Scenario: M 6.8 Lake Creek Fault
Clallam 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	5	0	0	8	0	0	2	0	0	18
Commercial	2	111	86	0	30	23	0	5	4	0	9	7	2	155	120
Educational	0	31	3	0	8	1	0	1	0	0	3	0	0	43	4
Hotels	2	0	1	1	0	0	0	0	0	0	0	0	3	0	1
Industrial	1	11	7	0	3	2	0	0	0	0	1	0	1	15	9
Other-Residential	61	15	22	12	3	4	1	0	0	2	0	1	76	18	27
Single Family	38	10	14	4	1	2	0	0	0	0	0	0	42	11	16
Total Clallam	**104**	**178**	**136**	**17**	**45**	**37**	**1**	**6**	**12**	**2**	**13**	**10**	**124**	**242**	**195**

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	65	42	34	14	4	159
Commercial	578	342	470	230	75	1,695
Education	25	13	15	8	3	64
Government	25	7	10	5	2	49
Industrial	200	115	146	71	24	556
Religion	44	27	30	14	5	120
Other Residential	3742	2,388	2,370	1,074	269	9,843
Single Family	10,364	8,031	3,206	194	25	21,820

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
$66,603,000	$265,867,000	$110,601,000	$2,660,000	6.76	$49,230,000	$21,356,000	$29,900,000	$21,797,000	$568,014,000

Hospital Functionality

		At Day 1		At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large											
Medium	178	95	53	96	54	136	76	172	97	175	98
Small											
Total	**178**	**95**	**—**	**96**	**—**	**136**	**—**	**172**	**—**	**175**	**—**

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

Highway Bridge Damage

Average Number for Damage State					
Total Number of Bridges	None	Slight	Moderate	Extensive	Complete
95 (96*)	81	4	3	5	3

* values in parentheses include rounding error.

Scenario: M 6.8 Lake Creek Fault
Clallam County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
6	174	$1,688,000

Potable Water System Performance

	Number of Households Without Water									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
28,764	544	2	56	0	0	0	0	0	0	0

Electrical Power System Performance

	Number of Households Without Power									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
28,764	9,095	32	6,226	22	2,981	10	683	2	11	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
66,000	116,000	182,000	7,280

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
459	283

Essential Facilities Functionality

	Count	Functionality (%)
		At Day 1
Emergency Operation Center	2	17
Fire Station Facilities	21	53
Police Station Facilities	5	40
School	34	49

Scenario: M 6.8 Lake Creek Fault
Jefferson 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 Jefferson	**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	87	4	1	0	0	92
Commercial	811	35	5	0	0	851
Education	28	1	0	0	0	29
Government	30	1	0	0	0	31
Industrial	305	16	3	0	0	324
Religion	64	2	0	0	0	66
Other Residential	4296	338	51	0	0	4,685
Single Family	10,313	158	1	0	0	10,472

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
$380,000	$3,312,000	$1,785,000	$66,000	0.16	$154,000	$75,000	$91,000	$107,000	$5,970,000

Hospital Functionality

		At Day 1		At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large											
Medium											
Small	43	43	99	43	99	43	100	43	100	43	100
Total	**43**	**43**	**—**	**43**	**—**	**43**	**—**	**43**	**—**	**43**	**—**

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

Highway Bridge Damage

Average Number for Damage State					
Total Number of Bridges	None	Slight	Moderate	Extensive	Complete
54	53	1	0	0	0

Scenario: M 6.8 Lake Creek Fault
Jefferson County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
2	10	$938,000

Potable Water System Performance

	Number of Households Without Water									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
12,634	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

	Number of Households Without Power									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
12,634	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
1,000	0	1,000	40

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	99
Fire Station Facilities	21	98
Police Station Facilities	2	99
School	17	99

Scenario: M 6.8 Lake Creek 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	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	5	3	0	0	0	0	0	0	0	0	0	0	5	3
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	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Single Family	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total King	**1**	**5**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**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	1,914	5	1	0	0	1,920
Commercial	36,932	165	16	0	0	37,113
Education	1,338	4	0	0	0	1,342
Government	551	3	0	0	0	554
Industrial	9,888	50	6	0	0	9,944
Religion	2,323	6	0	0	0	2,329
Other Residential	85,573	308	19	0	0	85,900
Single Family	448,417	154	0	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					
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
$1,837,000	$18,204,000	$10,556,000	$546,000	0.01	$621,000	$536,000	$536,000	$850,000	$33,687,000

Hospital Functionality

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

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

Highway Bridge Damage

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

Scenario: M 6.8 Lake Creek Fault
King County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
2	57	$5,188,000

Potable Water System Performance

	Number of Households Without Water									
Total Households	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

	Number of Households Without Power									
Total Households	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
4,000	1,000	5,000	200

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	18	100
Fire Station Facilities	164	100
Police Station Facilities	52	100
School	721	100

Scenario: M 6.8 Lake Creek 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	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 Kitsap	**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	307	2	0	0	0	309
Commercial	3717	34	4	0	0	3,755
Education	153	1	0	0	0	154
Government	129	1	0	0	0	130
Industrial	1175	11	1	0	0	1,187
Religion	277	2	0	0	0	279
Other Residential	17230	280	21	0	0	17,531
Single Family	64,896	83	0	0	0	64,979

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
$357,000	$4,600,000	$2,553,000	$47,000	0.03	$122,000	$93,000	$120,000	$130,000	$8,023,000

Hospital Functionality

		At Day 1		At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large	297	296	100	296	100	297	100	297	100	297	100
Medium	55	55	100	55	100	55	100	55	100	55	100
Small											
Total	**352**	**351**	**—**	**351**	**—**	**352**	**—**	**352**	**—**	**352**	**—**

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

Highway Bridge Damage

Average Number for Damage State					
Total Number of Bridges	None	Slight	Moderate	Extensive	Complete
82	82	0	0	0	0

Scenario: M 6.8 Lake Creek Fault
Kitsap County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
4	282	$22,886,000

Potable Water System Performance

	Number of Households Without Water									
Total Households	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

Electrical Power System Performance

	Number of Households Without Power									
Total Households	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
1,000	0	1,000	40

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	50	100
Police Station Facilities	8	100
School	110	100

Scenario: M 6.8 Lake Creek 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	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 Mason	**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	106	0	0	0	0	106
Commercial	1,049	4	0	0	0	1,053
Education	35	0	0	0	0	35
Government	39	0	0	0	0	39
Industrial	402	1	0	0	0	403
Religion	74	0	0	0	0	74
Other Residential	7,987	71	4	0	0	8,062
Single Family	18,110	7	0	0	0	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					
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
$31,000	$280,000	$133,000	$4,000	0.01	$9,000	$4,000	$4,000	$7,000	$472,000

Hospital Functionality

		At Day 1		At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large											
Medium	68	68	100	68	100	68	100	68	100	68	100
Small											
Total	**68**	**68**	**—**	**68**	**—**	**68**	**—**	**68**	**—**	**68**	**—**

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

Highway Bridge Damage

Average Number for Damage State					
Total Number of Bridges	None	Slight	Moderate	Extensive	Complete
92	92	0	0	0	0

Scenario: M 6.8 Lake Creek Fault
Mason County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
0	0	$0

Potable Water System Performance

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

Electrical Power System Performance

	Number of Households Without Power									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
20,412	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	2	100
Fire Station Facilities	31	100
Police Station Facilities	3	100
School	23	100

Scenario: M 6.8 Lake Creek Fault
Skagit 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 Skagit	**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	325	4	1	0	0	330
Commercial	2,491	35	4	0	0	2,530
Education	79	1	0	0	0	80
Government	52	1	0	0	0	53
Industrial	839	12	2	0	0	853
Religion	172	2	0	0	0	174
Other Residential	11,300	182	18	0	0	11,500
Single Family	30,753	65	0	0	0	30,818

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					
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
$358,000	$3,243,000	$1,898,000	$113,000	0.04	$124,000	$76,000	$89,000	$112,000	$6,014,000

Hospital Functionality

		At Day 1		At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large	159	159	100	159	100	159	100	159	100	159	100
Medium											
Small	78	78	100	78	100	78	100	78	100	78	100
Total	**237**	**237**	**—**	**237**	**—**	**237**	**—**	**237**	**—**	**237**	**—**

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

Highway Bridge Damage

Average Number for Damage State					
Total Number of Bridges	None	Slight	Moderate	Extensive	Complete
212	212	0	0	0	0

Scenario: M 6.8 Lake Creek Fault
Skagit County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
2	2	$209,000

Potable Water System Performance

	Number of Households Without Water									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
42,003	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

	Number of Households Without Power									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
42,003	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
1,000	0	1,000	40

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	37	100
Police Station Facilities	9	100
School	59	100

Scenario: M 6.8 Lake Creek Fault
Snohomish 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	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	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Single Family	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Snohomish	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**

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	826	3	0	0	0	829
Commercial	9,892	57	6	0	0	9,955
Education	342	1	0	0	0	343
Government	194	1	0	0	0	195
Industrial	3,737	22	2	0	0	3,761
Religion	650	3	0	0	0	653
Other Residential	35,306	327	21	0	0	35,654
Single Family	155,473	96	0	0	0	155,569

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
$552,000	$5,626,000	$2,913,000	$125,000	0.01	$162,000	$125,000	$140,000	$204,000	$9,846,000

Hospital Functionality

		At Day 1		At day 3		At day 7		At day 30		At day 90	
	Total Number of Beds	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large	738	736	100	736	100	737	100	737	100	737	100
Medium	72	72	100	72	100	72	100	72	100	72	100
Small	48	48	100	48	100	48	100	48	100	48	100
Total	**858**	**856**	**—**	**856**	**—**	**857**	**—**	**857**	**—**	**857**	**—**

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

Highway Bridge Damage

Average Number for Damage State					
Total Number of Bridges	None	Slight	Moderate	Extensive	Complete
466	466	0	0	0	0

Scenario: M 6.8 Lake Creek Fault
Snohomish County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
1	1	$37,000

Potable Water System Performance

	Number of Households Without Water									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
245,054	0	0	0	0	0	0	0	0	0	0

Electrical Power System Performance

	Number of Households Without Power									
Total Households	At day 1		At day 3		At day 7		At day 30		At day 90	
	Count	%	Count	%	Count	%	Count	%	Count	%
245,054	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
1,000	0	1,000	40

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	3	100
Fire Station Facilities	75	100
Police Station Facilities	23	100
School	248	100

HAZUS-MH: Earthquake Event Report

Region Name: LakeCreek_Booundary_M68_redoOct09

Earthquake Scenario: Lake creek boundary creek M68 redo

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	Lake creek boundary creek M68 redo
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	6.80
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 8,541 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 407 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	8,234	0.44	66	0.46	37	0.56	14	0.86	4	1.10
Commercial	97,270	5.24	745	5.22	513	7.87	231	14.31	75	18.46
Education	3,508	0.19	23	0.16	16	0.24	8	0.49	3	0.71
Government	2,335	0.13	16	0.11	11	0.17	5	0.32	2	0.44
Industrial	30,115	1.62	254	1.78	163	2.51	72	4.44	24	5.90
Other Residential	375,215	20.23	4,374	30.64	2,542	38.98	1,075	66.67	269	66.16
Religion	6,768	0.36	45	0.32	31	0.48	14	0.86	5	1.21
Single Family	1,331,535	71.78	8,752	61.31	3,208	49.19	194	12.06	25	6.02
Total	**1,854,980**		**14,276**		**6,522**		**1,612**		**407**	

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

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1,502,320	80.99	10268	71.93	3,804	58.33	225	13.98	34	8.25
Steel	39,956	2.15	241	1.69	230	3.53	114	7.09	25	6.12
Concrete	38,993	2.10	231	1.62	208	3.19	104	6.47	32	7.94
Precast	28,578	1.54	220	1.54	178	2.73	91	5.64	27	6.61
RM	69,037	3.72	263	1.84	343	5.26	146	9.04	27	6.55
URM	14,739	0.79	409	2.86	106	1.63	72	4.47	51	12.41
MH	161,357	8.70	2643	18.51	1,652	25.33	859	53.30	212	52.11
Total	**1,854,980**		**14,276**		**6,522**		**1,612**		**407**	

*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 14,065 hospital beds (99.00%) 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	2,236
EOCs	55	0	0	53
PoliceStations	226	0	0	223
FireStations	938	0	0	928

Transportation and Utility Lifeline Damage

Table 6 provides damage estimates for the transportation system.

Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	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	6	1	4,990	4,993
	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	2	0	43	45
Ferry	Facilities	45	1	0	44	45
Port	Facilities	486	22	0	479	486
Airport	Facilities	62	2	0	61	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	145
Natural Gas	56	0	0	56	56
Oil Systems	15	0	0	15	15
Electrical Power	78	3	0	75	78
Communication	196	3	0	194	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	360	157
Waste Water	85,851	285	124
Natural Gas	57,234	304	133
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	544	56	0	0	0
Electric Power		9,095	6,226	2,981	683	11

Induced Earthquake Damage

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 17 ignitions that will burn about 0.45 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 544 people and burn about 47 (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 0.190 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 38.00% 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 7,680,000 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 460 households to be displaced due to the earthquake. Of these, 283 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	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	2	1	0	0
	Industrial	2	0	0	0
	Other-Residential	64	12	1	2
	Single Family	39	4	0	0
	Total	**109**	**18**	**1**	**3**
2 PM	Commercial	118	30	5	9
	Commuting	0	0	0	0
	Educational	31	8	1	3
	Hotels	0	0	0	0
	Industrial	12	3	0	1
	Other-Residential	16	3	0	0
	Single Family	10	1	0	0
	Total	**188**	**45**	**7**	**13**
5 PM	Commercial	91	23	4	7
	Commuting	4	5	8	2
	Educational	3	1	0	0
	Hotels	1	0	0	0
	Industrial	7	2	0	0
	Other-Residential	23	4	0	1
	Single Family	15	2	0	0
	Total	**144**	**37**	**13**	**10**

Economic Loss

The total economic loss estimated for the earthquake is 1,003.08 (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 645.81 (millions of dollars); 20 % 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 49 % 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 Loses							
	Wage	0.00	3.29	25.21	0.71	1.87	31.08
	Capital-Related	0.00	1.41	20.01	0.41	0.59	22.43
	Rental	3.90	6.94	11.64	0.21	0.76	23.45
	Relocation	14.94	8.02	18.64	1.17	7.88	50.64
	Subtotal	**18.84**	**19.66**	**75.49**	**2.50**	**11.10**	**127.59**
Capital Stock Loses							
	Structural	20.06	12.77	25.43	3.69	8.85	70.81
	Non_Structural	118.86	61.62	83.95	16.04	28.41	308.89
	Content	49.36	15.07	45.52	10.39	14.47	134.80
	Inventory	0.00	0.00	1.33	2.23	0.18	3.73
	Subtotal	**188.28**	**89.46**	**156.23**	**32.35**	**51.91**	**518.22**
	Total	**207.12**	**109.11**	**231.72**	**34.85**	**63.02**	**645.81**

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	$5.96	0.01
	Bridges	90,051.61	$62.71	0.07
	Tunnels	66.98	$0.00	0.00
	Subtotal	**143442.50**	**68.70**	
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	$2.88	1.59
	Subtotal	**2843.50**	**2.90**	
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	$1.82	1.80
	Subtotal	**305.00**	**1.80**	
Bus	Facilities	53.96	$1.82	3.37
	Subtotal	**54.00**	**1.80**	
Ferry	Facilities	59.90	$1.49	2.49
	Subtotal	**59.90**	**1.50**	
Port	Facilities	970.54	$38.39	3.96
	Subtotal	**970.50**	**38.40**	
Airport	Facilities	660.36	$18.79	2.85
	Runways	2,809.34	$3.72	0.13
	Subtotal	**3469.70**	**22.50**	
	Total	**151145.10**	**137.60**	

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	$0.80	0.05
	Distribution Lines	2,861.70	$2.29	0.08
	Subtotal	**4,363.54**	**$3.10**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	10,696.00	$52.80	0.49
	Distribution Lines	1,717.00	$1.81	0.11
	Subtotal	**12,412.98**	**$54.62**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	67.10	$0.02	0.03
	Distribution Lines	1,144.70	$1.94	0.17
	Subtotal	**1,211.83**	**$1.96**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	1.70	$0.00	0.29
	Subtotal	**1.65**	**$0.00**	
Electrical Power	Facilities	9,438.00	$159.88	1.69
	Subtotal	**9,438.00**	**$159.88**	
Communication	Facilities	21.60	$0.14	0.63
	Subtotal	**21.56**	**$0.14**	
	Total	**27,449.55**	**$219.70**	

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

LOSS		Total	%
First Year			
	Employment Impact	153,275	8.51
	Income Impact	453	0.51
Second Year			
	Employment Impact	51,554	2.86
	Income Impact	217	0.24
Third Year			
	Employment Impact	1,158	0.06
	Income Impact	44	0.05
Fourth Year			
	Employment Impact	62	0.00
	Income Impact	(14)	-0.02
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(18)	-0.02
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(18)	-0.02

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

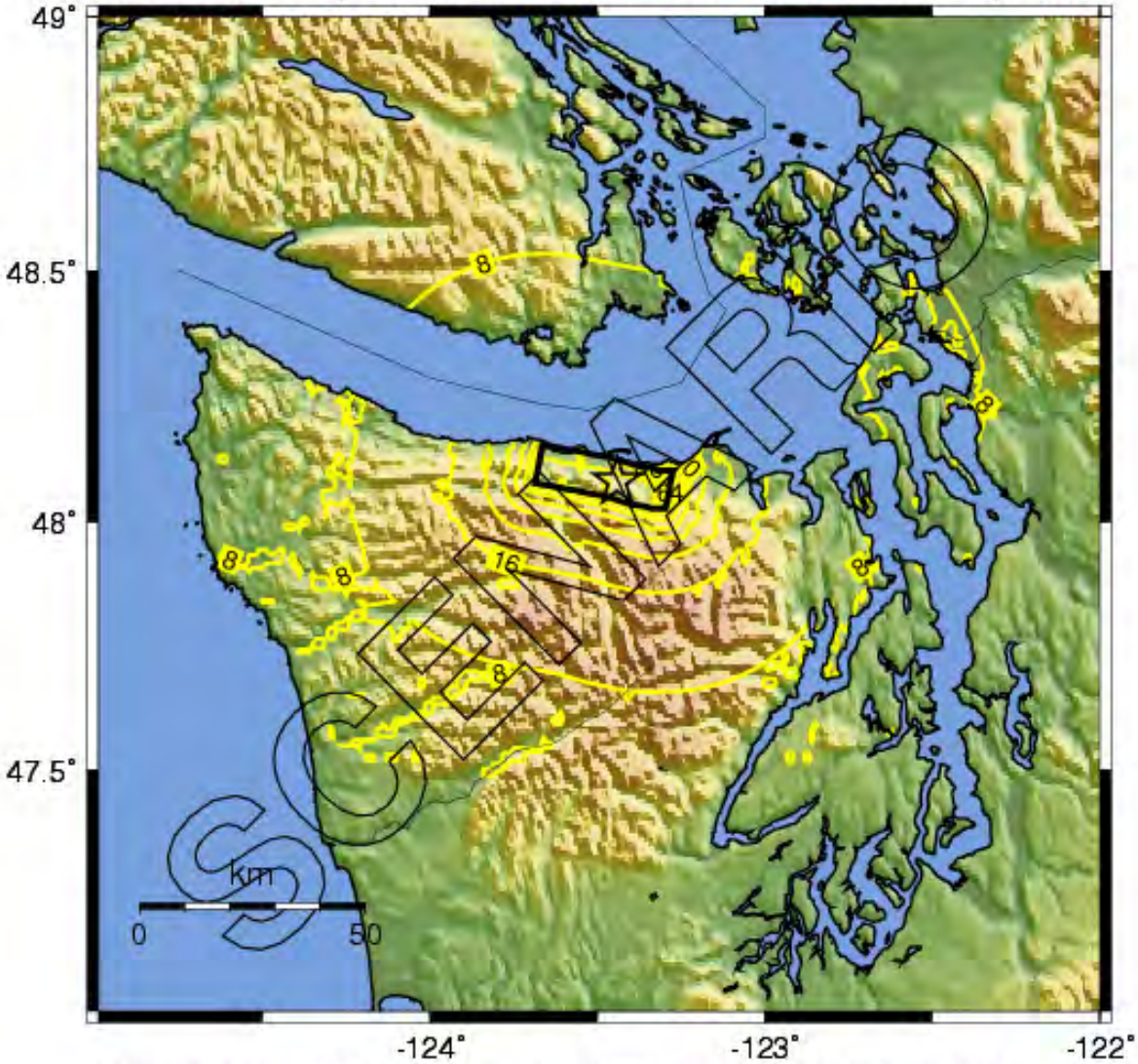
Appendix B: Regional Population and Building Value Data

