

**Scenario: M 7.0 St. Helens Fault
Clark 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	2:00 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	2	2	0	0	0	0	0	0	0	0	0	0	2	2
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	2	0	1	0	0	0	0	0	0	0	0	0	2	0	1
Single Family	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total Clark	3	3	3	0	0	0	0	0	0	0	0	0	3	3	3

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	473	12	2	0	0	487
Commercial	6058	159	25	0	0	6,242
Education	192	3	0	0	0	195
Government	107	3	0	0	0	110
Industrial	2206	70	13	0	0	2,289
Religion	396	8	1	0	0	405
Other Residential	21859	943	127	0	0	22,929
Single Family	94,401	408	9	0	0	94,818

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	
\$1,767,000	\$21,386,000	\$12,939,000	\$421,000	0.09	\$706,000	\$416,000	\$491,000	\$573,000	\$38,700,000

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	760	752	99	752	99	759	100	759	100	759	100
Medium											
Small											
Total	760	752	—	752	—	759	—	759	—	759	—

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
178	178	0	0	0	0

**Scenario: M 7.0 St. Helens Fault
Clark County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
8	479	\$29,584,000

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	%
145,493	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	%
145,493	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
2	1	3,000	120

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
1	0

Essential Facilities Functionality

	Count	Functionality (%)
	At Day 1	
Emergency Operation Center	2	99
Fire Station Facilities	46	99
Police Station Facilities	14	99
School	144	99

**Scenario: M 7.0 St. Helens Fault
Cowlitz 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	2:00 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	2	0	0	0	0	0	0	0	0	0	0	3	2
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	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Other-Residential	2	1	1	0	0	0	0	0	0	0	0	0	2	1	1
Single Family	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total Cowlitz	3	5	3	0	0	0	0	0	0	0	0	0	3	5	3

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	145	8	2	0	0	155
Commercial	1650	146	36	1	0	1,833
Education	57	4	1	0	0	62
Government	60	5	1	0	0	66
Industrial	546	45	14	1	0	606
Religion	149	9	2	0	0	160
Other Residential	7924	815	217	3	0	8,959
Single Family	26,110	440	11	0	0	26,561

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	
\$2,326,000	\$16,493,000	\$9,361,000	\$362,000	0.28	\$1,404,000	\$793,000	\$1,034,000	\$957,000	\$32,729,000

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	346	297	86	298	86	343	99	346	100	346	100
Medium											
Small											
Total	346	297	—	298	—	343	—	346	—	346	—

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
127 (126*)	124	1	0	0	0

* values in parentheses include rounding error.

**Scenario: M 7.0 St. Helens Fault
Cowlitz County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
3	78	\$4,284,000

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	%
37,037	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	%
37,037	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
2	3	5,000	200

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
3	2

Essential Facilities Functionality

	Count	Functionality (%)
		At Day 1
Emergency Operation Center	1	99
Fire Station Facilities	27	98
Police Station Facilities	7	97
School	48	98

**Scenario: M 7.0 St. Helens Fault
Lewis 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	2:00 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	4	3	0	0	0	0	0	0	0	0	0	0	4	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	6	2	2	1	0	0	0	0	0	0	0	0	7	2	2
Single Family	2	1	1	0	0	0	0	0	0	0	0	0	2	1	1
Total Lewis	8	9	6	1	0	0	0	0	1	0	0	0	9	9	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	193	27	16	2	0	238
Commercial	1,486	205	102	11	0	1,804
Education	45	5	3	0	0	53
Government	48	6	4	0	0	58
Industrial	481	73	42	5	0	601
Religion	117	14	7	1	0	139
Other Residential	8,550	1,534	953	86	1	11,124
Single Family	18,997	1,229	95	3	0	20,324

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	
\$5,242,000	\$22,425,000	\$11,500,000	\$468,000	0.59	\$3,729,000	\$1,294,000	\$1,872,000	\$1,579,000	\$48,109,000

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	390	305	78	307	79	386	99	390	100	390	100
Medium											
Small	25	5	19	5	20	17	68	24	95	24	97
Total	415	310	—	312	—	403	—	414	—	414	—

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
332 (335*)	322	7	3	3	0

* values in parentheses include rounding error.

**Scenario: M 7.0 St. Helens Fault
Lewis County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
2	13	\$828,000

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	%
27,107	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	%
27,107	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
6	7	13,000	520

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	95
Fire Station Facilities	37	91
Police Station Facilities	8	82
School	45	91

**Scenario: M 7.0 St. Helens 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	2:00 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	80	0	0	0	0	80
Commercial	639	0	0	0	0	639
Education	21	0	0	0	0	21
Government	32	0	0	0	0	32
Industrial	158	0	0	0	0	158
Religion	57	0	0	0	0	57
Other Residential	6,434	7	0	0	0	6,441
Single Family	9,525	1	0	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					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	
\$3,000	\$40,000	\$25,000	\$1,000	0	\$1,000	\$0	\$1,000	\$1,000	\$72,000

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											
Medium											
Small	53	53	100	53	100	53	100	53	100	53	100
Total	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	110	0	0	0	0

**Scenario: M 7.0 St. Helens Fault
Pacific County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
0	0	\$0

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	100
Police Station Facilities	3	100
School	19	100

**Scenario: M 7.0 St. Helens Fault
Skamania 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	2:00 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 Skamania	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	22	1	0	0	0	23
Commercial	190	8	2	0	0	200
Education	11	0	0	0	0	11
Government	14	1	1	0	0	16
Industrial	91	3	1	0	0	95
Religion	13	1	0	0	0	14
Other Residential	1,784	101	17	0	0	1,902
Single Family	3,070	54	3	0	0	3,127

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
\$151,000	\$1,058,000	\$581,000	\$10,000	0.18	\$89,000	\$18,000	\$33,000	\$41,000	\$1,980,000

Hospital Functionality (There are no hospitals for Skamania County in the HAZUS database.)

	At Day 1			At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%								
Large											
Medium											
Small											
Total	0	0	—								

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
50 (52*)	49	1	1	1	0

* values in parentheses include rounding error.

**Scenario: M 7.0 St. Helens Fault
Skamania County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
1	1	\$36,000

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	%
3,915	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	%
3,915	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	9	97
Police Station Facilities	1	99
School	10	100

**Scenario: M 7.0 St. Helens 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	2:00 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	1	1	0	0	0	0	0	0	0	0	0	0	1	1
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	2	0	1	0	0	0	0	0	0	0	0	0	2	0	1
Single Family	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total Thurston	3	1	2	0	0	0	0	0	0	0	0	0	3	1	2

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	409	10	2	0	0	421
Commercial	4,030	96	14	0	0	4,140
Education	156	3	0	0	0	159
Government	278	5	1	0	0	284
Industrial	1,231	37	7	0	0	1,275
Religion	302	5	1	0	0	308
Other Residential	19,546	1,079	177	1	0	20,803
Single Family	57,318	382	3	0	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	
\$1,190,000	\$11,497,000	\$6,103,000	\$169,000	0.08	\$477,000	\$199,000	\$250,000	\$302,000	\$20,188,000

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	374	100	374	100	375	100	375	100	375	100
Medium	119	119	100	119	100	119	100	116	100	119	100
Small											
Total	494	493	—	493	—	494	—	491	—	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	184	2	0	0	0

**Scenario: M 7.0 St. Helens Fault
Thurston County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
6	307	\$42,789,000

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
2	1	3,000	120

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	5	99
Fire Station Facilities	46	99
Police Station Facilities	9	100
School	95	99

**Scenario: M 7.0 St. Helens Fault
Wahkiakum 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	2:00 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 Wahkiakum	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	28	0	0	0	0	28
Commercial	104	0	0	0	0	104
Education	6	0	0	0	0	6
Government	8	0	0	0	0	8
Industrial	44	0	0	0	0	44
Religion	9	0	0	0	0	9
Other Residential	592	4	0	0	0	596
Single Family	1,265	0	0	0	0	1,265

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
\$2,000	\$22,000	\$14,000	\$1,000	0.01	\$0	\$0	\$0	\$0	\$39,000

Hospital Functionality (There are no hospitals for Wahkiakum County in the HAZUS database.)

