Scenario: M 7.1 Mill Creek Fault
Benton 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	4	1	1	0	0	0	0	0	0	0	0	0	4	1	1
Single Family	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total Benton	**5**	**4**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**4**	**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	158	6	1	0	0	165
Commercial	73	3	1	0	0	77
Education	174	7	2	0	0	183
Government	2428	113	33	2	0	2,576
Industrial	12283	1,194	424	13	0	13,914
Religion	35035	387	13	0	0	35,435
Other Residential	712	40	14	1	0	767
Single Family	279	20	8	0	0	307

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
$2,124,000	$13,507,000	$7,667,000	$277,000	0.15	$1,351,000	$551,000	$697,000	$581,000	$26,755,000

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	311	302	97	302	97	310	100	311	100	311	100
Small	32	32	99	32	99	32	100	32	100	32	100
Total	**343**	**334**	**—**	**334**	**—**	**342**	**—**	**343**	**—**	**343**	**—**

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
155	155	0	0	0	0

Scenario: M 7.1 Mill Creek Fault
Benton County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
5	265	$18,905,000

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	%
58,697	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	%
58,697	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
2,000	2,000	4,000	160

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	100
Fire Station Facilities	29	98
Police Station Facilities	6	98
School	62	99

Scenario: M 7.1 Mill Creek Fault
Franklin 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 Franklin	**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	33	0	0	0	0	33
Commercial	9615	16	0	0	0	9,631
Education	975	14	2	0	0	991
Government	40	0	0	0	0	40
Industrial	6042	136	13	0	0	6,191
Religion	81	1	0	0	0	82
Other Residential	257	2	0	0	0	259
Single Family	253	4	1	0	0	258

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
$148,000	$1,568,000	$965,000	$39,000	0.06	$63,000	$31,000	$42,000	$54,000	$2,909,000

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	132	129	98	129	98	132	100	132	100	132	100
Small											
Total	**132**	**129**	**—**	**129**	**—**	**132**	**—**	**132**	**—**	**132**	**—**

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
137	137	0	0	0	0

Scenario: M 7.1 Mill Creek Fault
Franklin County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
2	102	$4,731,000

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	%
18,183	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	%
18,183	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	17	100
Police Station Facilities	3	100
School	33	100

Scenario: M 7.1 Mill Creek Fault
Grant 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 Grant	**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	16543	7	0	0	0	16,550
Commercial	15165	180	12	0	0	15,357
Education	133	0	0	0	0	133
Government	1570	7	1	0	0	1,578
Industrial	386	2	0	0	0	388
Religion	472	3	0	0	0	475
Other Residential	61	0	0	0	0	61
Single Family	65	0	0	0	0	65

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
$95,000	$976,000	$650,000	$39,000	0.02	$31,000	$11,000	$12,000	$22,000	$1,837,000

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	161	161	100	161	100	161	100	161	100	161	100
Small	38	38	99	38	99	38	100	38	100	38	100
Total	**199**	**199**	**—**	**199**	**—**	**199**	**—**	**199**	**—**	**199**	**—**

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
272	272	0	0	0	0

Scenario: M 7.1 Mill Creek Fault
Grant County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
1	75	$4,280,000

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	%
27,584	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	%
27,584	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	52	100
Police Station Facilities	13	100
School	60	100

Scenario: M 7.1 Mill Creek Fault
Klickitat 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	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 Klickitat	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**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	37	1	0	0	0	38
Commercial	26	1	0	0	0	27
Education	5,648	58	1	0	0	5,707
Government	39	1	0	0	0	40
Industrial	3,942	356	62	0	0	4,360
Religion	405	20	4	0	0	429
Other Residential	181	9	2	0	0	192
Single Family	110	5	1	0	0	116

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
$261,000	$2,188,000	$1,312,000	$50,000	0.2	$132,000	$39,000	$58,000	$61,000	$4,100,000

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	63	48	77	49	77	61	97	63	100	63	100
Total	**63**	**48**	**—**	**49**	**—**	**61**	**—**	**63**	**—**	**63**	**—**

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
91 (92*)	90	1	0	0	0

* values in parentheses include rounding error.

Scenario: M 7.1 Mill Creek Fault
Klickitat County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
1	1	$41,000

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	%
7,860	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	%
7,860	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	23	97
Police Station Facilities	4	96
School	22	97

Scenario: M 7.1 Mill Creek 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	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 Lewis	**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	237	0	0	0	0	237
Commercial	20322	2	0	0	0	20,324
Education	1804	1	0	0	0	1,805
Government	11093	29	2	0	0	11,124
Industrial	59	0	0	0	0	59
Religion	138	0	0	0	0	138
Other Residential	53	0	0	0	0	53
Single Family	602	0	0	0	0	602

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
$10,000	$98,000	$54,000	$2,000	0	$4,000	$1,000	$2,000	$2,000	$172,000

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	390	390	100	390	100	390	100	390	100	390	100
Medium											
Small	25	25	100	25	100	25	100	25	100	25	100
Total	**415**	**415**	**—**	**415**	**—**	**415**	**—**	**415**	**—**	**415**	**—**

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
332	332	0	0	0	0

Scenario: M 7.1 Mill Creek Fault
Lewis County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
1	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	%
27,107	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	%
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
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	37	100
Police Station Facilities	8	100
School	45	100

Scenario: M 7.1 Mill Creek 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	16	0	0	0	0	16
Commercial	94	1	0	0	0	95
Education	11	0	0	0	0	11
Government	199	2	0	0	0	201
Industrial	23	0	0	0	0	23
Religion	14	0	0	0	0	14
Other Residential	3,121	5	0	0	0	3,126
Single Family	1,872	28	3	0	0	1,903

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
$19,000	$229,000	$140,000	$3,000	0.04	$8,000	$3,000	$4,000	$5,000	$411,000

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	%	Number of Beds	%	Number of Beds	%	Number of Beds	%	Number of Beds	%
Large											
Medium											
Small											
Total	**0**	**0**	**—**	**0**	**—**	**0**	**—**	**0**	**—**	**0**	**—**

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
50	50	0	0	0	0

Scenario: M 7.1 Mill Creek Fault
Skamania 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	%
3,915	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	%
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	100
Police Station Facilities	1	100
School	10	100

Scenario: M 7.1 Mill Creek Fault
Yakima 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	1	0	0	2	0	0	3	0	0	1	0	0	7
Commercial	1	75	65	0	13	12	0	1	1	0	3	3	1	92	81
Educational	0	43	2	0	10	0	0	1	0	0	3	0	0	57	2
Hotels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	1	6	4	0	1	1	0	0	0	0	0	0	1	7	5
Other-Residential	94	21	34	17	4	6	1	0	0	2	0	1	114	25	41
Single Family	28	7	11	3	1	1	0	0	0	0	0	0	31	8	12
Total Yakima	**124**	**152**	**117**	**20**	**29**	**22**	**1**	**2**	**4**	**2**	**6**	**5**	**147**	**189**	**148**

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	2,605	725	576	181	22	4,109
Commercial	46,204	5,937	1,004	175	18	53,338
Education	559	137	125	50	9	880
Government	238	58	49	19	2	366
Industrial	15,494	4,570	3,359	1,215	247	24,885
Religion	90	23	21	9	1	144
Other Residential	85	26	31	18	3	163
Single Family	687	188	160	52	8	1,095

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
$62,696,000	$175,212,000	$72,705,000	$3,206,000	1.74	$40,328,000	$17,669,000	$24,512,000	$17,202,000	$413,530,000

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	426	369	87	370	87	422	99	426	100	426	100
Medium	63	1	1	1	2	14	22	54	86	58	93
Small	38	2	6	3	7	17	44	37	97	37	98
Total	**527**	**372**	**—**	**374**	**—**	**453**	**—**	**517**	**—**	**521**	**—**

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
520 (515*)	452	16	16	21	10

* values in parentheses include rounding error.

Scenario: M 7.1 Mill Creek Fault
Yakima County

Fire Following Analysis Summary Report

Number of Ignitions	Population Exposed	Value Exposed
7	586	$36,076,000

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	%
76,461	14,206	19	12,447	16	9,014	12	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	%
76,461	1,135	2	765	1	355	1	77	0.1	1	0

Debris Summary Report

Brick, Wood & Others (tons)	Concrete & Steel (tons)	Total (tons)	Number of Truckloads
51,000	118,000	169,000	6,760

Shelter Summary Report

Number of Displaced Households	Number of People Needing Short Term Shelter
308	351

Essential Facilities Functionality

	Count	Functionality (%)
		At Day 1
Emergency Operation Center	1	95
Fire Station Facilities	55	80
Police Station Facilities	18	83
School	114	81

HAZUS-MH: Earthquake Event Report

Region Name: MillCreekM71redoOct09

Earthquake Scenario: MillCreekredoOct09

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

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 11 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 25,866.71 square miles and contains 662 census tracts. There are over 1,282 thousand households in the region and has a total population of 3,298,827 people (2005 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 1,134 thousand buildings in the region with a total building replacement value (excluding contents) of 256,832 (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 104,359 and 14,611 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

HAZUS estimates that there are 1,134 thousand buildings in the region which have an aggregate total replacement value of 256,832 (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 55 hospitals in the region with a total bed capacity of 10,853 beds. There are 1,413 schools, 521 fire stations, 139 police stations and 33 emergency operation facilities. With respect to HPL facilities, there are 284 dams identified within the region. Of these, 94 of the dams are classified as 'high hazard'. The inventory also includes 460 hazardous material sites, 0 military installations and 1 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 118,970.00 (millions of dollars). This inventory includes over 6,358 kilometers of highways, 3,271 bridges, 185,331 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	3,271	62,626.60
	Segments	2,449	36,197.00
	Tunnels	26	61.20
		Subtotal	**98,884.80**
Railways	Bridges	53	13.10
	Facilities	62	165.10
	Segments	1,176	2,125.00
	Tunnels	0	0.00
		Subtotal	**2,303.20**
Light Rail	Bridges	0	0.00
	Facilities	34	90.50
	Segments	42	153.00
	Tunnels	0	0.00
		Subtotal	**243.50**
Bus	Facilities	28	33.60
		Subtotal	**33.60**
Ferry	Facilities	18	24.00
		Subtotal	**24.00**
Port	Facilities	260	519.20
		Subtotal	**519.20**
Airport	Facilities	39	415.40
	Runways	51	1,936.20
		Subtotal	**2,351.60**
		Total	**104,359.80**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	1,853.30
	Facilities	35	1,282.10
	Pipelines	0	0.00
		Subtotal	**3,135.40**
Waste Water	Distribution Lines	NA	1,112.00
	Facilities	82	6,007.30
	Pipelines	0	0.00
		Subtotal	**7,119.30**
Natural Gas	Distribution Lines	NA	741.30
	Facilities	36	43.20
	Pipelines	0	0.00
		Subtotal	**784.50**
Oil Systems	Facilities	6	0.70
	Pipelines	0	0.00
		Subtotal	**0.70**
Electrical Power	Facilities	60	7,260.00
		Subtotal	**7,260.00**
Communication	Facilities	168	18.50
		Subtotal	**18.50**
		Total	**18,318.30**