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 --

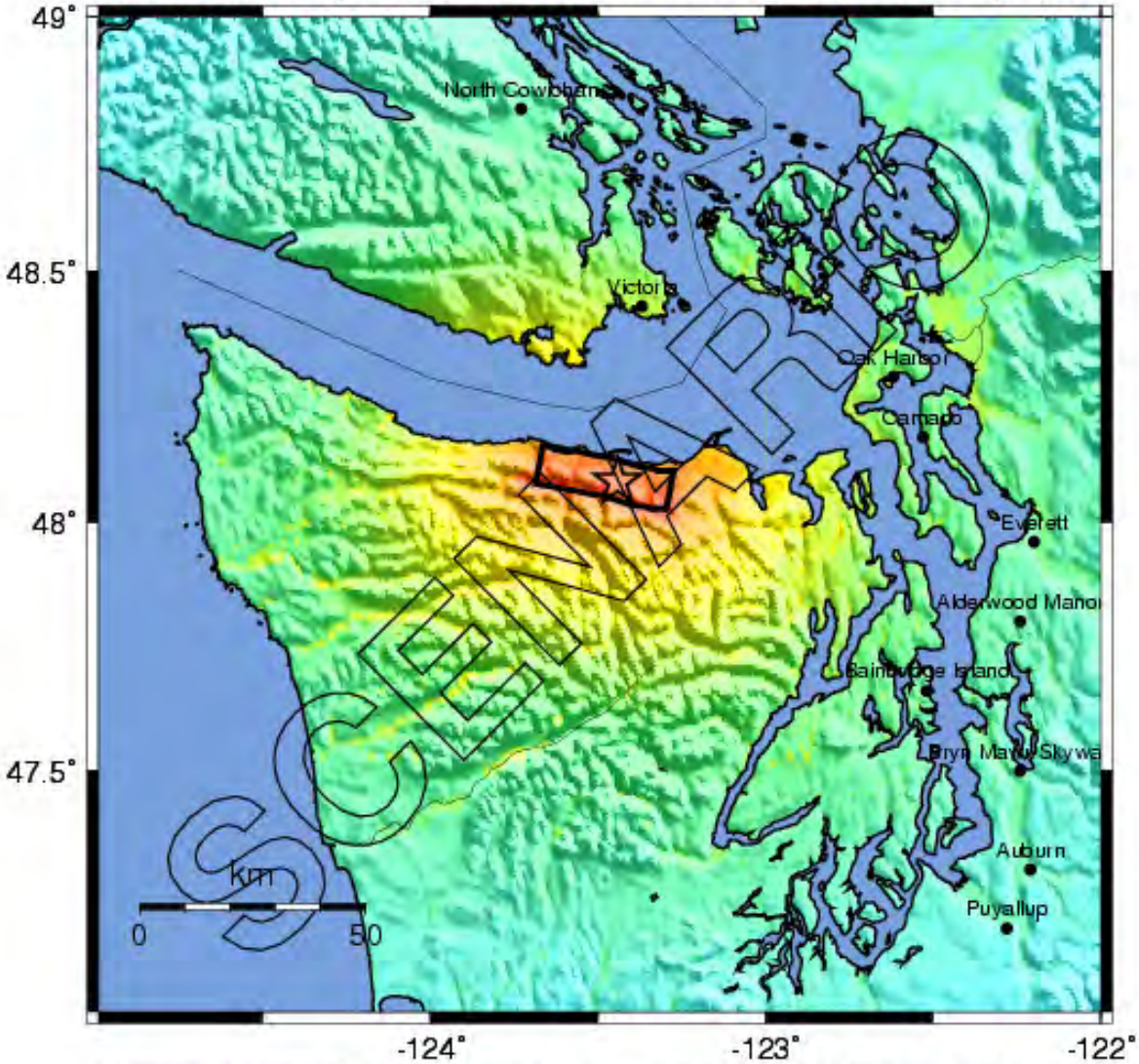
Peak Accel. Map (in %g) for LakeCreek6.8 Scenario

Scenario Date: Mon Apr 27, 2009 12:00:00 GMT M 6.8 N48.08 W123.44 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 5 Processed Wed May 6, 2009 10:37:22 PM MDT

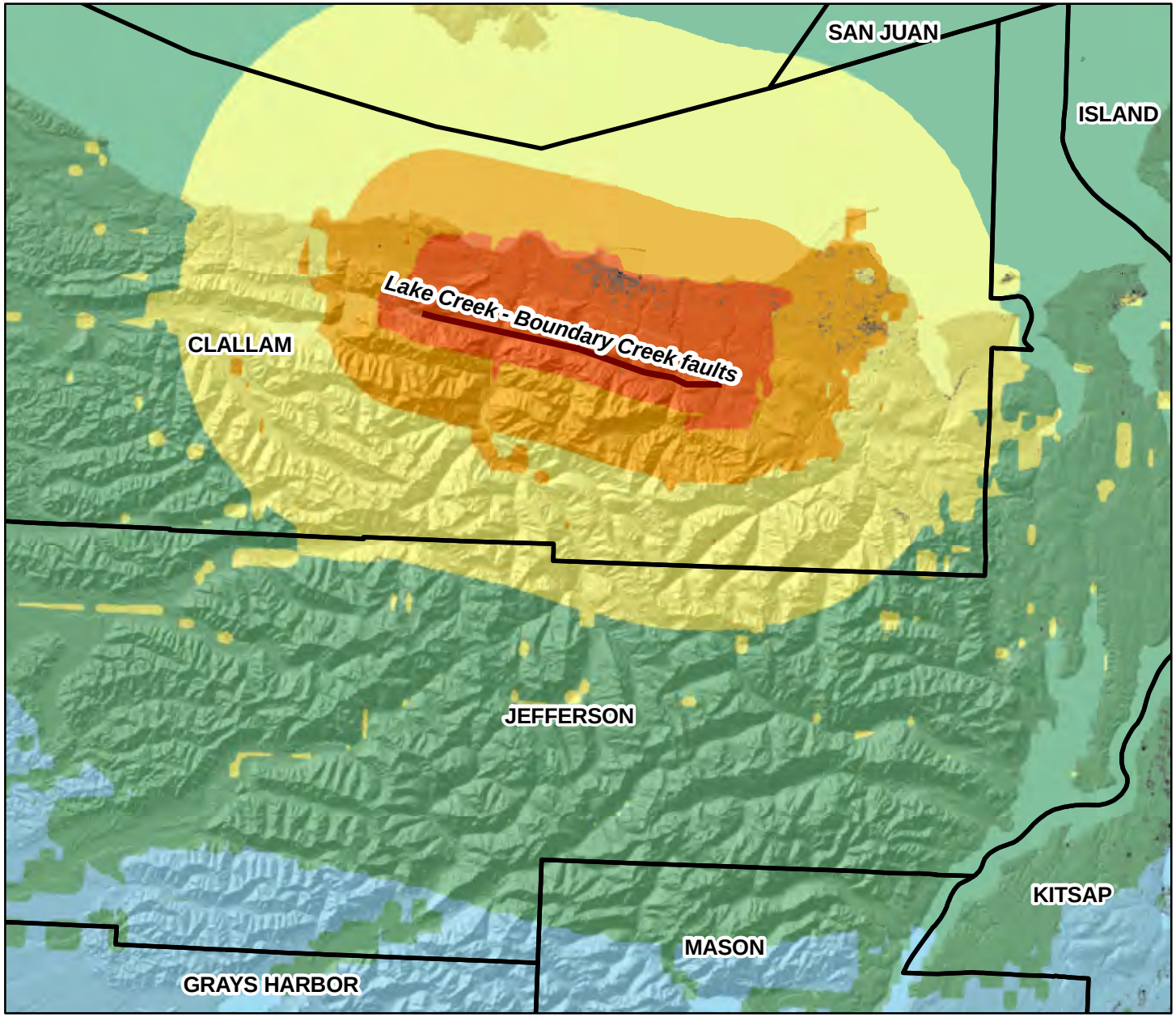
-- Earthquake Planning Scenario --
ShakeMap for LakeCreek6.8 Scenario
Scenario Date: Mon Apr 27, 2009 12:00:00 GMT M 6.8 N48.08 W123.44 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 5 Processed Wed May 6, 2009 10:37:22 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



M 6.8 Lake Creek - Boundary Creek

Population Density

People

- 0 - 4
- 4 - 20
- 20 - 40
- 40 - 50
- > 50

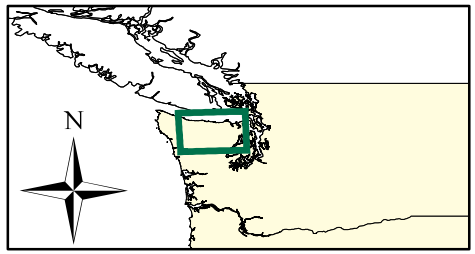
- Counties
- Fault source

MM Intensity

- IV Light
- V Moderate
- VI Strong
- VII Very Strong
- VIII Severe

0 1.5 3 6 9 12 15 18 Miles

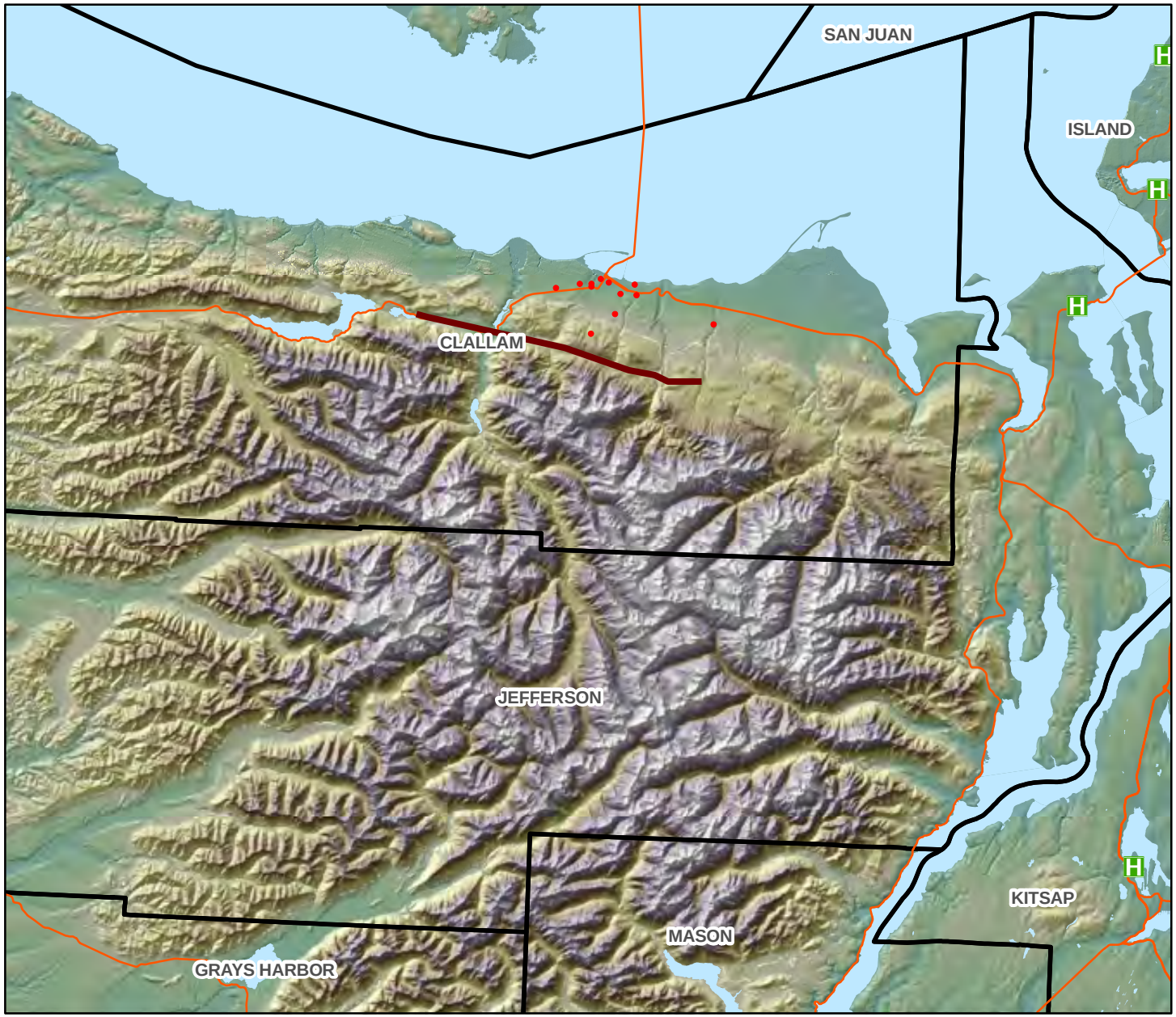
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

1 Dot = 1 Fatalitiy (Severity Level 4 delineated by census tract)

Roads
- Interstate
- Highway

Counties

Fault source

Impaired Hospitals at Day 1

Damage is expressed as the probability that a given hospital will be functional at Day 1.

