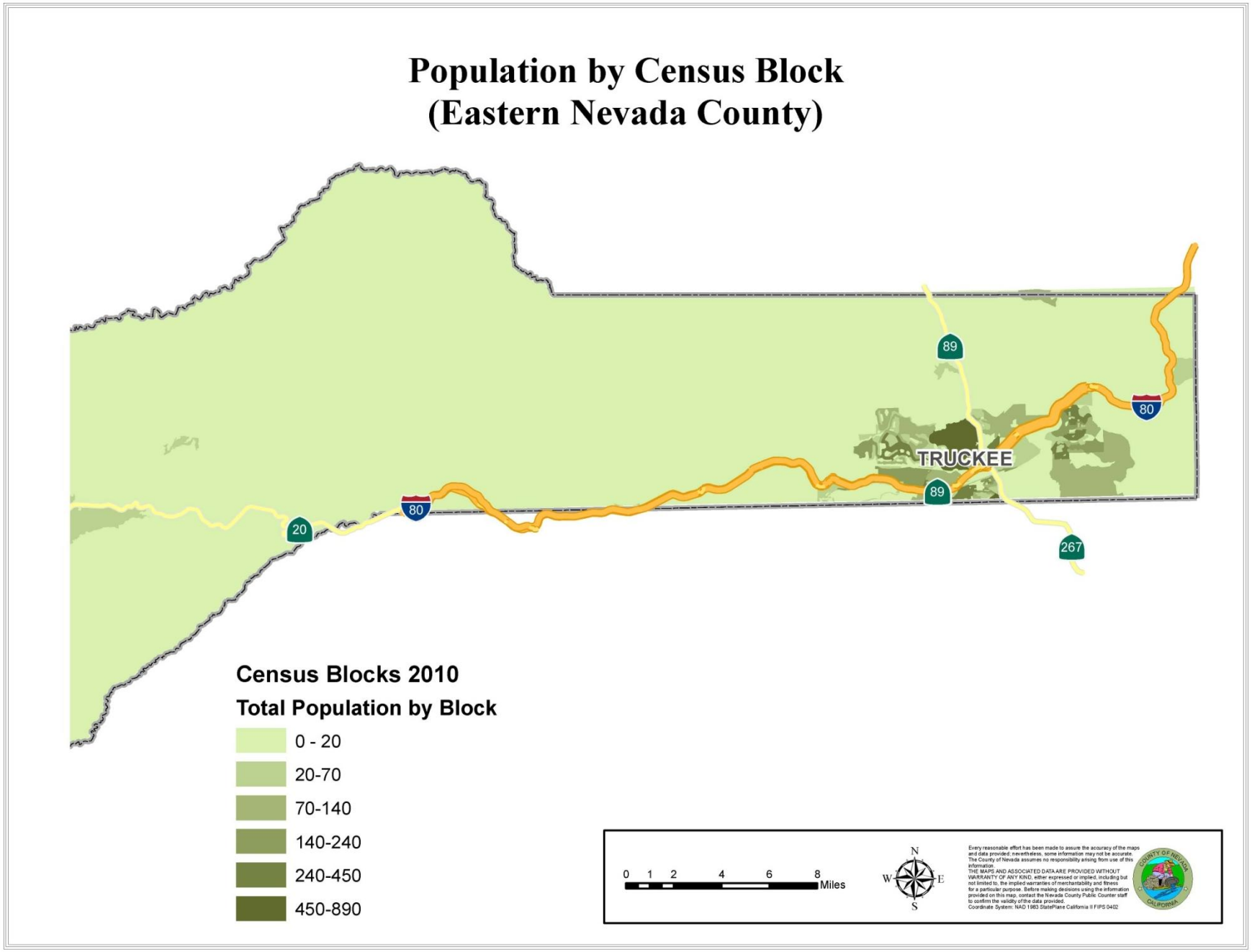
12.6.1. County Transportation Map



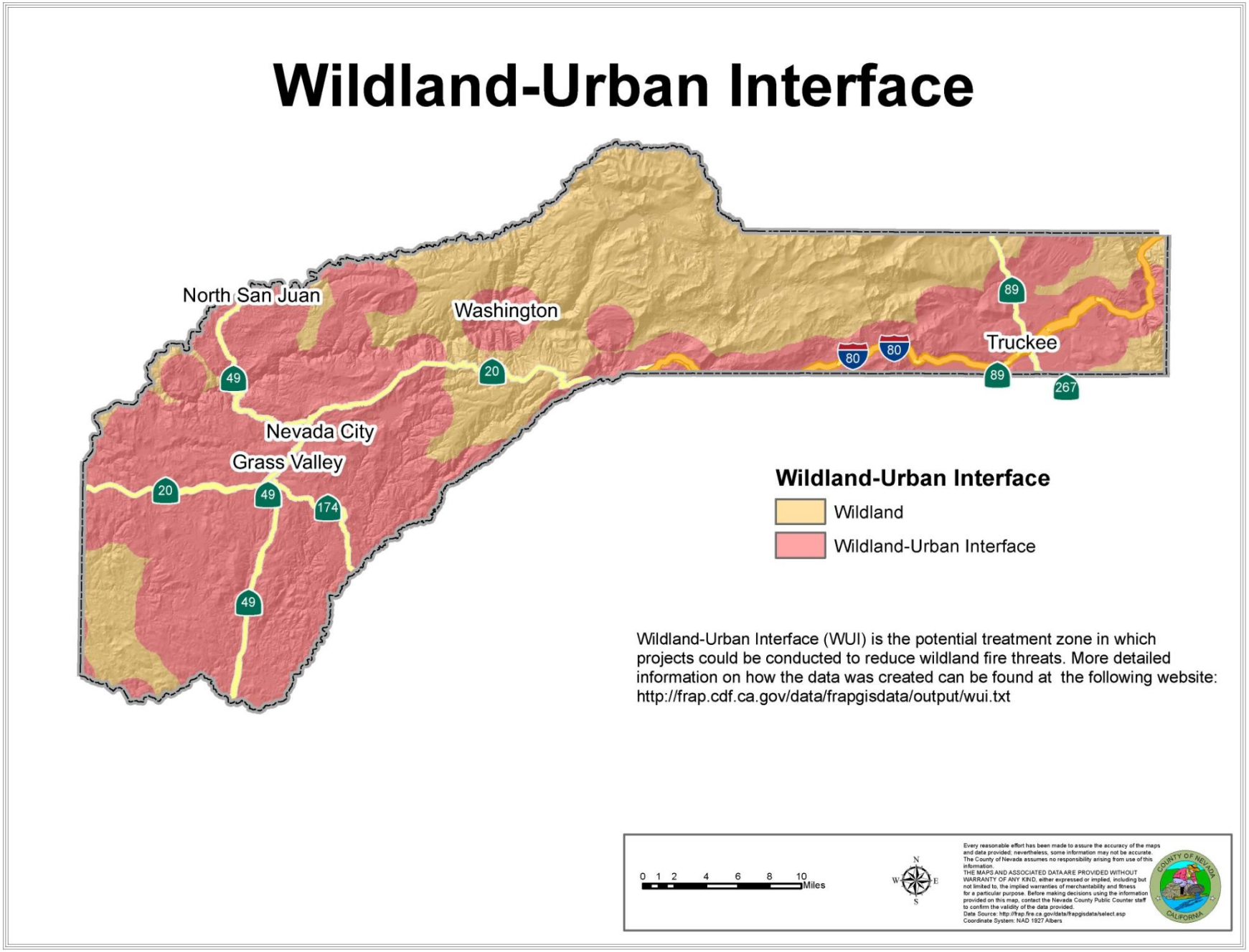