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	MillCreekredoOct09
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	7.10
Depth (Km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Building Damage

HAZUS estimates that about 7,902 buildings will be at least moderately damaged. This is over 1.00 % of the total number of buildings in the region. There are an estimated 296 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	5,096	0.46	167	1.16	134	2.27	51	3.02	9	3.09
Commercial	61,401	5.52	887	6.17	617	10.41	181	10.80	22	7.29
Education	2,205	0.20	28	0.20	23	0.38	9	0.52	1	0.46
Government	1,328	0.12	34	0.24	33	0.56	18	1.06	3	0.91
Industrial	17,387	1.56	245	1.71	177	2.99	52	3.11	8	2.78
Other Residential	219,148	19.70	6,488	45.14	3,881	65.48	1,213	72.29	243	81.72
Religion	4,214	0.38	69	0.48	51	0.87	19	1.11	2	0.81
Single Family	801,641	72.06	6,456	44.91	1,011	17.05	136	8.09	9	2.94
Total	**1,112,421**		**14,374**		**5,928**		**1,678**		**297**	

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

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	911,061	81.90	8129	56.56	1,216	20.51	107	6.35	3	0.97
Steel	24,327	2.19	409	2.85	459	7.74	212	12.66	43	14.32
Concrete	24,229	2.18	446	3.10	346	5.84	120	7.15	16	5.39
Precast	17,504	1.57	266	1.85	270	4.56	103	6.15	15	4.95
RM	42,408	3.81	450	3.13	454	7.67	167	9.93	17	5.89
URM	9,335	0.84	279	1.94	133	2.24	26	1.57	6	1.92
MH	83,557	7.51	4394	30.57	3,050	51.45	943	56.20	198	66.56
Total	**1,112,421**		**14,374**		**5,928**		**1,678**		**297**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 10,853 hospital beds available for use. On the day of the earthquake, the model estimates that only 10,308 hospital beds (95.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 97.00% 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	55	2	0	53
Schools	1,413	0	0	1,408
EOCs	33	0	0	33
PoliceStations	139	0	0	139
FireStations	521	0	0	517

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	2,449	0	0	2,449	2,449
	Bridges	3,271	9	0	3,262	3,268
	Tunnels	26	0	0	26	26
Railways	Segments	1,176	0	0	1,176	1,176
	Bridges	53	0	0	53	53
	Tunnels	0	0	0	0	0
	Facilities	62	0	0	62	62
Light Rail	Segments	42	0	0	42	42
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	34	0	0	34	34
Bus	Facilities	28	0	0	28	28
Ferry	Facilities	18	0	0	18	18
Port	Facilities	260	0	0	260	260
Airport	Facilities	39	0	0	39	39
	Runways	51	0	0	51	51

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	35	0	0	35	35
Waste Water	82	2	0	76	82
Natural Gas	36	0	0	36	36
Oil Systems	6	0	0	6	6
Electrical Power	60	0	0	60	60
Communication	168	0	0	168	168

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

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	92,666	2440	610
Waste Water	55,599	1930	483
Natural Gas	37,066	2063	516
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	1,282,957	9,440	7,788	4,756	0	0
Electric Power		1,135	765	355	77	1

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 15 ignitions that will burn about 0.67 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 727 people and burn about 44 (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 0.170 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 31.00% 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 6,880,000 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 287 households to be displaced due to the earthquake. Of these, 325 people (out of a total population of 3,298,827) will seek temporary shelter in public shelters.

Casualties

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

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

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

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

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	98	17	1	2
	Single Family	26	2	0	0
	Total	**126**	**19**	**1**	**2**
2 PM	Commercial	76	13	1	3
	Commuting	0	0	0	0
	Educational	44	9	1	3
	Hotels	0	0	0	0
	Industrial	7	1	0	0
	Other-Residential	22	4	0	0
	Single Family	6	1	0	0
	Total	**154**	**28**	**3**	**6**
5 PM	Commercial	66	12	1	3
	Commuting	1	1	2	0
	Educational	2	0	0	0
	Hotels	0	0	0	0
	Industrial	4	1	0	0
	Other-Residential	35	6	0	1
	Single Family	10	1	0	0
	Total	**118**	**21**	**4**	**4**

Economic Loss

The total economic loss estimated for the earthquake is 687.42 (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 441.50 (millions of dollars); 23 % 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 45 % 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	0.74	20.58	1.10	2.74	25.16
	Capital-Related	0.00	0.31	16.64	0.66	0.60	18.22
	Rental	1.54	4.69	9.50	0.48	1.44	17.65
	Relocation	5.29	9.35	15.32	2.31	8.92	41.19
	Subtotal	**6.83**	**15.09**	**62.04**	**4.56**	**13.71**	**102.22**
Capital Stock Loses							
	Structural	9.45	13.81	18.06	6.24	16.62	64.18
	Non_Structural	66.70	45.89	41.09	14.04	22.03	189.75
	Content	31.10	9.96	20.12	8.85	11.77	81.80
	Inventory	0.00	0.00	0.63	1.98	0.93	3.55
	Subtotal	**107.25**	**69.65**	**79.90**	**31.11**	**51.36**	**339.28**
	Total	**114.08**	**84.75**	**141.94**	**35.67**	**65.07**	**441.50**

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	36,196.95	$0.00	0.00
	Bridges	62,626.58	$68.58	0.11
	Tunnels	61.24	$0.00	0.00
	Subtotal	**98884.80**	**68.60**	
Railways	Segments	2,125.00	$0.00	0.00
	Bridges	13.09	$0.03	0.20
	Tunnels	0.00	$0.00	0.00
	Facilities	165.11	$1.42	0.86
	Subtotal	**2303.20**	**1.40**	
Light Rail	Segments	152.96	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	90.54	$0.00	0.00
	Subtotal	**243.50**	**0.00**	
Bus	Facilities	33.57	$0.91	2.70
	Subtotal	**33.60**	**0.90**	
Ferry	Facilities	23.96	$0.00	0.00
	Subtotal	**24.00**	**0.00**	
Port	Facilities	519.22	$0.72	0.14
	Subtotal	**519.20**	**0.70**	
Airport	Facilities	415.39	$9.99	2.41
	Runways	1,936.16	$0.00	0.00
	Subtotal	**2351.60**	**10.00**	
	Total	**104359.80**	**81.60**	

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	1,282.10	$4.90	0.38
	Distribution Lines	1,853.30	$10.98	0.59
	Subtotal	**3,135.36**	**$15.89**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	6,007.30	$95.12	1.58
	Distribution Lines	1,112.00	$8.69	0.78
	Subtotal	**7,119.31**	**$103.81**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	43.20	$0.44	1.02
	Distribution Lines	741.30	$9.28	1.25
	Subtotal	**784.49**	**$9.72**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.70	$0.00	0.00
	Subtotal	**0.66**	**$0.00**	
Electrical Power	Facilities	7,260.00	$34.66	0.48
	Subtotal	**7,260.00**	**$34.66**	
Communication	Facilities	18.50	$0.20	1.08
	Subtotal	**18.48**	**$0.20**	
	Total	**18,318.30**	**$164.28**	

Table 14. Indirect Economic Impact with outside aid

(Employment as # of people and Income in millions of $)

LOSS		Total	%
First Year			
	Employment Impact	44,130	3.51
	Income Impact	132	0.20
Second Year			
	Employment Impact	15,032	1.20
	Income Impact	60	0.09
Third Year			
	Employment Impact	340	0.03
	Income Impact	7	0.01
Fourth Year			
	Employment Impact	16	0.00
	Income Impact	(11)	-0.02
Fifth Year			
	Employment Impact	0	0.00
	Income Impact	(12)	-0.02
Years 6 to 15			
	Employment Impact	0	0.00
	Income Impact	(12)	-0.02

Appendix A: County Listing for the Region

Benton,WA

Chelan,WA

Douglas,WA

Grant,WA

King,WA

Kittitas,WA

Klickitat,WA

Lewis,WA

Pierce,WA

Skamania,WA

Yakima,WA

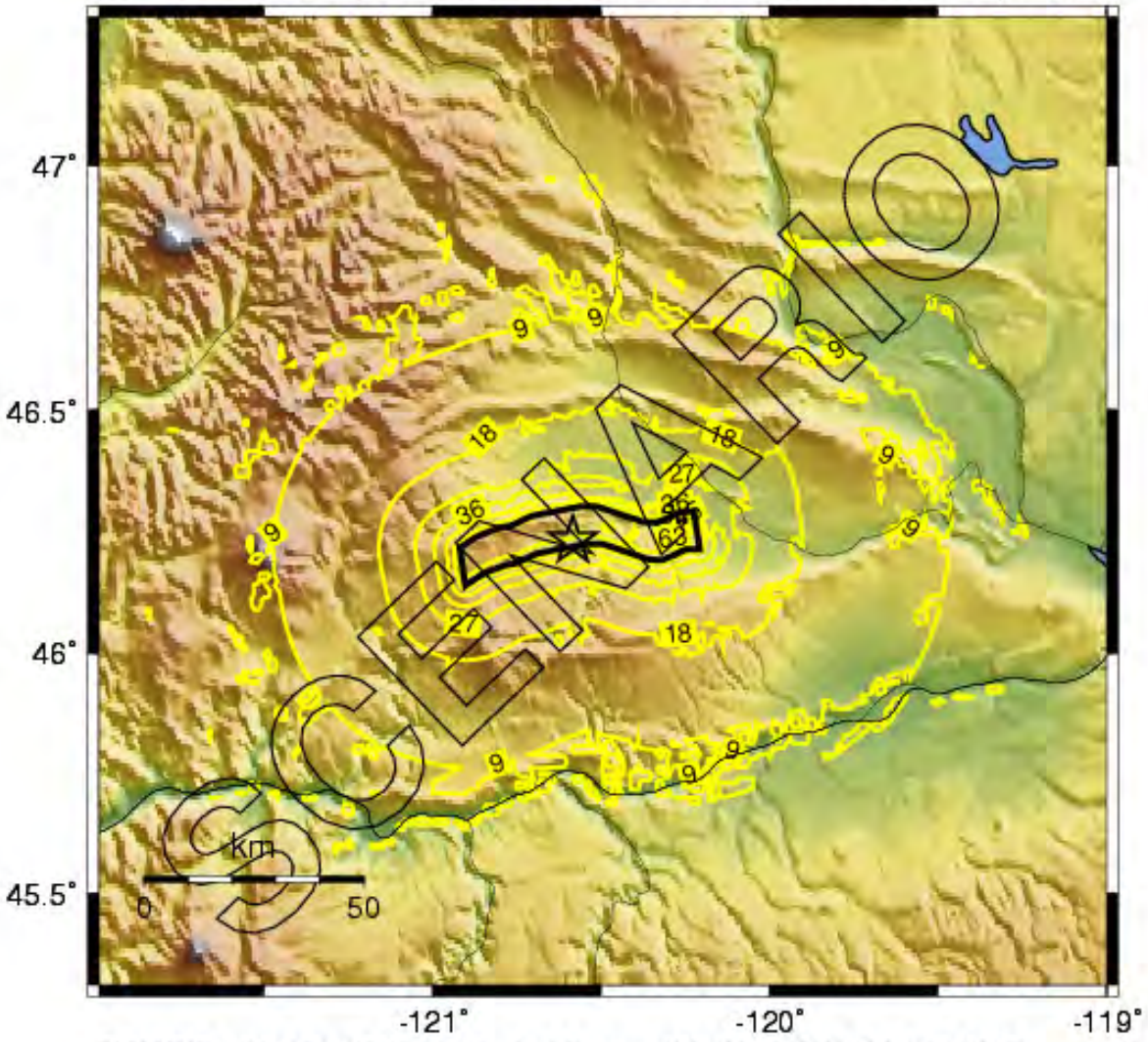
Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Washington					
	Benton	158,354	7,846	2,589	10,436
	Chelan	68,646	3,915	1,524	5,439
	Douglas	35,219	1,522	385	1,907
	Grant	81,821	2,986	1,504	4,491
	King	1,828,516	123,492	35,829	159,322
	Kittitas	37,701	2,087	539	2,627
	Klickitat	20,162	908	287	1,195
	Lewis	70,750	3,424	1,286	4,711
	Pierce	757,734	42,208	10,185	52,394
	Skamania	10,300	551	118	670
	Yakima	229,624	9,899	3,738	13,637
Total State		**3,298,827**	**198,838**	**57,984**	**256,829**
Total Region		**3,298,827**	**198,838**	**57,984**	**256,829**