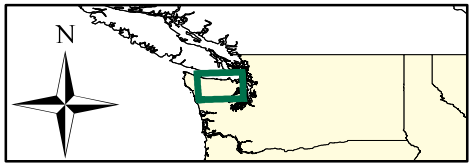
- < 50%
- 50 - 90%
- > 90%

County	Injuries Requiring Hospital Treatment (2 PM)	Fatalities (2 PM)
Clallam	229	13
Grays Harbor	1	0
Island	0	0
Jefferson	1	0
Kitsap	1	0
Mason	0	0
San Juan	0	0
Total	**232**	**13**

0 1.5 3 6 9 12 15 18

Miles

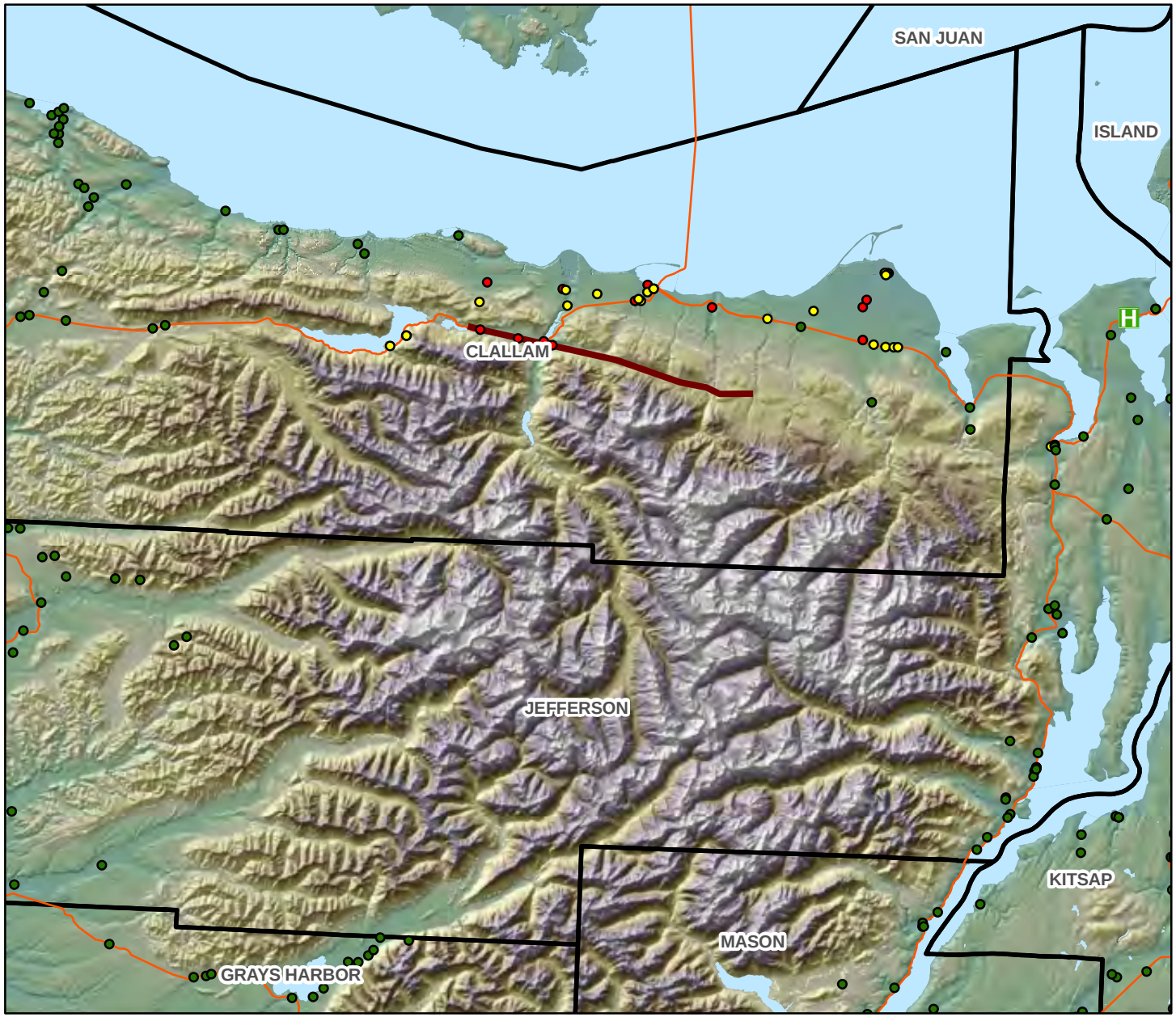
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

Highway Bridge Impacts

Damage is expressd as the probability that a given bridge segment will realize at least moderate damage.

Bridge Seg.
- high
- moderate
- low

Counties
Fault source

Roads
Interstate
Highway

Impaired Hospitals at Day 1

Damage is expressed as the probability that a given hospital will be functional at Day 1.

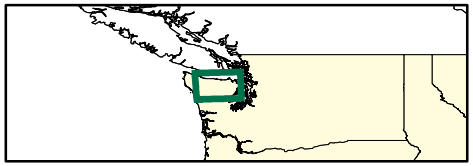
- < 50%
- 50 - 90%
- > 90%

County	Total # Hospital Beds	Hospital Beds Available	Injuries Requiring Hospital Treatment 2pm
Clallam	178	95	229
Jefferson	43	43	0
Kitsap	352	351	1
Pierce	3,270	3,267	0
Snohomish	858	857	0
Total	**4,701**	**4,613**	**230**

0 1.25 2.5 5 7.5 10 12.5 15
Miles

N

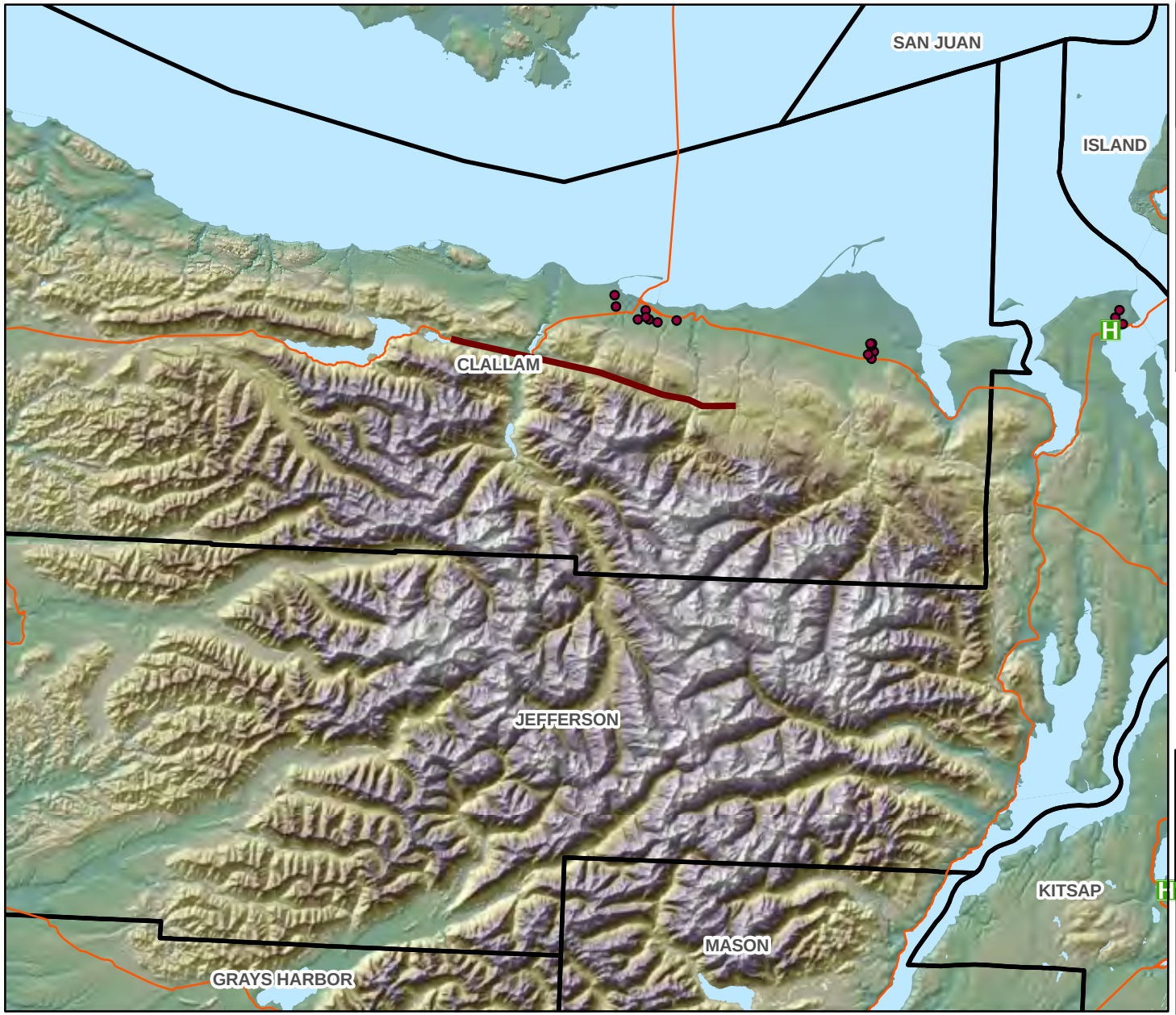
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

1 Dot = 30 People over 65

Nursing Home

Counties

Fault source

Roads

Interstate

Highway

Impaired Hospitals at Day 1

Damage is expressed as the probability that a given hospital will be functional at Day 1.

