

**Scenario: M 7.4 Canyon River Fault
Grays Harbor County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	3	3	0	0	0	0	0	0	0	0	0	0	3	3
Educational	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Other-Residential	4	1	1	0	0	0	0	0	0	0	0	0	4	1	1
Single Family	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1
Total Grays Harbor	5	6	5	0	0	0	0	0	0	0	0	0	5	6	5

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.

Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.

Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.

Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	123	16	8	1	0	148
Commercial	1336	226	90	6	0	1,658
Education	45	5	2	0	0	52
Government	45	8	3	0	0	56
Industrial	386	70	33	2	0	491
Religion	133	17	6	0	0	156
Other Residential	9,652	1,503	612	27	0	11,794
Single Family	21,772	1,002	44	1	0	22,819

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					Total Loss
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	
\$4,434,000	\$21,903,000	\$11,593,000	\$439,000	0.52	\$2,850,000	\$1,239,000	\$1,625,000	\$1,525,000	\$45,608,000

Hospital Functionality

	Total Number of Beds	At Day 1		At day 3		At day 7		At day 30		At day 90	
		Number of Beds	%								
Medium	140	56	40	57	40	97	70	138	98	139	99
Small	24	22	93	22	93	24	100	24	100	24	100
Total	164	78	—	79	—	121	—	162	—	163	—

Large Hospital: > 150 beds

Medium Hospital: 50-150 beds

Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
269	250	11	5	3	0

**Scenario: M 7.4 Canyon River Fault
Grays Harbor County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
2	20	\$1,275,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
27,930	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
27,930	0	0	0	0	0	0	0	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
4,000	5,000	9,000	360

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
6	4

Essential Facilities Functionality

	Count	Functionality (%)
	At Day 1	
Emergency Operation Center	1	92
Fire Station Facilities	39	95
Police Station Facilities	11	93
School	44	94

**Scenario: M 7.4 Canyon River Fault
King County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	3	0	0	3	0	0	6	0	0	1	0	0	13
Commercial	1	34	21	0	2	1	0	0	0	0	0	0	1	36	22
Educational	0	3	1	0	0	0	0	0	0	0	0	0	0	3	1
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	1	5	3	0	0	0	0	0	0	0	0	0	1	5	3
Other-Residential	9	2	3	0	0	0	0	0	0	0	0	0	9	2	3
Single Family	4	1	1	0	0	0	0	0	0	0	0	0	4	1	1
Total King	15	45	32	0	2	4	0	0	6	0	0	1	15	47	43

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.

Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.

Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.

Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	1,870	42	8	0	0	1,920
Commercial	35,815	1,104	189	5	0	37,113
Education	1,307	30	5	0	0	1,342
Government	529	22	5	0	0	556
Industrial	9,498	360	84	3	0	9,945
Religion	2,273	49	7	0	0	2,329
Other Residential	82,996	2,520	380	4	0	85,900
Single Family	445,946	2,609	16	0	0	448,571

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					Total Loss
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	
\$17,217,000	\$159,653,000	\$90,781,000	\$3,681,000	0.11	\$7,720,000	\$5,850,000	\$6,209,000	\$7,269,000	\$298,380,000

Hospital Functionality

	At Day 1			At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%								
Large	4,943	4,917	99	4,917	99	4,938	100	4,938	100	4,938	100
Medium	684	677	99	677	99	683	100	683	100	683	100
Small	100	100	100	100	100	100	100	100	100	100	100
Total	5,727	5,694	—	5,694	—	5,721	—	5,721	—	5,721	—

Large Hospital: > 150 beds

Medium Hospital: 50-150 beds

Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
1,033	1,023	10	0	0	0

**Scenario: M 7.4 Canyon River Fault
King County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
61	7,688	\$676,761,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
745,853	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
745,953	0	0	0	0	0	0	0	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
22,000	16,000	38,000	1,520

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
9	5

Essential Facilities Functionality

	Count	Functionality (%)
	At Day 1	
Emergency Operation Center	18	99
Fire Station Facilities	164	99
Police Station Facilities	52	99
School	721	99

**Scenario: M 7.4 Canyon River Fault
Kitsap County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	6	5	0	1	0	0	0	0	0	0	0	0	7	5
Educational	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Other-Residential	8	2	3	1	0	0	0	0	0	0	0	0	9	2	3
Single Family	5	1	2	0	0	0	0	0	0	0	0	0	5	1	2
Total Kitsap	13	12	11	1	1	0	0	0	0	0	0	0	14	13	11

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
 Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.
 Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
 Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	281	21	6	1	0	309
Commercial	3,360	315	75	4	0	3,754
Education	140	11	3	0	0	154
Government	118	10	3	0	0	131
Industrial	1,040	110	35	3	0	1,188
Religion	255	19	4	0	0	278
Other Residential	14,304	2,410	782	33	2	17,531
Single Family	62,629	2,286	36	22	5	64,978

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	Total Loss
\$7,328,000	\$52,079,000	\$25,467,000	\$443,000	0.34	\$3,657,000	\$1,727,000	\$2,242,000	\$2,085,000	\$95,028,000

Hospital Functionality

	At Day 1			At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%								
Large	297	277	93	278	94	296	100	297	100	297	100
Medium	55	39	70	39	71	53	97	55	100	55	100
Total	352	316	—	317	—	349	—	352	—	352	—

Large Hospital: > 150 beds
 Medium Hospital: 50-150 beds
 Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
82 (81*)	80	1	0	0	0

* values in parentheses include rounding error.

**Scenario: M 7.4 Canyon River Fault
Kitsap County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
9	610	\$41,997,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
91,417	94	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
91,417	0	0	0	0	0	0	0	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
9,000	6,000	15,000	600

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
15	10

Essential Facilities Functionality

	Count	Functionality (%)
		At Day 1
Emergency Operation Center	1	95
Fire Station Facilities	50	96
Police Station Facilities	8	97
School	110	97

**Scenario: M 7.4 Canyon River Fault
Mason County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	1	0	0	2	0	0	3	0	0	1	0	0	7
Commercial	0	7	7	0	1	1	0	0	0	0	0	0	0	8	8
Educational	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Other-Residential	14	4	5	2	0	1	0	0	0	0	0	0	16	4	6
Single Family	6	2	2	0	0	0	0	0	0	0	0	0	6	2	2
Total Mason	20	17	16	2	1	4	0	0	3	0	0	1	22	18	24

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
 Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.
 Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
 Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	68	24	12	2	0	106
Commercial	637	253	139	23	1	1,053
Education	22	8	4	1	0	35
Government	24	9	5	1	0	39
Industrial	233	98	61	11	0	403
Religion	48	17	8	1	0	74
Other Residential	3,435	2,345	1,951	319	13	8,063
Single Family	13,571	4,223	312	9	2	18,117

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					Total Loss
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	
\$11,100,000	\$52,556,000	\$22,872,000	\$437,000	1.73	\$7,416,000	\$2,017,000	\$2,672,000	\$2,602,000	\$101,672,000

Hospital Functionality

	Total Number of Beds	At Day 1		At day 3		At day 7		At day 30		At day 90	
		Number of Beds	%								
Medium	68	57	83	57	84	67	98	68	100	68	100
Total	68	57	—	57	—	67	—	68	—	68	—

Large Hospital: > 150 beds
 Medium Hospital: 50-150 beds
 Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
92 (93*)	76	5	4	4	4

* values in parentheses include rounding error.

**Scenario: M 7.4 Canyon River Fault
Mason County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
3	15	\$1,085,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
20,412	1,091	5	282	1	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
20,412	166	1	93	1	33	0	6	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
15,000	11,000	26,000	1,040

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
9	7

Essential Facilities Functionality

	Count	Functionality (%)
	At Day 1	
Emergency Operation Center	2	80
Fire Station Facilities	31	72
Police Station Facilities	3	81
School	23	82

**Scenario: M 7.4 Canyon River Fault
Pacific County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Educational	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other-Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Pacific	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
 Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.
 Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
 Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	78	1	0	0	0	79
Commercial	626	11	2	0	0	639
Education	21	0	0	0	0	21
Government	32	0	0	0	0	32
Industrial	153	4	1	0	0	158
Religion	56	1	0	0	0	57
Other Residential	6,100	293	48	0	0	6,441
Single Family	9,476	49	1	0	0	9,526

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	Total Loss
\$166,000	\$1,225,000	\$662,000	\$18,000	0.08	\$85,000	\$23,000	\$30,000	\$37,000	\$2,246,000

Hospital Functionality

	At Day 1			At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%								
Small	53	52	99	52	99	53	100	53	100	53	100
Total	53	52	—	52	—	53	—	53	—	53	—

Large Hospital: > 150 beds
 Medium Hospital: 50-150 beds
 Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
110	109	1	0	0	0

**Scenario: M 7.4 Canyon River Fault
Pacific County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
1	4	\$448,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
9,028	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
9,028	0	0	0	0	0	0	0	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
0	0	0	0

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
0	0

Essential Facilities Functionality

	Count	Functionality (%)
	At Day 1	
Emergency Operation Center	1	100
Fire Station Facilities	18	99
Police Station Facilities	3	99
School	19	99

**Scenario: M 7.4 Canyon River Fault
Pierce County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	1	0	0	1	0	0	1	0	0	0	0	0	3
Commercial	0	9	7	0	1	0	0	0	0	0	0	0	0	10	7
Educational	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	2	1	0	0	0	0	0	0	0	0	0	0	2	1
Other-Residential	7	1	3	0	0	0	0	0	0	0	0	0	7	1	3
Single Family	3	1	1	0	0	0	0	0	0	0	0	0	3	1	1
Total Pierce	10	15	13	0	1	1	0	0	1	0	0	0	10	16	15

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
 Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.
 Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
 Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	724	26	6	0	0	756
Commercial	11,528	510	94	3	0	12,135
Education	415	14	2	0	0	431
Government	215	9	2	0	0	226
Industrial	3,563	191	49	2	0	3,805
Religion	867	26	4	0	0	897
Other Residential	48,728	2,724	538	11	0	52,001
Single Family	184,077	2,274	22	0	0	186,373

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					Total Loss
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	
\$8,375,000	\$71,352,000	\$38,331,000	\$1,504,000	0.15	\$3,551,000	\$2,024,000	\$2,358,000	\$2,744,000	\$130,239,000

Hospital Functionality

	At Day 1			At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%								
Large	2,873	2,847	99	2,847	99	2,870	100	2,870	100	2,870	100
Medium	397	393	99	393	99	397	100	397	100	397	100
Total	3,270	3,240	—	3,240	—	3,267	—	3,267	—	3,267	—

Large Hospital: > 150 beds
 Medium Hospital: 50-150 beds
 Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
404	400	4	0	0	0

**Scenario: M 7.4 Canyon River Fault
Pierce County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
23	1,924	\$123,000,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
282,052	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
282,052	0	0	0	0	0	0	0	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
11,000	7,000	17,000	680

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
4	2

Essential Facilities Functionality

	Count	Functionality (%)
	At Day 1	
Emergency Operation Center	5	99
Fire Station Facilities	86	99
Police Station Facilities	26	99
School	299	99

**Scenario: M 7.4 Canyon River Fault
Thurston County**

Casualties Summary Report

	Injury Severity Level														
	Severity 1			Severity 2			Severity 3			Severity 4			Total		
	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	2:00 AM	2:00 PM	5:00 PM	12:00 AM	2:00 PM	5:00 PM
Commuting	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Commercial	0	5	4	0	0	0	0	0	0	0	0	0	0	5	4
Educational	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other-Residential	4	1	1	0	0	0	0	0	0	0	0	0	4	1	1
Single Family	2	0	1	0	0	0	0	0	0	0	0	0	2	0	1
Total Thurston	6	7	6	0	0	0	0	0	1	0	0	0	6	7	7

Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
 Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.
 Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
 Severity Level 4: Victims are killed by the earthquake

Number of Buildings Damaged by General Occupancy Class

	Number of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
Agriculture	397	19	5	0	0	421
Commercial	3,838	251	50	1	0	4,140
Education	148	9	2	0	0	159
Government	254	23	6	0	0	283
Industrial	1,166	85	23	1	0	1,275
Religion	288	17	3	0	0	308
Other Residential	18,719	1,709	370	6	0	20,804
Single Family	56,505	1,184	12	2	0	57,703

Structural damage states vary by building type. See HAZUS Technical Manual Vol. I. "Complete damage" indicates structural collapse or is in imminent danger of collapse.