	At Day 1			At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%								
Large											
Medium											
Small											
Total	0	0	—								

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
34	34	0	0	0	0

**Scenario: M 7.0 St. Helens Fault
Wahkiakum County**

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
0	0	\$0

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	%
1,584	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	%
1,584	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	9	100
Police Station Facilities	1	100
School	2	100

HAZUS-MH: Earthquake Event Report

Region Name: StHelensM7RedoOct09

Earthquake Scenario: StHelensM7.0Redo Oct09

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.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	6
Direct Earthquake Damage	7
Buildings Damage	
Critical Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	11
Fire Following Earthquake	
Debris Generation	
Social Impact	12
Shelter Requirements	
Casualties	
Economic Loss	13
Building Losses	
Transportation and Utility Lifeline Losses	
Long-term Indirect Economic Impacts	
Appendix A: County Listing for the Region	
Appendix B: Regional Population and Building Value Data	

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	StHelensM7.0Redo Oct09
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	7.00
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

Building Damage

HAZUS estimates that about 2,309 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 1 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	8,259	0.44	70	0.67	25	1.12	2	1.98	0	2.58
Commercial	97,841	5.25	777	7.43	202	9.23	14	11.43	0	14.42
Education	3,533	0.19	20	0.19	5	0.23	0	0.27	0	0.35
Government	2,338	0.13	23	0.22	7	0.34	1	0.50	0	0.65
Industrial	30,236	1.62	297	2.84	89	4.07	6	5.25	0	5.51
Other Residential	375,432	20.13	6,224	59.52	1,725	78.82	92	77.03	1	74.99
Religion	6,805	0.36	45	0.43	12	0.55	1	0.64	0	0.80
Single Family	1,340,586	71.88	3,002	28.71	123	5.64	3	2.91	0	0.71
Total	1,865,030		10,457		2,189		119		1	

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

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1,513,074	81.13	3468	33.17	109	4.96	0	0.42	0	0.00
Steel	39,995	2.14	398	3.81	161	7.35	13	10.89	0	10.66
Concrete	39,235	2.10	272	2.60	60	2.74	3	2.33	0	1.63
Precast	28,706	1.54	272	2.61	106	4.86	10	7.96	0	6.64
RM	69,466	3.72	248	2.37	94	4.29	7	6.07	0	1.57
URM	14,936	0.80	368	3.52	68	3.11	4	3.56	0	14.05
MH	159,619	8.56	5429	51.92	1,591	72.69	82	68.77	1	65.45
Total	1,865,030		10,457		2,189		119		1	

*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 14,021 hospital beds (98.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% 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	2,251
EOCs	55	0	0	55
PoliceStations	226	0	0	224
FireStations	938	0	0	936

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	0	0	4,996	4,996
	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	1	0	144	146
Natural Gas	56	0	0	56	56
Oil Systems	15	0	0	15	15
Electrical Power	78	0	0	78	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	474	118
Waste Water	85,851	375	94
Natural Gas	57,234	401	100
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	0	0	0	0	0
Electric Power		0	0	0	0	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 35 ignitions that will burn about 1.23 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 1,938 people and burn about 124 (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 0.030 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 56.00% 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 1,120,000 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 10 households to be displaced due to the earthquake. Of these, 7 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	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	16	1	0	0
	Single Family	5	0	0	0
	Total	21	1	0	0
2 PM	Commercial	12	1	0	0
	Commuting	0	0	0	0
	Educational	3	0	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	4	0	0	0
	Single Family	1	0	0	0
	Total	23	2	0	0
5 PM	Commercial	10	1	0	0
	Commuting	1	1	1	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	6	0	0	0
	Single Family	2	0	0	0
	Total	20	2	1	0

Economic Loss

The total economic loss estimated for the earthquake is 360.60 (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 180.67 (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 53 % 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	0.26	3.17	0.25	0.44	4.13
	Capital-Related	0.00	0.11	2.77	0.16	0.07	3.11
	Rental	0.24	1.16	2.46	0.10	0.11	4.07
	Relocation	0.52	2.52	2.85	0.49	0.82	7.19
	Subtotal	0.75	4.06	11.25	1.00	1.44	18.50
Capital Stock Losses							
	Structural	2.69	3.62	3.96	1.33	1.18	12.77
	Non_Structural	38.49	19.56	21.73	9.21	5.90	94.88
	Content	21.07	5.97	14.81	6.42	4.30	52.56
	Inventory	0.00	0.00	0.47	1.39	0.10	1.95
	Subtotal	62.25	29.14	40.96	18.34	11.47	162.17
	Total	63.00	33.20	52.21	19.34	12.92	180.67

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	\$13.62	0.03
	Bridges	90,051.61	\$35.92	0.04
	Tunnels	66.98	\$0.00	0.00
	Subtotal	143442.50	49.50	
Railways	Segments	2,642.42	\$0.16	0.01
	Bridges	19.99	\$0.00	0.00
	Tunnels	0.00	\$0.00	0.00
	Facilities	181.08	\$2.51	1.39
	Subtotal	2843.50	2.70	
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	\$0.71	0.70
	Subtotal	305.00	0.70	
Bus	Facilities	53.96	\$0.44	0.81
	Subtotal	54.00	0.40	
Ferry	Facilities	59.90	\$0.14	0.23
	Subtotal	59.90	0.10	
Port	Facilities	970.54	\$4.62	0.48
	Subtotal	970.50	4.60	
Airport	Facilities	660.36	\$11.56	1.75
	Runways	2,809.34	\$1.63	0.06
	Subtotal	3469.70	13.20	
	Total	151145.10	71.30	

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	\$2.69	0.18
	Distribution Lines	2,861.70	\$2.13	0.07
	Subtotal	4,363.54	\$4.82	
Waste Water	Pipelines	0.00	\$0.00	0.00
	Facilities	10,696.00	\$56.67	0.53
	Distribution Lines	1,717.00	\$1.69	0.10
	Subtotal	12,412.98	\$58.36	
Natural Gas	Pipelines	0.00	\$0.00	0.00
	Facilities	67.10	\$0.32	0.48
	Distribution Lines	1,144.70	\$1.80	0.16
	Subtotal	1,211.83	\$2.12	
Oil Systems	Pipelines	0.00	\$0.00	0.00
	Facilities	1.70	\$0.00	0.00
	Subtotal	1.65	\$0.00	
Electrical Power	Facilities	9,438.00	\$43.27	0.46
	Subtotal	9,438.00	\$43.27	
Communication	Facilities	21.60	\$0.06	0.26
	Subtotal	21.56	\$0.06	
	Total	27,449.55	\$108.62	

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

	LOSS	Total	%
First Year			
	Employment Impact	62,167	3.45
	Income Impact	182	0.20
Second Year			
	Employment Impact	19,245	1.07
	Income Impact	82	0.09
Third Year			
	Employment Impact	419	0.02
	Income Impact	17	0.02
Fourth Year			
	Employment Impact	20	0.00
	Income Impact	(4)	0.00
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(5)	-0.01
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(5)	-0.01