12.6.2. County Population Map – West



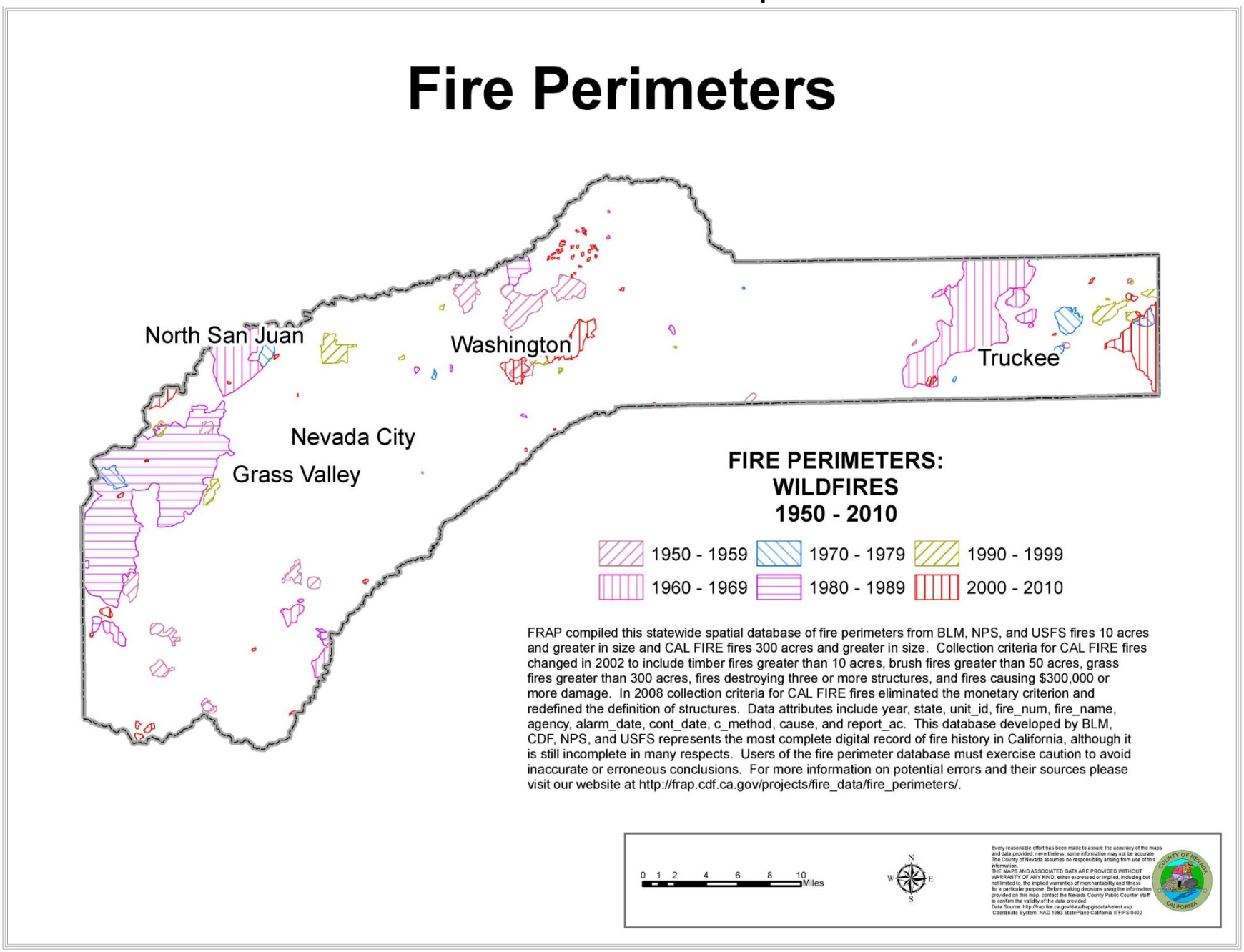
12.6.3. County