APPENDIX M Earthquake Vulnerability by County & Statewide

Estimated Losses from Earthquakes near Nevada Communities, 2009, by Jonathan G. Price, Gary Johnson, Christine M. Ballard, Heather Armeno, Irene Seelye, Linda D. Goar, Craig M. dePolo, and Jordan T. Hastings

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Nevada Bureau of Mines and Geology Open-File Report 09-8

Estimated Losses from Earthquakes near Nevada Communities

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2009

This report is available as an online document at www.nbmg.unr.edu.
Please use links on the tables to view summary reports for scenarios involving
earthquakes of magnitude 5.0, 5.5, 6.0, 6.5, and 7.0
for 38 communities in Nevada.

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Estimated Losses from Earthquakes near Nevada Communities

This report estimates losses from earthquakes that could occur near thirty-eight Nevada communities, including all county seats and major population centers (figure 1). The report uses the Federal Emergency Management Agency's sophisticated loss-estimation computer model, HAZUS-MH, to estimate such factors as total economic loss, numbers of buildings receiving extensive to complete damage, number of people needing public shelter and hospital care, and number of fatalities from earthquakes of magnitude 5.0, 5.5, 6.0, 6.5, and 7.0. The report also tabulates earthquake probabilities for these communities from the U.S. Geological Survey's probabilistic seismic hazard analysis (table 1).

The primary audiences for this report are emergency managers, emergency responders, and the local and state government officials responsible for action after a natural disaster. HAZUS reports have been quite helpful in response and recovery planning and exercises, identifying opportunities for mitigation, and, in the case of an actual earthquake, providing the Governor, through the Chief of the Nevada Division of Emergency Management, with an early estimate of the likely severity of the event. Such information can be critical to decisions regarding disaster declarations, a timely and appropriate emergency response, and securing resources that will be necessary during recovery. Because the report covers many of the likely earthquakes that could affect Nevada communities, it serves as an immediate reference against which the HAZUS output produced by the Nevada Bureau of Mines and Geology immediately after an earthquake can be compared. Another important audience for this report is the general public, including homeowners, operators of businesses, and individuals responsible for the wellbeing of others.

Earthquakes are inevitable. The report demonstrates that the consequences of earthquakes can be huge in Nevada, particularly if individuals are not prepared. Recommendations on what to do before, during, and after an earthquake are provided by dePolo and others (2000) and on various websites of the Nevada Bureau of Mines and Geology (http://www.nbmg.unr.edu/EQ/earthquakes.htm), Nevada Seismological Laboratory (http://www.seismo.unr.edu/), and U.S. Geological Survey (http://earthquake.usgs.gov/). The version of HAZUS-MH (Federal Emergency Management Agency, 2003 and 2004) used for this report was documented by Johnson (2009). Given an earthquake location, depth, and magnitude, HAZUS estimates amounts of various types of economic and social loss. We chose 38 communities that include all the major population centers in each of Nevada's 17 counties (figure 1). Some communities were not explicitly in the tabulations, because the effects of earthquakes near those cities and towns are included in the effects of nearby communities. For example, losses in North Las Vegas are included in the scenarios for Las Vegas, Henderson, and Boulder City. For earthquake scenarios for each community, we chose the closest Quaternary fault on the map of dePolo (2008). Quaternary is the name of a geological time period; these faults moved more recently than approximately two million years ago and are likely candidates for future earthquakes. The epicenters of the earthquakes were chosen at the fault position that is closest to the community. A depth of 10 kilometers (6 miles) was used for each scenario.

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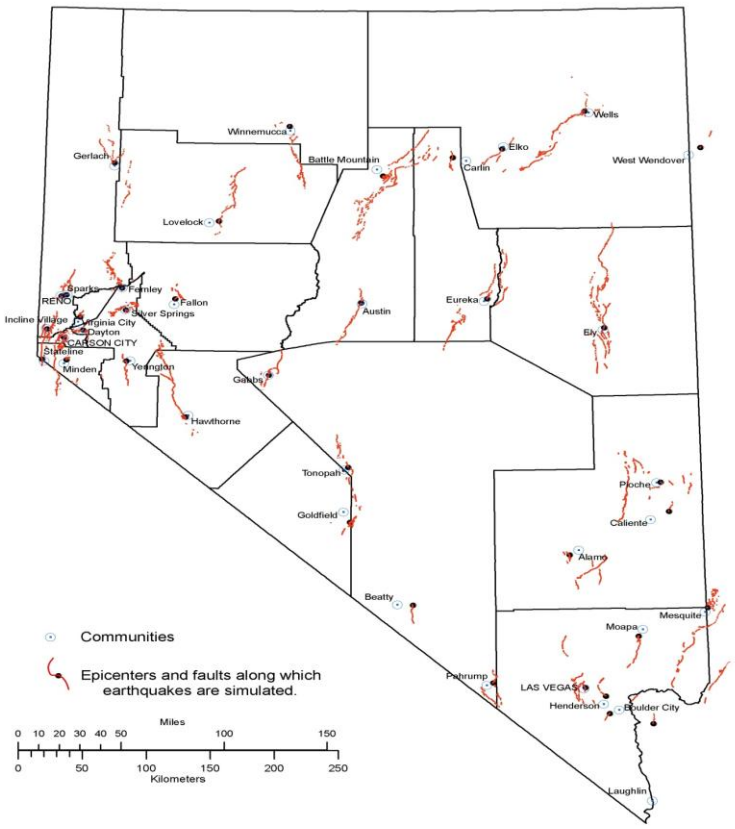
We chose magnitudes from 5.0 to 7.0 to illustrate the variation that magnitude has on losses. Earthquakes larger than magnitude 7.0 have occurred in Nevada (dePolo and dePolo, 1999; dePolo and others, 2000) and will occur here in the future. That is, damages could be even more than listed in this report.