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

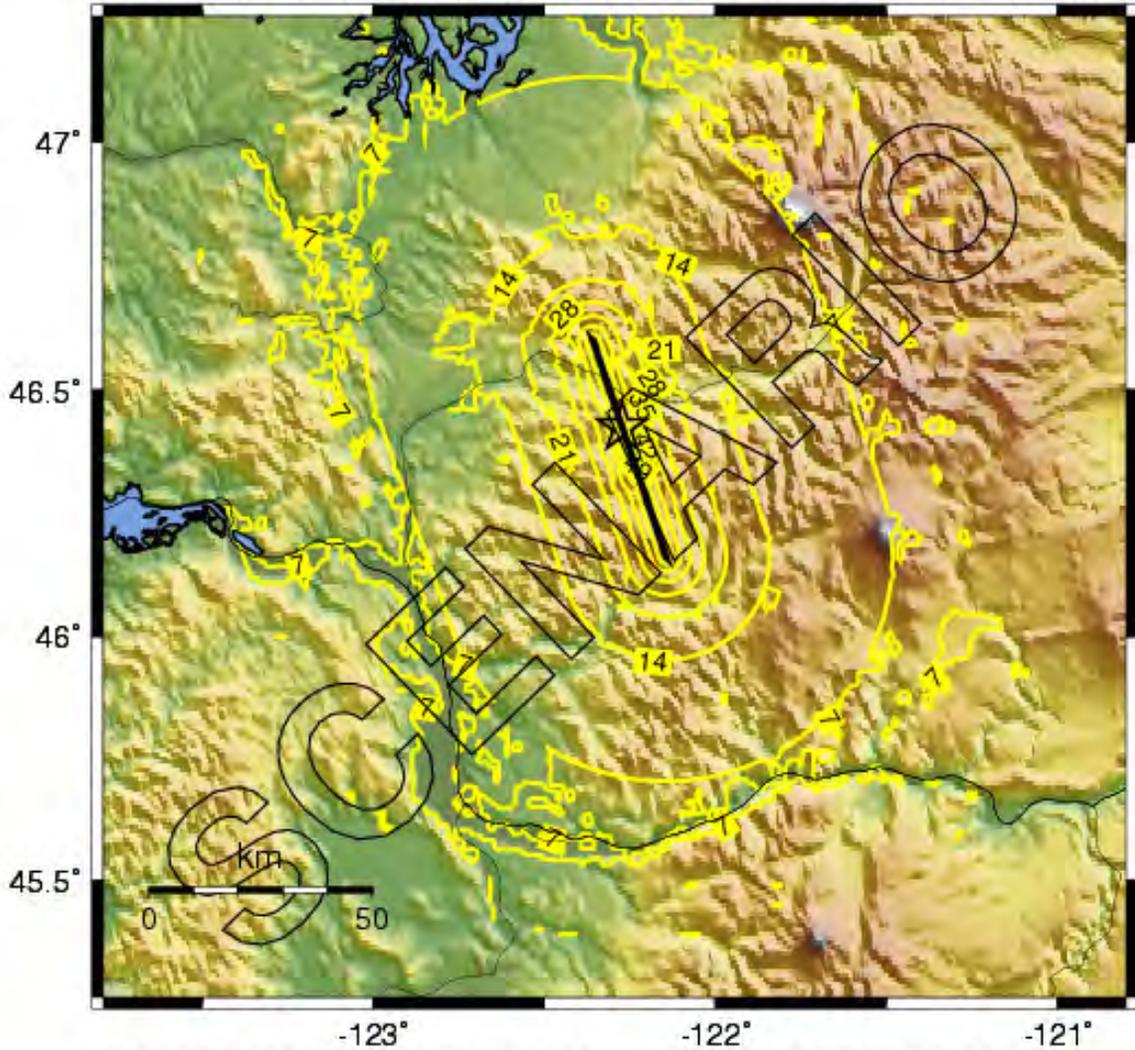
Yakima,WA

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 StHelens7.0 Scenario

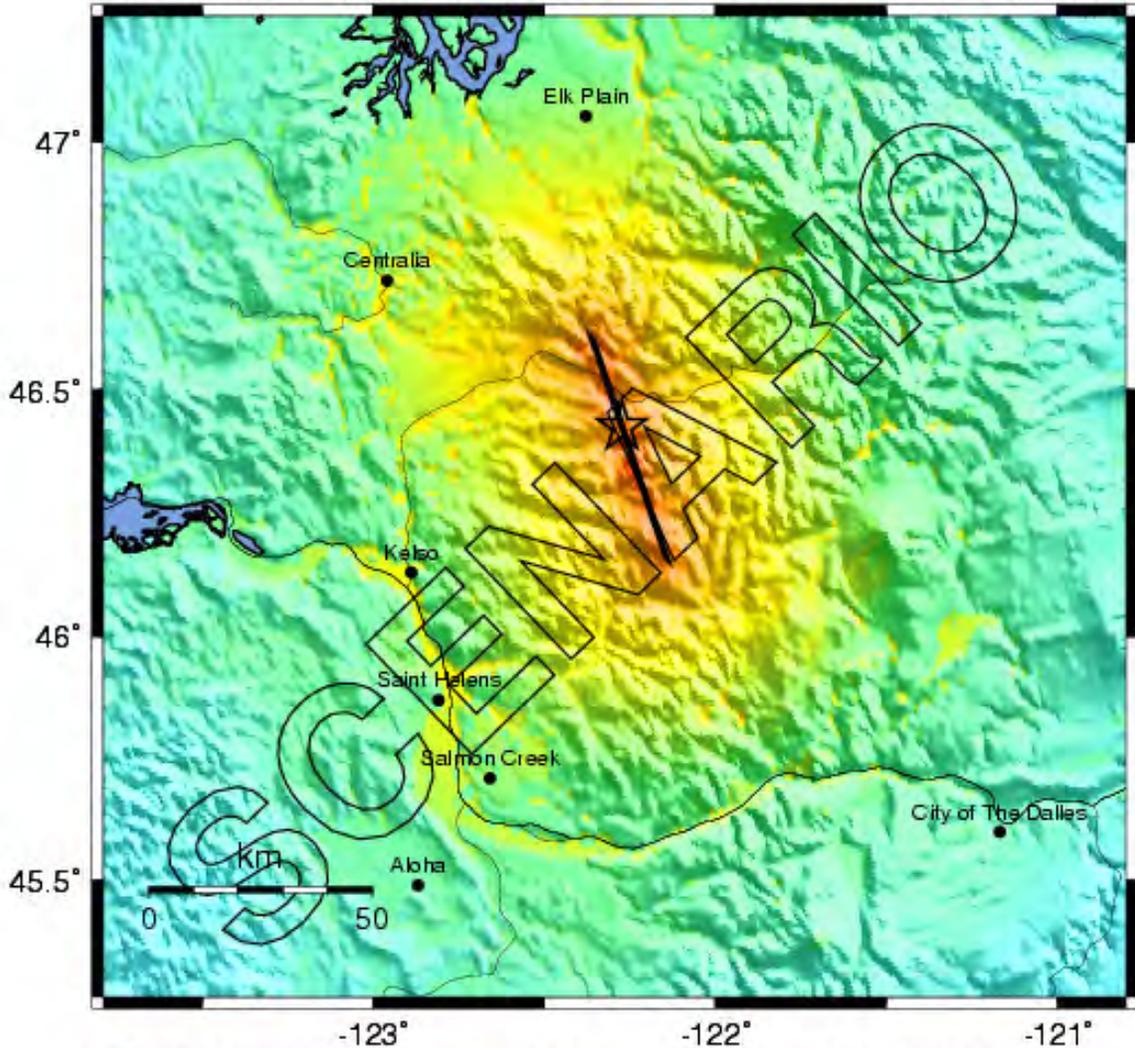
Scenario Date: Mon Apr 27, 2009 12:00:00 GMT M 7.0 N46.42 W122.27 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 9 Processed Wed May 6, 2009 11:16:51 PM MDT

-- Earthquake Planning Scenario --
 ShakeMap for StHelens7.0 Scenario

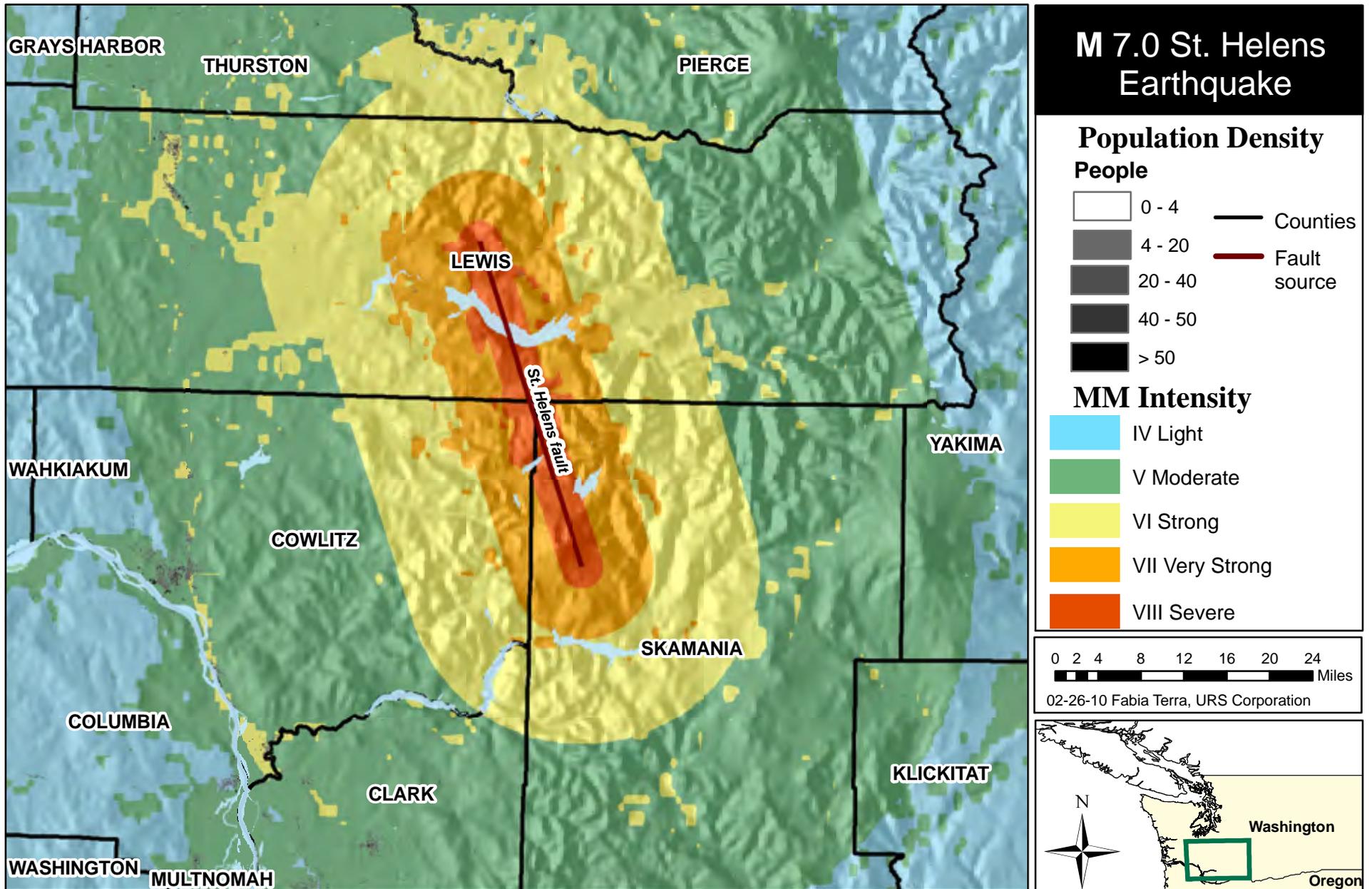
Scenario Date: Mon Apr 27, 2009 12:00:00 GMT M 7.0 N46.42 W122.27 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 9 Processed Wed May 6, 2009 11:16:51 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+