Population Map – East



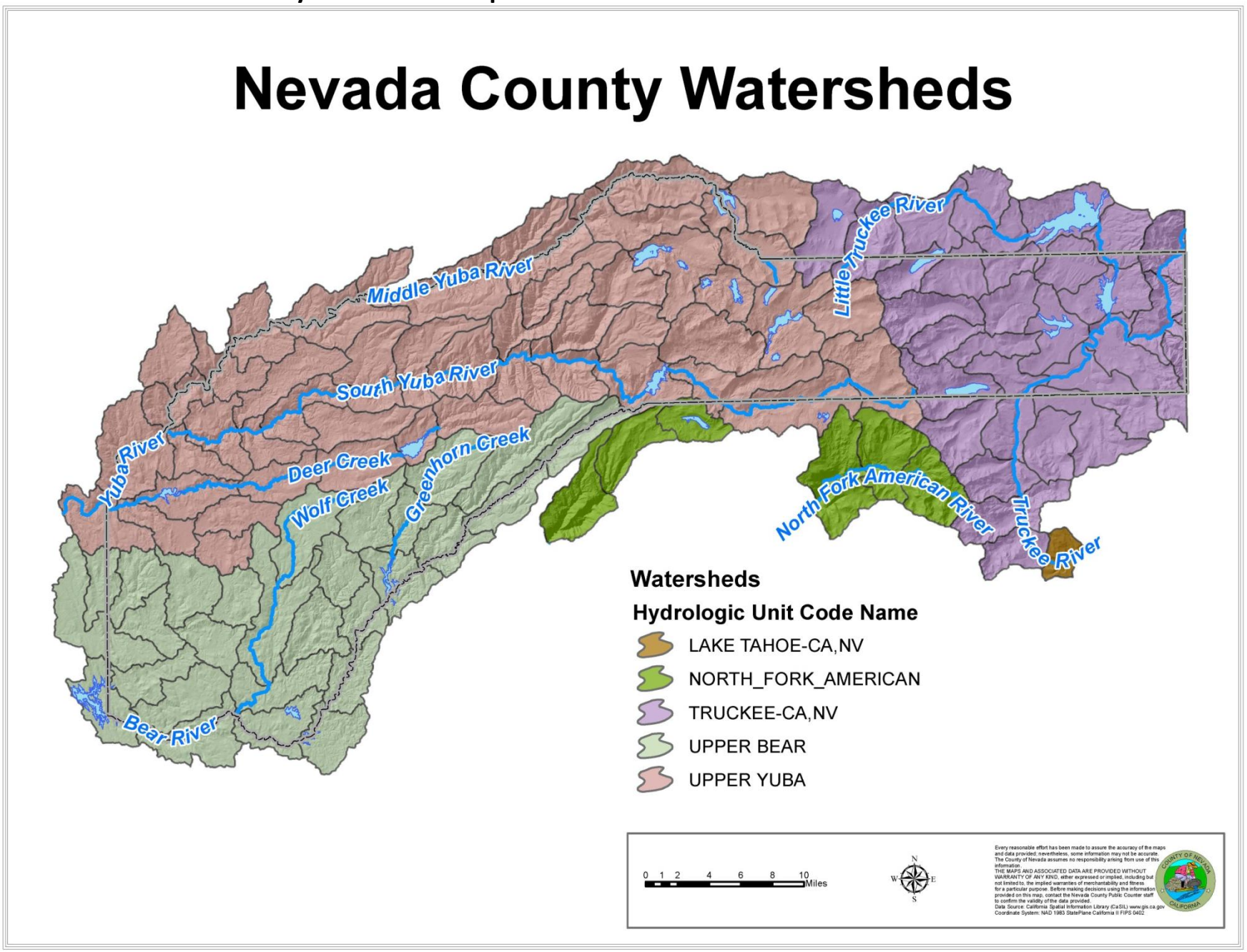
12.6.4. Wildland-Urban Fires Interface Map