Figure 3-37. Locations of the 38 communities in Nevada for which HAZUS earthquake scenarios have been developed



Note: The faults chosen for the earthquake scenarios are also shown. The epicenters of the earthquakes were chosen at the fault position that is closest to the community.

Figure 1. Location of the 38 communities in Nevada for which HAZUS earthquake scenarios have been developed. The faults chosen for the earthquake scenarios are also shown. The epicenters of the earthquakes were chosen at the fault position that is closest to the community.

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Table 1. Probabilities of earthquakes of various magnitudes occurring within 50 years within 50 kilometers (31 miles) of major communities in Nevada.

County	County seat *or other*	% Probability of magnitude greater than or equal to					Rank by Probability
		5.0	5.5	6.0	6.5	7.0	
Carson City	**Carson City**	**>90**	**~80**	**70**	**50-55**	**12-15**	**2**
Churchill	Fallon	80-90	~60	35	20-25	6-8	14
Clark	Las Vegas	40-50	~30	12	4-5	<0.5	28
	Boulder City	50-60	~30	12	4-5	<0.5	23
	Henderson	50-60	~30	12	4-5	<0.5	23
	Laughlin	10-20	~5	2-3	0.5-1	<0.5	38
	Mesquite	20-30	~15	4-6	2	<0.5	35
	Moapa	40-50	~25	10	4-5	<0.5	30
Douglas	**Minden**	**>90**	**~80**	**67**	**50-60**	**10-12**	**6**
	Stateline	**>90**	**~80**	**60-70**	**40-50**	**10**	**9**
Elko	Elko	30-40	~25	10-15	6-8	0.5-1	31
	Carlin	40-50	~30	10-15	6-8	0.5-1	27
	Wells	30-40	~20	9	6	0.5-1	32
	West Wendover	20	~10	4	1-2	<0.5	37
Esmeralda	Goldfield	80-90	~55	20-30	5-10	<1	15
Eureka	Eureka	40-50	~30	10-15	4-6	<0.5	28
Humboldt	Winnemucca	50-60	~35	15-20	5-10	1-1.5	22
Lander	Battle Mountain	60-70	~40	18	10	1.5	20
	Austin	60-70	~40	20	10-15	2-3	19
Lincoln	Pioche	30-40	~20	6-10	2-3	<0.5	33
	Alamo	70-80	~50	20-25	6-8	<0.5	17
	Caliente	50-60	~35	10-15	4	<0.5	23
Lyon	**Yerington**	**>90**	**~75**	**60**	**40-45**	**12**	**8**
	Dayton	**>90**	**~80**	**70-75**	**50-55**	**15-18**	**1**
	Fernley	90	~70	48	35	8	12
	Silver Springs	**>90**	**~70**	**50-60**	**30-40**	**10-12**	**11**
Mineral	**Hawthorne**	**>90**	**~75**	**61**	**30-40**	**10-12**	**10**
Nye	Tonopah	70-80	~50	20-30	5-10	<1	17
	Beatty	70-80	~55	30-40	20-30	10-12	16
	Gabbs	90	~65	40-50	20-25	6-8	13
	Pahrump	30-40	~25	5-10	3	<1	33
Pershing	Lovelock	50-60	~35	10-20	10	1-2	21
Storey	**Virginia City**	**>90**	**~80**	**70**	**50**	**12-15**	**3**
Washoe	**Reno**	**>90**	**~80**	**67**	**50**	**12-15**	**4**
	Gerlach	40	~25	10-15	6-10	2-3	26
	Incline Vilage	**>90**	**~80**	**60-70**	**40-50**	**10-12**	**7**
	Sparks	**>90**	**~80**	**67**	**50**	**12-15**	**4**
White Pine	Ely	20-30	~15	4-6	1.5-2	<0.5	35

Data are taken from maps produced by the U.S. Geological Survey at http://eqint.cr.usgs.gov/eqprob/2002/index.php. Values for magnitude 5.5 are extrapolated between values for magnitudes 5.0 and 6.0.

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Five magnitudes for each of 38 communities amount to 190 individual earthquake scenarios, for which we produced separate HAZUS summary reports. Because many of these earthquakes would affect multiple counties or multiple states, we also produced separate summary reports such that the user can view the estimated losses for the county in which the earthquake occurred, for the entire state, or, if applicable, for a multi-state region. For each community, we created one page with tables summarizing total economic loss, numbers of buildings receiving extensive to complete damage, number of people needing public shelter and hospital care, and number of fatalities for the five magnitudes. These 38 pages are arranged alphabetically by community name. The individual 20-page summary reports are available online through links on these pages.

Table 2 lists the total economic losses estimated by HAZUS for magnitude 6.0 earthquakes near each of the 38 communities. This magnitude is significant, because that was the size of the 21 February 2008 earthquake near Wells, Nevada. When developing the HAZUS program, the Federal Emergency Management Agency calibrated it against known losses from earthquakes in California in the 1980s and early 1990s. When HAZUS has been run for significant earthquakes that have occurred in the United States since then, the scenario results have generally been within a factor of two or three of reality. On the basis of sensitivity analyses that we have performed and of uncertainties in locating and measuring magnitudes of earthquakes and in local soil and geological conditions, basin effects, direction in which the seismic waves travel, how well buildings have been retrofitted to withstand earthquakes, and number of visitors in Nevada at the time of the earthquake, we feel that the numbers could vary by a factor of ten. Our current best estimate of the total economic loss from the Wells Earthquake is a bit more than $9 million, about one third of the value estimated by HAZUS.