-- Earthquake Planning Scenario --

Peak Accel. Map (in %g) for Millcreek7.1 Scenario

Scenario Date: Tue May 5, 2009 12:00:00 GMT M 7.1 N46.23 W120.58 Depth: 0.0km

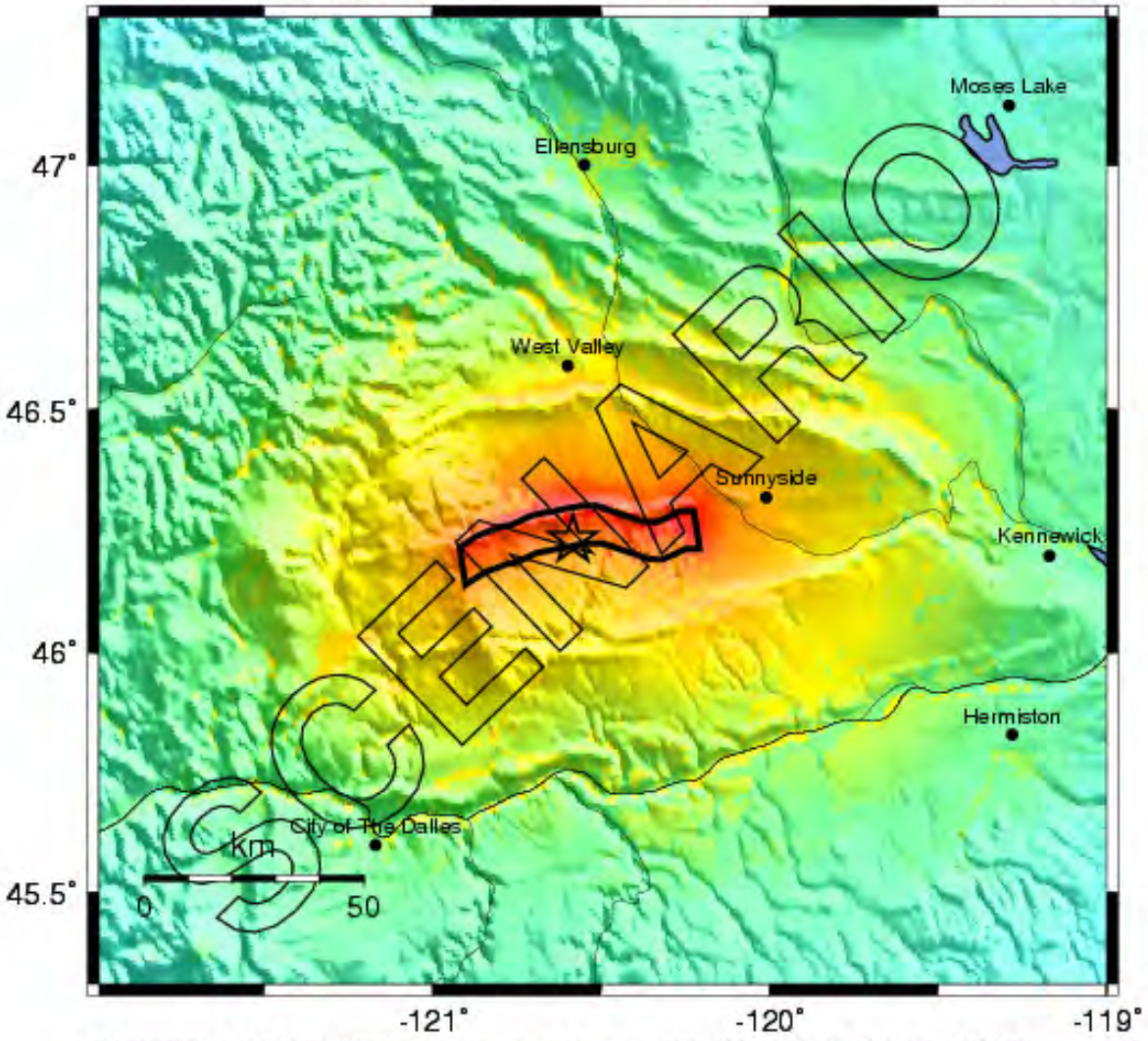


PLANNING SCENARIO ONLY -- Map Version 5 Processed Wed May 6, 2009 11:53:09 PM MDT

-- Earthquake Planning Scenario --

ShakeMap for Millcreek7.1 Scenario

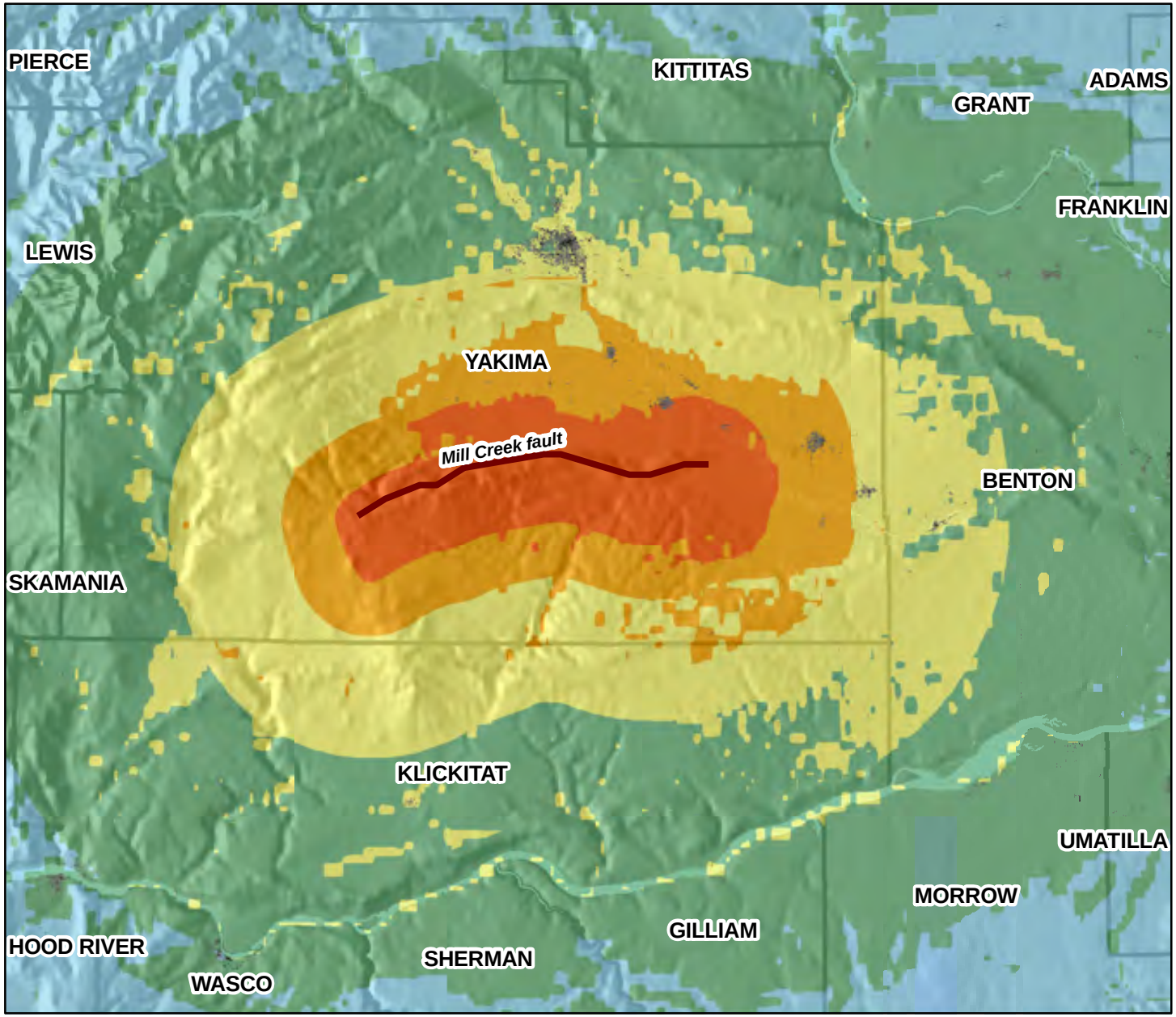
Scenario Date: Tue May 5, 2009 12:00:00 GMT M 7.1 N46.23 W120.58 Depth: 0.0km



PLANNING SCENARIO ONLY -- Map Version 5 Processed Wed May 6, 2009 11:53:09 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 7.1 Mill Creek Earthquake