Direct Economic Losses For Buildings

Capital Stock Losses				Income Losses					Total Loss
Cost Structural Damage	Cost Non-structural Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Loss	Wages Losses	Rental Income Loss	
\$4,036,000	\$34,450,000	\$18,093,000	\$409,000	0.24	\$2,006,000	\$1,079,000	\$1,482,000	\$1,371,000	\$62,926,000

Hospital Functionality

	Total Number of Beds	At Day 1		At day 3		At day 7		At day 30		At day 90	
		Number of Beds	%								
Large	375	367	98	367	98	375	100	375	100	375	100
Medium	119	116	98	116	98	119	100	119	100	119	100
Total	494	483	—	483	—	494	—	494	—	494	—

Large Hospital: > 150 beds
 Medium Hospital: 50-150 beds
 Small Hospital: < 50 beds

Highway Bridge Damage

Total Number of Bridges	Average Number for Damage State				
	None	Slight	Moderate	Extensive	Complete
186	180	4	2	0	0

**Scenario: M 7.4 Canyon River Fault
Thurston County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
8	440	\$33,256,000

Potable Water System Performance

Total Households	Number of Households Without Water									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
89,162	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

Total Households	Number of Households Without Power									
	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
89,162	0	0	0	0	0	0	0	0	0	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
5,000	3,000	8,000	320

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
4	2

Essential Facilities Functionality

	Count	Functionality (%)
		At Day 1
Emergency Operation Center	5	97
Fire Station Facilities	46	98
Police Station Facilities	9	97
School	95	98

HAZUS-MH: Earthquake Event Report

Region Name: CanyonRiverM74-redo

Earthquake Scenario: CanyonRiver-RedoM7.4

Print Date: March 10, 2010

Totals only reflect data for those census tracts/blocks included in the user's study region.

Disclaimer:

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

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General Description of the Region

HAZUS is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of HAZUS is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 23 county(ies) from the following state(s):

Washington

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36,495.82 square miles and contains 1,084 census tracts. There are over 2,043 thousand households in the region and has a total population of 5,283,432 people (2005 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 1,877 thousand buildings in the region with a total building replacement value (excluding contents) of 402,081 (millions of dollars). Approximately 92.00 % of the buildings (and 0.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 151,145 and 21,726 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 1,877 thousand buildings in the region which have an aggregate total replacement value of 402,081 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 81% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

HAZUS breaks critical facilities into two (2) groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 75 hospitals in the region with a total bed capacity of 14,258 beds. There are 2,254 schools, 938 fire stations, 226 police stations and 55 emergency operation facilities. With respect to HPL facilities, there are 450 dams identified within the region. Of these, 146 of the dams are classified as 'high hazard'. The inventory also includes 839 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within HAZUS, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 172,871.00 (millions of dollars). This inventory includes over 9,562 kilometers of highways, 4,996 bridges, 286,170 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	4,996	90,051.60
	Segments	3,454	53,323.90
	Tunnels	29	67.00
		Subtotal	143,442.50
Railways	Bridges	77	20.00
	Facilities	68	181.10
	Segments	1,407	2,642.40
	Tunnels	0	0.00
		Subtotal	2,843.50
Light Rail	Bridges	0	0.00
	Facilities	38	101.20
	Segments	48	203.90
	Tunnels	0	0.00
		Subtotal	305.00
Bus	Facilities	45	54.00
		Subtotal	54.00
Ferry	Facilities	45	59.90
		Subtotal	59.90
Port	Facilities	486	970.50
		Subtotal	970.50
Airport	Facilities	62	660.40
	Runways	74	2,809.30
		Subtotal	3,469.70
		Total	151,145.10

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	2,861.70
	Facilities	41	1,501.80
	Pipelines	0	0.00
		Subtotal	4,363.50
Waste Water	Distribution Lines	NA	1,717.00
	Facilities	146	10,696.00
	Pipelines	0	0.00
		Subtotal	12,413.00
Natural Gas	Distribution Lines	NA	1,144.70
	Facilities	56	67.10
	Pipelines	0	0.00
		Subtotal	1,211.80
Oil Systems	Facilities	15	1.70
	Pipelines	0	0.00
		Subtotal	1.70
Electrical Power	Facilities	78	9,438.00
		Subtotal	9,438.00
Communication	Facilities	196	21.60
		Subtotal	21.60
		Total	27,449.60

Earthquake Scenario

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	CanyonRiver-RedoM7.4
Type of Earthquake	User-defined
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	7.40
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Building Damage

HAZUS estimates that about 7,012 buildings will be at least moderately damaged. This is over 0.00 % of the total number of buildings in the region. There are an estimated 25 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 3 below summaries the expected damage by general occupancy for the buildings in the region. Table 4 summaries the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	8,133	0.44	170	0.50	48	0.74	4	0.82	0	0.71
Commercial	95,160	5.18	2,948	8.61	680	10.50	43	8.44	2	7.06
Education	3,454	0.19	84	0.24	19	0.30	1	0.26	0	0.37
Government	2,258	0.12	86	0.25	24	0.37	1	0.29	0	0.18
Industrial	29,270	1.59	1,031	3.01	305	4.70	22	4.34	1	2.71
Other Residential	362,784	19.75	15,359	44.85	4,914	75.88	402	78.68	15	58.42
Religion	6,664	0.36	161	0.47	36	0.55	2	0.47	0	0.54
Single Family	1,328,816	72.35	14,407	42.07	450	6.95	34	6.70	8	30.01
Total	1,836,538		34,246		6,476		511		26	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1,499,536	81.65	16605	48.49	468	7.23	34	6.64	8	31.23
Steel	38,841	2.11	1275	3.72	423	6.53	27	5.31	1	2.68
Concrete	38,338	2.09	1020	2.98	200	3.09	11	2.15	0	1.45
Precast	27,789	1.51	964	2.82	317	4.89	24	4.67	1	2.51
RM	68,789	3.75	791	2.31	221	3.41	14	2.81	0	1.86
URM	13,534	0.74	1497	4.37	324	5.00	21	4.15	1	5.29
MH	149,711	8.15	12094	35.32	4,524	69.85	380	74.28	14	54.98
Total	1,836,538		34,246		6,476		511		26	

*Note:

RM Reinforced Masonry
 URM Unreinforced Masonry
 MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 14,258 hospital beds available for use. On the day of the earthquake, the model estimates that only 13,950 hospital beds (98.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 99.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	75	0	0	74
Schools	2,254	0	0	2,254
EOCs	55	0	0	55
PoliceStations	226	0	0	226
FireStations	938	0	0	932

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	Number of Locations_			
			With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	3,454	0	0	3,454	3,454
	Bridges	4,996	5	0	4,991	4,994
	Tunnels	29	0	0	29	29
Railways	Segments	1,407	0	0	1,407	1,407
	Bridges	77	0	0	77	77
	Tunnels	0	0	0	0	0
	Facilities	68	0	0	68	68
Light Rail	Segments	48	0	0	48	48
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	38	0	0	38	38
Bus	Facilities	45	0	0	45	45
Ferry	Facilities	45	0	0	45	45
Port	Facilities	486	0	0	486	486
Airport	Facilities	62	0	0	62	62
	Runways	74	0	0	74	74

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, HAZUS performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	41	0	0	41	41
Waste Water	146	0	0	146	146
Natural Gas	56	0	0	56	56
Oil Systems	15	0	0	15	15
Electrical Power	78	0	0	77	78
Communication	196	0	0	196	196

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	143,085	1069	323
Waste Water	85,851	846	255
Natural Gas	57,234	904	273
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	2,043,617	1,185	282	0	0	0
Electric Power		166	93	33	6	0

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 133 ignitions that will burn about 4.83 sq. mi (0.01 % of the region's total area.) The model also estimates that the fires will displace about 12,771 people and burn about 1,029 (millions of dollars) of building value.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.120 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 59.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 4,760,000 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Social Impact

Shelter Requirement

HAZUS estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 49 households to be displaced due to the earthquake. Of these, 32 people (out of a total population of 5,283,432) will seek temporary shelter in public shelters.