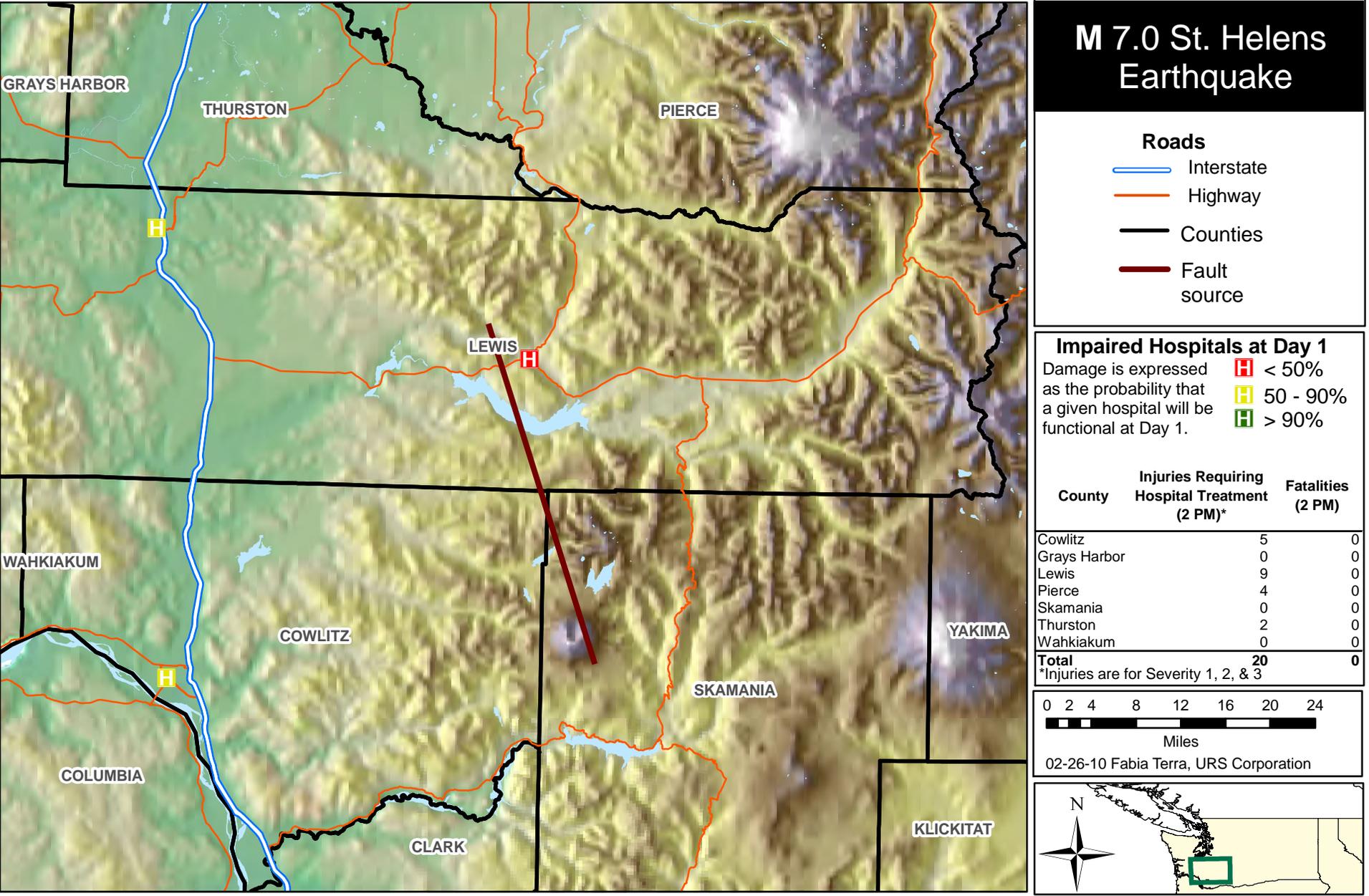
Population Density and Ground Shaking Intensities - Earthquake Scenario: Washington



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

Figure 1

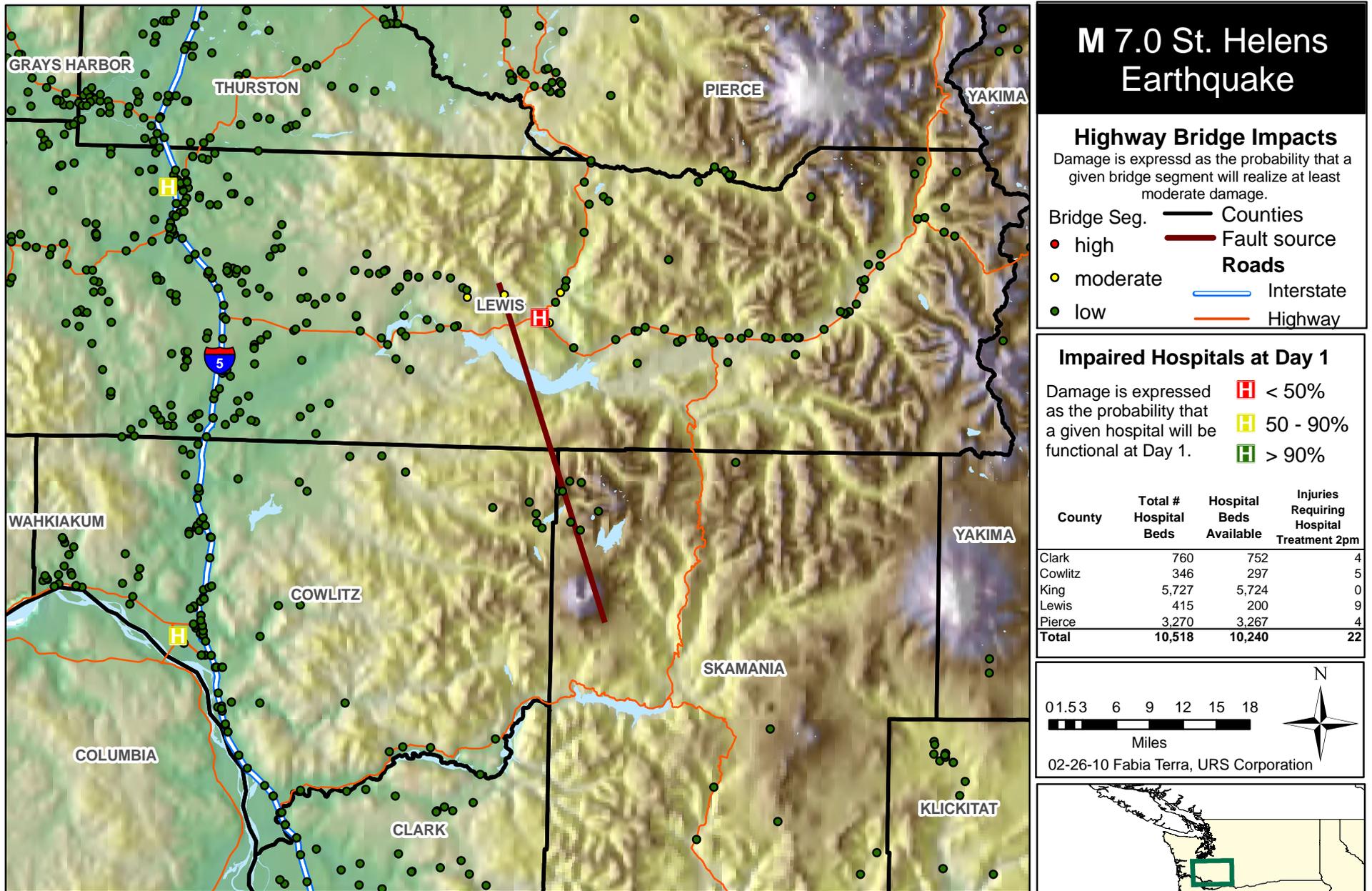
Injuries (2 pm) and Impaired Hospitals (Day 1) - Earthquake Scenario: Washington



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

Figure 2

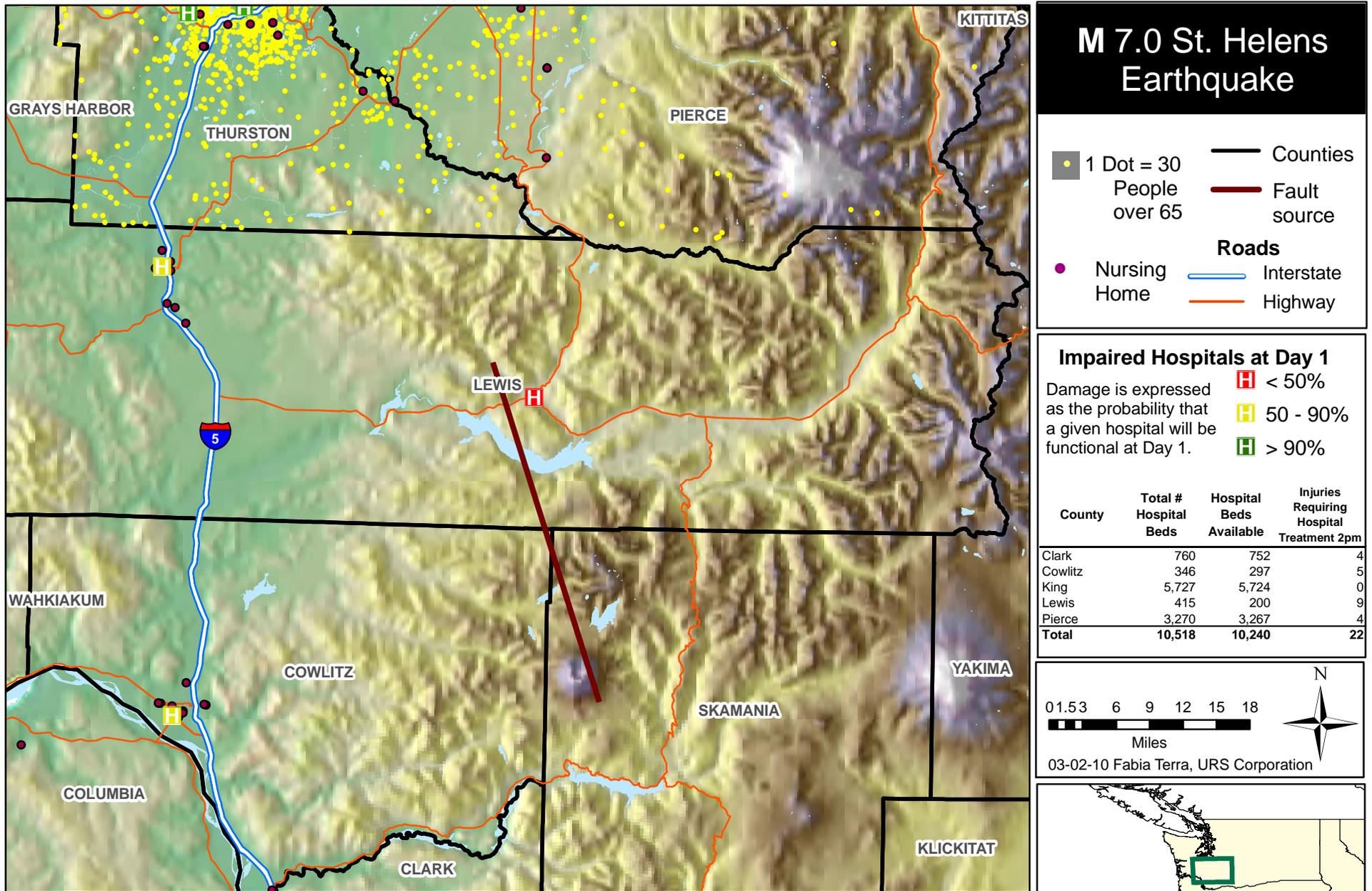
Impaired Hospitals (Day 1), Hospital Bed Availability, & Bridge Functionality - Earthquake Scenario: Washington