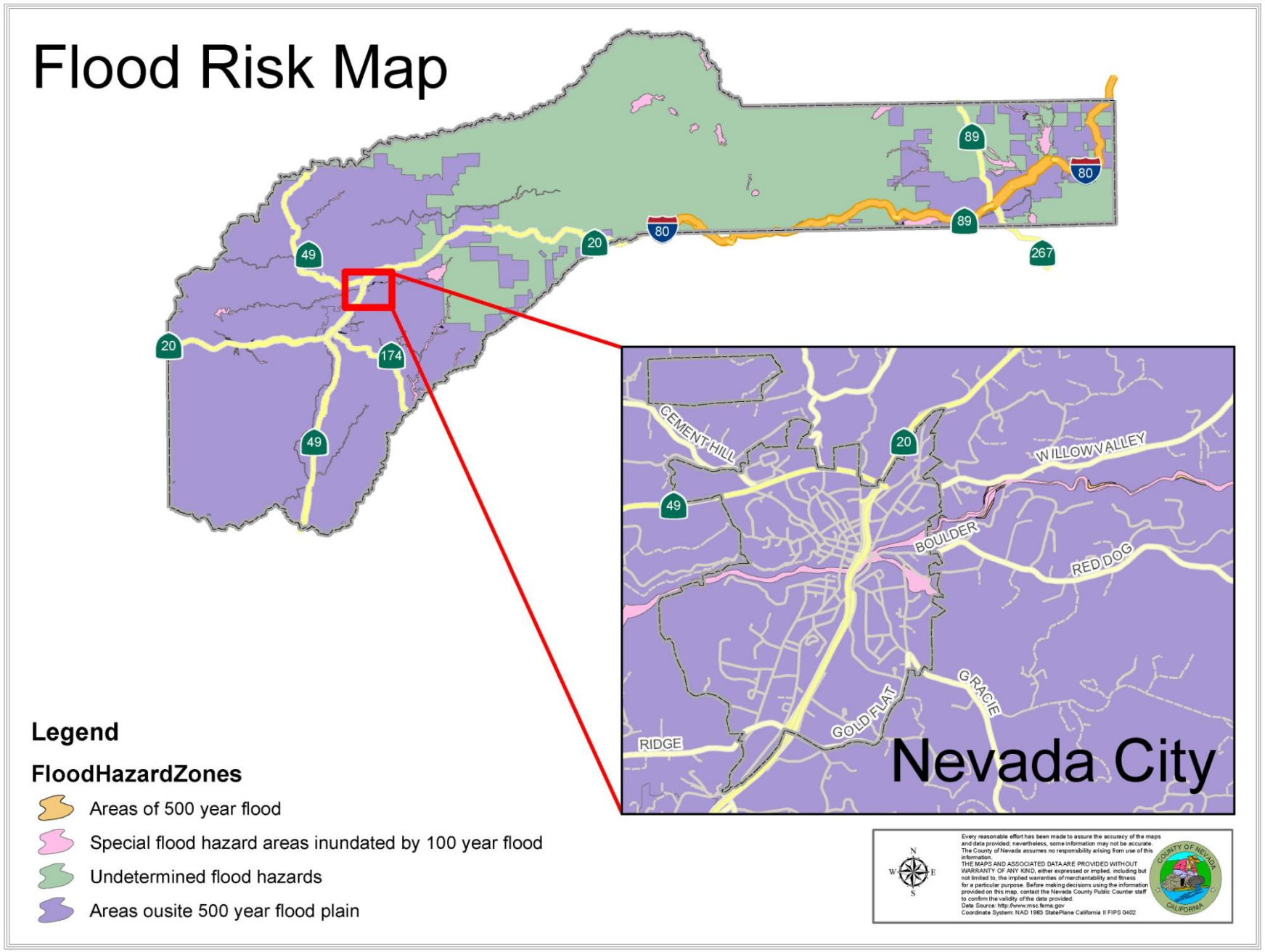
12.6.5. Perimeter of Fires Greater Than 300 Acres Since 1950 Map