Casualties

HAZUS estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	1	0	0	0
	Industrial	1	0	0	0
	Other-Residential	50	4	0	0
	Single Family	23	1	0	0
	Total	76	5	0	0
2 PM	Commercial	71	5	0	0
	Commuting	0	0	0	0
	Educational	12	1	0	0
	Hotels	0	0	0	0
	Industrial	10	1	0	0
	Other-Residential	11	1	0	0
	Single Family	5	0	0	0
	Total	108	8	1	0
5 PM	Commercial	50	4	0	0
	Commuting	5	7	12	2
	Educational	1	0	0	0
	Hotels	0	0	0	0
	Industrial	6	0	0	0
	Other-Residential	18	1	0	0
	Single Family	8	0	0	0
	Total	90	14	12	3

Economic Loss

The total economic loss estimated for the earthquake is 1,264.25 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 798.54 (millions of dollars); 10 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 50 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.66	14.60	0.89	1.37	17.52
	Capital-Related	0.00	0.28	13.67	0.53	0.25	14.74
	Rental	1.15	4.75	11.84	0.40	0.53	18.67
	Relocation	2.34	8.45	12.84	2.01	2.81	28.45
	Subtotal	3.49	14.15	52.95	3.83	4.96	79.38
Capital Stock Losses							
	Structural	14.56	13.53	19.05	5.08	3.48	55.70
	Non_Structural	158.13	92.76	119.49	35.49	22.27	428.14
	Content	77.38	28.76	81.11	24.63	15.68	227.57
	Inventory	0.00	0.00	2.27	5.26	0.21	7.74
	Subtotal	250.08	135.05	221.93	70.46	41.64	719.16
	Total	253.57	149.19	274.89	74.29	46.60	798.54

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, HAZUS computes the direct repair cost for each component only. There are no losses computed by HAZUS for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

HAZUS estimates the long-term economic impacts to the region for 15 years after the earthquake. The model quantifies this information in terms of income and employment changes within the region. Table 14 presents the results of the region for the given earthquake.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	53,323.90	\$24.07	0.05
	Bridges	90,051.61	\$151.28	0.17
	Tunnels	66.98	\$0.01	0.01
	Subtotal	143442.50	175.40	
Railways	Segments	2,642.42	\$0.00	0.00
	Bridges	19.99	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	181.08	\$9.64	5.32
	Subtotal	2843.50	9.60	
Light Rail	Segments	203.85	\$0.00	0.00
	Bridges	0.00	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	101.19	\$5.90	5.83
	Subtotal	305.00	5.90	
Bus	Facilities	53.96	\$2.08	3.85
	Subtotal	54.00	2.10	
Ferry	Facilities	59.90	\$2.05	3.42
	Subtotal	59.90	2.10	
Port	Facilities	970.54	\$39.33	4.05
	Subtotal	970.50	39.30	
Airport	Facilities	660.36	\$18.87	2.86
	Runways	2,809.34	\$0.02	0.00
	Subtotal	3469.70	18.90	
	Total	151145.10	253.30	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	\$0.00	0.00
	Facilities	1,501.80	\$15.36	1.02
	Distribution Lines	2,861.70	\$5.37	0.19
	Subtotal	4,363.54	\$20.73	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	10,696.00	\$85.44	0.80
	Distribution Lines	1,717.00	\$4.25	0.25
	Subtotal	12,412.98	\$89.69	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	67.10	\$0.31	0.46
	Distribution Lines	1,144.70	\$4.54	0.40
	Subtotal	1,211.83	\$4.85	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	1.70	\$0.02	0.98
	Subtotal	1.65	\$0.02	
Electrical Power	Facilities	9,438.00	\$97.01	1.03
	Subtotal	9,438.00	\$97.01	
Communication	Facilities	21.60	\$0.16	0.74
	Subtotal	21.56	\$0.16	
	Total	27,449.55	\$212.46	

Table 14. Indirect Economic Impact with outside aid
 (Employment as # of people and Income in millions of \$)

	LOSS	Total	%
First Year			
	Employment Impact	203,854	11.32
	Income Impact	605	0.68
Second Year			
	Employment Impact	69,317	3.85
	Income Impact	293	0.33
Third Year			
	Employment Impact	1,563	0.09
	Income Impact	61	0.07
Fourth Year			
	Employment Impact	89	0.00
	Income Impact	(18)	-0.02
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(22)	-0.03
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(23)	-0.03

Appendix A: County Listing for the Region

Chelan,WA

Clallam,WA

Clark,WA

Cowlitz,WA

Grays Harbor,WA

Island,WA

Jefferson,WA

King,WA

Kitsap,WA

Kittitas,WA

Klickitat,WA

Lewis,WA

Mason,WA

Pacific,WA

Pierce,WA

San Juan,WA

Skagit,WA

Skamania,WA

Snohomish,WA

Thurston,WA

Wahkiakum,WA

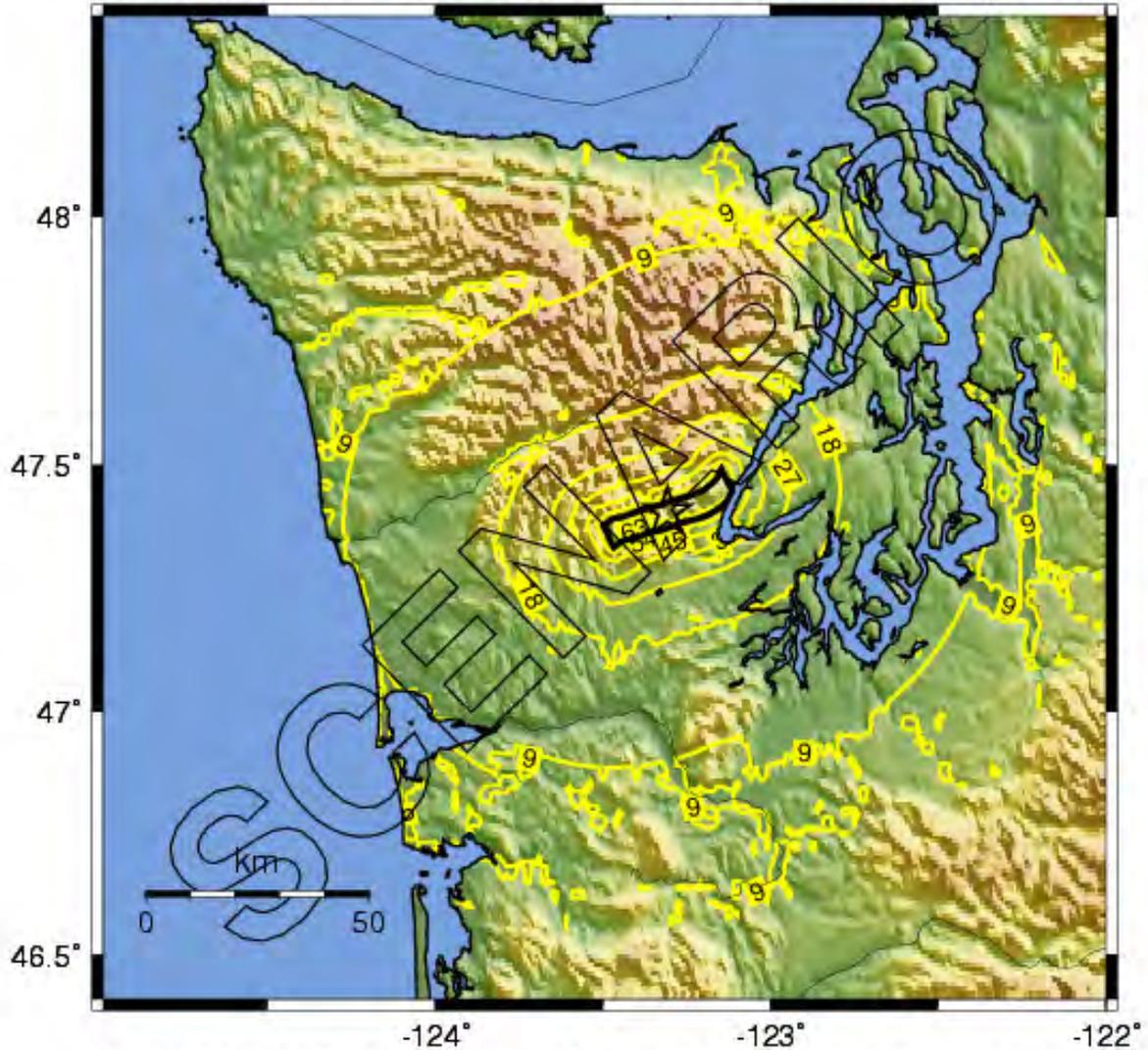
Whatcom,WA

Yakima,WA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Washington	Chelan	68,646	3,915	1,524	5,439
	Clallam	68,232	3,789	1,128	4,917
	Clark	395,707	21,358	5,081	26,439
	Cowlitz	96,113	5,167	1,575	6,742
	Grays Harbor	69,881	3,866	1,228	5,095
	Island	78,149	5,289	842	6,132
	Jefferson	28,169	1,741	517	2,258
	King	1,828,516	123,492	35,829	159,322
	Kitsap	245,278	14,460	2,974	17,435
	Kittitas	37,701	2,087	539	2,627
	Klickitat	20,162	908	287	1,195
	Lewis	70,750	3,424	1,286	4,711
	Mason	53,236	3,094	593	3,687
	Pacific	20,855	1,443	384	1,828
	Pierce	757,734	42,208	10,185	52,394
	San Juan	15,413	1,454	350	1,805
	Skagit	111,356	6,119	1,896	8,015
	Skamania	10,300	551	118	670
	Snohomish	661,444	38,562	8,570	47,132
	Thurston	226,721	12,793	3,286	16,080
Wahkiakum	3,900	204	62	267	
Whatcom	185,545	10,528	3,715	14,244	
Yakima	229,624	9,899	3,738	13,637	
Total State		5,283,432	316,351	85,707	402,071
Total Region		5,283,432	316,351	85,707	402,071

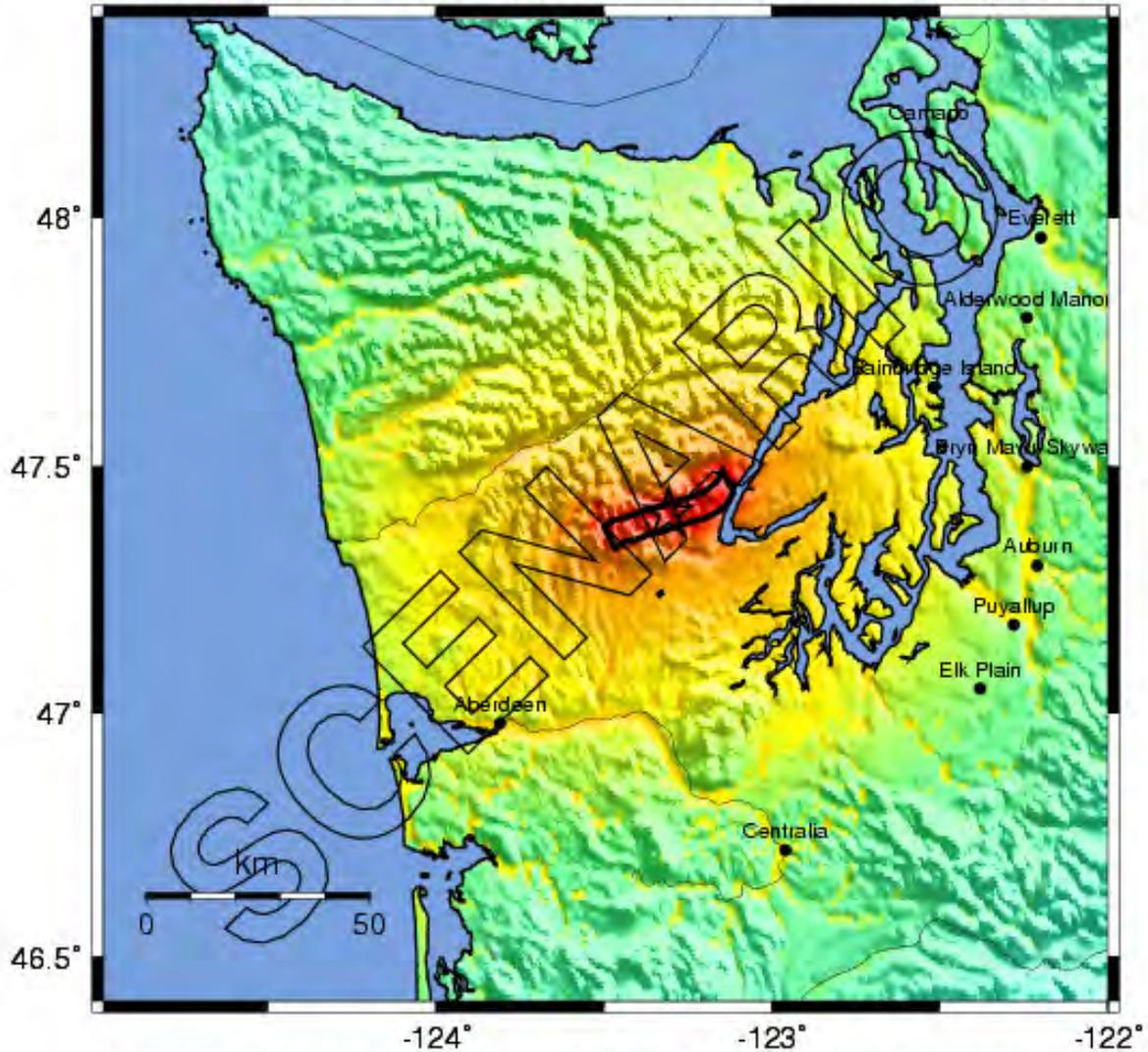
-- Earthquake Planning Scenario --
Peak Accel. Map (in %g) for CanyonR_PriceL7.4 Scenario
Scenario Date: Thu Jun 4, 2009 12:00:00 GMT M 7.4 N47.41 W123.31 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 3 Processed Fri Jun 5, 2009 01:43:05 PM MDT