Population Density

People

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

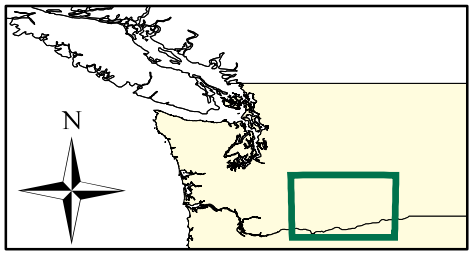
- Counties
- Fault source

MM Intensity

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

0 2 4 8 12 16 20 24 Miles

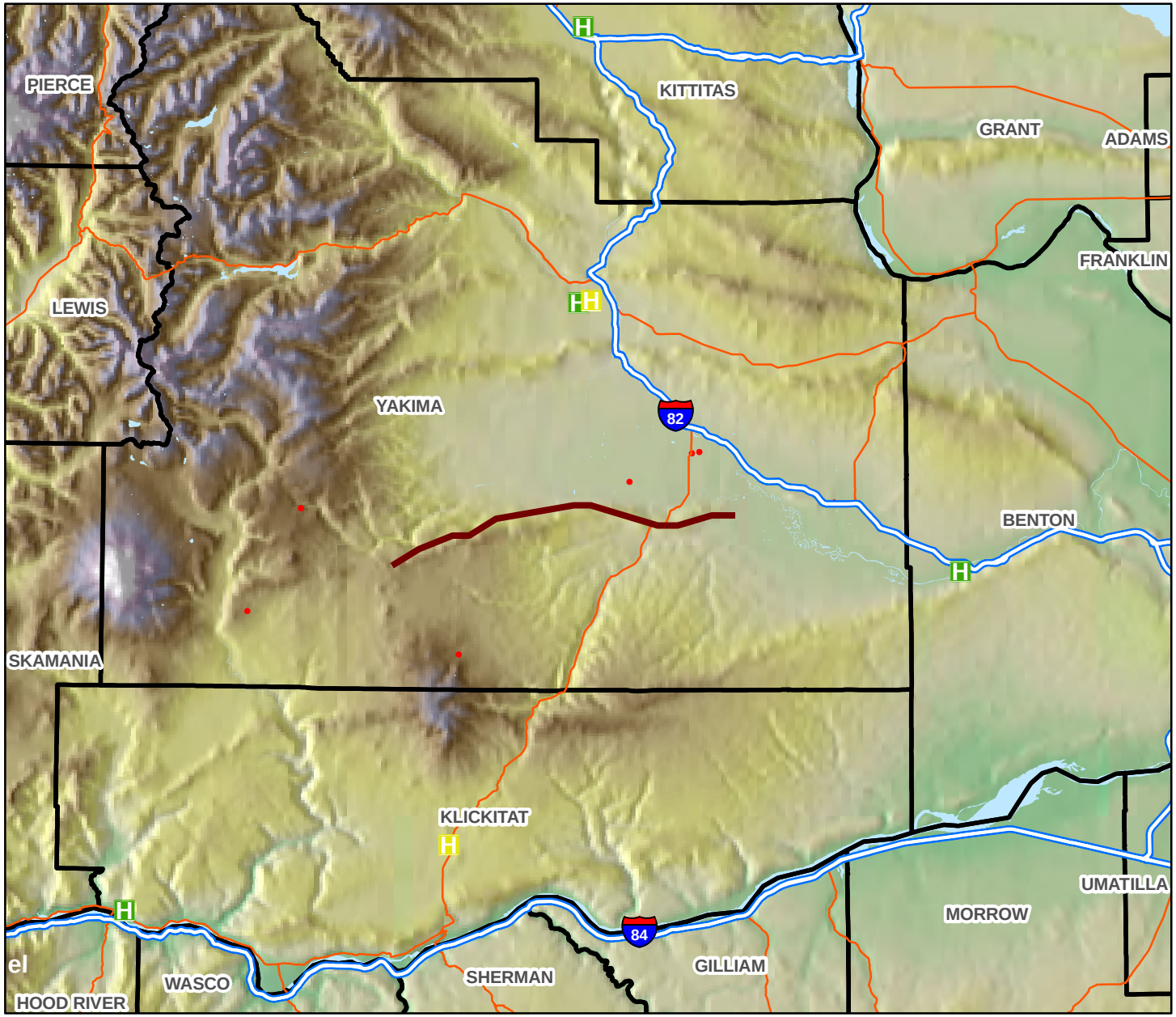
1-7-10 Fabia Terra, URS Corporation



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

Figure 1

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



M 7.1 Mill Creek Earthquake

1 Dot = 1 Death
(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.

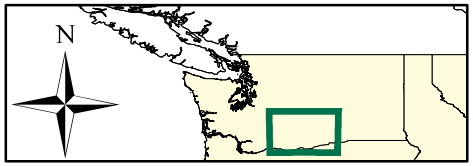
- < 50%
- 50 - 90%
- > 90%

County	Injuries Requiring Hospital Treatment (2 PM)	Fatalities (2 PM)
Benton	4	0
Kittitas	0	0
Klickitat	0	0
Yakima	181	6
Total	**185**	**6**

*Injuries are for Severity 1, 2, & 3

0 2.5 5 10 15 20 25 30
Miles

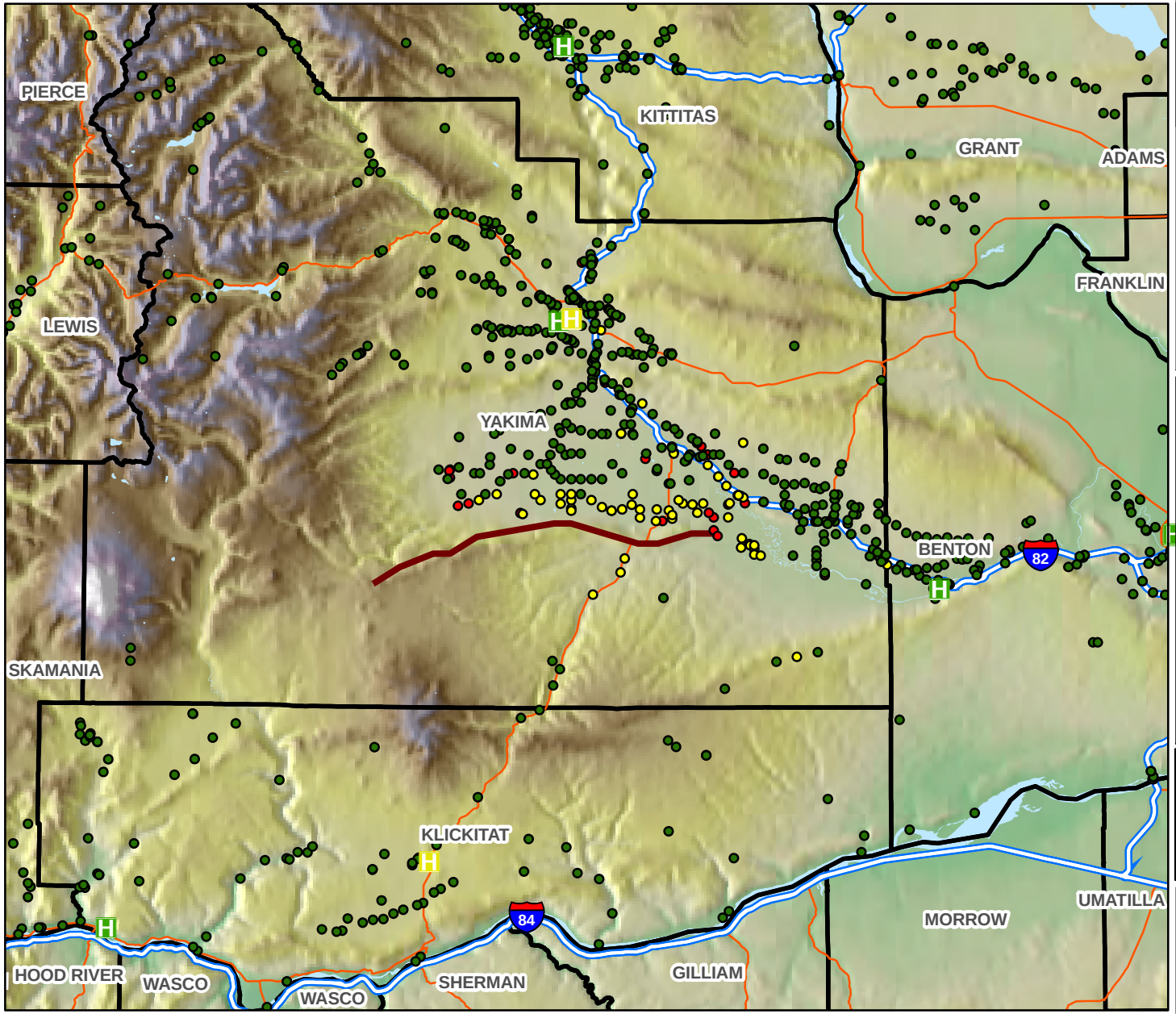
1-7-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

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%

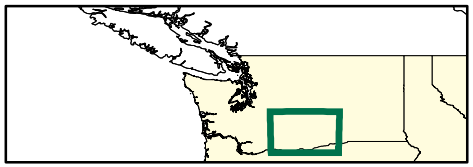
County	Total # Hospital Beds	Hospital Beds Available	Injuries Requiring Hospital Treatment 2pm
Benton	343	337	4
King	5,727	5,726	0
Kittitas	25	25	0
Klickitat	63	48	0
Yakima	527	165	181
Total	**6,685**	**6,301**	**185**

N

0 2 4 8 12 16 20 24

Miles

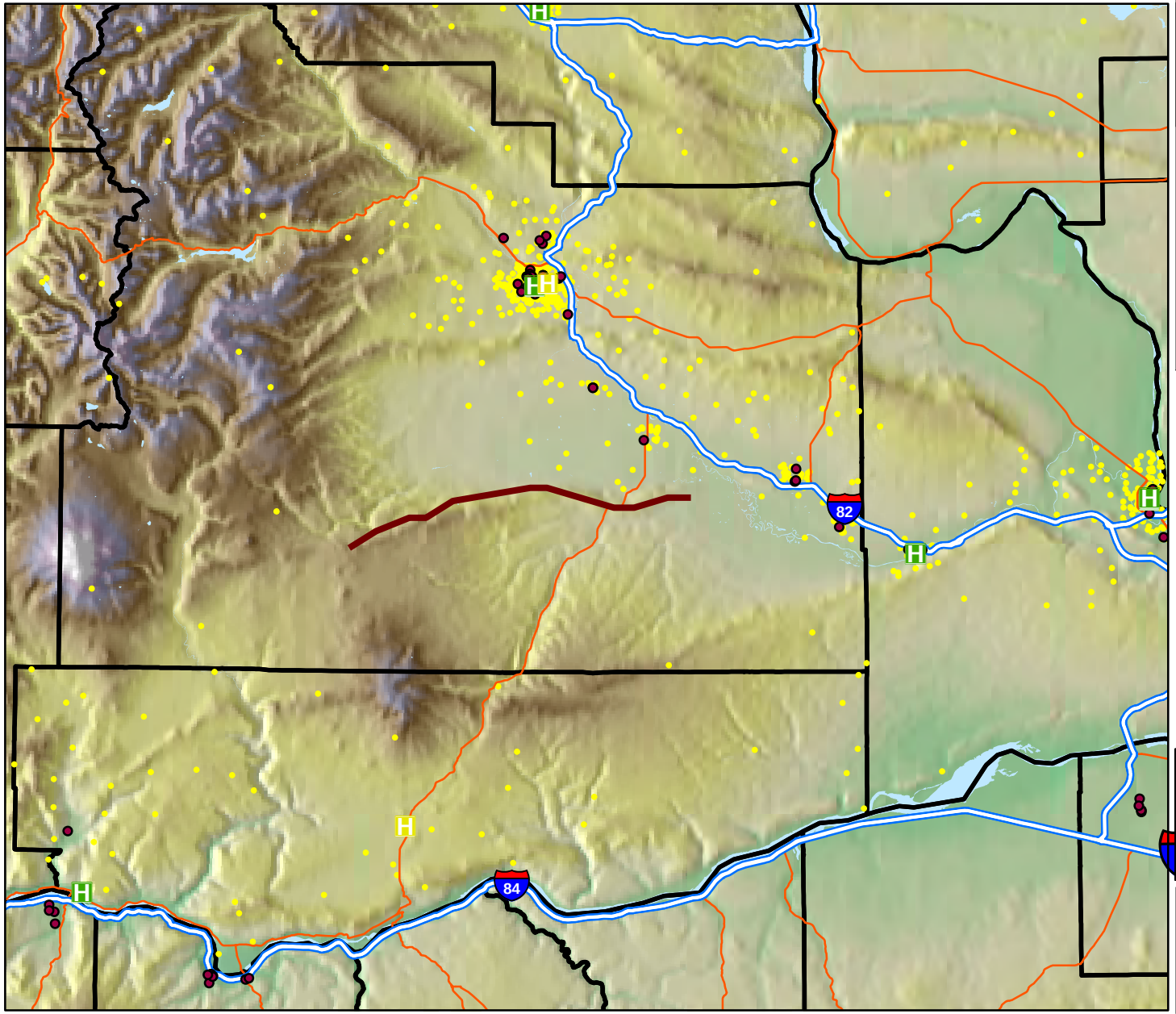
1-7-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

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.