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

Figure 3

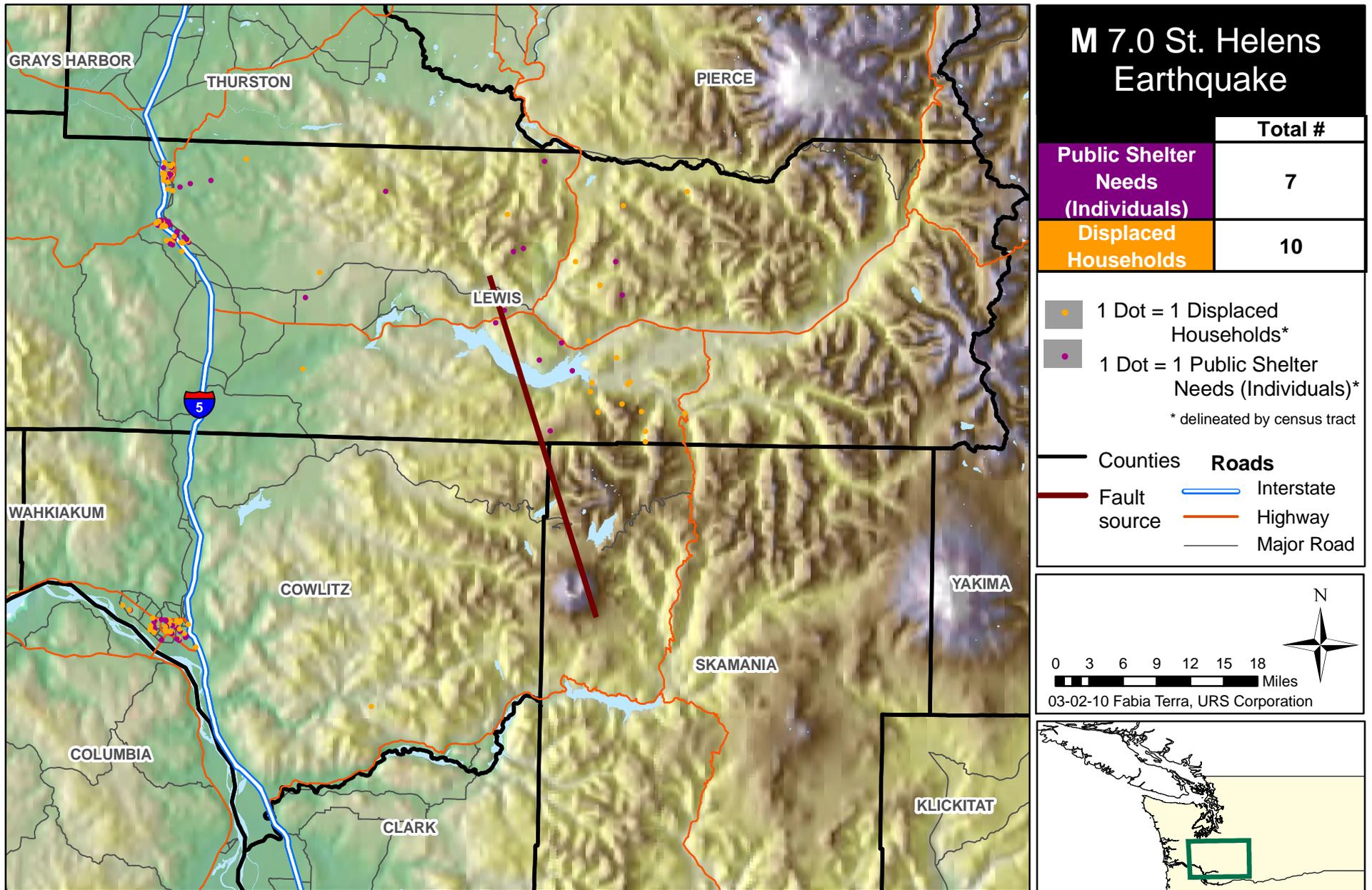
Distribution of Elderly, Impaired Hospitals (Day 1), & Hospital Bed Availability - Earthquake Scenario: Washington



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

Figure 4

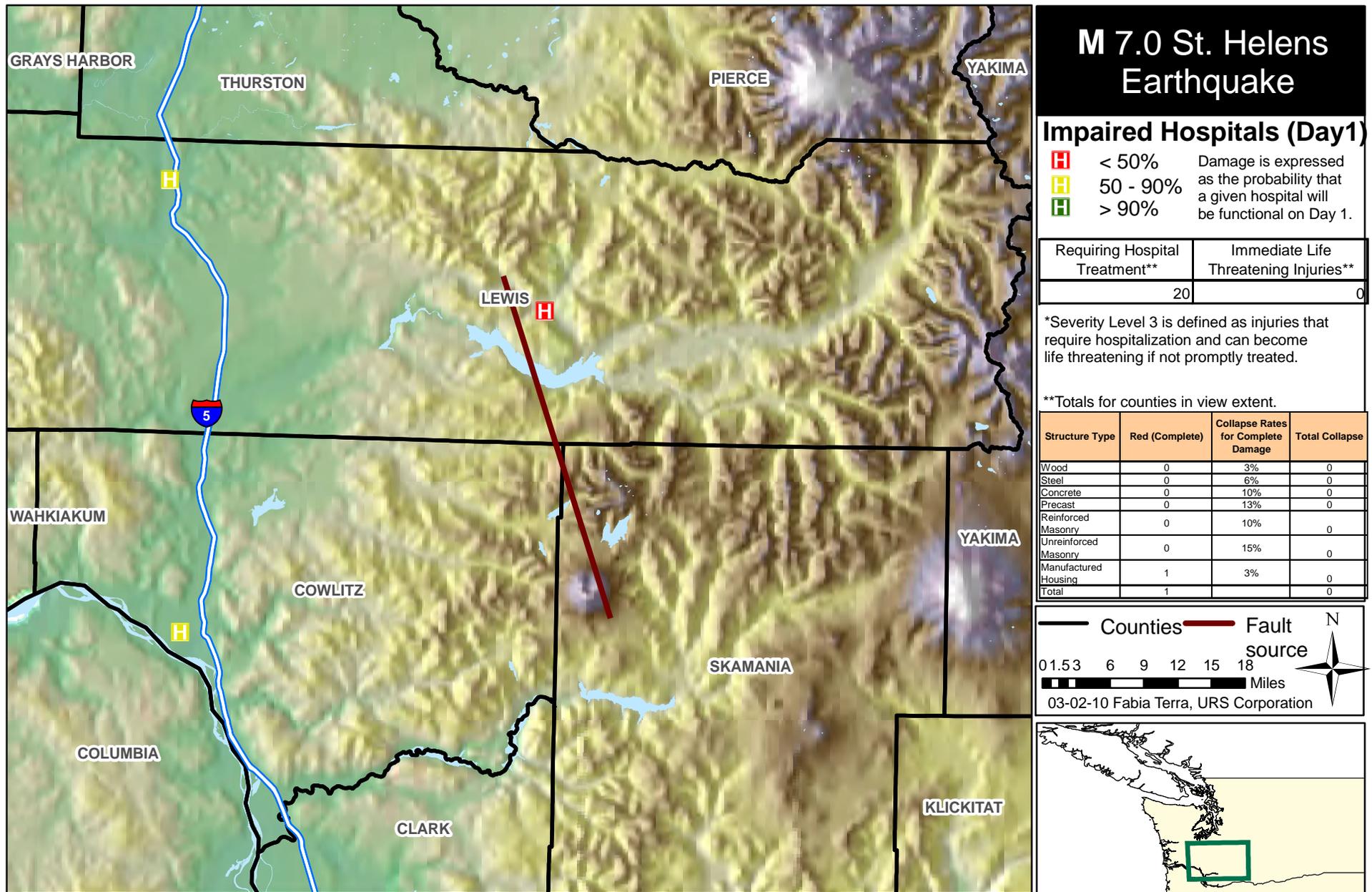
Estimated Displaced Households & Short Term Public Shelter Needs - Earthquake Scenario: Washington