-- Earthquake Planning Scenario --
 ShakeMap for CanyonR_PriceL7.4 Scenario

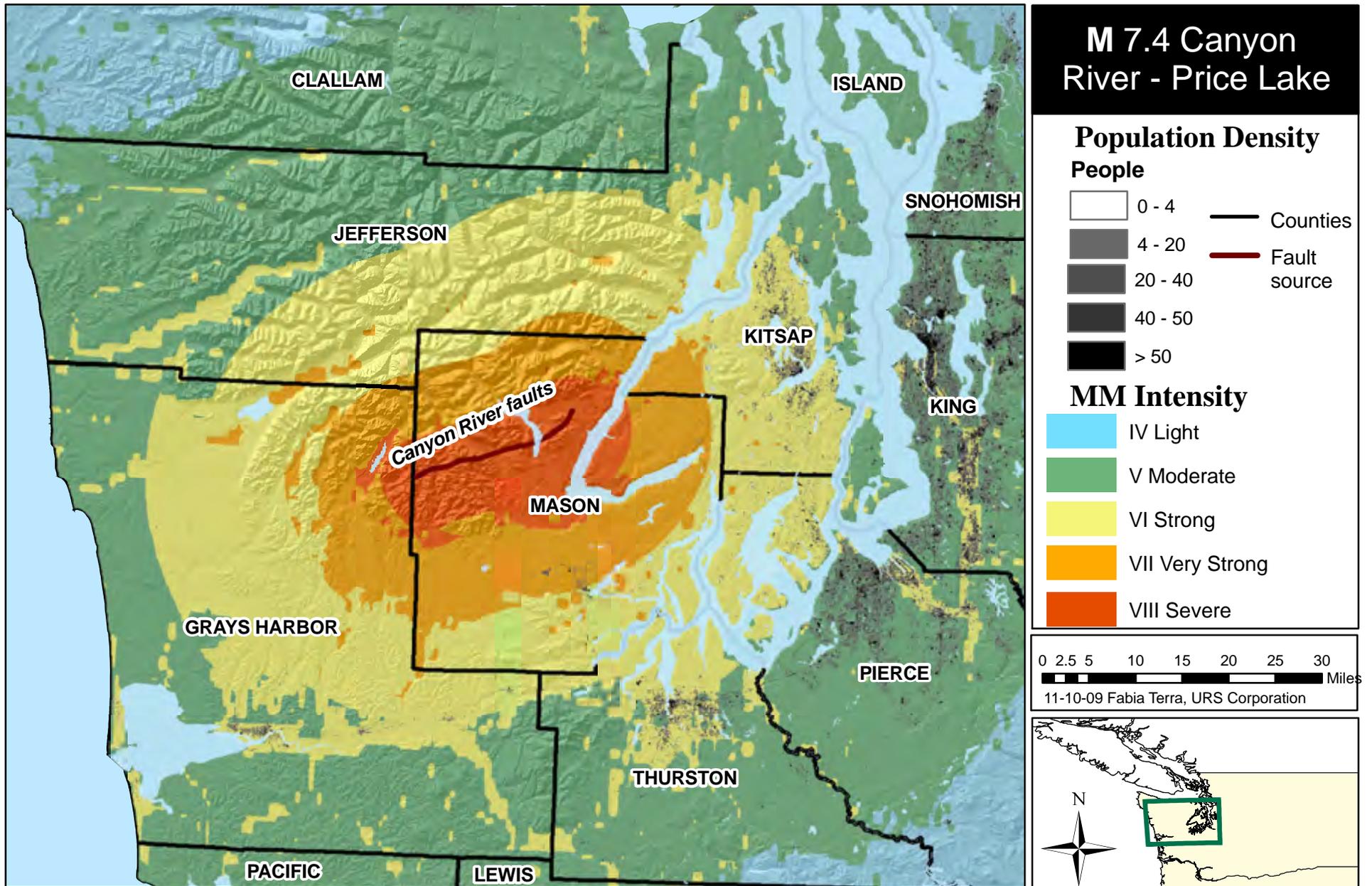
Scenario Date: Thu Jun 4, 2009 12:00:00 GMT M 7.4 N47.41 W123.31 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 3 Processed Fri Jun 5, 2009 01:43:05 PM MDT

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC. (%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL. (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

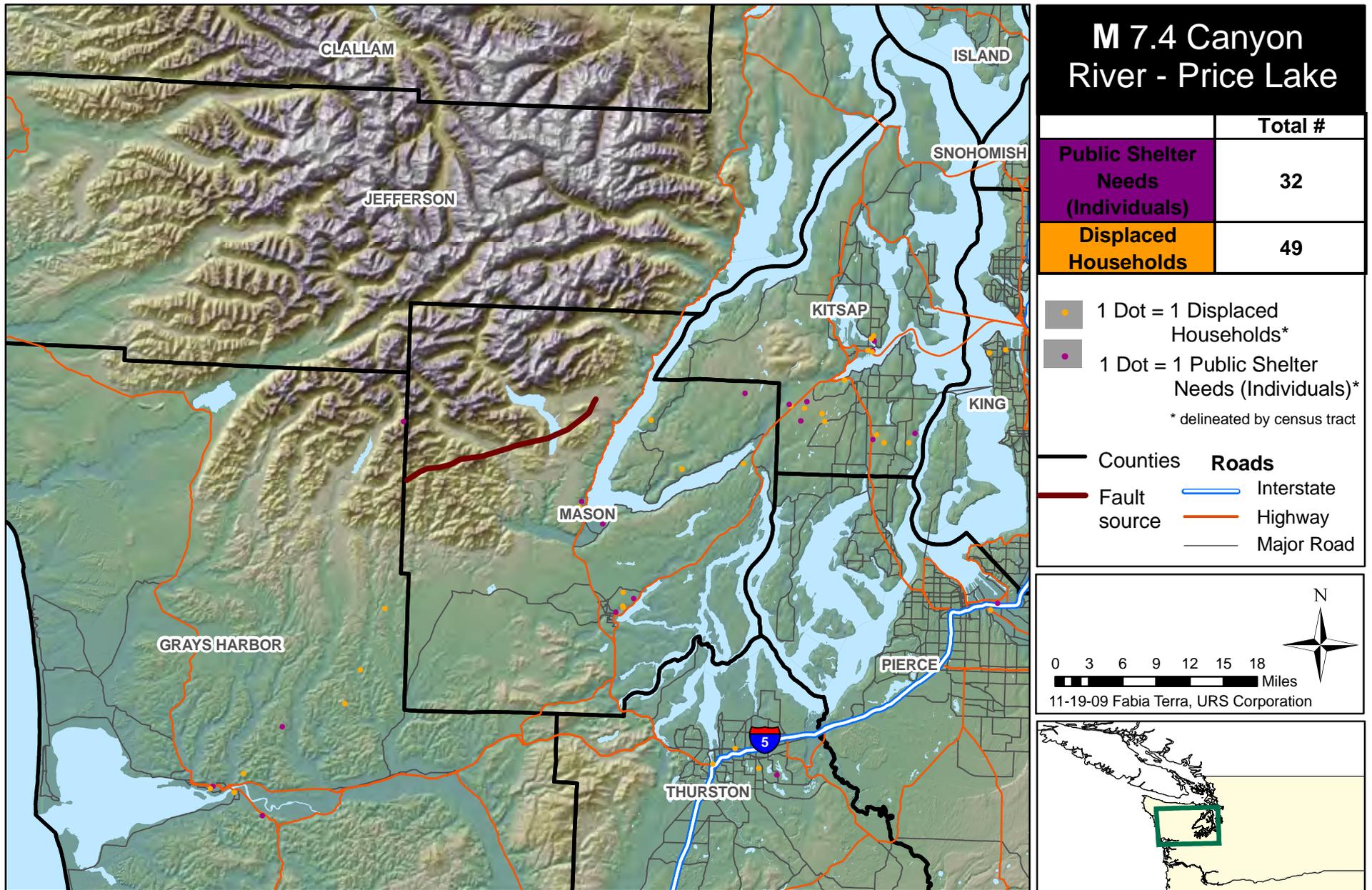
Population Density and Ground Shaking Intensities - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, MMI Map USGS 2009
Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 1