Links from tables 1 and 2 take the user to the single pages with tables summarizing losses for each community, from which further links take the user to over 400 separate HAZUS summary reports. The individual HAZUS summary reports include the following sections and subsections:

- General Description of the Region
  - Building and Lifeline Inventory
  - Building Inventory
    - Critical Facility Inventory
    - Transportation and Utility Lifeline Inventory
- Earthquake Scenario Parameters
    - Direct Earthquake Damage
    - Buildings Damage
    - Critical Facilities Damage
    - Transportation and Utility Lifeline Damage
- Induced Earthquake Damage
    - Fire Following Earthquake
    - Debris Generation

Social Impact
- Shelter Requirements
- Casualties

Economic Loss
- Building Losses
- Transportation and Utility Lifeline Losses
- Long-term Indirect Economic Impacts

Appendix listing population and building value data for counties included in the region

Tables 1 and 2 demonstrate that significant earthquake hazards exist throughout Nevada and that the potential losses from earthquakes are high for many communities. The magnitude 6.0 Wells Earthquake serves as a call for action. The probability that an earthquake of that magnitude or greater will occur in the Las Vegas area is 1.3 times higher than the probability for Wells, and the probability of such an earthquake in the Reno-Sparks-Carson City-Lake Tahoe-Minden area is approximately seven times higher than for Wells. The consequences for our major urban areas are enormous-billions of dollars for such an event in either urban area.

Although the risks are locally huge, actions can be taken to reduce those risks. Current building codes no longer allow construction of the types of unreinforced masonry buildings that collapsed in Wells. Over time, the remaining unreinforced masonry buildings in Nevada can be replaced, taken out of service for human occupation, or retrofitted. The HAZUS summary reports for individual earthquake scenarios indicate that much of the damage will be non-structural in nature – that is, not a collapsed building but damage from falling exterior facades, interior light fixtures, and bookshelves; broken china, glassware, pictures, and computers; and ruptured gas and water lines. These non-structural hazards can often be mitigated inexpensively.

References

dePolo, C.M., 2008, Quaternary faults in Nevada: Nevada Bureau of Mines and Geology Map 167, 1:1,000,000 scale.

dePolo, C.M., Jones, L.M., dePolo, D.M., and Tingley, S., 2000, Living with earthquakes in Nevada: Nevada Bureau of Mines and Geology Special Publication 27, 36 p.

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Federal Emergency Management Agency, 2003, *Multi-hazard loss estimation methodology, earthquake model, HAZUS-MH MR3 technical manual,* developed by the Department of Homeland Security, Emergency Preparedness and Response Directorate under a contract with the National Institute of Building Sciences, Washington, D.C., 16 chapters, and Multi-hazard loss estimation methodolory, earthquake model, HAZUS®MH MR3 user manual, 11 chapters. Electronic document available at http://www.fema.gov/library/viewRecord.do?id=3503.

Federal Emergency Management Agency, 2004, *Using HAZUS-MH for risk assessment, how-to guide,* HAZUS®-MH Risk Assessment and User Group Series, FEMA 433, 5 chapters: Electronic document available at http://www.fema.gov/library/viewRecord.do?id=1985.

Ballard, C.M., Johnson, G., and Hastings, J. T., 2009, Nevada Statewide HAZUS Database Update: HAZUS-MH for Nevada: Nevada Bureau of Mines and Geology Open-File Report 09-7, 2 p.

Table 2. HAZUS estimates for total economic loss from a magnitude 6.0 earthquake on a fault close to the communities and probabilities of earthquakes of this size or greater occurring within 50 years and within 50 kilometers (31 miles) of the communities.

County	County seat *or other community*	Total economic loss	% Probability	Rank by Loss
Carson City	**Carson City**	**$650,000,000**	**70**	**6**
Churchill	Fallon	$110,000,000	35	13
Clark	**Las Vegas**	**$7,200,000,000**	**12**	**1**
	Boulder City	**$1,400,000,000**	**12**	**5**
	Henderson	**$2,500,000,000**	**12**	**2**
	Laughlin	$79,000,000	2-3	16
	Mesquite	$59,000,000	4-6	19
	Moapa	$94,000,000	10	14
Douglas	Minden	$340,000,000	67	10
	Stateline	$590,000,000	60-70	7
Elko	Elko	$160,000,000	10-15	12
	Carlin	$9,800,000	10-15	35
	Wells	$30,000,000	9	25
	West Wendover	$19,000,000	4	29
Esmeralda	Goldfield	$13,000,000	20-30	33
Eureka	Eureka	$34,000,000	10-15	24
Humboldt	Winnemucca	$46,000,000	15-20	21
Lander	Battle Mountain	$18,000,000	18	31
	Austin	$26,000,000	20	26
Lincoln	Pioche	$20,000,000	6-10	28
	Alamo	$5,100,000	20-25	37
	Caliente	$12,000,000	10-15	34
Lyon	Yerington	$56,000,000	60	20
	Dayton	$340,000,000	70-75	11
	Fernley	$62,000,000	48	17
	Silver Springs	$60,000,000	50-60	18
Mineral	Hawthorne	$24,000,000	61	27
Nye	Tonopah	$18,000,000	20-30	30
	Beatty	$6,500,000	30-40	36
	Gabbs	$2,600,000	40-50	38
	Pahrump	$84,000,000	5-10	15
Pershing	Lovelock	$17,000,000	10-20	32
Storey	Virginia City	$490,000,000	70	9
Washoe	**Reno**	**$1,900,000,000**	**67**	**3**
	Gerlach	$39,000,000	10-15	23
	Incline Village	$510,000,000	60-70	8
	Sparks	**$1,800,000,000**	**67**	**4**
White Pine	Ely	$44,000,000	4-6	22