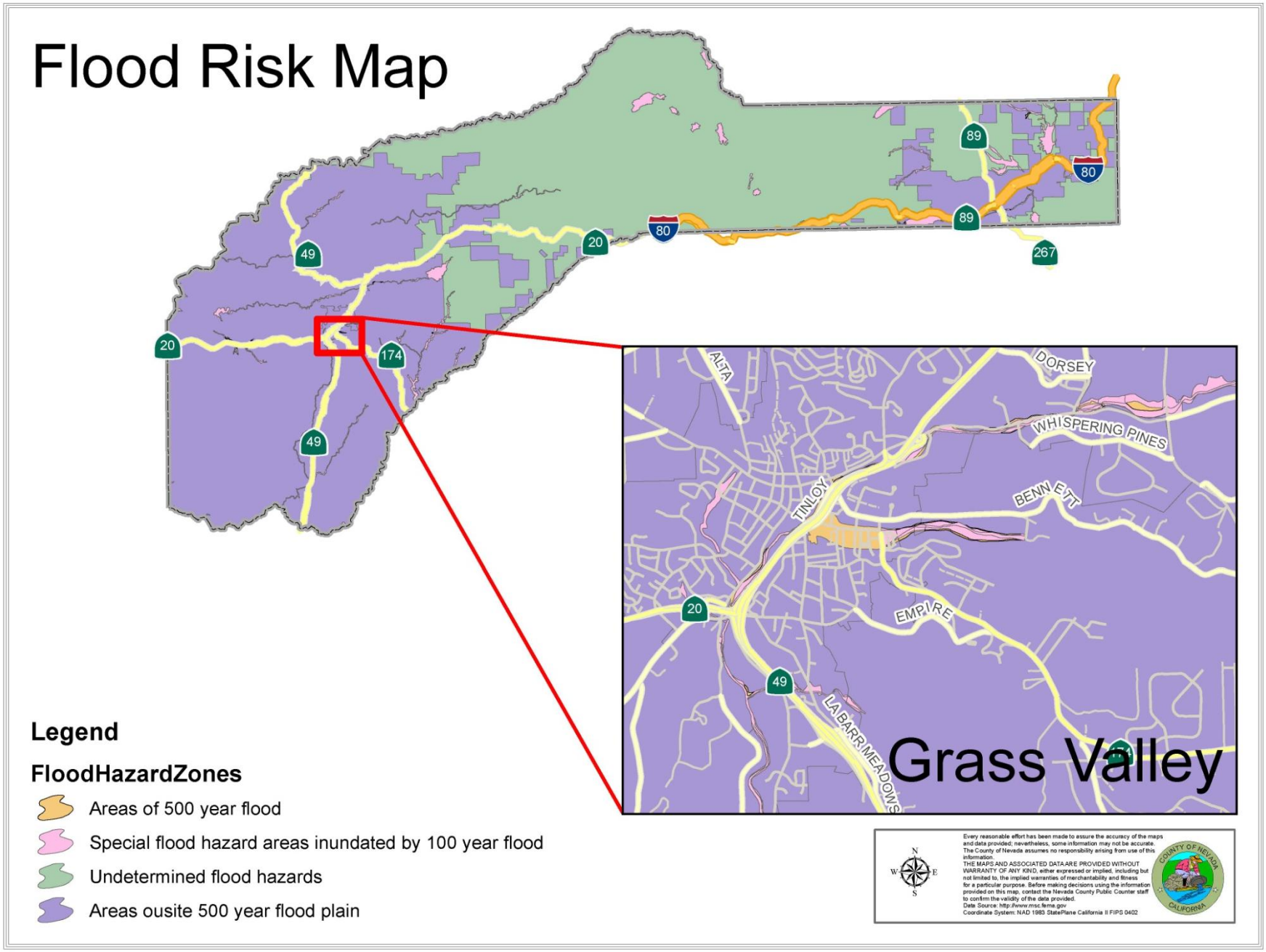
12.6.6. Nevada County Watersheds Map



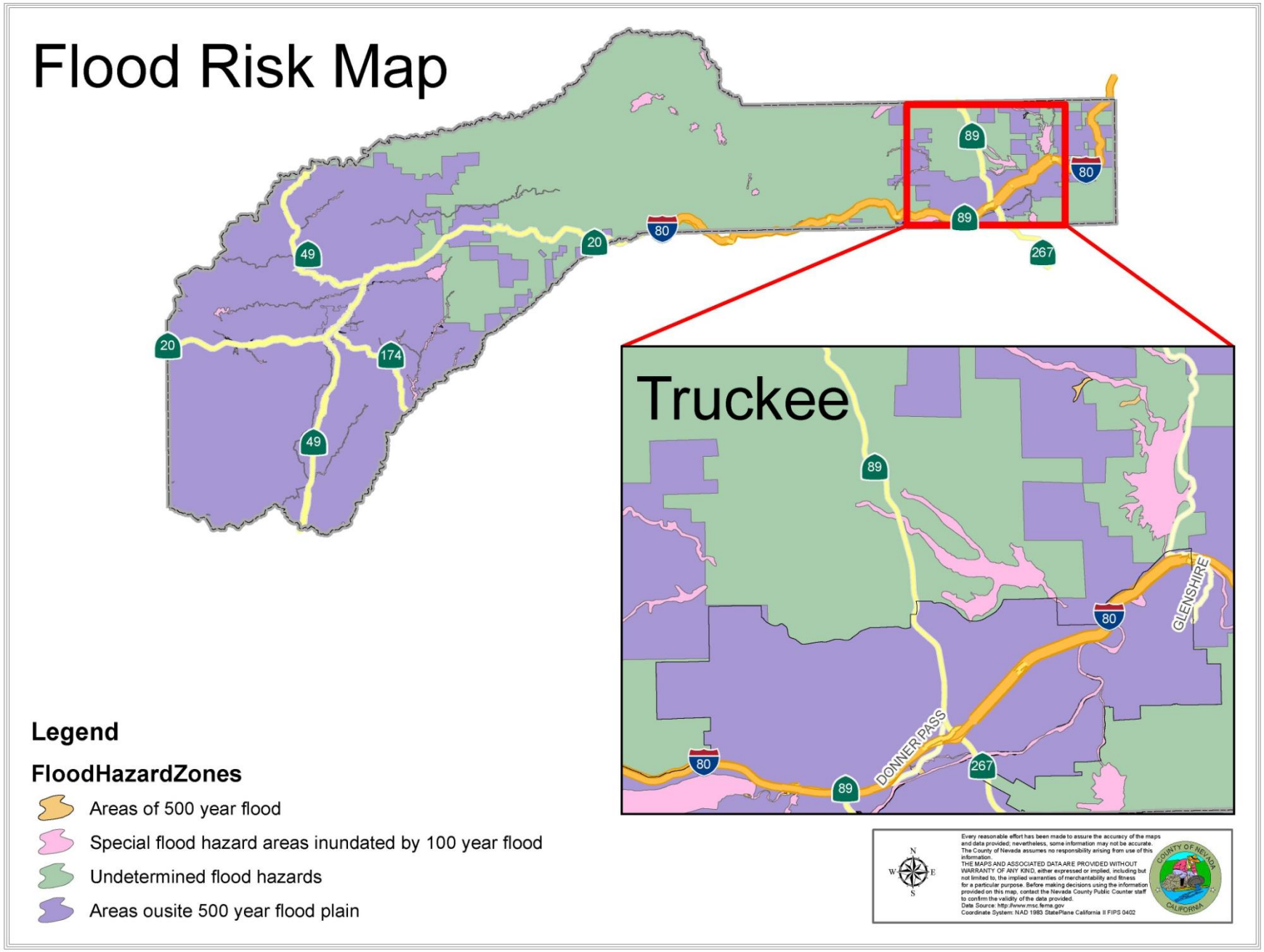
12.6.7. Nevada City Flood Hazard Map



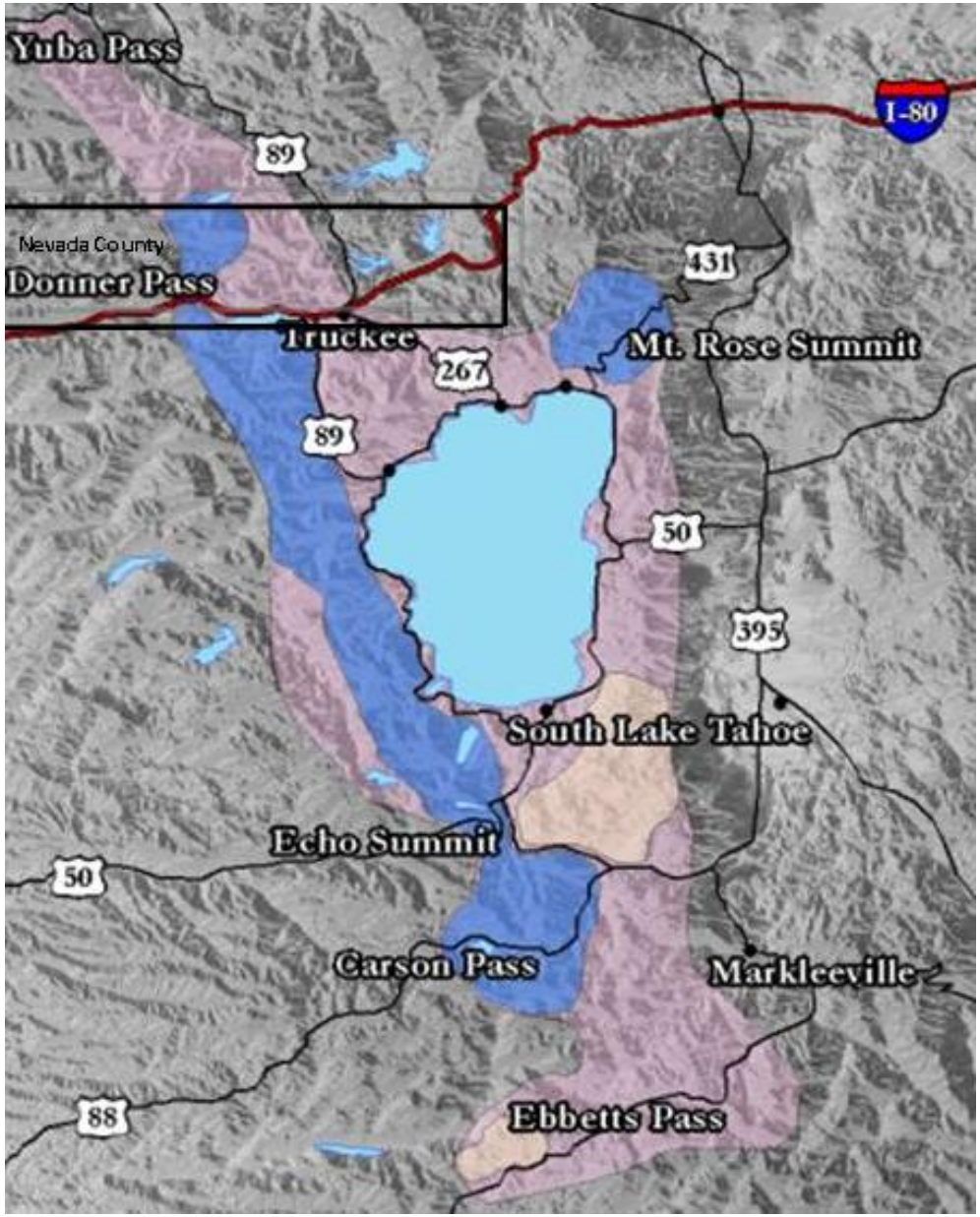
12.6.8. Grass Valley Flood Hazard Map



12.6.9. Truckee City Flood Hazard Map



12.6.10. Map of Avalanche Risk - Eastern Nevada County Map



Blue Region – High Avalanche Risk

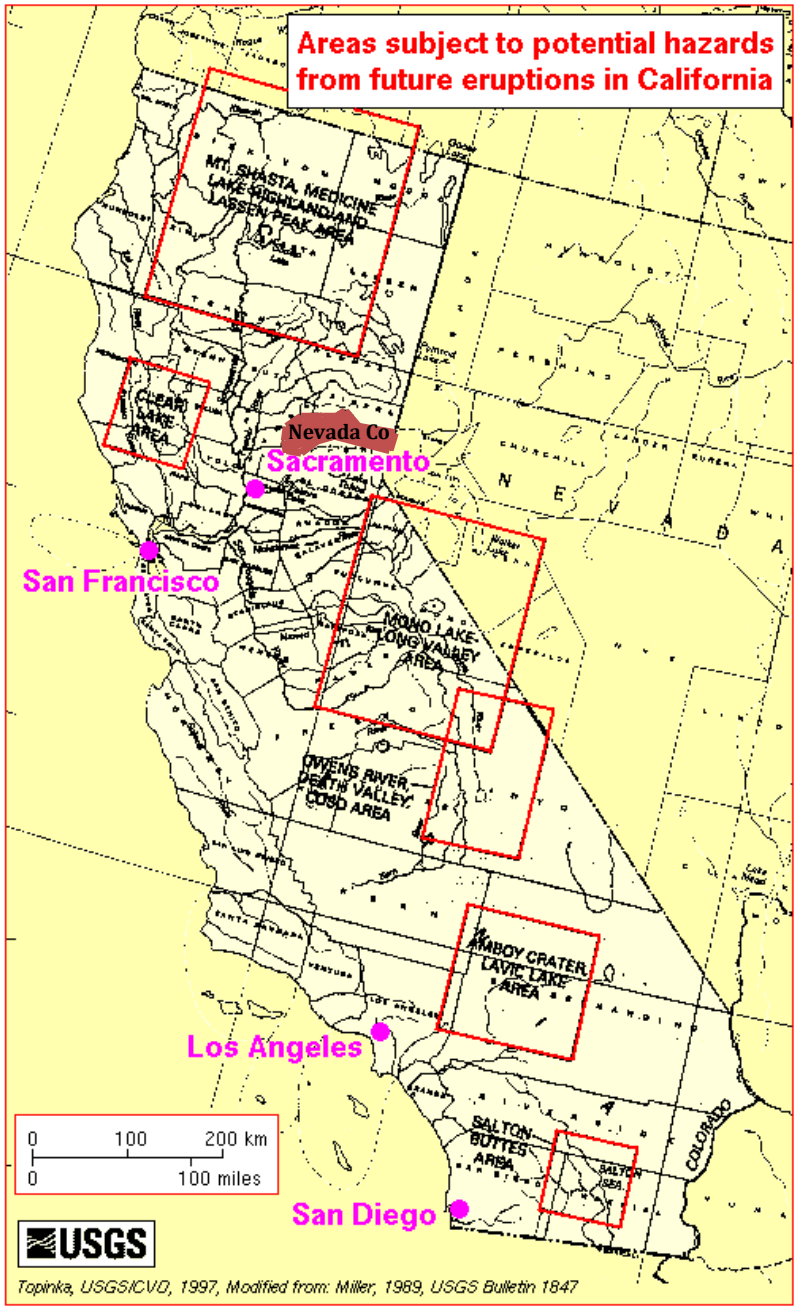
Beige Region – Moderate Avalanche Risk

Pink Region – Cautionary Zone with few or no reported Avalanches

Grey Region – No Data Reported

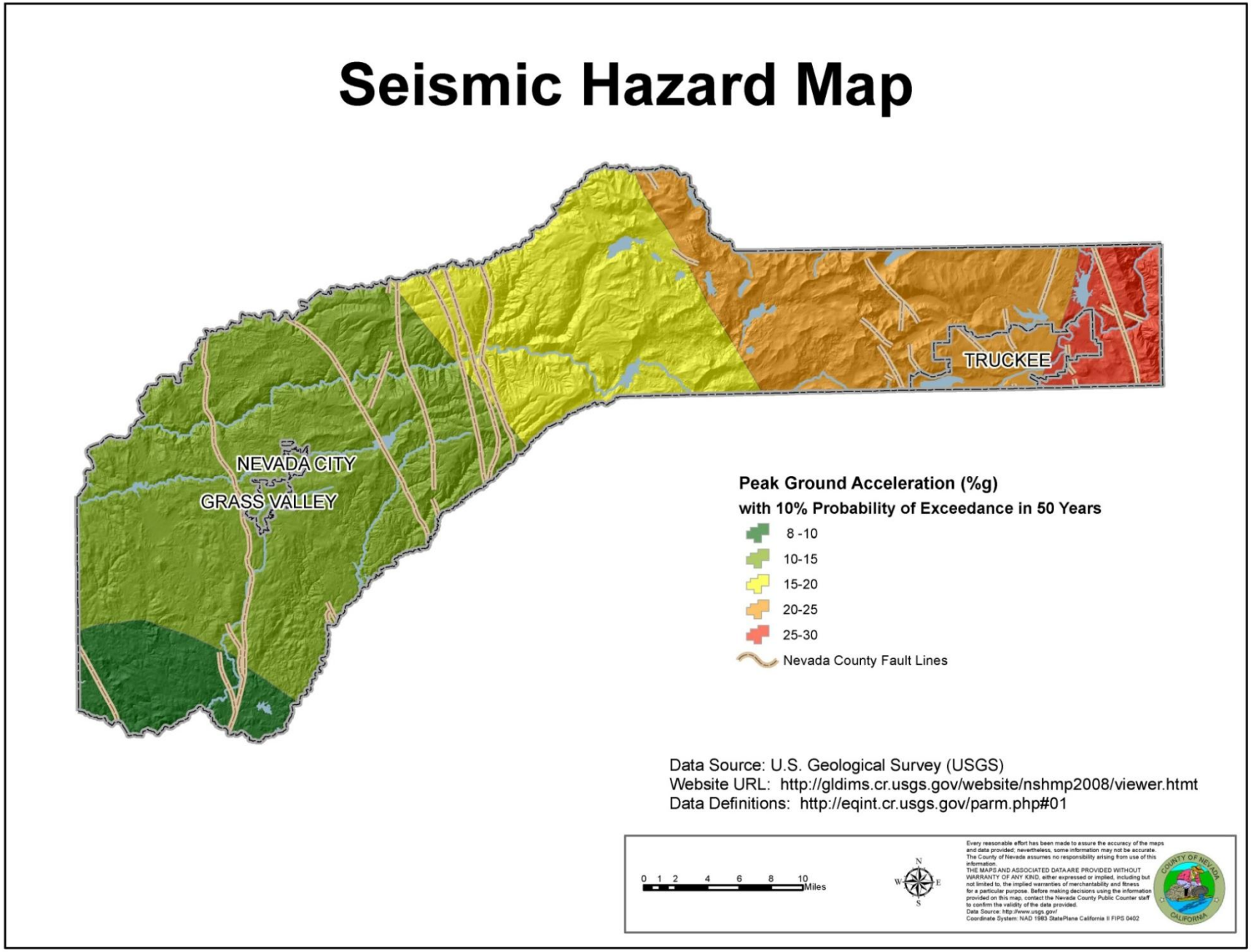
www.sierraavalanchecenter.org

12.6.11. USGS Volcanic Hazards Maps



These maps represent all potentially active volcanoes in the region (below) and impact zones from local volcanoes (left). The left map has been altered by highlighting and labeling Nevada County.

12.6.12. Nevada County Fault Lines Map



12.7. Endnotes

[1] See http://quickfacts.census.gov/qfd/states/06/06057.html