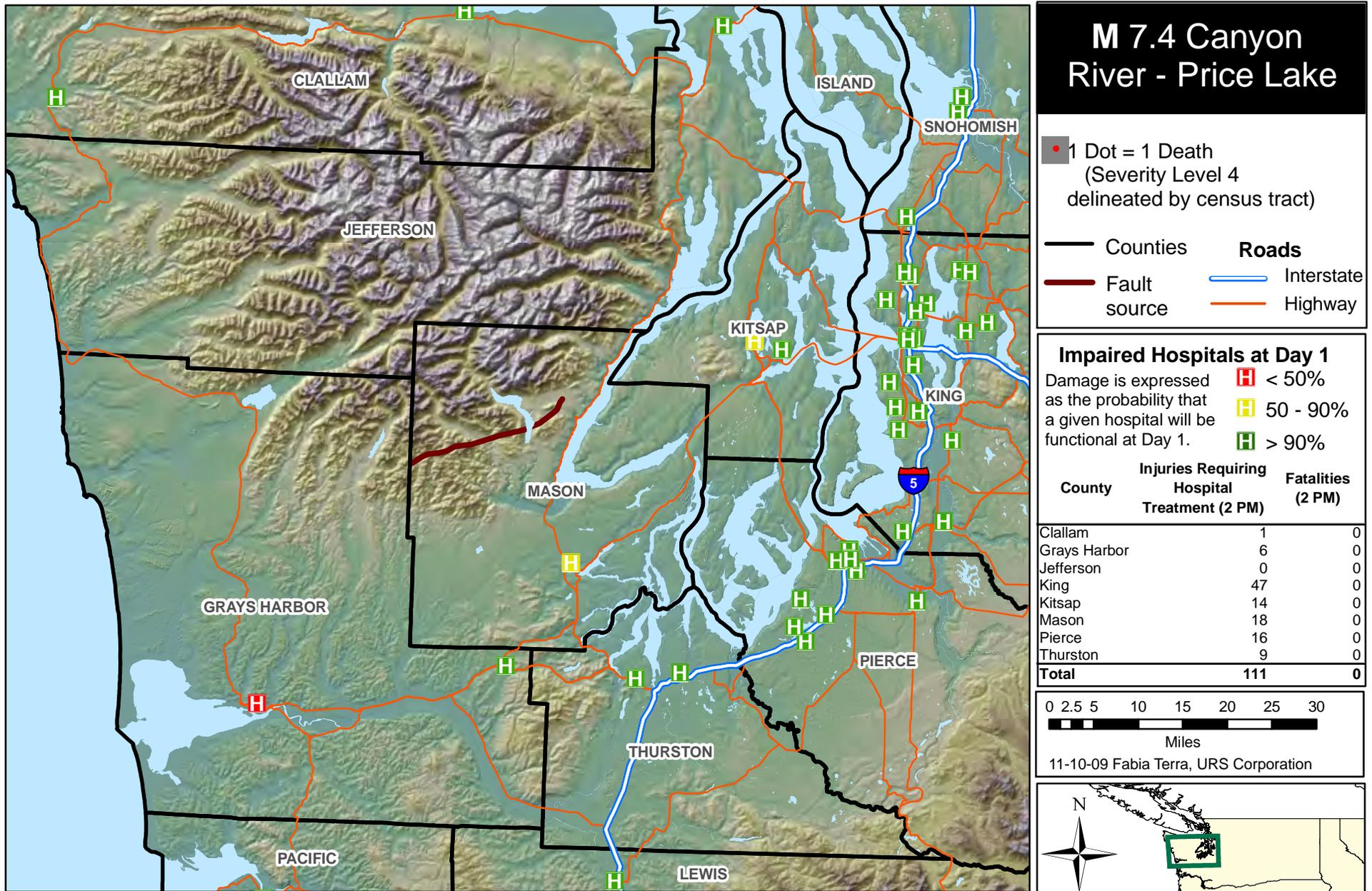
Estimated Displaced Households & Short Term Public Shelter Needs - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 5

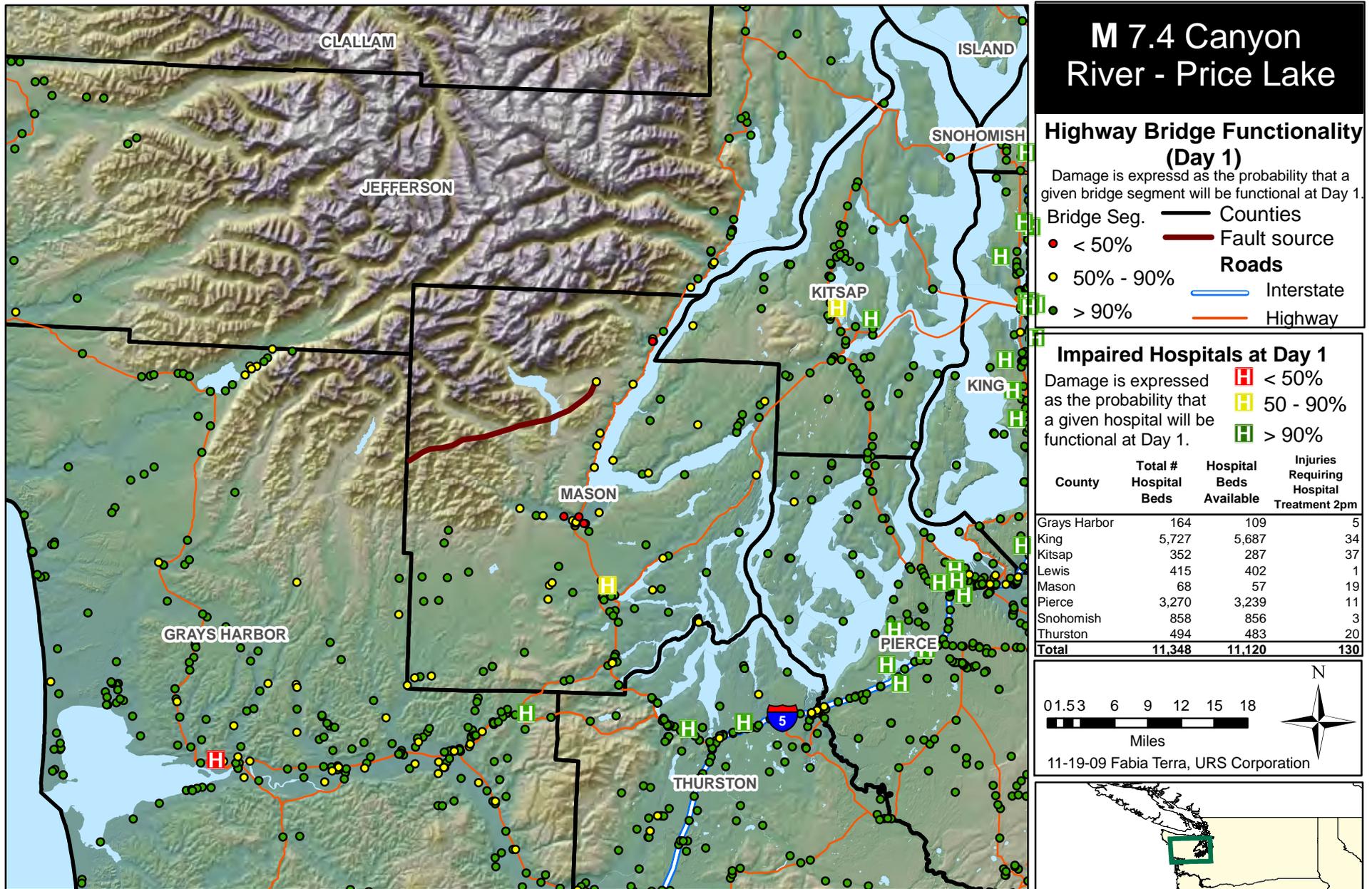
Fatalities (2 pm) and Impaired Hospitals (Day 1) - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 2

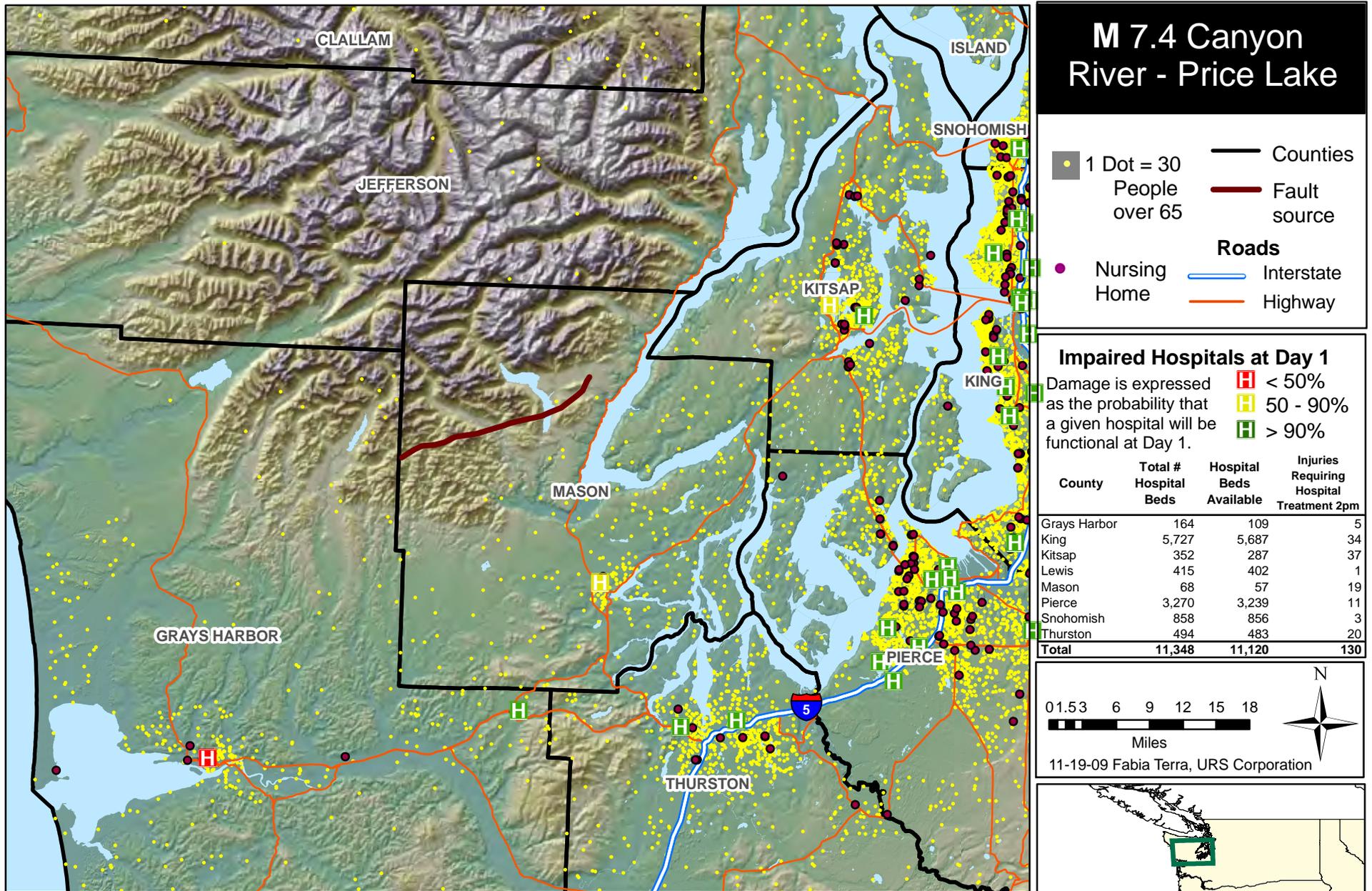
Impaired Hospitals (Day 1), Hospital Bed Availability, & Bridge Functionality - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 3