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

Figure 5

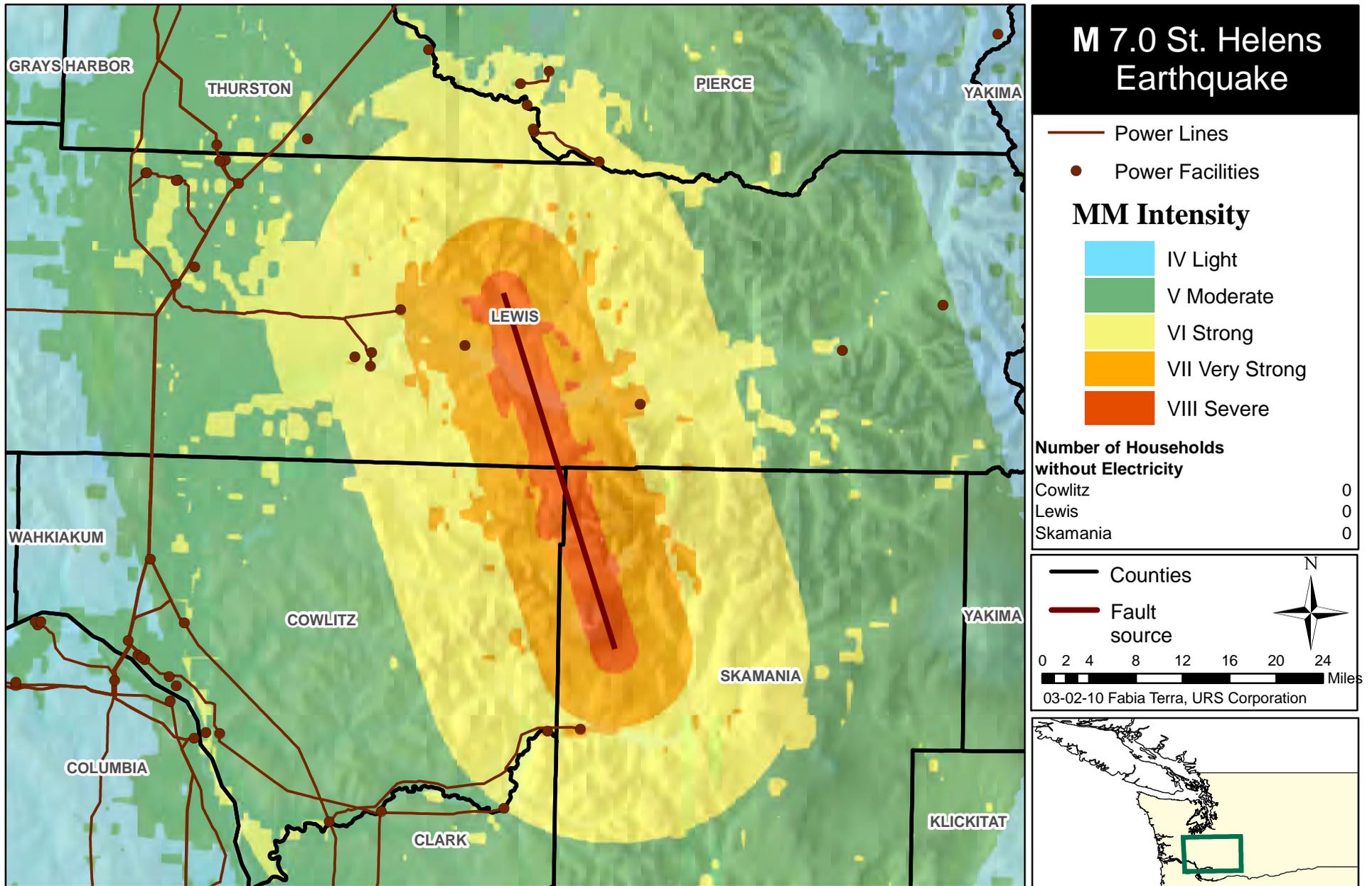
Potential Search and Rescue Needs, Collapsed Structures, and Impaired Hospitals - Earthquake Scenario: Washington



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

Figure 6

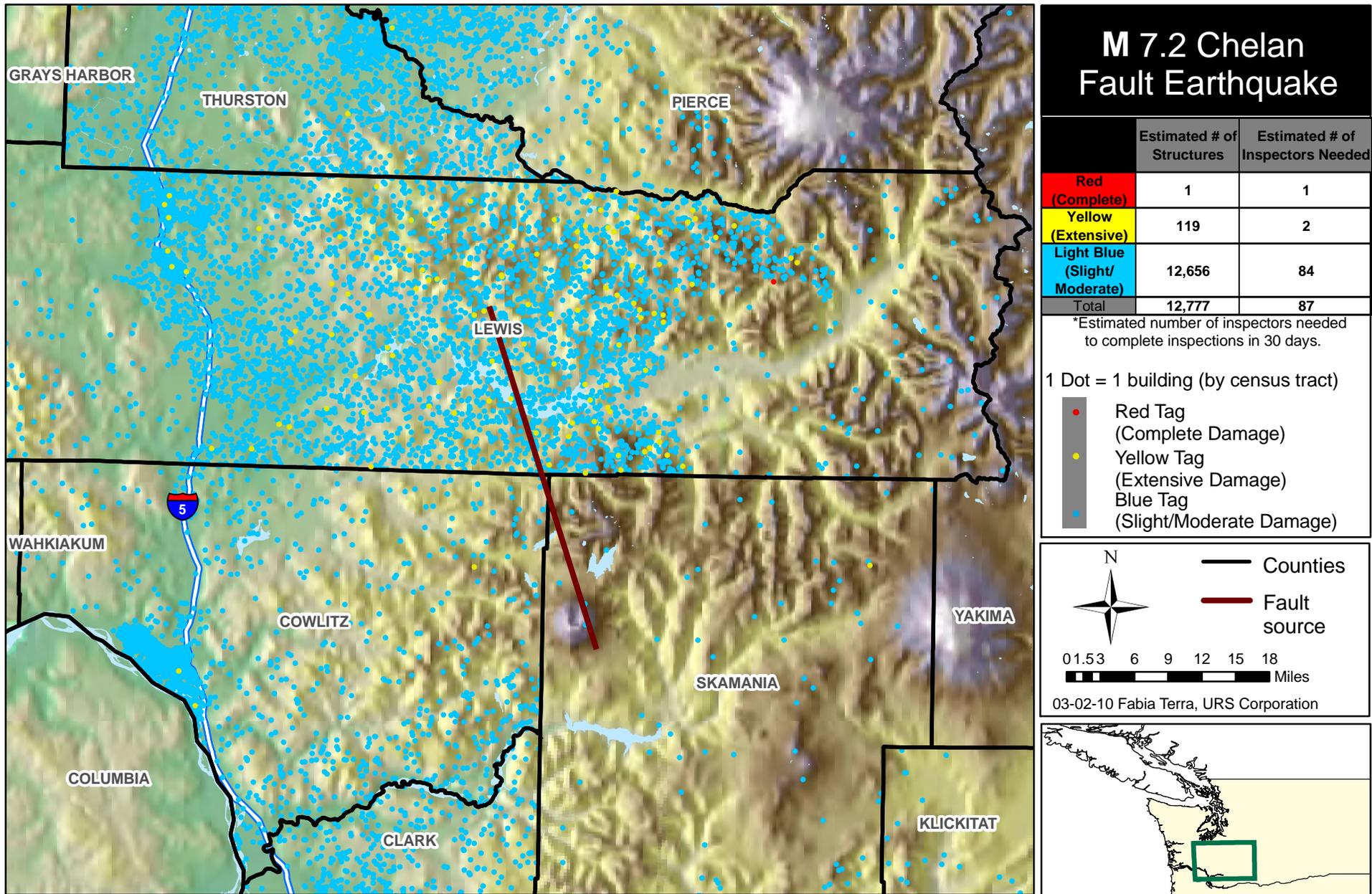
Power Lines and Facilities, Households Without Electricity, and Ground Shaking Intensities - Earthquake Scenario: Washington