[2] See http://www.ncerc.org/documents/NevadaCountyFacts3.pdf and www.dof.ca.gov and http://www.ncerc.org/documents/Demo2010forERC.pdf
[3] See http://www.dof.ca.gov/research/demographic/reports/projections/p-3/documents/NEVADA.xls
[4] California Multi-Hazard Mitigation Plan 2010, Appendix M – California Disaster History 1950 -2007/2009
[5] See www.nevadacityca.gov
[6] See www.cityofgrassvalley.com
[7] See www.townoftruckee.com/index.aspx?page=2
[8] See www.dspud.com/about.php
[9] See www.nid.dst.ca.us/what-is-nid.cfm
[10] See www.nevadacemeterydistrict.com
[11] See www.fs.usda.gov
[12] See www.fire.ca.gov/about/about.php
[13] See www.snmh.org
[14] See www.ncrcd.org
[15] See www.sierra.cc.ca.us/AboutUs/index.html
[16] See www.tfhd.com/tfhd.asp
[17] See www.tdpud.org/index.php?cId=2
[18] See www.ttusd.org/
[19] See www.truckeesan.org
[20] See www.tdrpd.com/history.html
[21] See www.areyoufiresafe.com/index.php/about
[22] See www.nccfire.com
[23] See www.truckeefire.org