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Disclaimer

The information in this report should be considered preliminary and approximate. It has not been thoroughly edited or peer reviewed. All numbers in this report are estimates derived from HAZUS, the Federal Emergency Management Agency's loss-estimation model. Individual numbers may vary by a factor of 10, depending on location, depth, and magnitude of the earthquake and on other factors, including, among others, local soil and geological conditions, basin effects, direction in which the seismic waves travel, how well buildings have been retrofitted to withstand earthquakes, and number of visitors in Nevada at the time of the earthquake.

Note: To view the links in this report, you should have a minimum of Adobe Reader 9.0 installed on your computer. Adobe Reader 9.0 is a free download and can be downloaded from this site: http://get.adobe.com/reader/

Alamo, Nevada

Epicenter at 1 15.24° W longitude, 37.31° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lincoln County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	0	0	0	2
People needing public shelter	0	0	0	0	0
People needing hospital care	0	0	0	0	0
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.60	0.97	1.7	2.8	5.5

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	0	2	20	96
People needing public shelter	0	0	0	5	20
People needing hospital care	0	0	0	2	6
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.61	1.0	5.1	38	140

Austin, Nevada

Epicenter at 1 17.08° W longitude, 39.49° N latitude; depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lander County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	10	64	130	180
People needing public shelter	0	0	0	0	0
People needing hospital care	0	0	0	1	1
Fatalities	0	0	0	0	0
Total economic loss ($ million)	2.0	7.0	25	60	110

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	10	64	130	180
People needing public shelter	0	0	0	1	1
People needing hospital care	0	0	0	1	1
Fatalities	0	0	0	0	0
Total economic loss ($ million)	2.1	7.2	26	63	120

Battle Mountain, Nevada

Epicenter at 1 16.88° W longitude, 40.58° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lander County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	4	18	160	550	830
People needing public shelter	0	0	0	3	5
People needing hospital care	0	0	1	6	10
Fatalities	0	0	0	1	3
Total economic loss ($ million)	2.0	5.3	17	49	81

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	4	18	160	560	830
People needing public shelter	0	0	0	3	5
People needing hospital care	0	0	1	6	10
Fatalities	0	0	0	1	3
Total economic loss ($ million)	2.1	5.7	18	55	98

Beatty, Nevada

Epicenter at 1 16.62°W longitude, 36.89°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Nye County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	9	59	200	360
People needing public shelter	0	0	0	0	1
People needing hospital care	0	0	0	0	1
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.68	2.0	6.0	16	35

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	9	59	200	370
People needing public shelter	0	0	0	0	5
People needing hospital care	0	0	0	1	3
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.69	2.0	6.2	21	64

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	9	59	200	370
People needing public shelter	0	0	0	0	5
People needing hospital care	0	0	0	1	0
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.71	2.1	6.5	22	69

Boulder City, Nevada

Epicenter at 1 14.92° W longitude, 35.95° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Clark County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	82	430	2,400	9,600	24,000
People needing public shelter	5	31	180	1,300	3,800
People needing hospital care	3	12	72	460	1,700
Fatalities	0	1	13	110	430
Total economic loss ($ million)	120	410	1,300	4,000	8,900

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	89	460	2,600	9,600	24,000
People needing public shelter	9	50	280	1,300	3,800
People needing hospital care	3	15	87	460	1,700
Fatalities	0	2	16	110	430
Total economic loss ($ million)	130	430	1,400	4,000	8,900

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	89	460	2,600	9,700	24,000
People needing public shelter	9	50	280	1,300	3,800
People needing hospital care	3	15	87	460	1,700
Fatalities	0	2	16	110	430
Total economic loss ($ million)	130	430	1,400	4,000	8,900

Caliente, Nevada

Epicenter at 1 14.35° W longitude, 37.67° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lincoln County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	3	20	92	280
People needing public shelter	0	0	0	1	6
People needing hospital care	0	0	0	1	6
Fatalities	0	0	0	0	1
Total economic loss ($ million)	0.87	2.8	10	33	85

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	3	20	94	300
People needing public shelter	0	0	0	2	11
People needing hospital care	0	0	0	1	7
Fatalities	0	0	0	0	1
Total economic loss ($ million)	0.88	2.9	10	35	120

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	3	22	100	330
People needing public shelter	0	0	0	2	12
People needing hospital care	0	0	0	1	8
Fatalities	0	0	0	0	2
Total economic loss ($ million)	0.90	3.2	12	43	140

Carlin, Nevada

Epicenter at 1 16.23°W longitude, 40.73°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Elko County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	2	13	55	160
People needing public shelter	0	0	0	0	2
People needing hospital care	0	0	0	2	7
Fatalities	0	0	0	0	2
Total economic loss ($ million)	0.43	1.7	5.6	17	41

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	2	13	57	170
People needing public shelter	0	0	0	0	2
People needing hospital care	0	0	0	2	8
Fatalities	0	0	0	0	2
Total economic loss ($ million)	0.79	3.0	9.8	29	67