H < 50%

H 50 - 90%

H > 90%

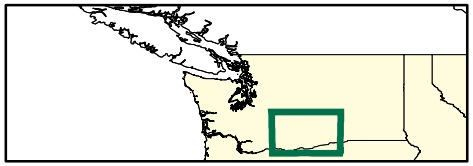
County	Total # Hospital Beds	Hospital Beds Available	Injuries Requiring Hospital Treatment 2pm
Benton	343	337	4
King	5,727	5,726	0
Kittitas	25	25	0
Klickitat	63	48	0
Yakima	527	165	181
Total	**6,685**	**6,301**	**185**

N

0 2 4 8 12 16 20 24

Miles

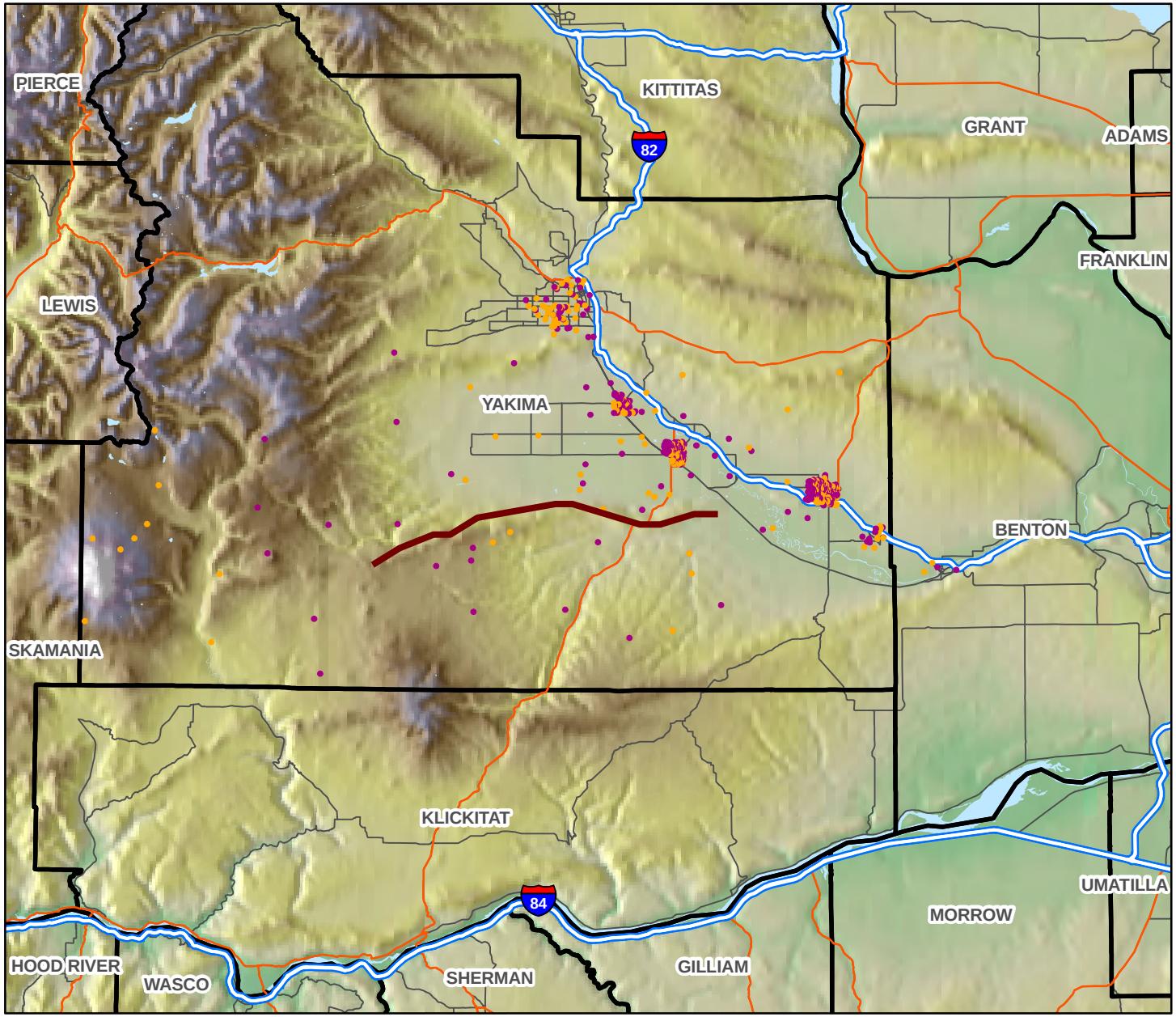
07-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

	Total #
Public Shelter Needs (Individuals)	325
Displaced Households	287

1 Dot = 1 Displaced Households*

1 Dot = 1 Public Shelter Needs (Individuals)*

* delineated by census tract

Counties

Fault source

Roads

Interstate

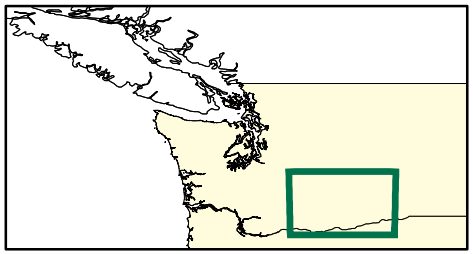
Highway

Major Road

N

0 4 8 12 16 20 24 Miles

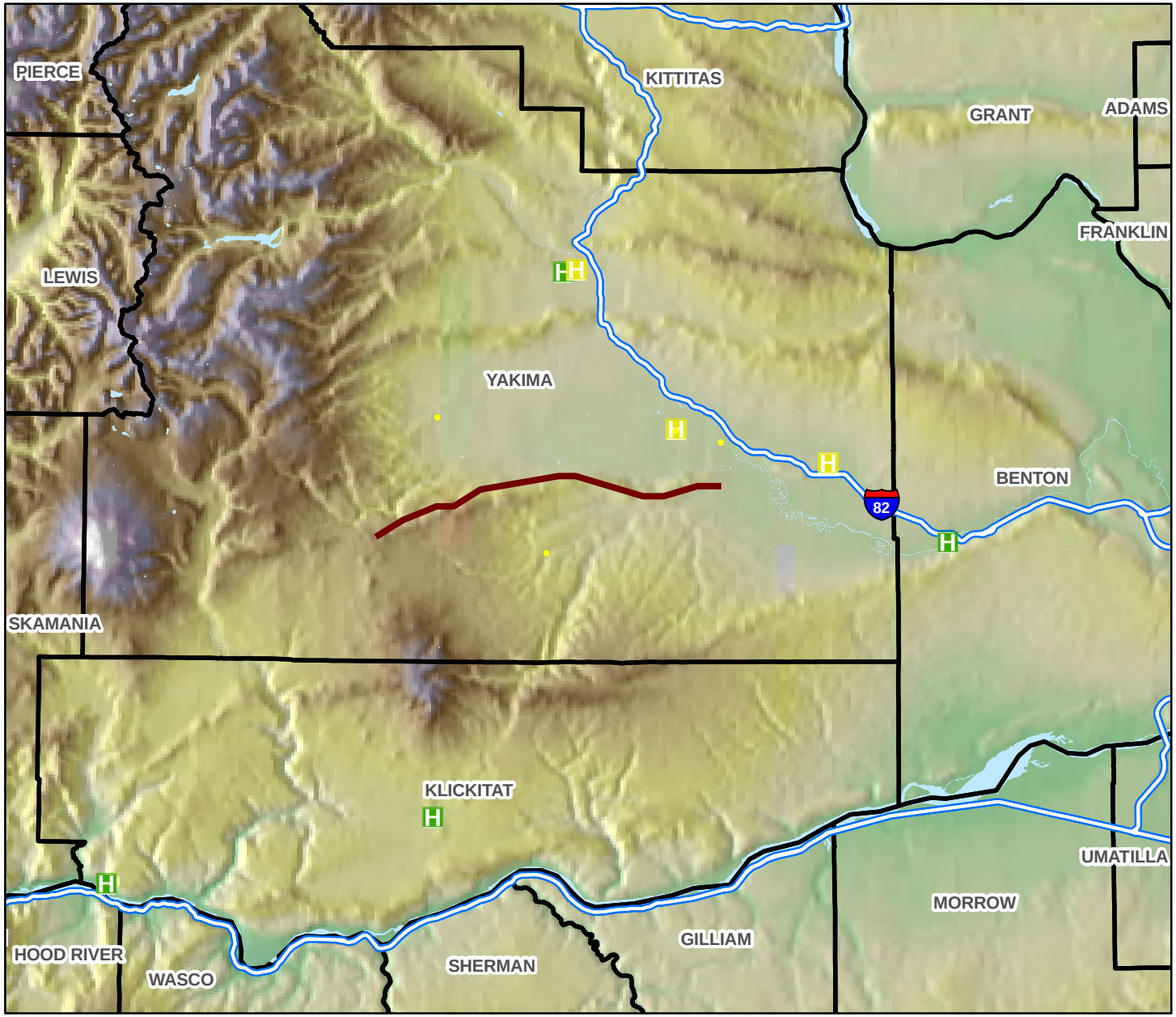
1-7-10 Fabia Terra, URS Corporation



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

Figure 5

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



M 7.1 Mill Creek Earthquake

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**
185	3

**Totals for counties in view extent.

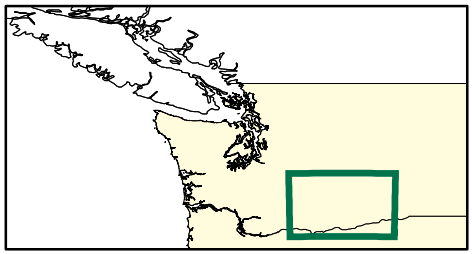
Structure Type	Red (Complete)	Collapse Rates for Complete Damage	Total Collapse
Wood	3	3%	0
Steel	43	6%	3
Concrete	16	10%	2
Precast	15	13%	2
Reinforced Masonry	17	10%	2
Unreinforced Masonry	6	15%	1
Manufactured Housing	198	3%	6
Total	298		15