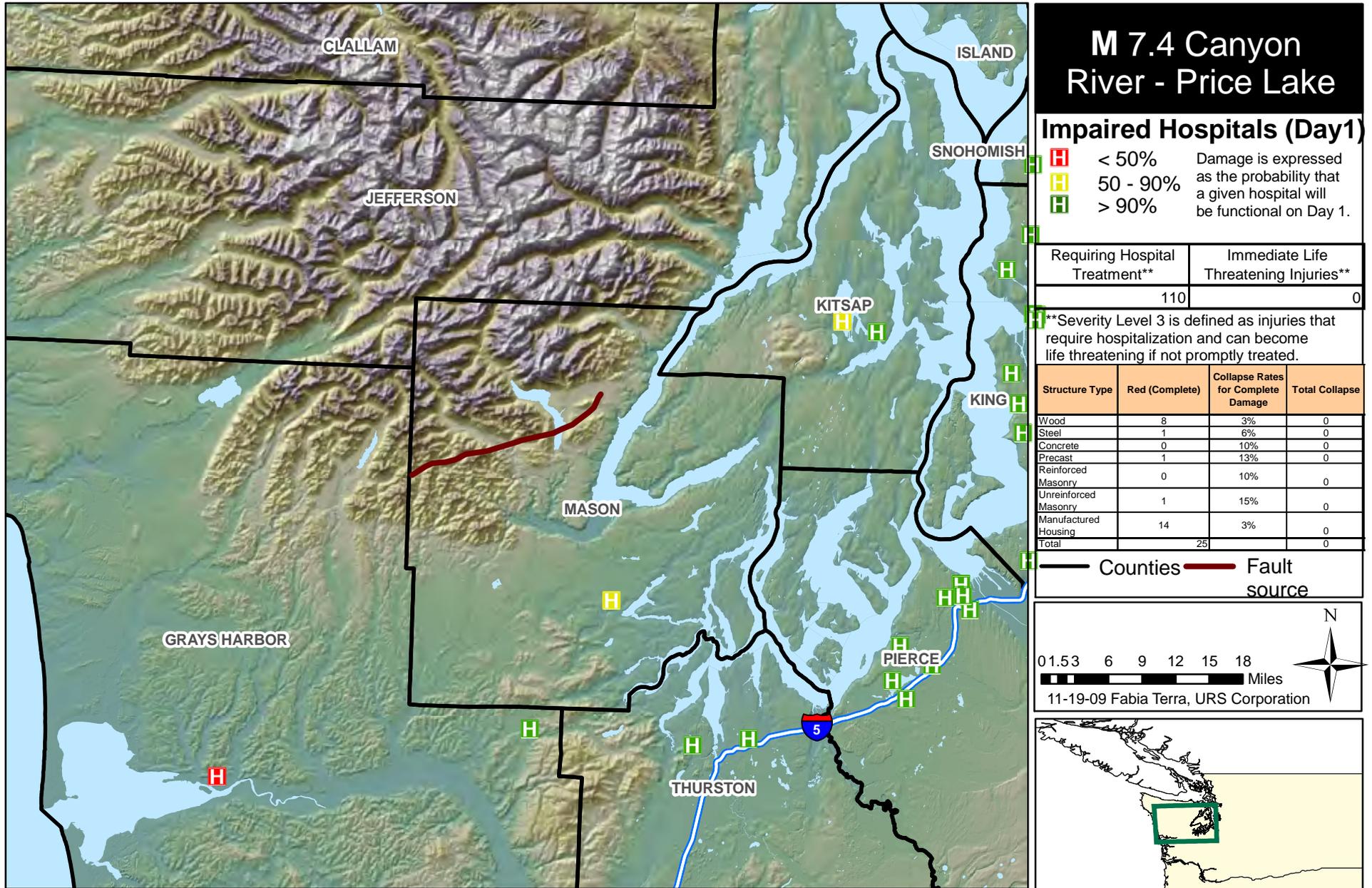
Distribution of Elderly, Impaired Hospitals (Day 1), & Hospital Bed Availability - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways and Nursing homes HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 4

Injuries at 2 pm, Collapsed Structures, and Impaired Hospitals - Earthquake Scenario: Washington



M 7.4 Canyon River - Price Lake

Impaired Hospitals (Day1)

	< 50%	Damage is expressed as the probability that a given hospital will be functional on Day 1.
	50 - 90%	
	> 90%	

Requiring Hospital Treatment**	Immediate Life Threatening Injuries**
110	0

**Severity Level 3 is defined as injuries that require hospitalization and can become life threatening if not promptly treated.

Structure Type	Red (Complete)	Collapse Rates for Complete Damage	Total Collapse
Wood	8	3%	0
Steel	1	6%	0
Concrete	0	10%	0
Precast	1	13%	0
Reinforced Masonry	0	10%	0
Unreinforced Masonry	1	15%	0
Manufactured Housing	14	3%	0
Total	25		0

— Counties — Fault source

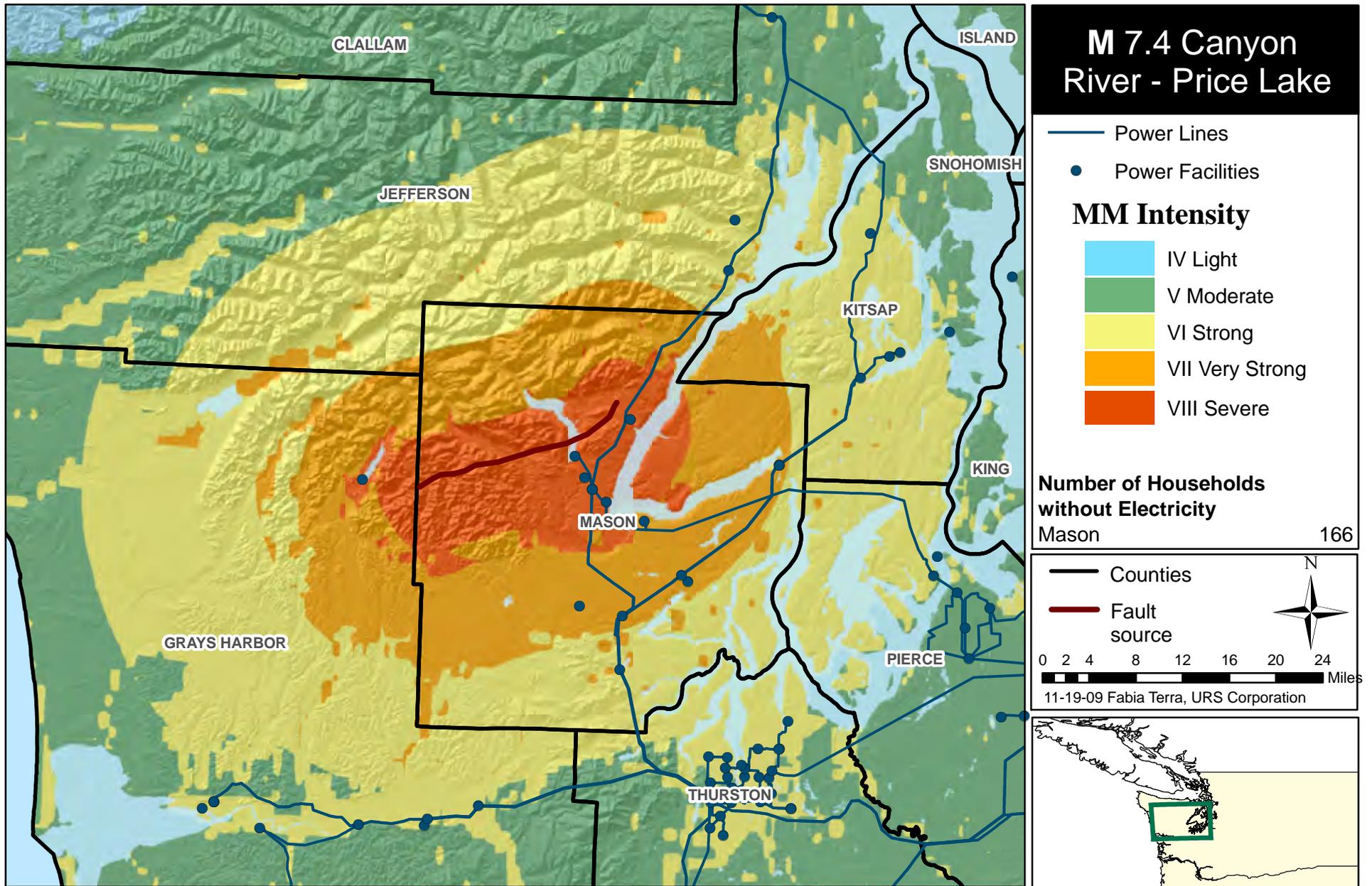
0 1.53 6 9 12 15 18 Miles

11-19-09 Fabia Terra, URS Corporation

Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 6

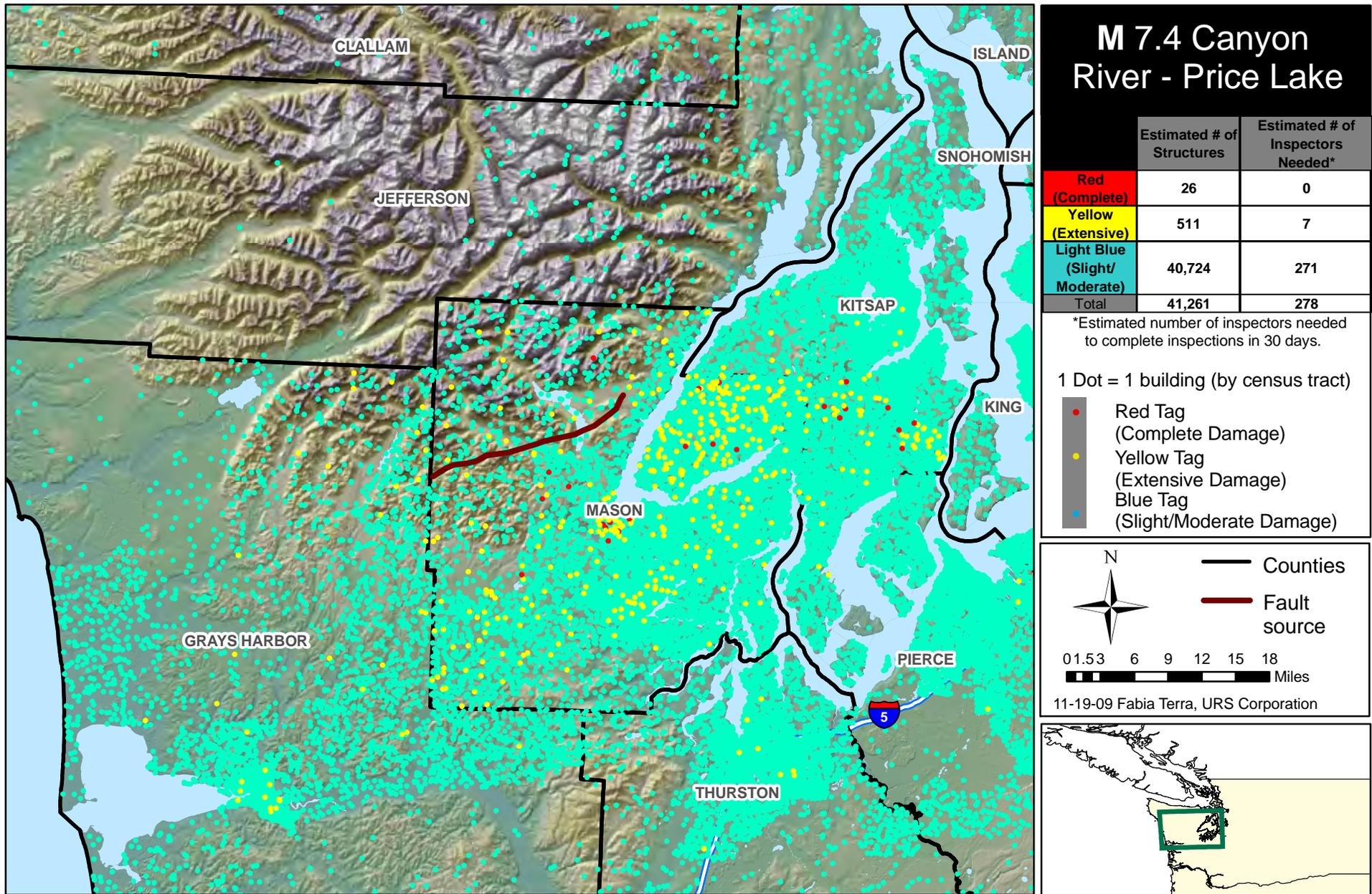
Power Lines and Facilities, Households Without Electricity, and Ground Shaking Intensities - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Power lines and facilities HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 7