Carson City, Nevada

Epicenter at 1 19.76°W longitude, 39.16°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Carson City County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	52	210	950	2,000	2,700
People needing public shelter	5	20	73	170	230
People needing hospital care	2	7	39	110	180
Fatalities	0	1	9	28	48
Total economic loss ($ million)	67	160	370	690	950

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	60	260	1,300	3,400	8,000
People needing public shelter	6	23	89	250	760
People needing hospital care	2	9	48	160	500
Fatalities	0	2	11	39	130
Total economic loss ($ million)	85	230	610	1,500	3,700

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	60	270	1,300	3,500	8,400
People needing public shelter	6	24	91	260	810
People needing hospital care	2	9	48	160	520
Fatalities	0	2	11	39	140
Total economic loss ($ million)	87	240	650	1,600	4,000

Dayton, Nevada

Epicenter at 1 19.60° W longitude, 39.23° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lyon County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	14	60	290	610	920
People needing public shelter	0	0	3	8	13
People needing hospital care	0	1	7	20	33
Fatalities	0	0	2	5	8
Total economic loss ($ million)	9.8	24	55	110	160

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	25	130	680	2,100	5,300
People needing public shelter	1	7	33	130	420
People needing hospital care	1	3	17	68	250
Fatalities	0	1	3	15	63
Total economic loss ($ million)	32	110	330	940	2,300

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	25	130	690	2,200	5,400
People needing public shelter	1	7	33	130	430
People needing hospital care	1	3	18	68	260
Fatalities	0	1	3	15	63
Total economic loss ($ million)	32	110	340	970	2,500

Elko, Nevada

Epicenter at 1 15.77°W longitude, 40.81°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Elko County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	19	74	390	960	1,800
People needing public shelter	1	6	31	71	110
People needing hospital care	1	2	21	63	120
Fatalities	0	1	5	17	32
Total economic loss ($ million)	21	50	160	340	540

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	19	74	390	960	1,800
People needing public shelter	1	6	31	71	110
People needing hospital care	1	2	21	63	120
Fatalities	0	1	5	17	32
Total economic loss ($ million)	21	50	160	340	540

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	19	74	390	960	1,800
People needing public shelter	1	6	31	71	110
People needing hospital care	1	2	21	63	120
Fatalities	0	1	5	17	32
Total economic loss ($ million)	21	50	160	340	540

Ely, Nevada

Epicenter at 1 14.88° W longitude, 39.26° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **White Pine County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	7	27	150	390	680
People needing public shelter	0	0	2	8	18
People needing hospital care	0	0	2	11	25
Fatalities	0	0	1	3	7
Total economic loss ($ million)	5.3	14	44	120	230

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	7	27	150	390	680
People needing public shelter	0	0	2	8	18
People needing hospital care	0	0	2	11	25
Fatalities	0	0	1	3	7
Total economic loss ($ million)	5.3	14	44	120	230

Eureka, Nevada

Epicenter at 1 15.93° W longitude, 39.52° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Eureka County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	7	29	170	340	460
People needing public shelter	0	0	0	2	4
People needing hospital care	0	0	2	7	12
Fatalities	0	0	0	2	3
Total economic loss ($ million)	3.9	10	34	76	130

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	7	29	170	340	460
People needing public shelter	0	0	0	2	4
People needing hospital care	0	0	2	7	12
Fatalities	0	0	0	2	3
Total economic loss ($ million)	3.9	10	34	78	130

Fallon, Nevada

Epicenter at 1 18.77°W longitude, 39.51°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Churchill County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	12	48	250	570	970
People needing public shelter	0	3	14	30	43
People needing hospital care	0	1	7	20	33
Fatalities	0	0	2	5	8
Total economic loss ($ million)	19	45	100	190	280

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	12	49	250	590	1,100
People needing public shelter	0	3	14	31	46
People needing hospital care	0	1	8	20	34
Fatalities	0	0	2	5	9
Total economic loss ($ million)	19	45	110	210	340

Fernley, Nevada

Epicenter at 1 19.25° W longitude, 39.60° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lyon County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	5	22	130	420	1,400
People needing public shelter	0	0	2	7	15
People needing hospital care	0	0	2	8	22
Fatalities	0	0	0	2	5
Total economic loss ($ million)	4.9	13	35	77	170

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	5	27	150	510	1,700
People needing public shelter	0	1	5	14	34
People needing hospital care	0	1	3	10	30
Fatalities	0	0	1	2	6
Total economic loss ($ million)	5.9	21	62	170	410

Gabbs, Nevada

Epicenter at 117.91° W longitude, 38.87° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Nye County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	0	0	1	2
People needing public shelter	0	0	0	0	0
People needing hospital care	0	0	0	0	0
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.59	0.98	1.8	3.2	6.2

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	0	1	3	19
People needing public shelter	0	0	0	0	0
People needing hospital care	0	0	0	0	0
Fatalities	0	0	0	0	0
Total economic loss ($ million)	0.63	1.1	2.6	7.0	21

Gerlach, Nevada

Epicenter at 1 19.36° W longitude, 40.67° N latitude; depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Washoe County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	10	56	130	190
People needing public shelter	0	0	1	3	6
People needing hospital care	0	0	1	2	5
Fatalities	0	0	0	1	1
Total economic loss ($ million)	4.3	13	39	93	160

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	10	56	140	200
People needing public shelter	0	0	1	3	6
People needing hospital care	0	0	1	3	5
Fatalities	0	0	0	1	1
Total economic loss ($ million)	4.3	13	39	95	170