Counties — Fault source

N

0 2 4 8 12 16 20 24 Miles

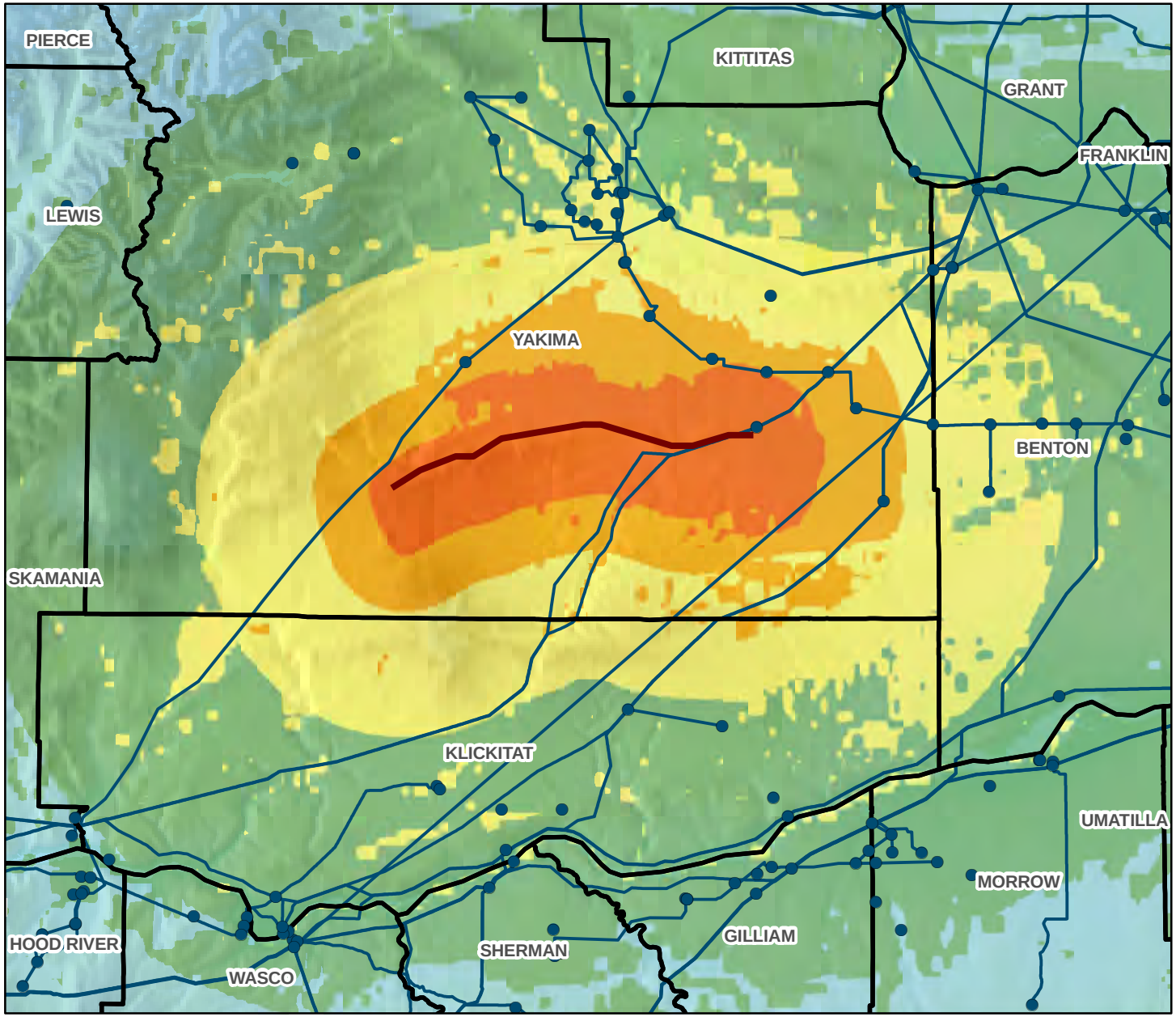
1-7-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

Power Lines

Power Facilities

MM Intensity

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

Number of Households without Electricity

Yakima	1,135

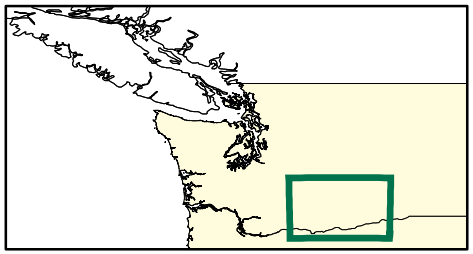
Counties

Fault source

N

0 2.5 5 10 15 20 25 30 Miles

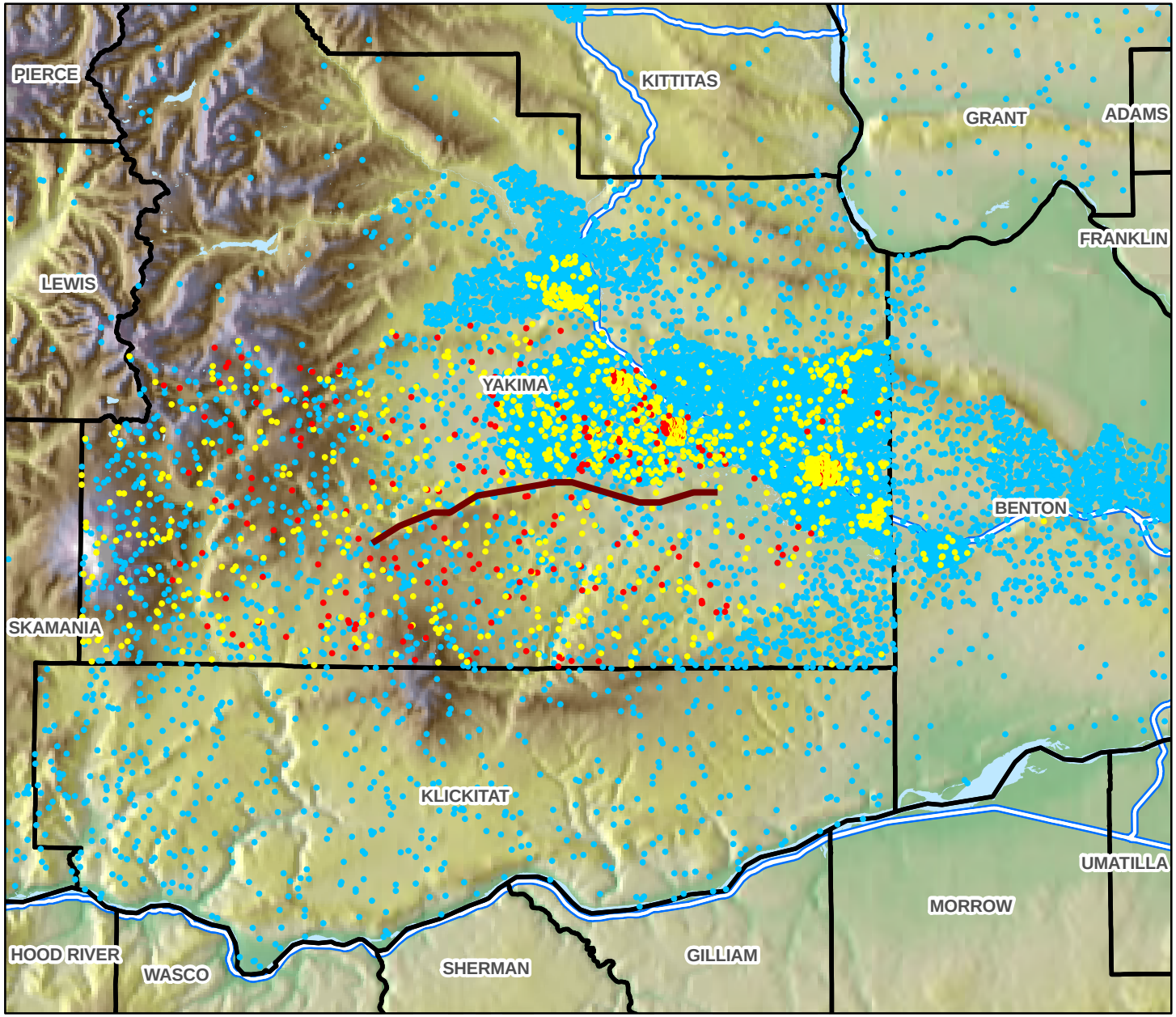
1-7-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

	Estimated # of Structures	Estimated # of Inspectors Needed
Red (Complete)	297	2
Yellow (Extensive)	1,678	22
Light Blue (Slight/ Moderate)	20,303	135
Total	22,278	160

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

1 Dot = 1 building (by census tract)

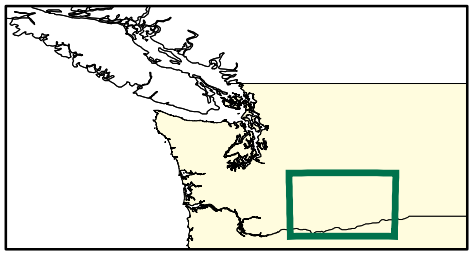
Red Tag (Complete Damage)
Yellow Tag (Extensive Damage)
Blue Tag (Slight/Moderate Damage)