< 50%

50 - 90%

> 90%

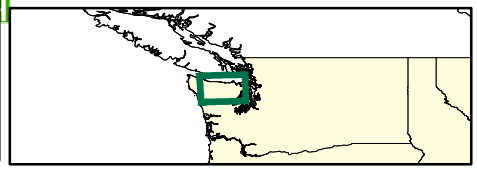
County	Total # Hospital Beds	Hospital Beds Available	Injuries Requiring Hospital Treatment 2pm
Clallam	178	95	229
Jefferson	43	43	0
Kitsap	352	351	1
Pierce	3,270	3,267	0
Snohomish	858	857	0
Total	**4,701**	**4,613**	**230**

0 1.25 2.5 5 7.5 10 12.5 15

Miles

N

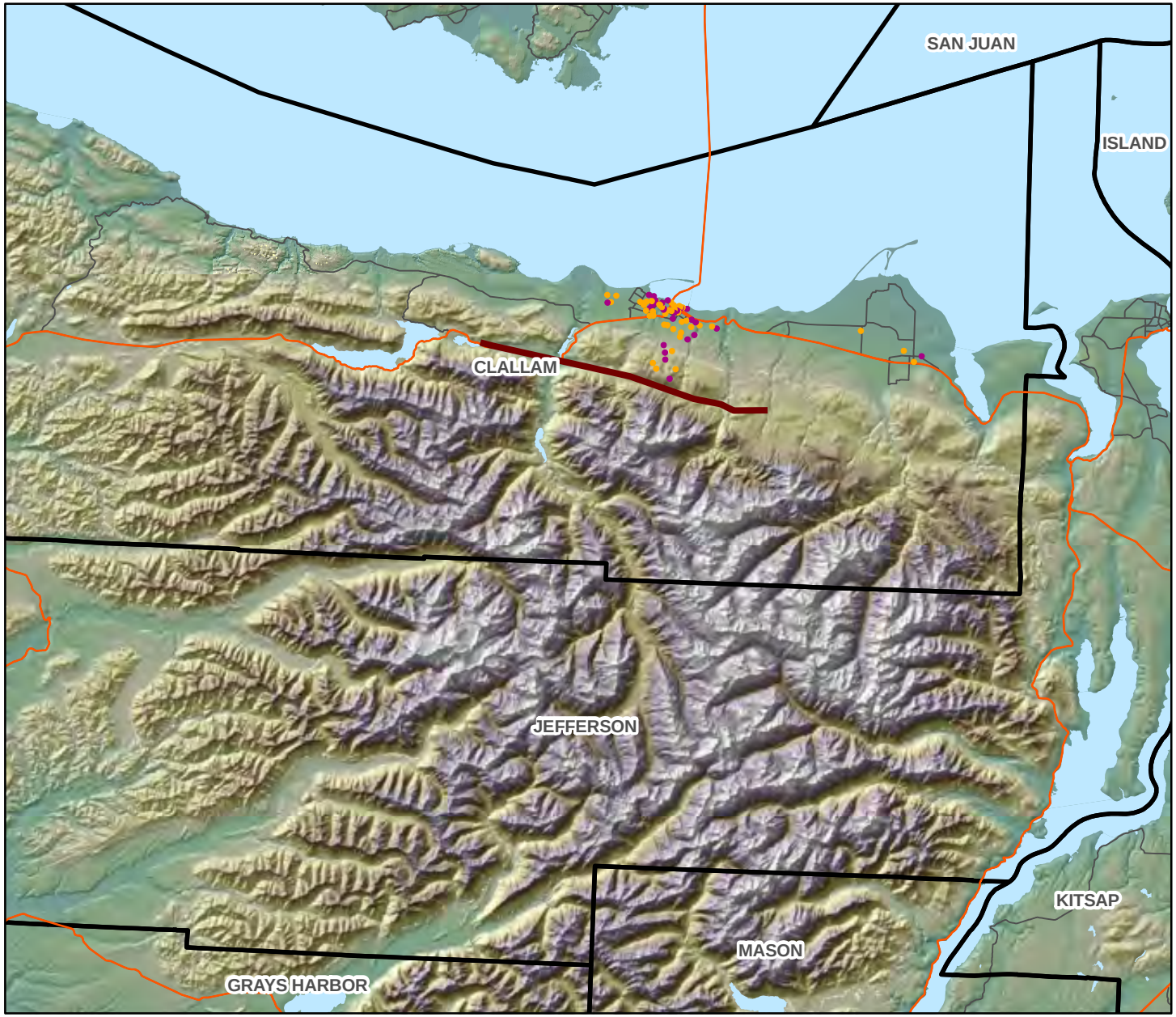
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

	Total #
Public Shelter Needs (Individuals)	283
Displaced Households	460

1 Dot = 10 Displaced Households*

1 Dot = 10 Public Shelter Needs (Individuals)*

* delineated by census tract

Counties

Fault source

Roads

Interstate

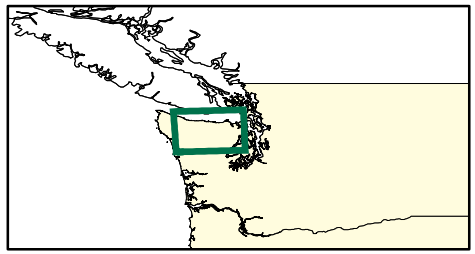
Highway

Major Road

N

0 2.5 5 7.5 10 12.5 15 Miles

1-4-10 Fabia Terra, URS Corporation

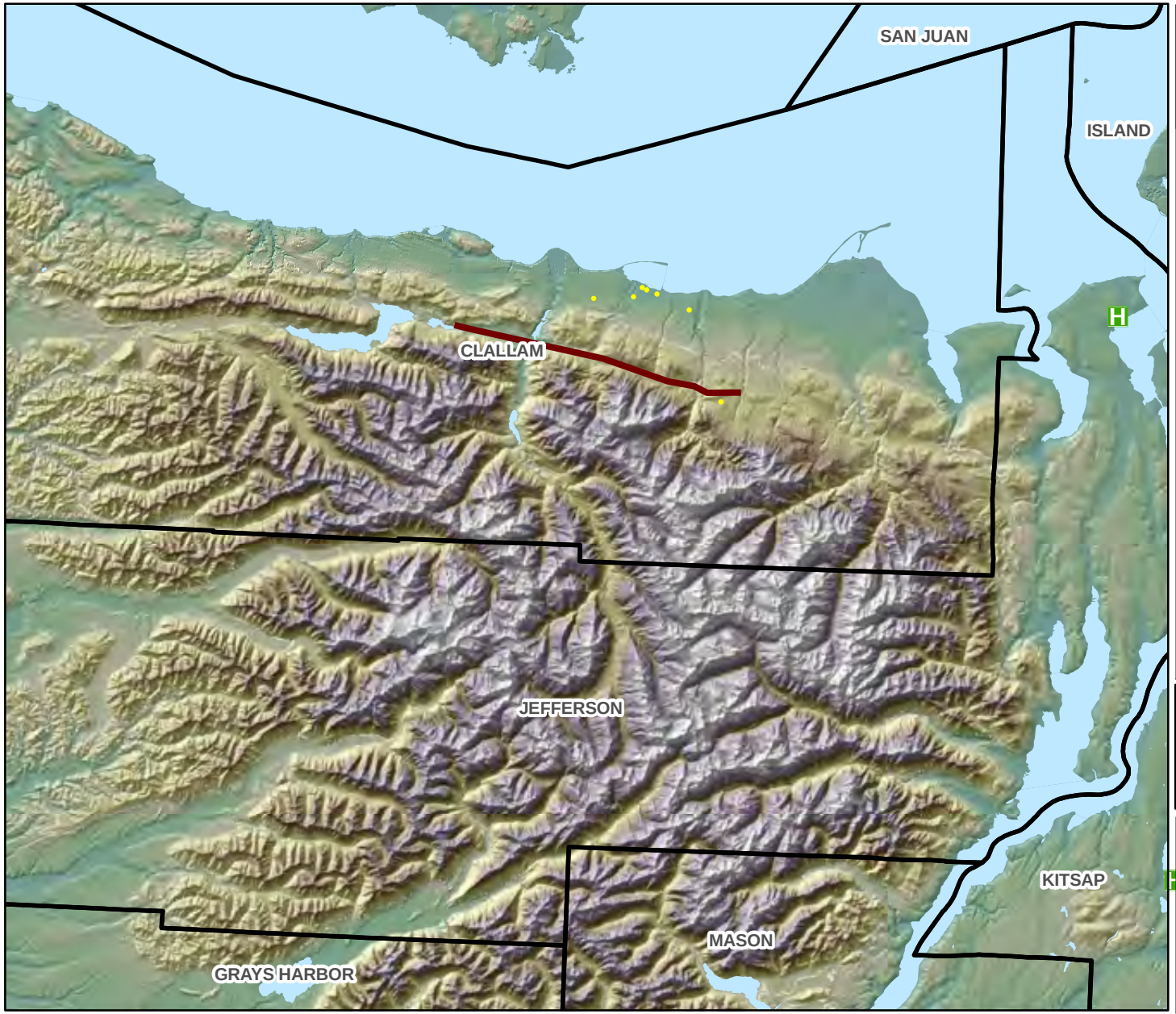


Sources: 2009 HAZUS runs by URS Corporation, Highways HSIP Gold 2007

Projection: NAD83 Harn State Plane Washington 4602 (feet)

Figure 5

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



M 6.8 Lake Creek - Boundary Creek

Impaired Hospitals (Day1)

H < 50%
H 50 - 90%
H > 90%

Damage is expressed as the probability that a given hospital will be functional on Day 1.