Goldfield, Nevada

Epicenter at 1 17.17° W longitude, 37.61° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Esmeralda County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	5	43	150	220
People needing public shelter	0	0	0	0	0
People needing hospital care	0	0	0	1	1
Fatalities	0	0	0	0	0
Total economic loss ($ million)	1.2	3.2	11	36	66

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	5	44	150	250
People needing public shelter	0	0	0	0	1
People needing hospital care	0	0	0	1	1
Fatalities	0	0	0	0	0
Total economic loss ($ million)	1.2	3.5	13	41	89

Hawthorne, Nevada

Epicenter at 1 18.65° W longitude, 38.50° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Mineral County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	26	120	230	320
People needing public shelter	0	0	2	5	8
People needing hospital care	0	0	1	3	6
Fatalities	0	0	0	1	1
Total economic loss ($ million)	4.2	10	23	42	61

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	26	120	240	340
People needing public shelter	0	0	2	6	9
People needing hospital care	0	0	1	3	6
Fatalities	0	0	0	1	1
Total economic loss ($ million)	4.2	10	23	49	84

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	26	120	240	340
People needing public shelter	0	0	2	5	9
People needing hospital care	0	0	1	3	6
Fatalities	0	0	0	1	1
Total economic loss ($ million)	4.2	10	24	50	89

APPENDIX M Earthquake Vulnerability by County & Statewide

Henderson, Nevada

Epicenter at 1 14.95° W longitude, 36.10° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Clark County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	170	840	4,900	17,000	30,000
People needing public shelter	25	130	700	2,500	5,100
People needing hospital care	6	29	36	900	2,400
Fatalities	1	4	36	220	630
Total economic loss ($ million)	260	800	2,500	6,300	11,000

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	170	840	4,900	17,000	30,000
People needing public shelter	25	130	700	2,500	5,100
People needing hospital care	6	29	180	900	2,400
Fatalities	1	4	36	220	630
Total economic loss ($ million)	260	800	2,500	6,300	11,000

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	170	840	4,900	17,000	31,000
People needing public shelter	25	130	700	2,500	5,100
People needing hospital care	6	29	180	900	2,400
Fatalities	1	4	36	220	630
Total economic loss ($ million)	260	800	2,500	6,300	11,000

Incline Village, Nevada

Epicenter at 1 19.92°W longitude, 39.23°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Washoe County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	10	44	190	850	4,100
People needing public shelter	1	6	26	110	550
People needing hospital care	1	3	13	54	280
Fatalities	0	0	3	12	71
Total economic loss ($ million)	33	100	290	830	2,500

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	14	75	360	1,600	6,000
People needing public shelter	2	9	38	150	670
People needing hospital care	1	4	19	81	350
Fatalities	0	1	4	19	89
Total economic loss ($ million)	44	140	420	1,200	3,300

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	15	85	420	1,900	7,400
People needing public shelter	2	10	43	180	820
People needing hospital care	1	4	21	88	420
Fatalities	0	1	4	20	110
Total economic loss ($ million)	50	170	510	1,500	4,100

Las Vegas, Nevada

Epicenter at 1 15.12° W longitude, 36.17° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Clark County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	640	2,700	15,000	38,000	60,000
People needing public shelter	170	690	3,600	8,700	13,000
People needing hospital care	32	140	1,100	4,300	8,100
Fatalities	4	24	280	1,200	2,300
Total economic loss ($ million)	870	2,300	7,200	16,000	25,000

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	640	2,700	15,000	38,000	60,000
People needing public shelter	170	690	3,600	8,700	13,000
People needing hospital care	32	140	1,100	4,300	8,100
Fatalities	4	24	280	1,200	2,300
Total economic loss ($ million)	870	2,300	7,200	16,000	25,000

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	640	2,700	15,000	38,000	60,000
People needing public shelter	170	690	3,600	8,700	13,000
People needing hospital care	32	140	1,100	4,300	8,100
Fatalities	4	24	280	1,200	2,300
Total economic loss ($ million)	870	2,300	7,200	16,000	25,000

Laughlin, Nevada

Epicenter at 1 14.54° W longitude, 35.85° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Clark County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	11	55	280	970
People needing public shelter	0	2	9	36	120
People needing hospital care	0	1	3	11	34
Fatalities	0	0	0	1	4
Total economic loss ($ million)	1.5	18	72	250	690

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	11	55	280	970
People needing public shelter	0	2	9	36	120
People needing hospital care	0	1	3	11	34
Fatalities	0	0	0	1	4
Total economic loss ($ million)	1.5	18	72	250	690

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	16	79	400	1,500
People needing public shelter	0	2	9	37	130
People needing hospital care	0	1	3	12	37
Fatalities	0	0	0	1	5
Total economic loss ($ million)	2.1	20	79	270	760

Lovelock, Nevada

Epicenter at 1 18.39°W longitude, 40.18°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Pershing County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	2	11	55	160
People needing public shelter	0	0	0	0	0
People needing hospital care	0	0	0	0	1
Fatalities	0	0	0	0	0
Total economic loss ($ million)	2.3	6.0	16	36	64

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	0	2	13	62	200
People needing public shelter	0	0	0	0	2
People needing hospital care	0	0	0	1	2
Fatalities	0	0	0	0	0
Total economic loss ($ million)	2.4	6.3	17	45	95