N

Counties
Fault source

0 2 4 8 12 16 20 24 Miles

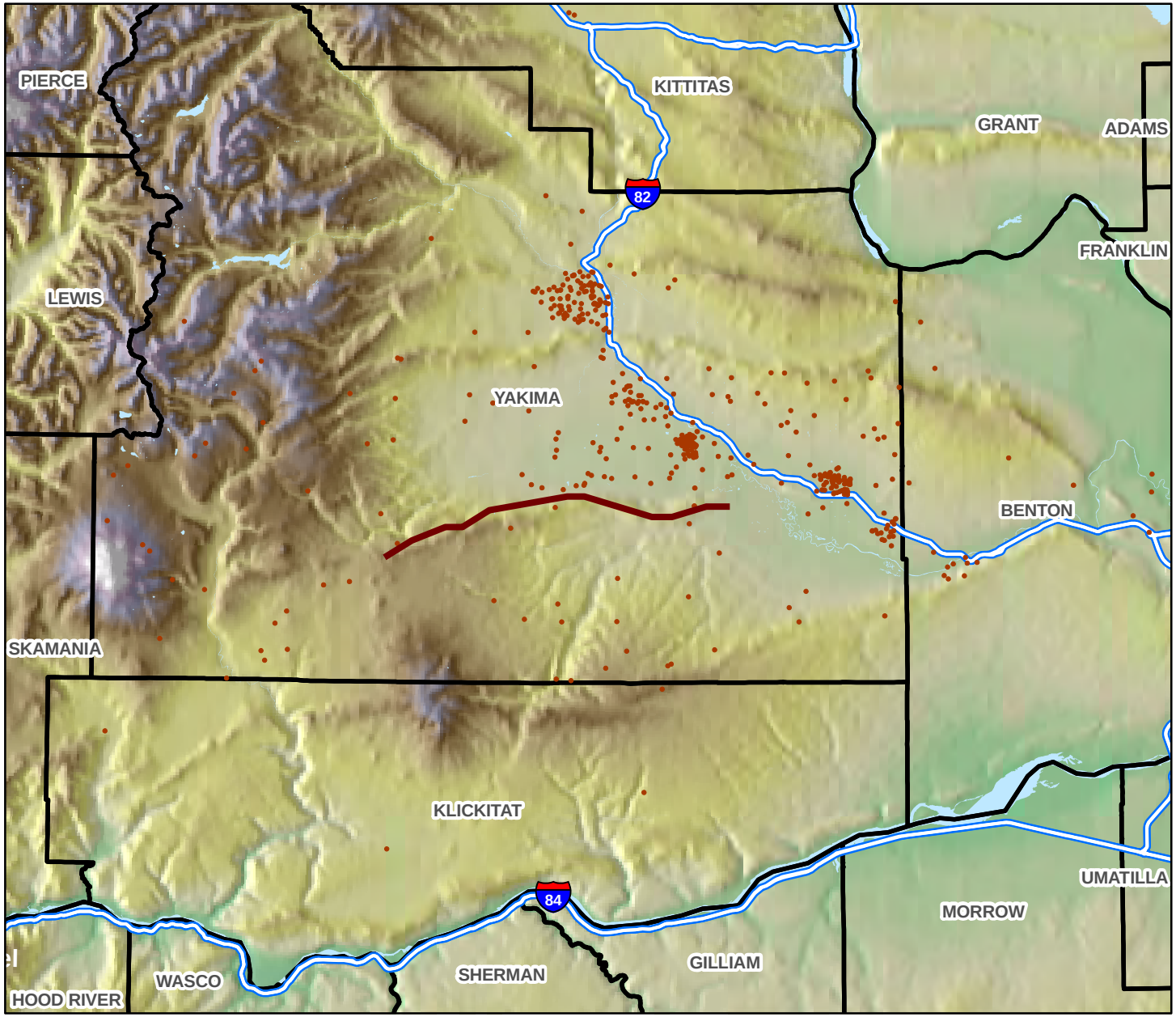
1-7-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

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

County	Cost Strucutral Damage	Cost Non-Structural Damage	Total Loss (Including Contents)
Benton	$2 M	$14 M	$23 M
Kittitas	$0 M	$2 M	$3 M
Klickitat	$0 M	$2 M	$4 M
Yakima	$61 M	$171 M	$304 M
Total	**$64 M**	**$188 M**	**$333 M**

* All values are millions of dollars

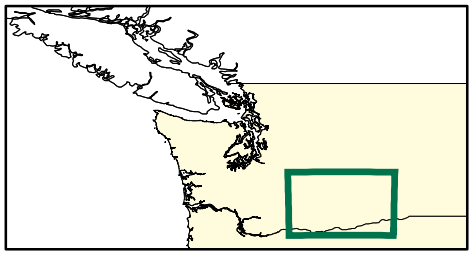
Counties

Fault source

N

0 5 10 15 20 25 30 Miles

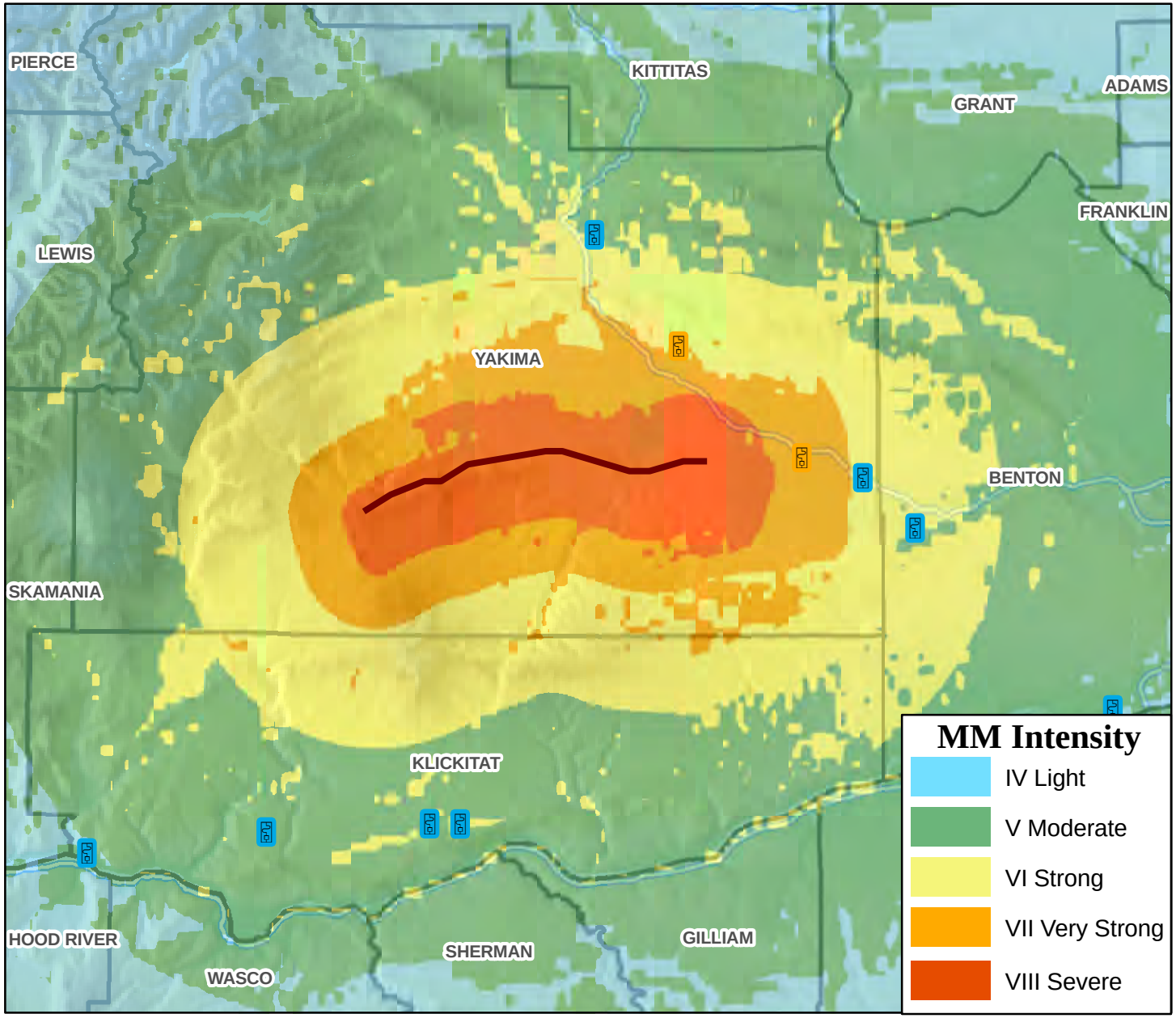
1-7-10 Fabia Terra, URS Corporation



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



M 7.1 Mill Creek Earthquake

Utility Damage (at least moderate)

Damage is expressed as the percentage chance that a given Utility System will realize at least moderate damage.

Natural Gas Facility

- < 20%
- 20% - 60%
- > 60%

- Counties
- Fault source

MM Intensity

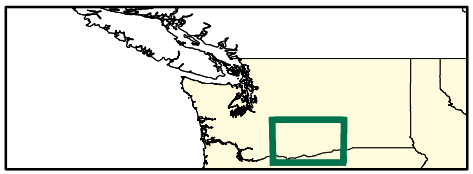
- IV Light
- V Moderate
- VI Strong
- VII Very Strong
- VIII Severe

N

0 5 10 15 20 25 30

Miles

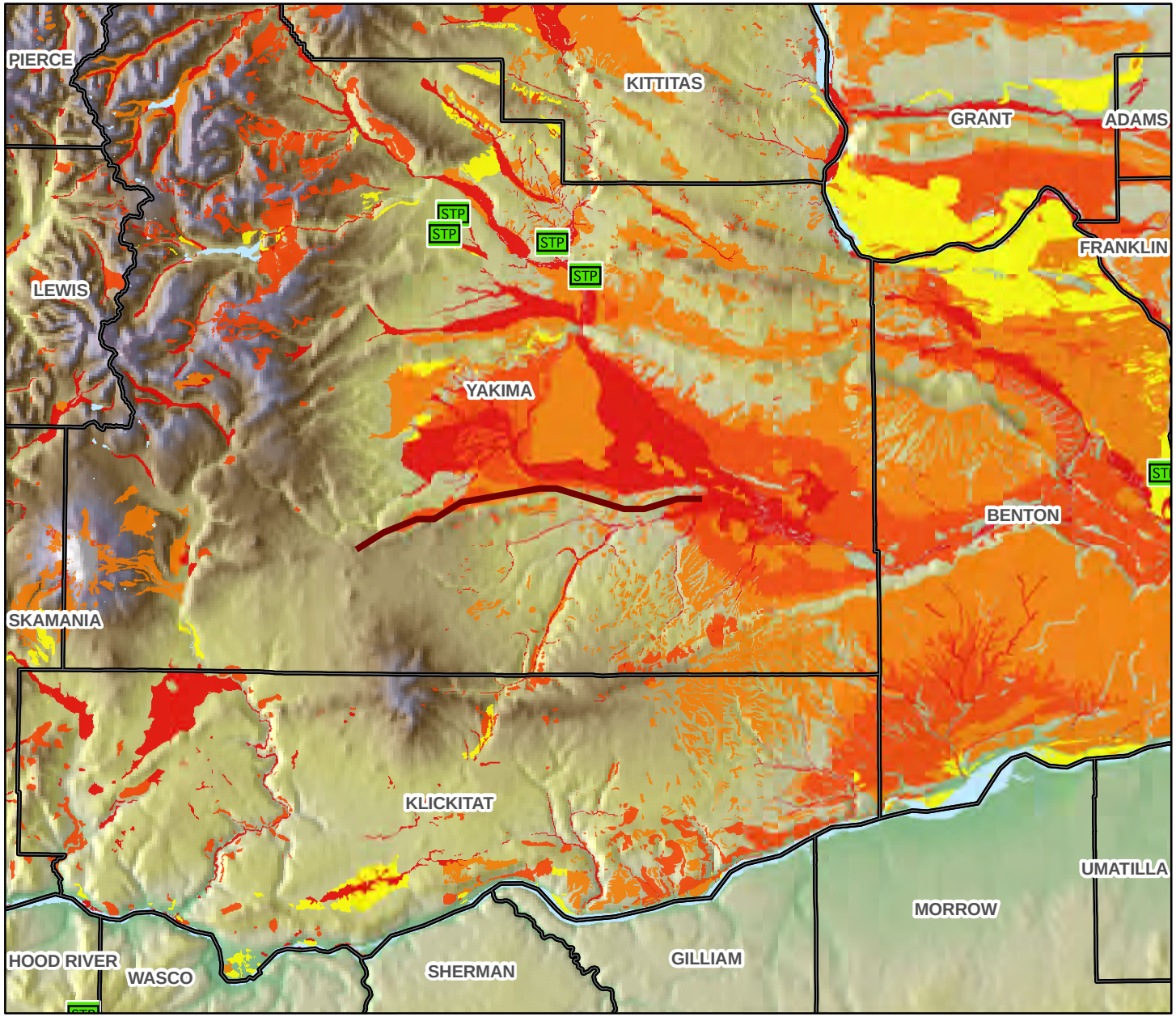
1-7-10 Fabia Terra, URS Corporation



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

Figure 10

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



M 7.1 Mill Creek Earthquake

Liquefaction Susceptibility

- Low
- Moderate
- Low-Moderate
- High

STP Sewage Treatment Facilities

Counties

Fault source

County	# Households without Potable Water (at Day 1)	Daily Potable Water Needs Per Person (Gallons/day)*	Number of Truckloads needed Daily
Yakima	9,440	28,320	6

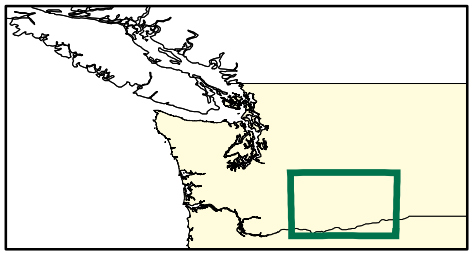
* Based on U.S. Army Corp Mission Guidebook
(Daily water is based on an esimated 3 people per household.
One truck can transport an esimated 5000 gallons of water.)