[24] See http://pennvalleyfire.com
[25] See http://higginsfire.org
[26] See www.pcpfire.org
[27] See www.nsjfire.org
[28] See www.rrvfd.com and http://usfiredept.com/rough-ready-fpd-19880.html
[29] See http://usfiredept.com/ophir-hill-fire-protection-district-17226.html
[30] See http://usfiredept.com/washington-fire-department-24361.html
[31] See www.westerngatewaypark.com
[32] See www.westerngatewaypark.com
[33] Compiled from data provided at http://frap.fire.ca.gov/data/frapgisdata/select.asp
[34] California Department of Forestry and Fire Protection, http://www.fire.ca.gov/communications/communications_factsheets.php
[35] Nevada County General Plan, Chapter 10-Safety Element
[36] See http://www.spk.usace.army.mil/projects/civil/Martis_Creek/Docs/Martis%20Supplemental%20Fact%20Sheet%20-%20Mar%202009.pdf
[37] "Emergency Action Plan" Scotts Flat Dam, Nevada Irrigation District, issued August 2004
[38] Nevada County General Plan, Chapter 10-Safety Element
[39] Nevada County general Plan, Chapter 10 Safety Element
[40] Nevada County General Plan, Chapter 10 Safety Element
[41] Town of Truckee 2025 General Plan, Chapter 9 Safety Element http://www.townoftruckee.com/index.aspx?page=470
Nevada County General Plan, Chapter 10 Safety Element
[42] Nevada County General Plan, Chapter 10 Safety Element
[43] Nevada County General Plan, Chapter 10 Safety Element
[44] NOAA, Sacramento Office, National Weather Service
[45] Material source for this Section: Grass Valley 2020 General Plan, Chapter 7 Safety Element
[46] See http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/California/cp06057.pdf
[47] See http://www.edf.org/article.cfm?contentid=11026 and http://www.nrdc.org/globalwarming/fcons/fcons1.asp
[48] See http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/regional-climate-change-impacts/southwest
[49] See http://diseasemaps.usgs.gov/wnv_us_human.html
[50] See http://myairdistrict.com/Executive_Summary.pdf