Mesquite, Nevada

Epicenter at 1 14.07° W longitude, 36.67° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Clark County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	3	17	120	560	1,100
People needing public shelter	0	1	12	60	120
People needing hospital care	0	0	4	32	79
Fatalities	0	0	1	8	21
Total economic loss ($ million)	4.2	14	54	200	410

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	3	17	120	300	1,100
People needing public shelter	0	1	12	30	120
People needing hospital care	0	0	4	14	79
Fatalities	0	0	1	3	21
Total economic loss ($ million)	4.2	14	54	120	410

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	3	18	130	590	1,200
People needing public shelter	0	1	4	61	130
People needing hospital care	0	0	4	32	82
Fatalities	0	0	1	8	22
Total economic loss ($ million)	4.3	16	59	220	480

Minden, Nevada

Epicenter at 1 19.73° W longitude, 38.97° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Douglas County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	10	46	230	690	1,300
People needing public shelter	0	3	14	42	69
People needing hospital care	1	2	15	46	81
Fatalities	0	0	3	12	21
Total economic loss ($ million)	25	66	170	370	550

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	13	69	380	1,700	5,300
People needing public shelter	1	5	27	120	360
People needing hospital care	1	3	19	82	280
Fatalities	0	1	4	20	73
Total economic loss ($ million)	32	100	300	850	2,100

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	14	75	410	1,800	5,600
People needing public shelter	1	6	31	130	400
People needing hospital care	1	3	19	86	300
Fatalities	0	1	4	21	76
Total economic loss ($ million)	36	110	340	980	2,400

Moapa, Nevada

Epicenter at 1 14.65° W longitude, 36.61° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Clark County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	21	120	480	1,400
People needing public shelter	0	2	9	39	160
People needing hospital care	0	1	4	16	54
Fatalities	0	0	0	3	9
Total economic loss ($ million)	8.4	30	94	290	840

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	21	120	480	1,400
People needing public shelter	0	2	9	39	160
People needing hospital care	0	1	4	16	54
Fatalities	0	0	0	3	9
Total economic loss ($ million)	8.4	30	94	290	850

Pahrump, Nevada

Epicenter at 1 15.92°W longitude, 36.22°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Nye County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	11	55	390	1,300	2,400
People needing public shelter	0	0	3	10	19
People needing hospital care	0	0	2	11	27
Fatalities	0	0	0	2	5
Total economic loss ($ million)	4.9	15	43	110	190

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	11	58	410	1,400	2,700
People needing public shelter	0	1	8	28	67
People needing hospital care	0	1	4	17	42
Fatalities	0	0	1	3	7
Total economic loss ($ million)	5.3	23	84	240	540

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	11	58	410	1,400	2,700
People needing public shelter	0	1	8	28	67
People needing hospital care	0	1	4	17	42
Fatalities	0	0	1	3	7
Total economic loss ($ million)	5.3	23	84	240	550

Pioche, Nevada

Epicenter at 114.41° W longitude, 37.92° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lincoln County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	9	56	170	380
People needing public shelter	0	0	1	4	11
People needing hospital care	0	0	0	2	8
Fatalities	0	0	0	1	2
Total economic loss ($ million)	1.8	5.5	19	51	120

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	9	56	170	390
People needing public shelter	0	0	1	4	13
People needing hospital care	0	0	0	2	9
Fatalities	0	0	0	1	2
Total economic loss ($ million)	1.8	5.6	19	52	140

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	9	57	170	410
People needing public shelter	0	0	1	4	14
People needing hospital care	0	0	1	2	9
Fatalities	0	0	0	1	2
Total economic loss ($ million)	1.8	5.6	20	57	150

APPENDIX M Earthquake Vulnerability by County & Statewide

Reno, Nevada

Epicenter at 1 19.80°W longitude, 39.52°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Washoe County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	130	540	2,800	6,900	11,000
People needing public shelter	32	120	460	990	1,400
People needing hospital care	8	30	160	480	840
Fatalities	1	6	39	130	220
Total economic loss ($ million)	310	770	1,900	3,600	5,200

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	130	550	2,800	7,100	12,000
People needing public shelter	32	120	460	1,000	1,500
People needing hospital care	8	30	160	480	890
Fatalities	1	6	39	130	240
Total economic loss ($ million)	310	780	1,900	3,700	5,700

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	130	550	2,800	7,100	12,000
People needing public shelter	32	120	460	1,000	1,500
People needing hospital care	8	30	160	480	890
Fatalities	1	6	39	130	240
Total economic loss ($ million)	310	780	1,900	3,800	5,900

Silver Springs, Nevada

Epicenter at 119.21° W longitude, 39.41° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lyon County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	35	280	1,100	2,100
People needing public shelter	0	0	1	10	31
People needing hospital care	0	0	2	13	40
Fatalities	0	0	0	3	9
Total economic loss ($ million)	3.3	10	36	120	290

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	38	300	1,200	2,300
People needing public shelter	0	0	3	16	47
People needing hospital care	0	1	2	15	47
Fatalities	0	0	0	3	10
Total economic loss ($ million)	4.0	16	60	210	510

Sparks, Nevada

Epicenter at 1 19.76° W longitude, 39.53° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Washoe County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	119	520	2,700	6,700	10,000
People needing public shelter	26	100	410	910	1,300
People needing hospital care	8	29	160	480	820
Fatalities	1	6	39	130	220
Total economic loss ($ million)	283	720	1,800	3,500	5,000

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	120	520	2,700	6,900	12,000
People needing public shelter	26	100	410	920	1,400
People needing hospital care	8	29	160	480	880
Fatalities	1	6	39	130	230
Total economic loss ($ million)	290	730	1,800	3,600	5,500