Note: Counties not listed had no potable water losses.

N

0 4 8 12 16 20 24 Miles

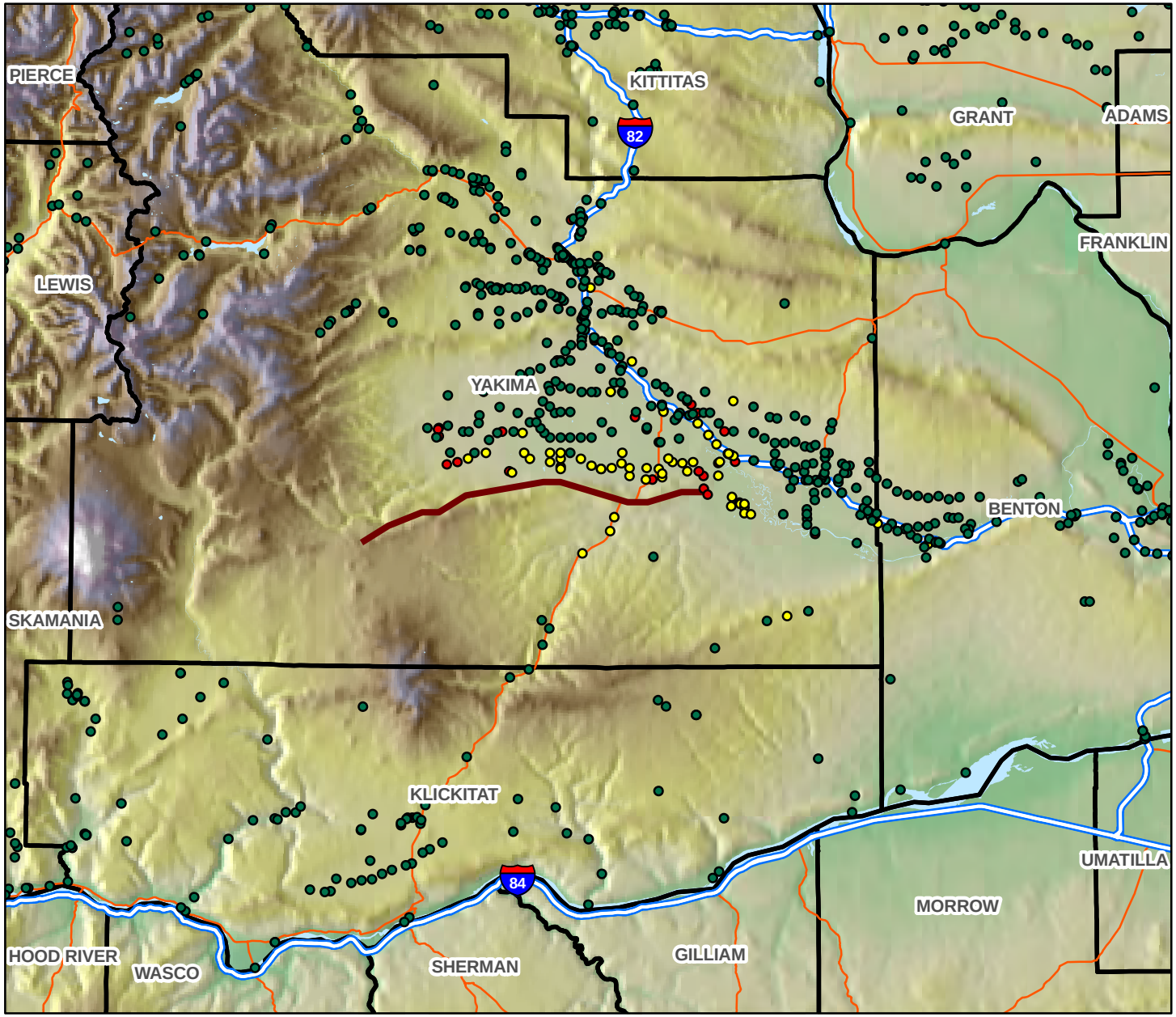
1-7-10 Fabia Terra, URS Corporation



Sources: 2009 HAZUS runs by URS Corporation, Sewage Treatment Faciiltes 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 7.1 Mill Creek Earthquake

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

Major Roadway Bridge
- low
- moderate
- high

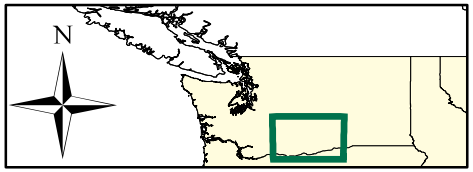
Roads
- Interstate
- Highway

County	# of Bridges Needing Inspection	# of Bridge Engineers Needed*
Benton	155	21
Kittitas	257	34
Klickitat	92	12
Yakima	520	69
Total	**1,024**	**82**

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

0 5 10 15 20 25 30
Miles

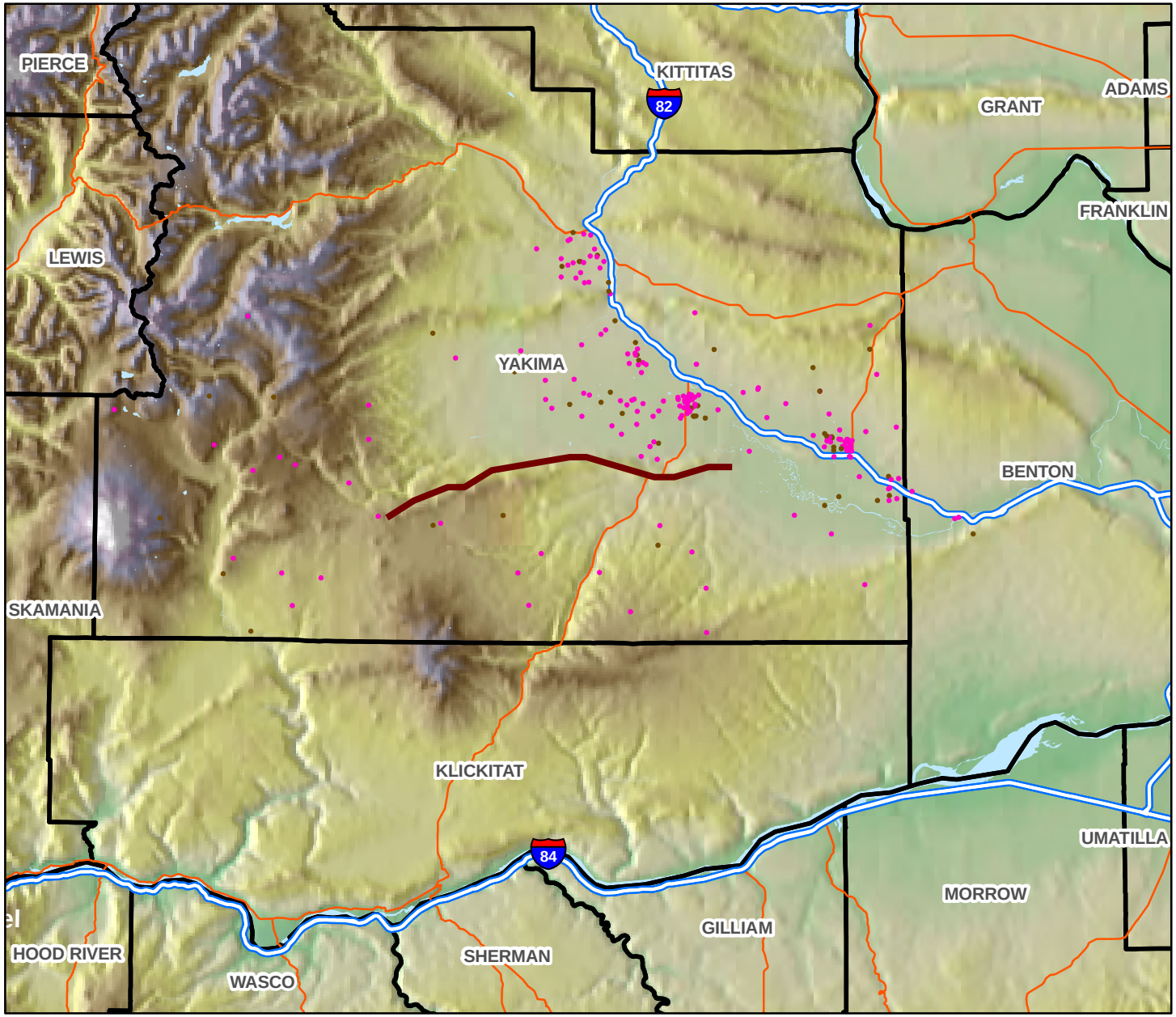
1-7-10 Fabia Terra, URS Corporation



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 7.1 Mill Creek Earthquake

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

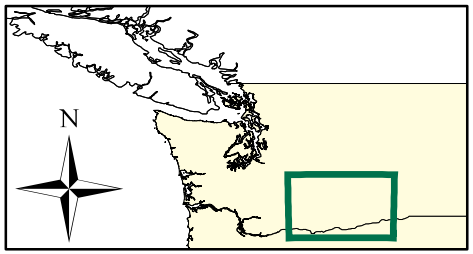
Highway

County	Brick and Wood (tons)	Concrete and Steel (tons)	Estimated Truck Loads*
Benton	2,000	2,000	160
Kittitas	0	0	0
Klickitat	0	0	0
Yakima	50,000	117,000	6,680
Total	**52,000**	**119,000**	**6,840**

* Truck loads estimated at 25 tons per truck

0 5 10 15 20 25 30 Miles

1-7-10 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