1 Dot = 1 Life Threatening Injury (Severtiy Level 3*)

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

Requiring Hospital Treatment**	Immediate Life Threatening Injuries**
232	7

**Totals for counties in view extent.

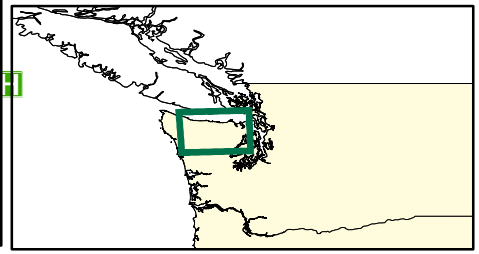
Structure Type	Red (Complete)	Collapse Rates for Complete Damage	Total Collapse
Wood	34	3%	1
Steel	25	6%	2
Concrete	32	10%	3
Precast	27	13%	4
Reinforced Masonry	27	10%	3
Unreinforced Masonry	51	15%	8
Manufactured Housing	212	3%	6
Total	408		26

Counties — Fault source

N

0 1.25 2.5 5 7.5 10 12.5 15 Miles

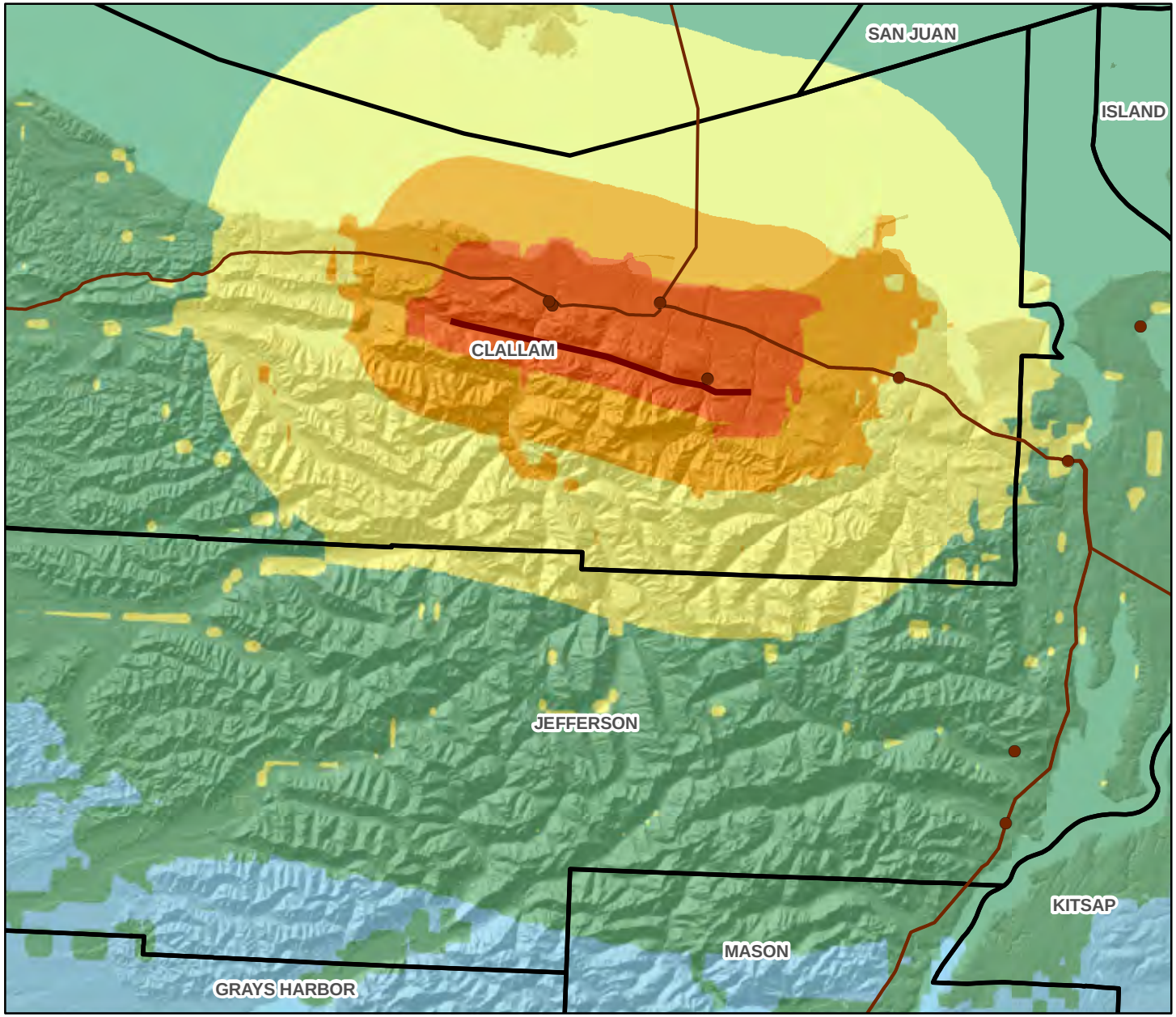
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

Power Lines

Power Facilities

MM Intensity

IV Light

V Moderate

VI Strong

VII Very Strong

VIII Severe

Number of Households without Electricity

Clallam	9,095

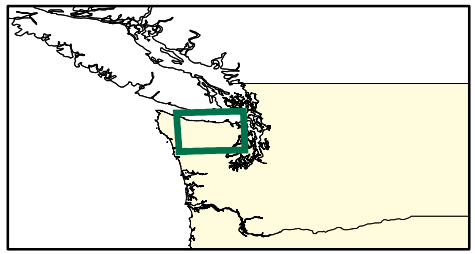
Counties

Fault source

N

0 1.5 3 6 9 12 15 18 Miles

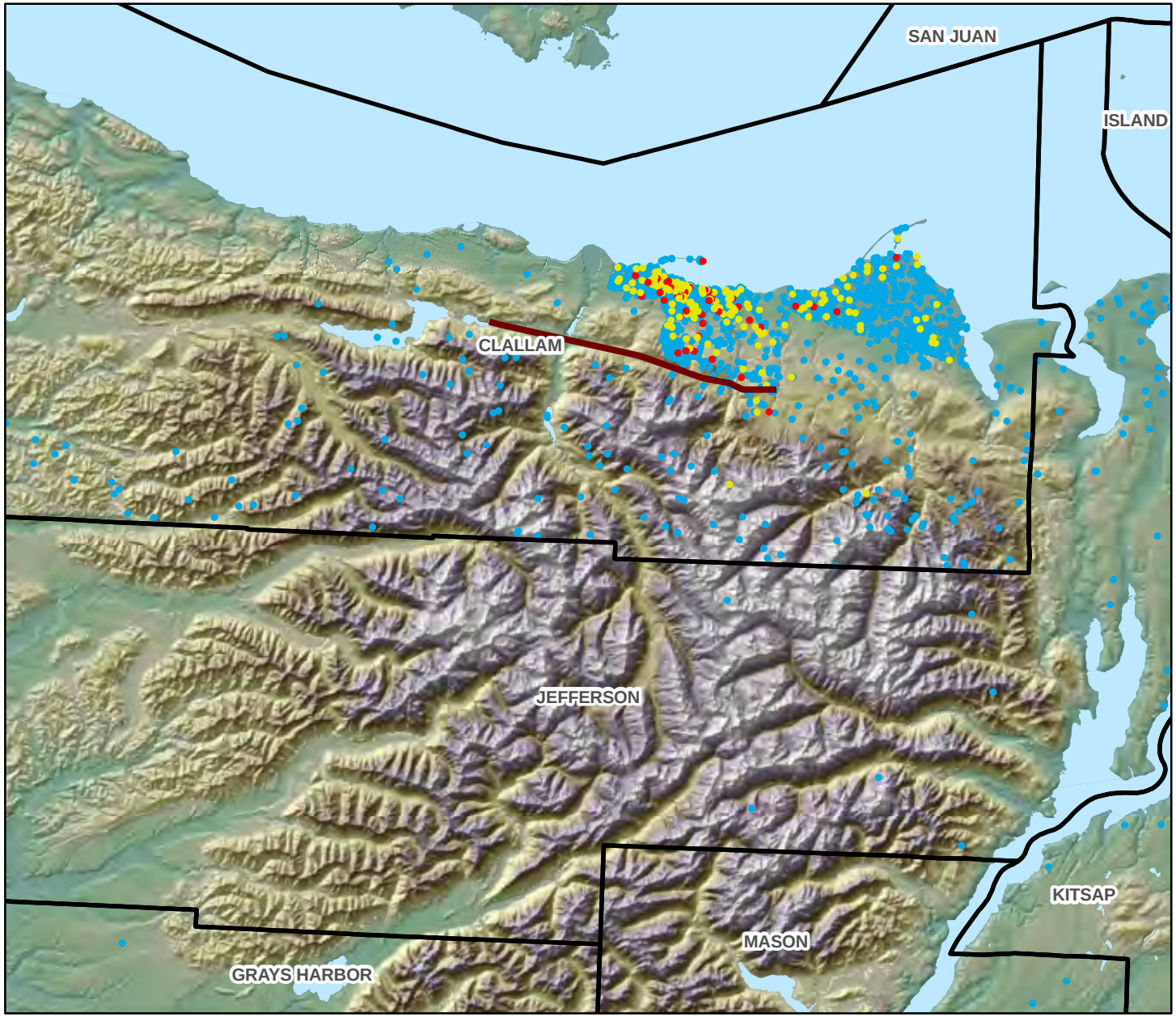
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

	Estimated # of Structures	Estimated # of Inspectors Needed
Red (Complete)	407	3
Yellow (Extensive)	1,612	21
Light Blue (Slight/ Moderate)	20,782	139
Total	22,801	163

*Estimated number of inspectors needed to complete inspections in 30 days.

1 Dot = 10 buildings (by census tract)

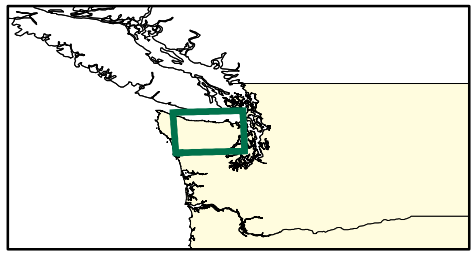
Red Tag (Complete Damage)
Yellow Tag (Extensive Damage)
Blue Tag (Slight/Moderate Damage)

N

Counties
Fault source

0 1.25 2.5 5 7.5 10 12.5 15 Miles

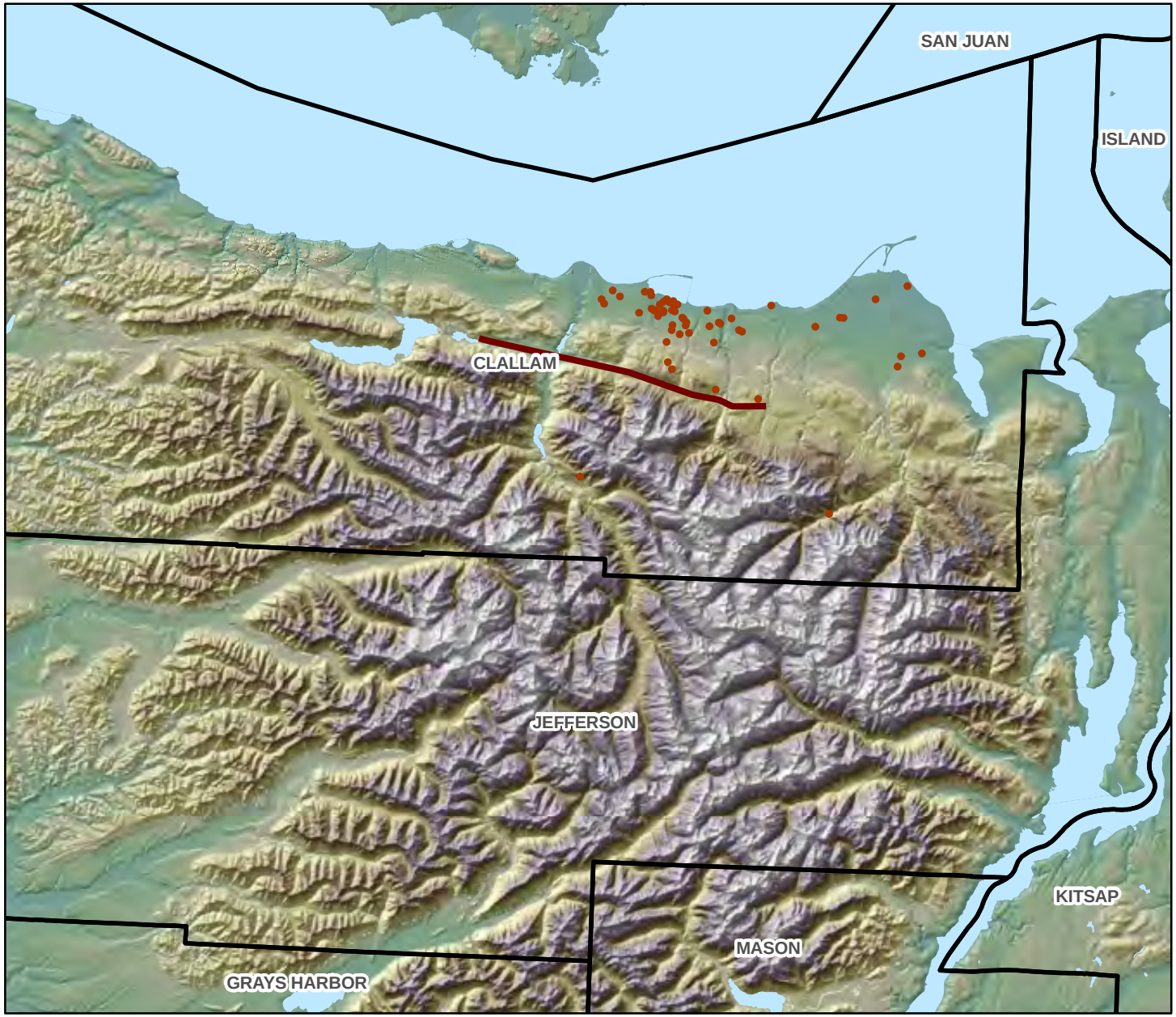
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