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	120	520	2,700	6,900	12,000
People needing public shelter	26	100	410	920	1,400
People needing hospital care	8	29	160	480	880
Fatalities	1	6	39	130	230
Total economic loss ($ million)	290	730	1,800	3,600	5,600

Stateline, Nevada

Epicenter at 1 19.95°W longitude, 38.97°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Douglas County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	8	37	160	420	700
People needing public shelter	0	3	12	31	48
People needing hospital care	0	0	2	8	19
Fatalities	0	0	0	2	4
Total economic loss ($ million)	16	42	100	230	340

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	9	47	210	750	2,300
People needing public shelter	1	4	18	61	180
People needing hospital care	0	1	4	22	100
Fatalities	0	0	1	5	25
Total economic loss ($ million)	19	61	180	510	1,300

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	40	180	890	2,600	5,500
People needing public shelter	5	21	99	250	480
People needing hospital care	1	4	28	110	260
Fatalities	0	1	7	27	69
Total economic loss ($ million)	79	210	590	1,400	2,800

Tonopah, Nevada

Epicenter at 1 17.19°W longitude, 38.08°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Nye County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	14	78	180	290
People needing public shelter	0	0	1	4	6
People needing hospital care	0	0	1	2	5
Fatalities	0	0	0	1	1
Total economic loss ($ million)	1.9	5.6	17	39	76

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	3	14	80	200	400
People needing public shelter	0	0	1	4	6
People needing hospital care	0	0	1	2	5
Fatalities	0	0	0	1	1
Total economic loss ($ million)	2.0	5.9	18	44	100

Virginia City, Nevada

Epicenter at 119.63°W longitude, 39.34°N latitude, depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Storey County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	3	17	110	230	320
People needing public shelter	0	0	1	4	6
People needing hospital care	0	0	1	4	7
Fatalities	0	0	0	1	2
Total economic loss ($ million)	7.4	16	33	62	83

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	20	110	740	3,000	7,600
People needing public shelter	1	9	46	230	670
People needing hospital care	1	4	21	120	430
Fatalities	0	1	4	29	110
Total economic loss ($ million)	39	140	480	1,500	3,300

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	20	110	740	3,000	7,700
People needing public shelter	1	9	46	240	680
People needing hospital care	1	4	21	120	430
Fatalities	0	1	4	29	110
Total economic loss ($ million)	39	140	490	1,500	3,400

Wells, Nevada

Epicenter at 1 15.00° W longitude, 41.12° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Elko County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	24	120	250	360
People needing public shelter	0	0	1	4	7
People needing hospital care	0	0	1	5	8
Fatalities	0	0	0	1	2
Total economic loss ($ million)	3.9	10	30	68	120

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	24	120	250	360
People needing public shelter	0	0	1	4	7
People needing hospital care	0	0	1	5	8
Fatalities	0	0	0	1	2
Total economic loss ($ million)	3.9	10	30	68	120

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	6	24	120	250	360
People needing public shelter	0	0	1	4	8
People needing hospital care	0	0	1	5	8
Fatalities	0	0	0	1	2
Total economic loss ($ million)	3.9	10	30	69	120

West Wendover, Nevada

Epicenter at 1 13.94°W longitude, 40.78°N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Elko County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	11	75	260	450
People needing public shelter	0	0	4	15	27
People needing hospital care	0	0	3	14	35
Fatalities	0	0	1	3	10
Total economic loss ($ million)	1.4	4.7	17	47	86

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	11	75	260	450
People needing public shelter	0	0	4	15	27
People needing hospital care	0	0	3	14	35
Fatalities	0	0	1	3	10
Total economic loss ($ million)	1.4	4.7	17	47	87

Study Region: **Nevada and adjacent states**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	2	11	75	260	450
People needing public shelter	0	0	4	15	27
People needing hospital care	0	0	3	14	35
Fatalities	0	0	1	3	10
Total economic loss ($ million)	1.8	5.5	19	53	99

Winnemucca, Nevada

Epicenter at 1 17.74° W longitude, 41.00° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Humboldt County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	7	36	240	650	990
People needing public shelter	0	0	3	9	16
People needing hospital care	0	0	2	10	19
Fatalities	0	0	1	2	5
Total economic loss ($ million)	5.0	15	45	100	180

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	7	36	240	650	990
People needing public shelter	0	0	3	9	16
People needing hospital care	0	0	2	10	20
Fatalities	0	0	1	2	5
Total economic loss ($ million)	5.0	15	46	110	180

Yerington, Nevada

Epicenter at 1 19.20° W longitude, 38.97° N latitude depth = 10 kilometers

Results of earthquake scenarios using HAZUS, the Federal Emergency Management Agency's loss-estimation model. All numbers are estimates; individual numbers may vary by a factor of 10, depending on the location, depth, and magnitude of the earthquake.

Study Region: **Lyon County**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	6	45	270	1,300
People needing public shelter	0	0	0	4	16
People needing hospital care	0	0	0	3	20
Fatalities	0	0	0	1	5
Total economic loss ($ million)	9.3	19	42	98	220

Study Region: **All Nevada counties**	Earthquake Magnitude				
	5.0	**5.5**	**6.0**	**6.5**	**7.0**
Number of buildings with extensive to complete damage	1	7	53	300	1,400
People needing public shelter	0	0	1	7	27
People needing hospital care	0	0	1	6	24
Fatalities	0	0	0	1	5
Total economic loss ($ million)	9.5	22	56	140	360