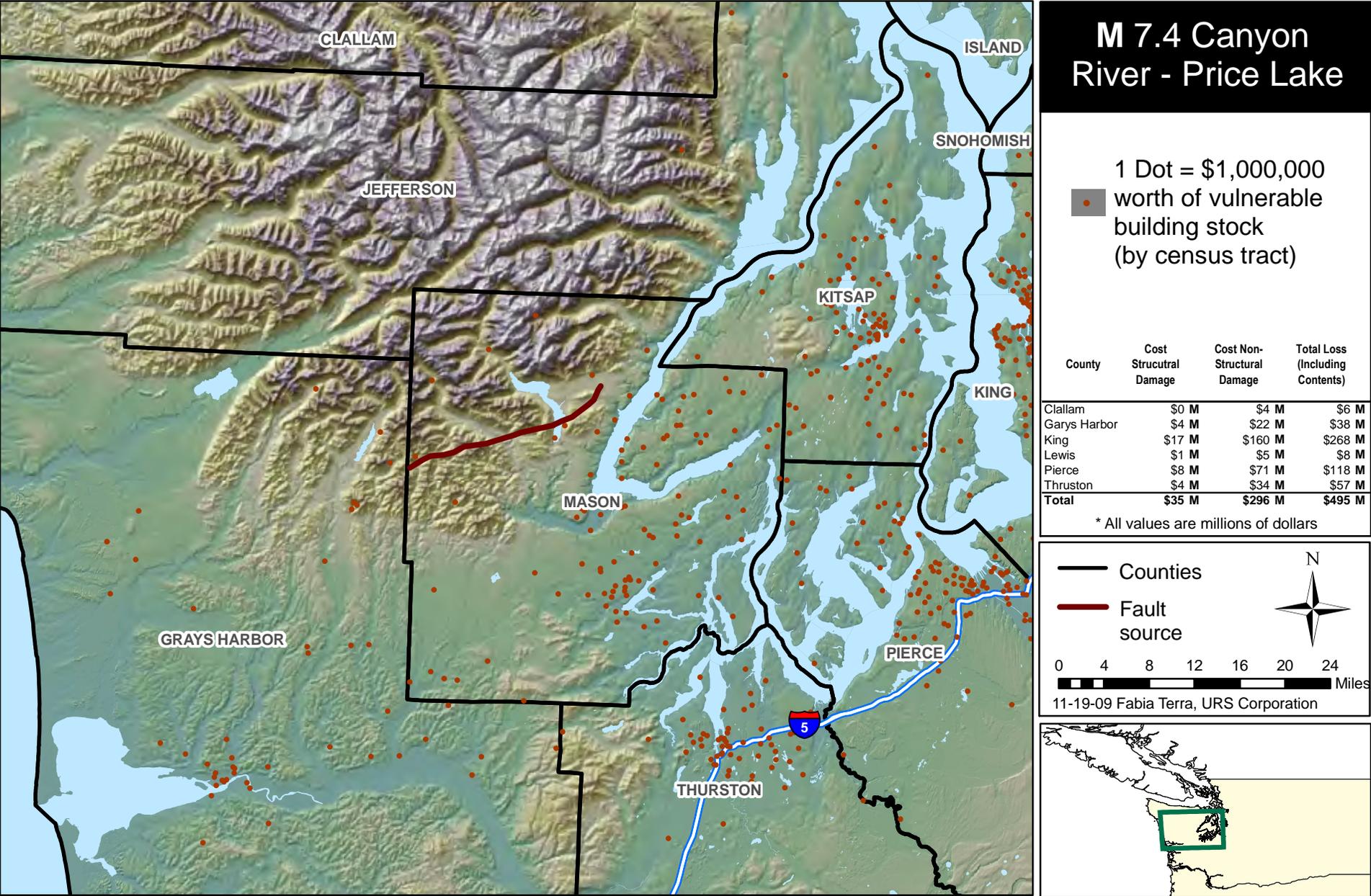
Estimated Building Inspection Needs - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 8

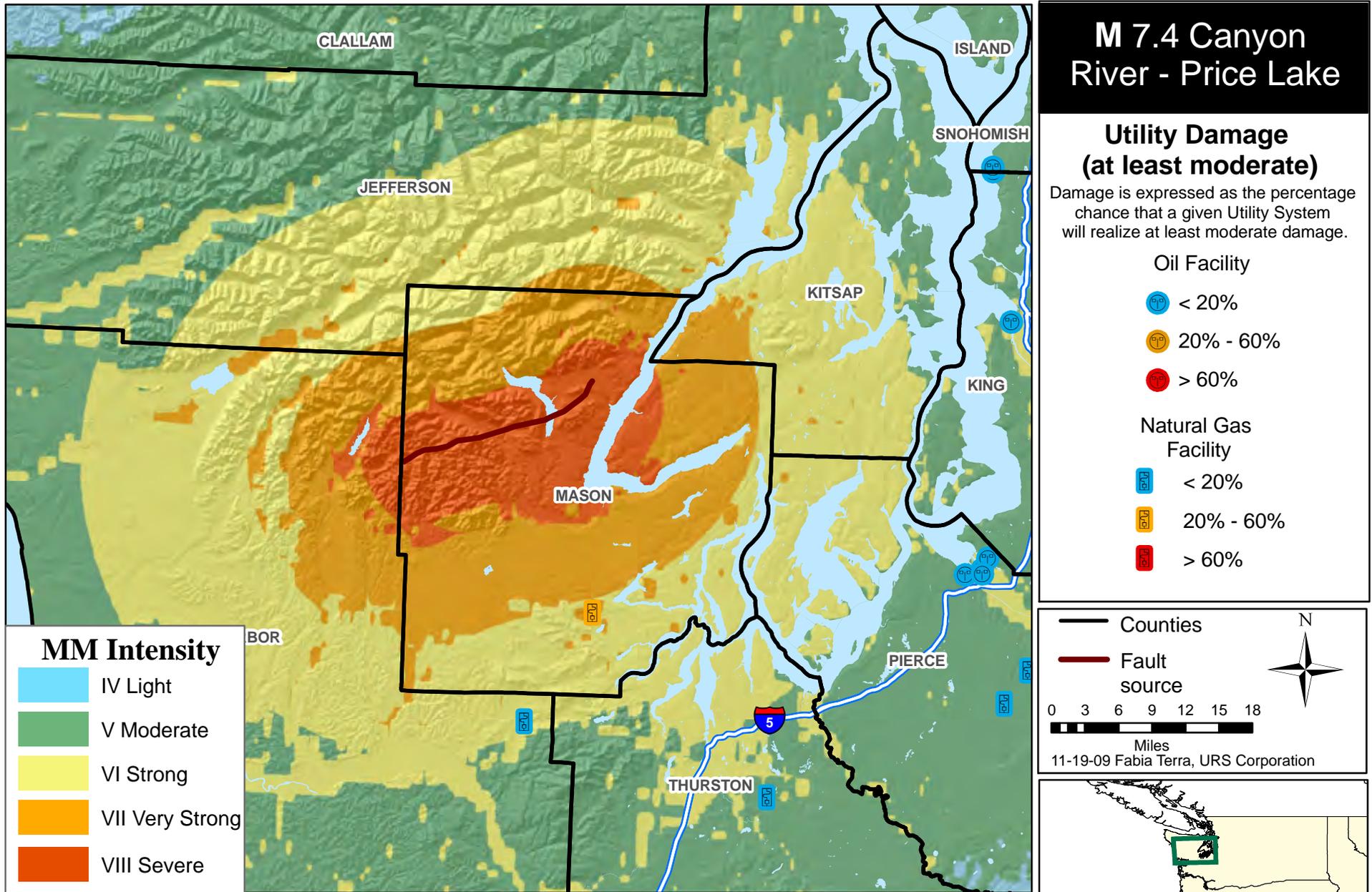
Direct Building Economic Loss - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 9