1 Dot = $10,000,000 worth of vulnerable building stock (by census tract)

County	Cost Strucutral Damage	Cost Non-Structural Damage	Total Loss (Including Contents)
Clallam	$67 M	$266 M	$443 M
Grays Harbor	$0 M	$0 M	$0 M
Island	$0 M	$4 M	$6 M
Jefferson	$0 M	$3 M	$5 M
Kitsap	$0 M	$5 M	$8 M
King	$2 M	$18 M	$31 M
Mason	$0 M	$0 M	$0 M
Pierce	$0 M	$2 M	$4 M
San Juan	$0 M	$1 M	$1 M
Snohomish	$1 M	$6 M	$10 M
Total	**$70 M**	**$304 M**	**$508 M**

* All values are millions of dollars

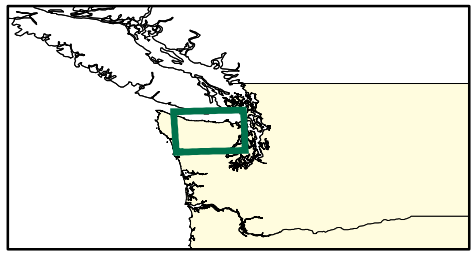
Counties

Fault source

N

0 3 6 9 12 15 18 Miles

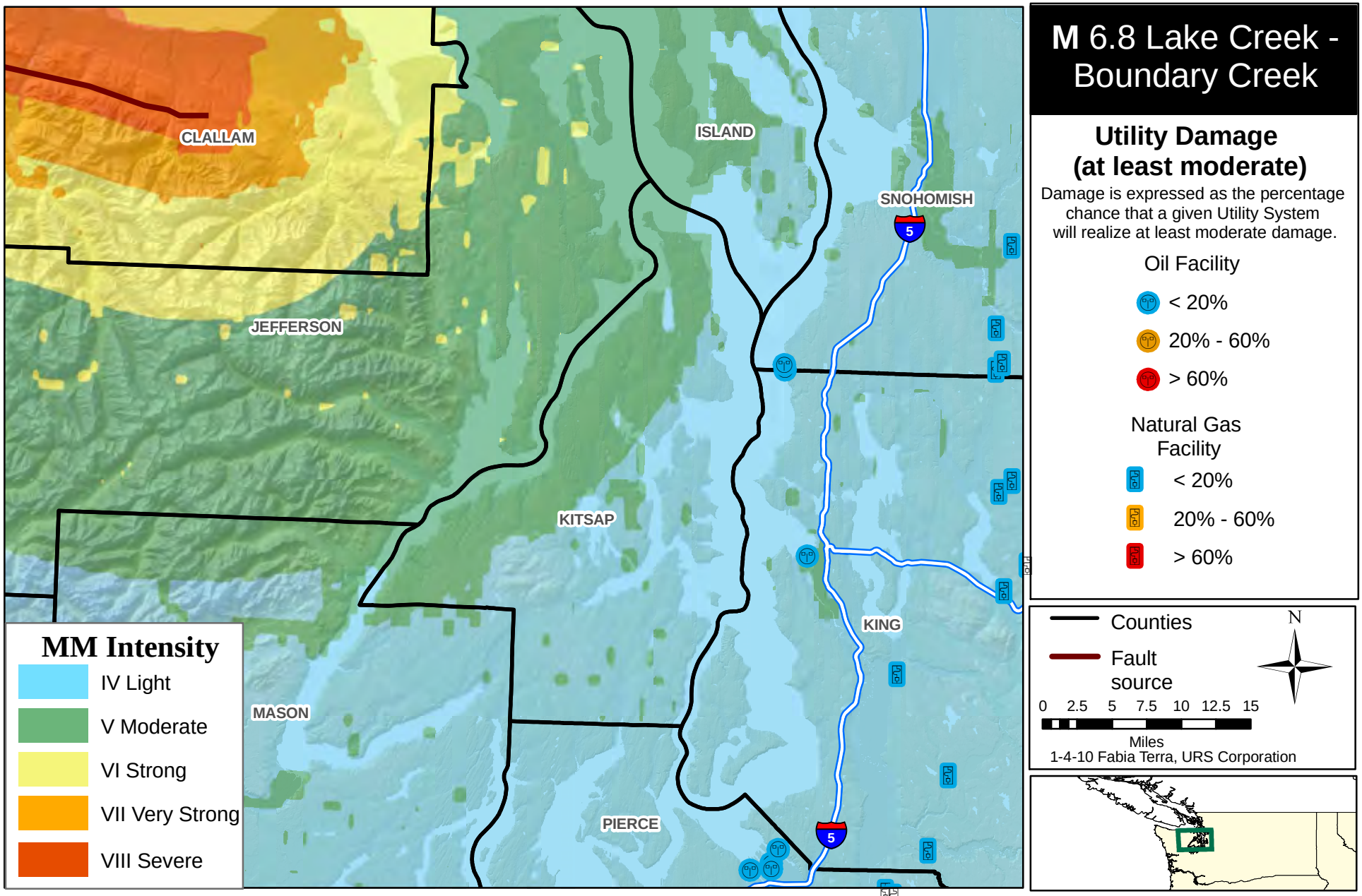
1-4-10 Fabia Terra, URS Corporation



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

Figure 9

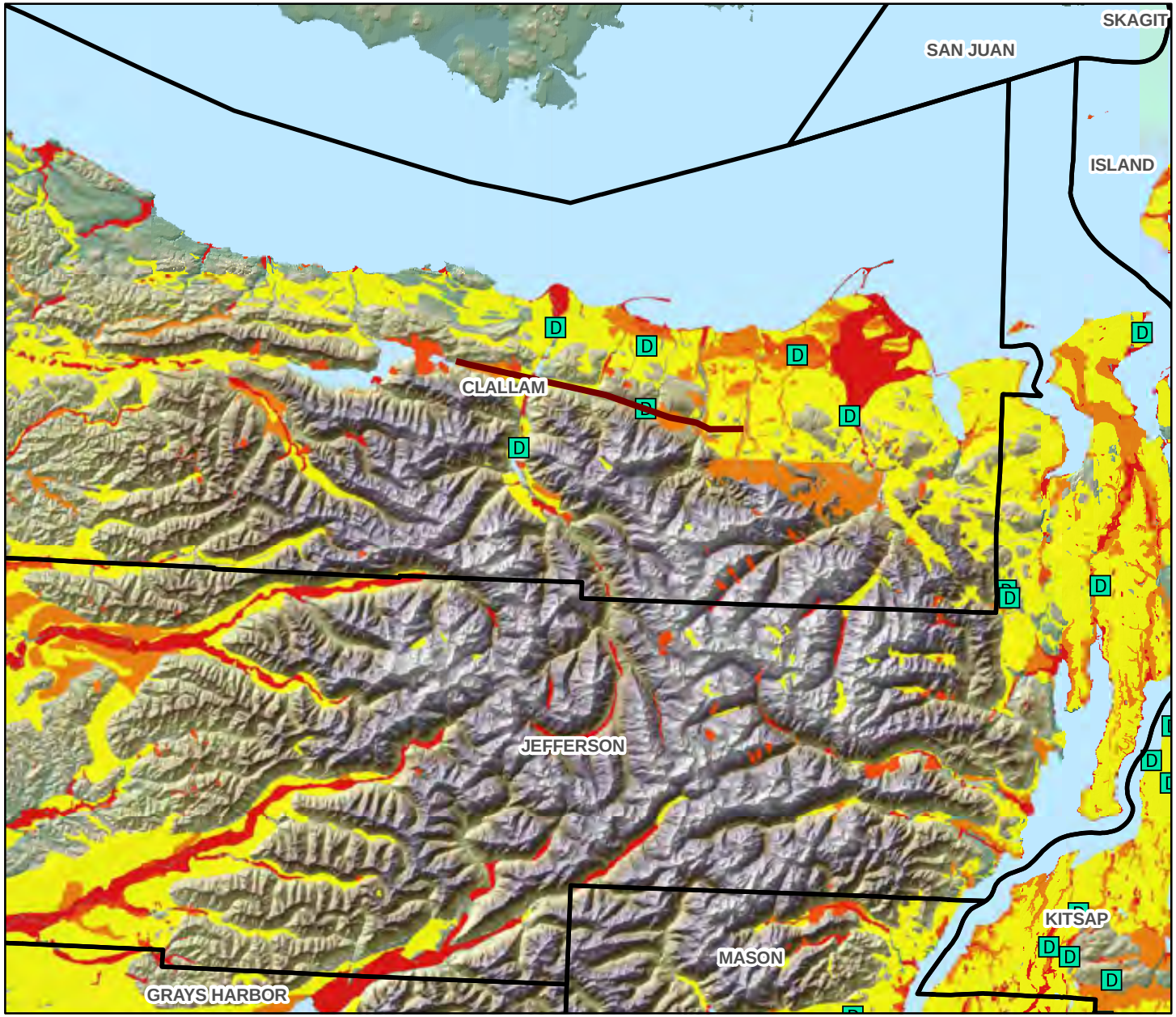
Natural Gas, and Oil Facility Damage - Earthquake Scenario: Washington



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



M 6.8 Lake Creek - Boundary Creek

Liquefaction Susceptibility

- Low
- Moderate
- Low-Moderate
- High
- D Dams
- Counties
- Fault source

County	# Households without Potable Water (at Day 1)	Daily Potable Water Needs Per Person (Gallons/day)*	Number of Truckloads needed Daily
Clallam	544	1,632	1

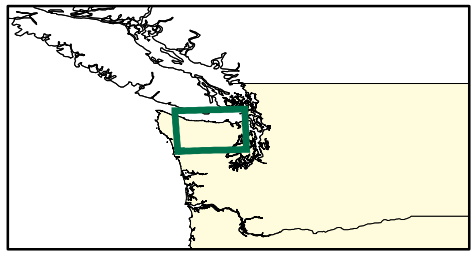
* Based on U.S. Army Corp Mission Guidebook
(Daily water is based on an esimated 3 people per household.
One truck can transport an esimated 5000 gallons of water.)