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

Figure 7

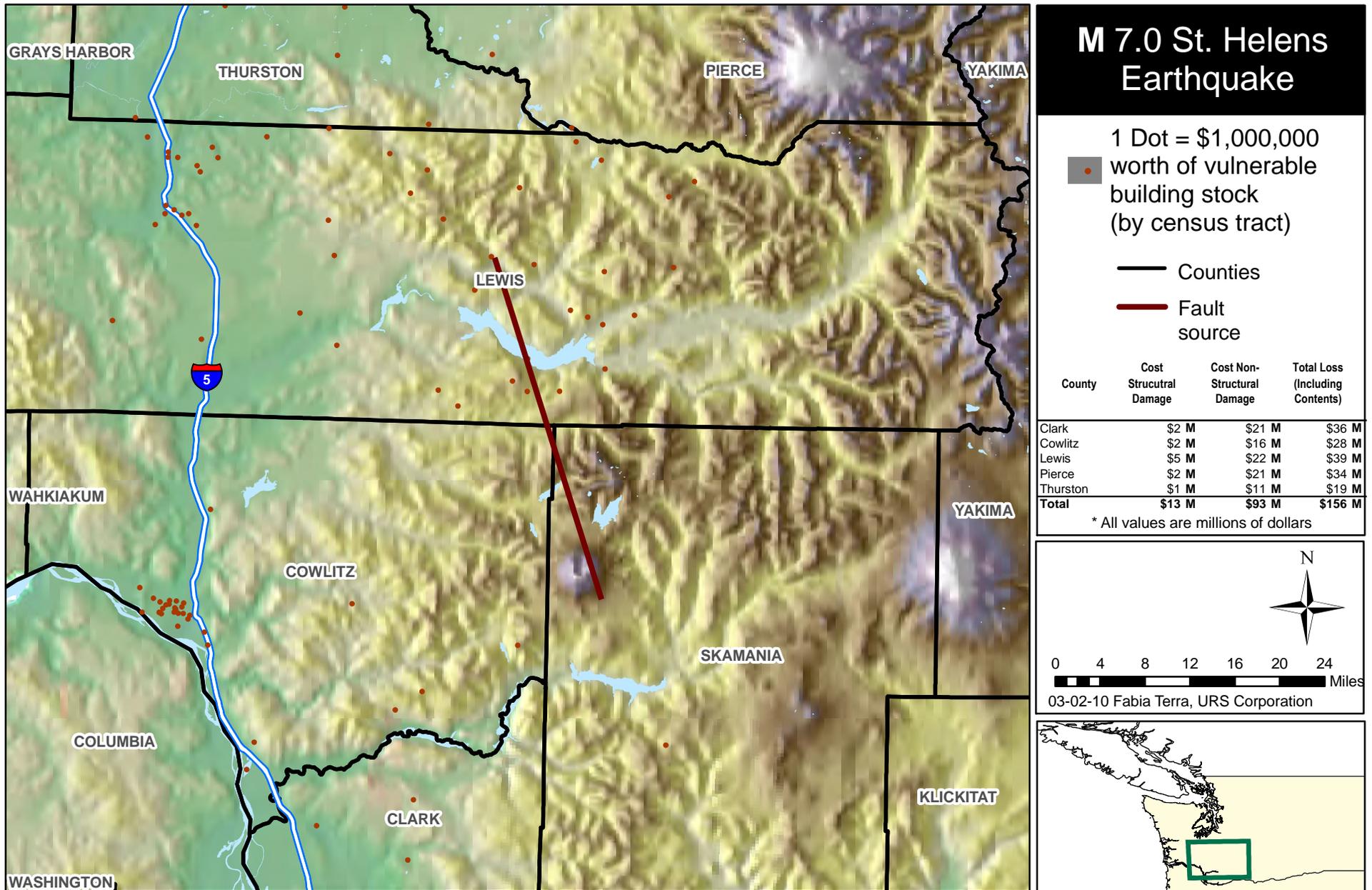
Estimated Building Inspection Needs - Earthquake Scenario: Washington



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

Figure 8

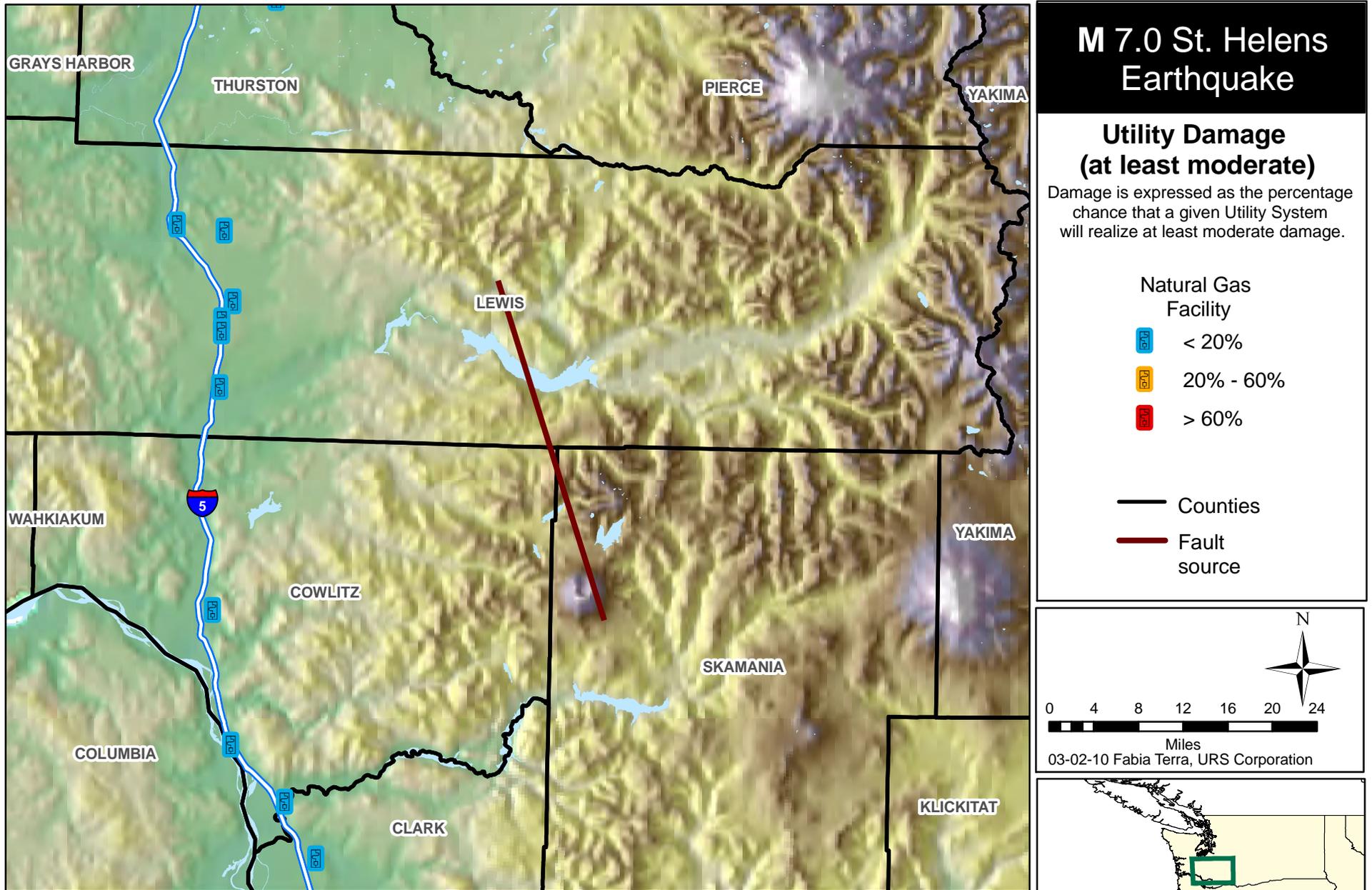
Direct Building Economic Loss - Earthquake Scenario: Washington



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

Figure 9

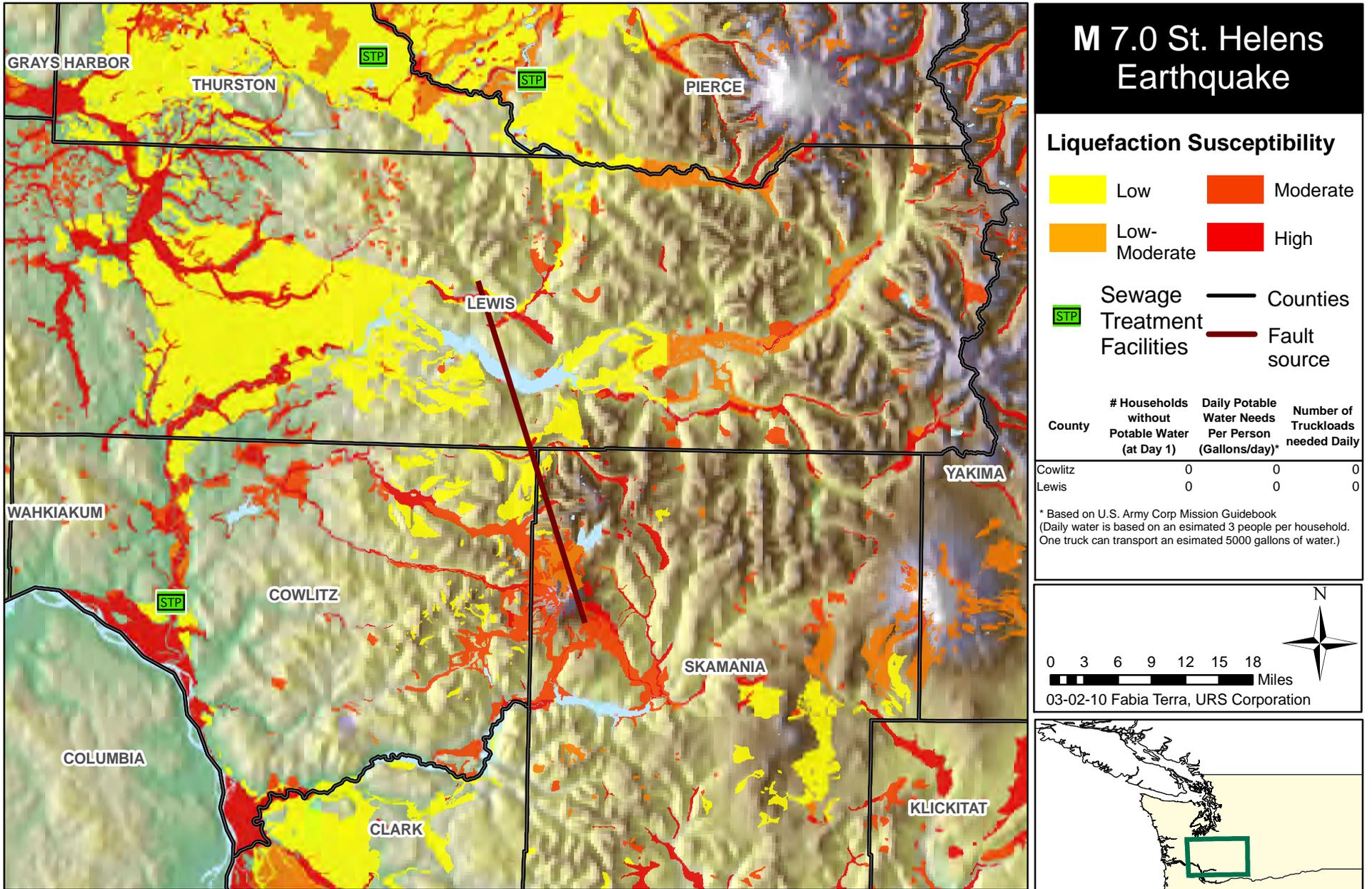
Natural Gas, and Oil Facility Damage - Earthquake Scenario: Washington