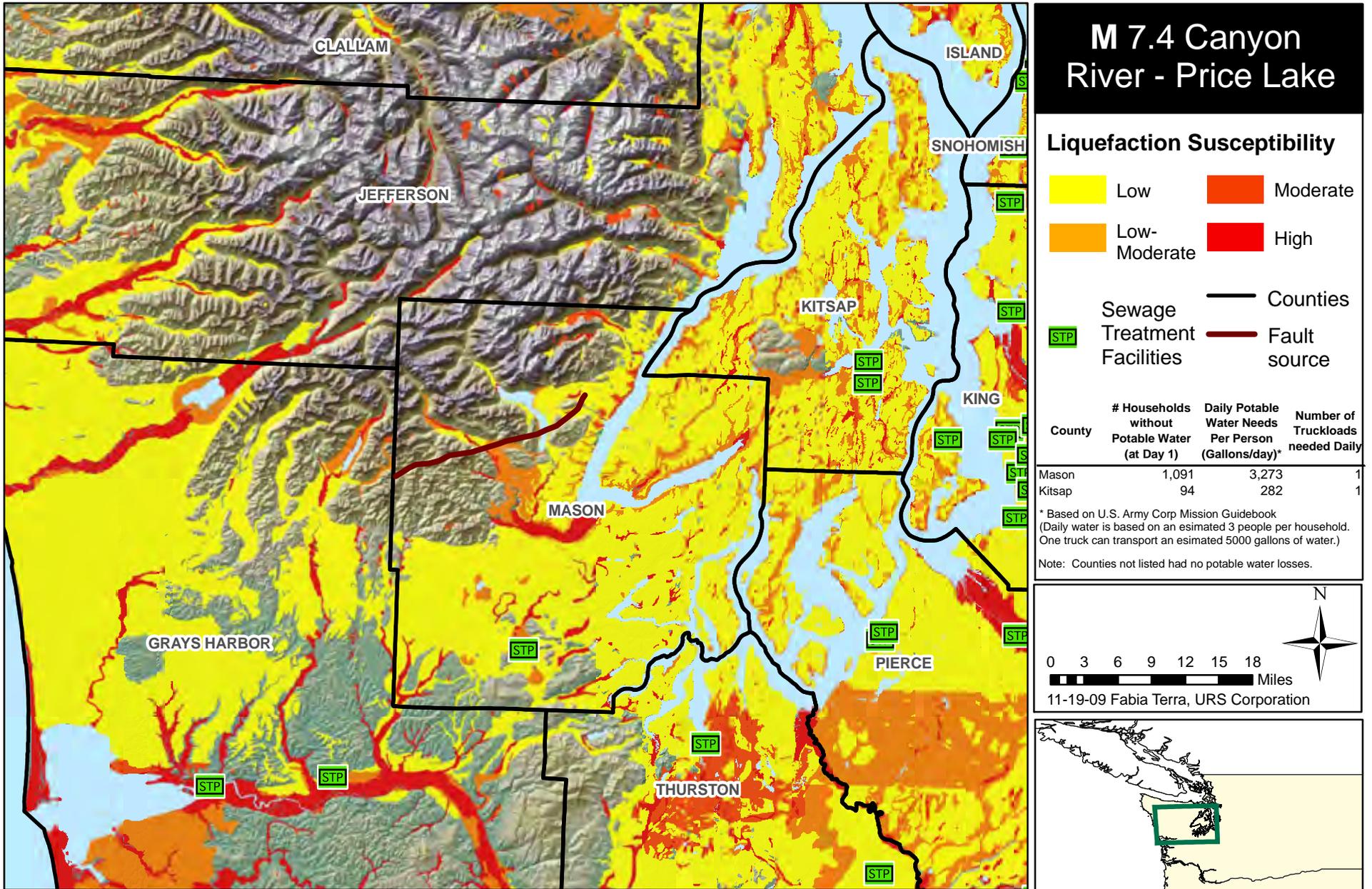
Natural Gas, and Oil Facility Damage - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007, MMI Map USGS 2009
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 10

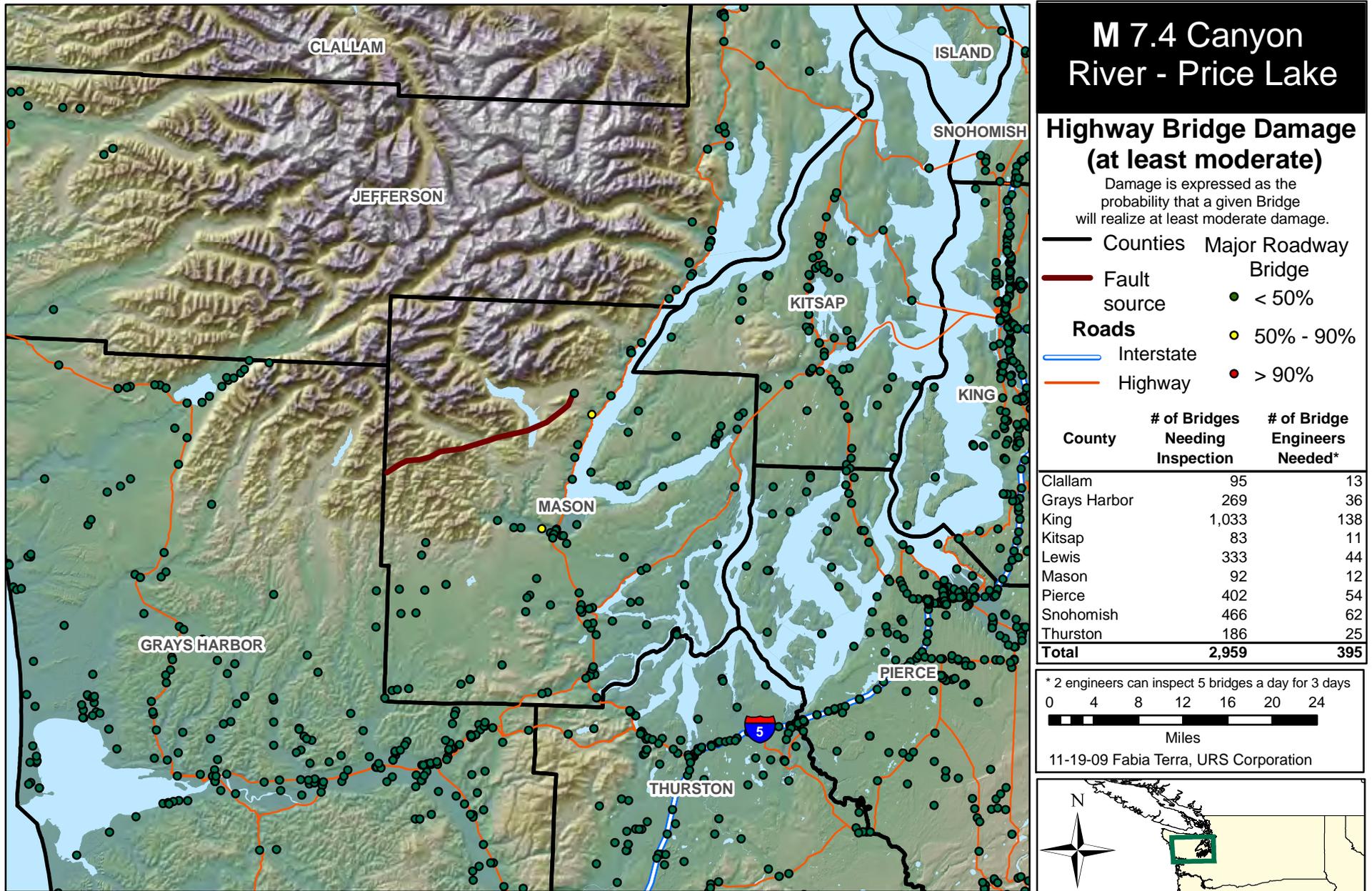
Sewage Treatment Facility Distribution, Households Without Potable Water, and Liquefaction Susceptibility - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Sewage Treatment Facilities HSIP Gold 2007, Liquefaction The Wash State Geological Survey
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 11

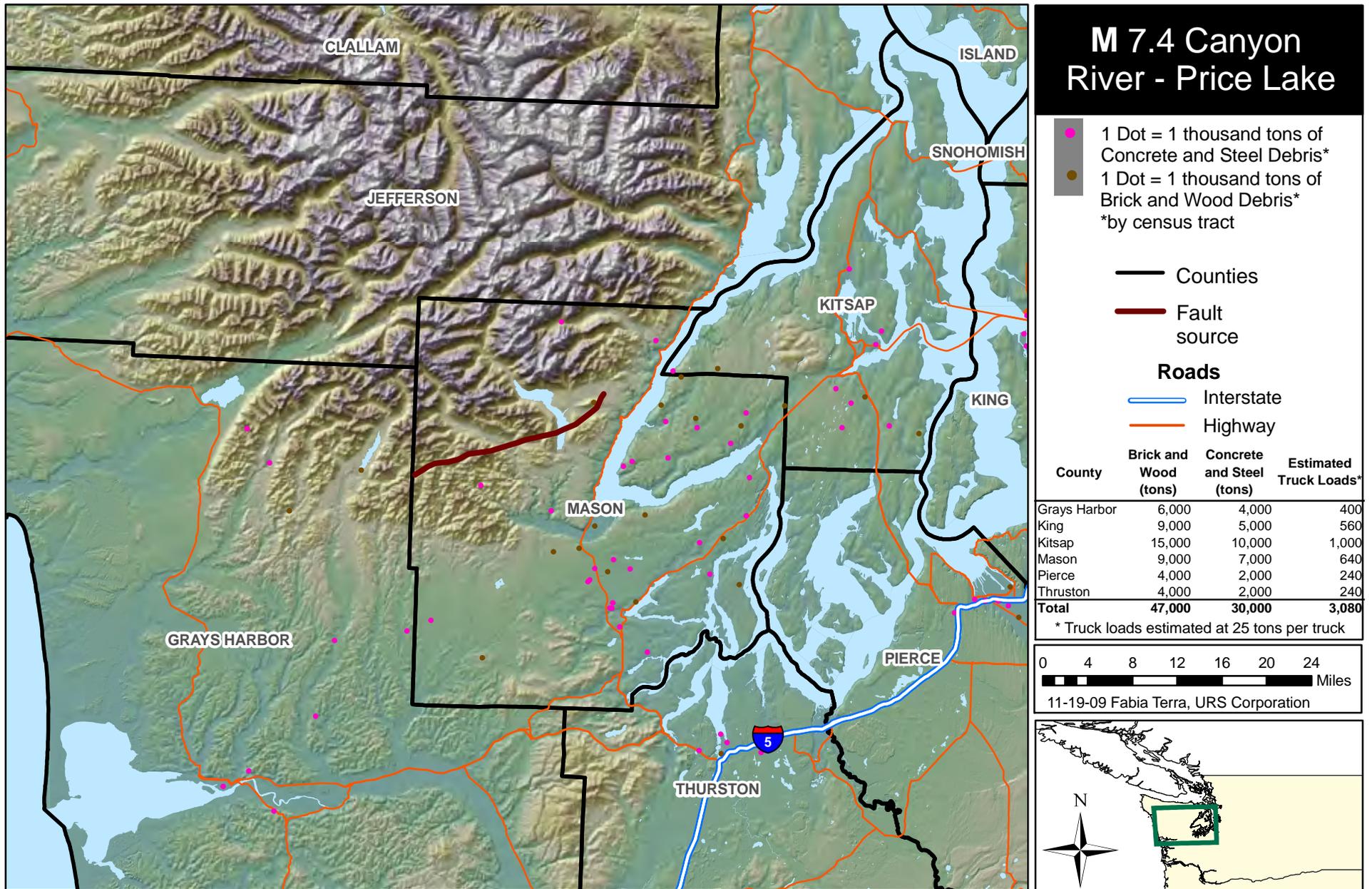
Estimated Highway Bridge Damage - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 12

Estimated Brick, Concrete, Steel, and Wood Debris - Earthquake Scenario: Washington



Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007
 Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 13