Note: Counties not listed had no potable water losses.

N

0 2.5 5 7.5 10 12.5 15 Miles

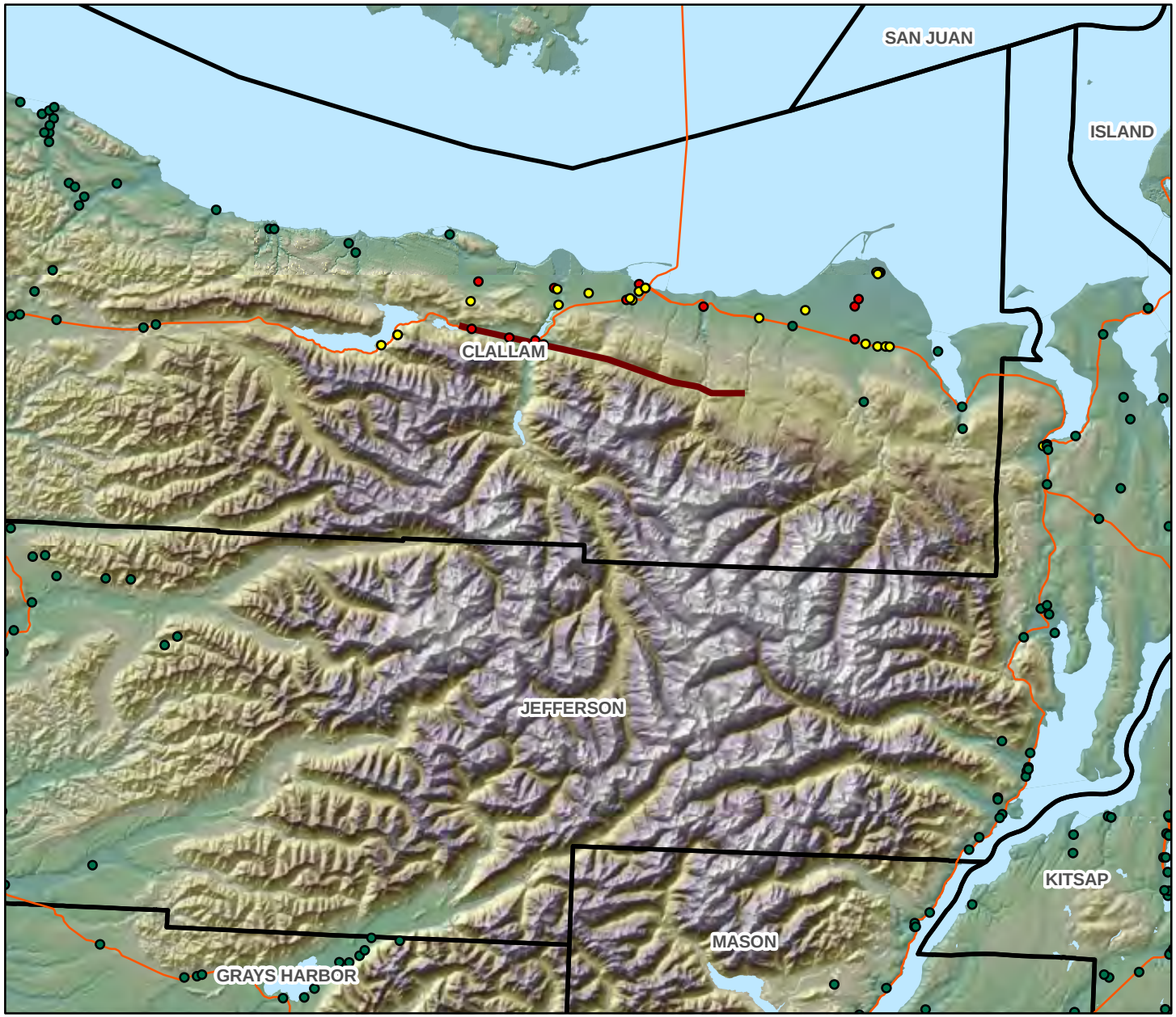
1-4-10 Fabia Terra, URS Corporation



Sources: 2009 HAZUS runs by URS Corporation, Dams 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



M 6.8 Lake Creek - Boundary Creek

Highway Bridge Impacts (at least moderate)

Damage is expressed as the probability that a given Bridge will realize at least moderate damage.

Counties
Fault source

Roads
Interstate
Highway

Major Roadway Bridge
- low
- moderate
- high

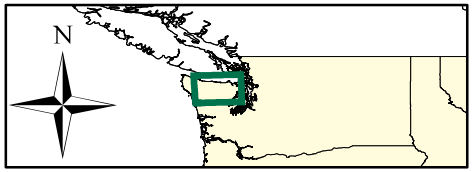
County	# of Bridges Needing Inspection	# of Bridge Engineers Needed*
Clallam	95	13
Grays Harbor	269	36
Island	6	1
Jefferson	54	7
King	1,033	138
Kitsap	83	11
Mason	92	12
Pierce	402	54
San Juan	9	1
Snohomish	466	62
Total	**2,509**	**224**

* 2 engineers can inspect 5 bridges a day for 3 days

0 3 6 9 12 15 18

Miles

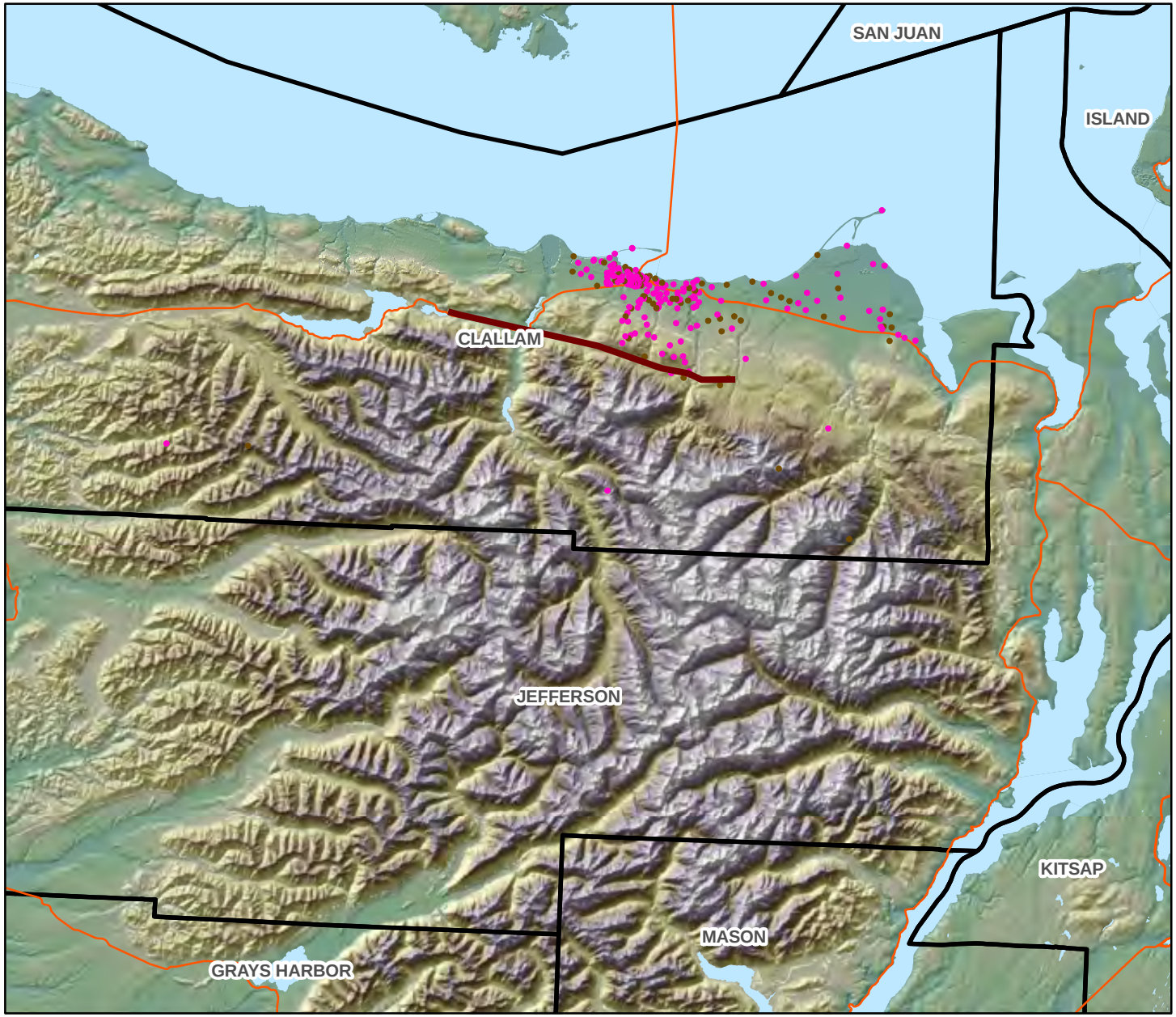
1-4-10 Fabia Terra, URS Corporation



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



M 6.8 Lake Creek - Boundary Creek

1 Dot = 1 thousand tons of Concrete and Steel Debris*
1 Dot = 1 thousand tons of Brick and Wood Debris*
*by census tract

Counties
Fault source

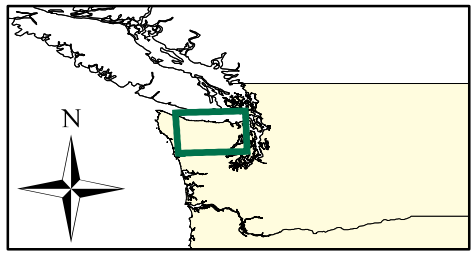
Roads
Interstate
Highway

County	Brick and Wood (tons)	Concrete and Steel (tons)	Estimated Truck Loads*
Clallam	66,000	116,000	7,280
Jefferson	1,000	0	40
King	4,000	1,000	200
Kitsap	1,000	0	40
Snohomish	1,000	0	40
Total	**73,000**	**117,000**	**7,600**

* Truck loads estimated at 25 tons per truck

0 3 6 9 12 15 18 Miles

1-4-10 Fabia Terra, URS Corporation



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

Figure 13