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

Figure 10

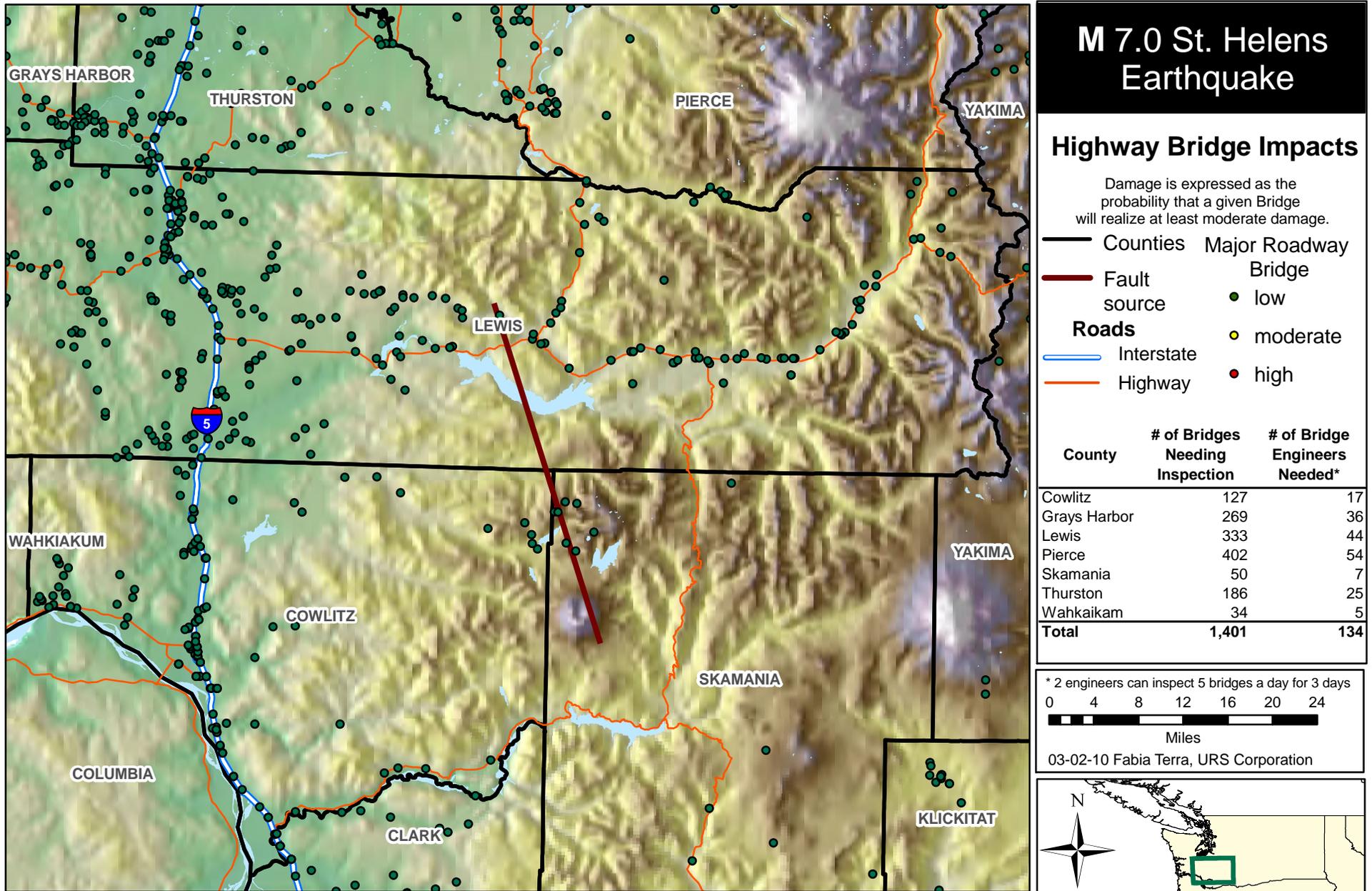
Sewage Treatment Facility Distribution, Households Without Potable Water, and Liquefaction Susceptibility - Earthquake Scenario: Washington



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

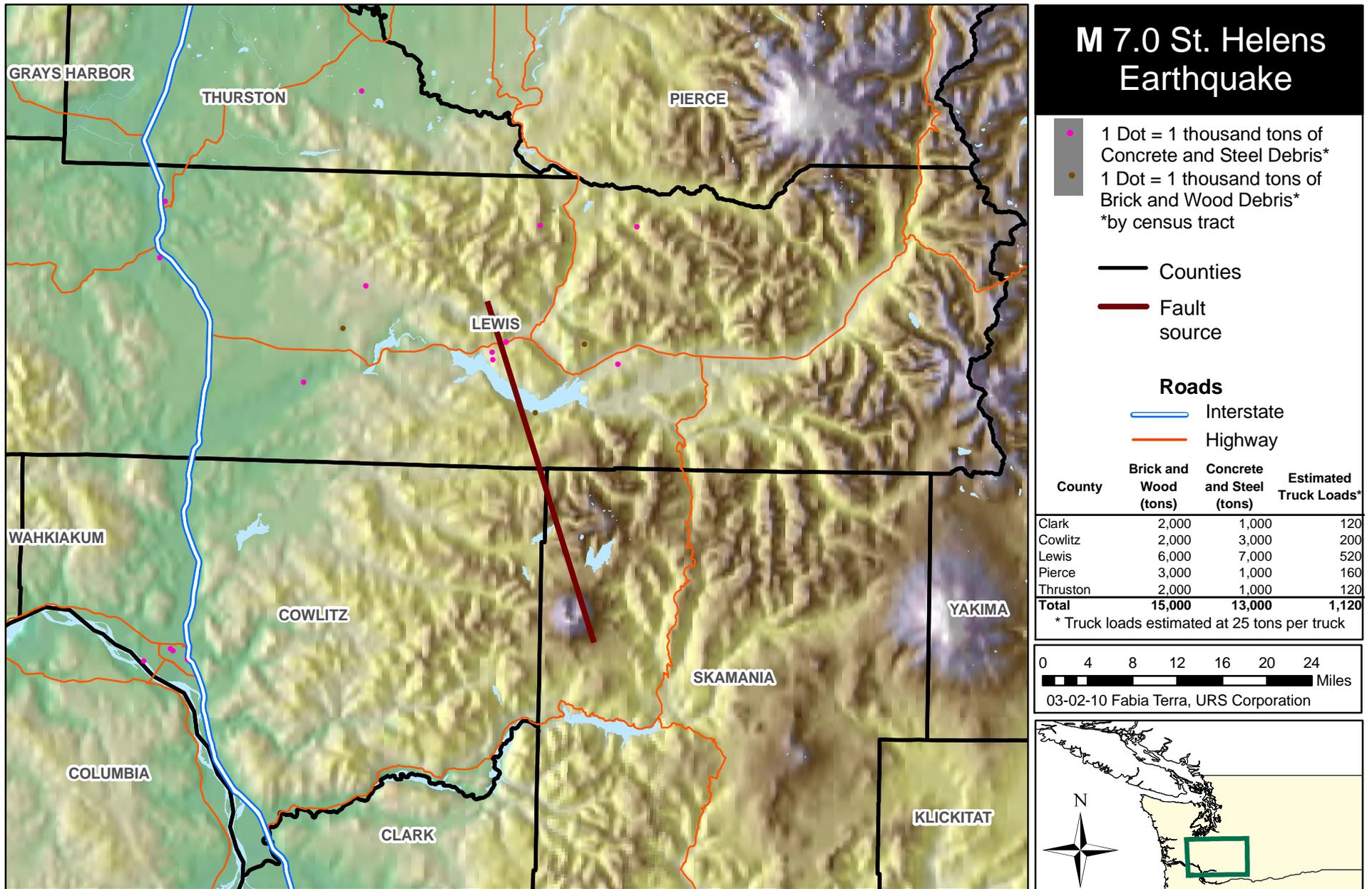
Estimated Highway Bridge Damage - Earthquake Scenario: Washington



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