



Ground Failure

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Shannon & Wilson, Inc.

Seattle Fault
Earthquake
Scenario

ASCE Geotechnical Team

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** - Team Leader

* - Reviewer



Expected Ground Failure

- **Fault Rupture**
- **Liquefaction**
- **Lateral Spreading**
- **Landsliding**
- **The Good News**



Fault Rupture



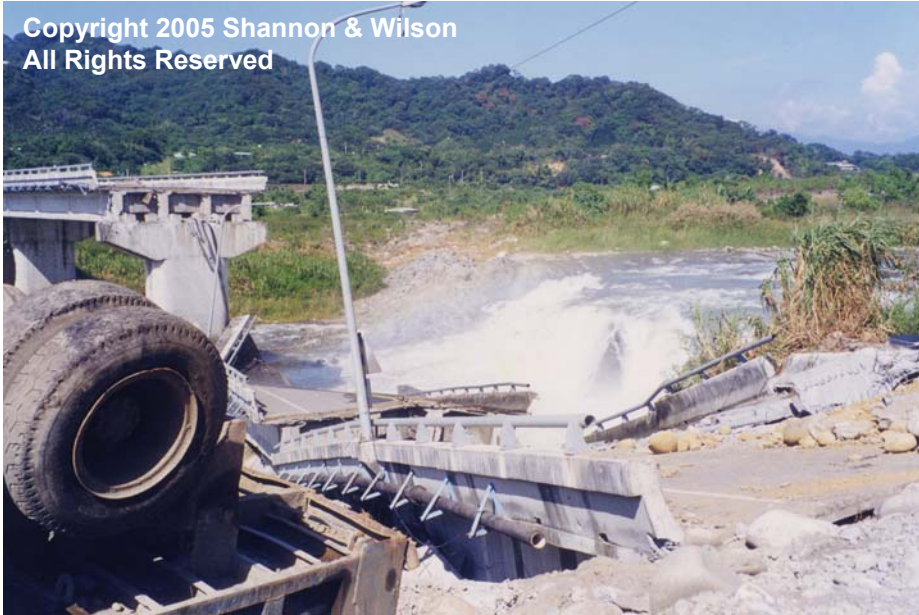
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Seattle Fault
Earthquake
Scenario

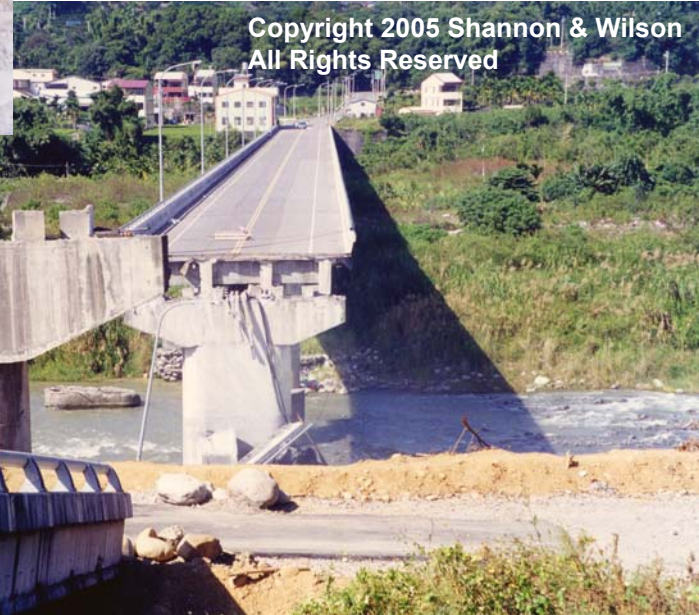
1999 M7.6 Chi-Chi Earthquake

Fault Rupture

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1999 M7.6 Chi-Chi Earthquake

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1999 M7.6 Chi-Chi Earthquake

Liquefaction



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2001 M6.8 Nisqually Earthquake

Liquefaction



Photo by Landau Associates



Photo courtesy of Kathy Troost

2001 M6.8 Nisqually Earthquake

Seattle Fault
Earthquake
Scenario

Liquefaction

Photo from NGDC



1964 M7.5 Niigata Earthquake

Seattle Fault
Earthquake
Scenario



Liquefaction

Photo courtesy of Steve Palmer



1949 M>6.5 Olympia Earthquake

Seattle Fault
Earthquake
Scenario



Liquefaction



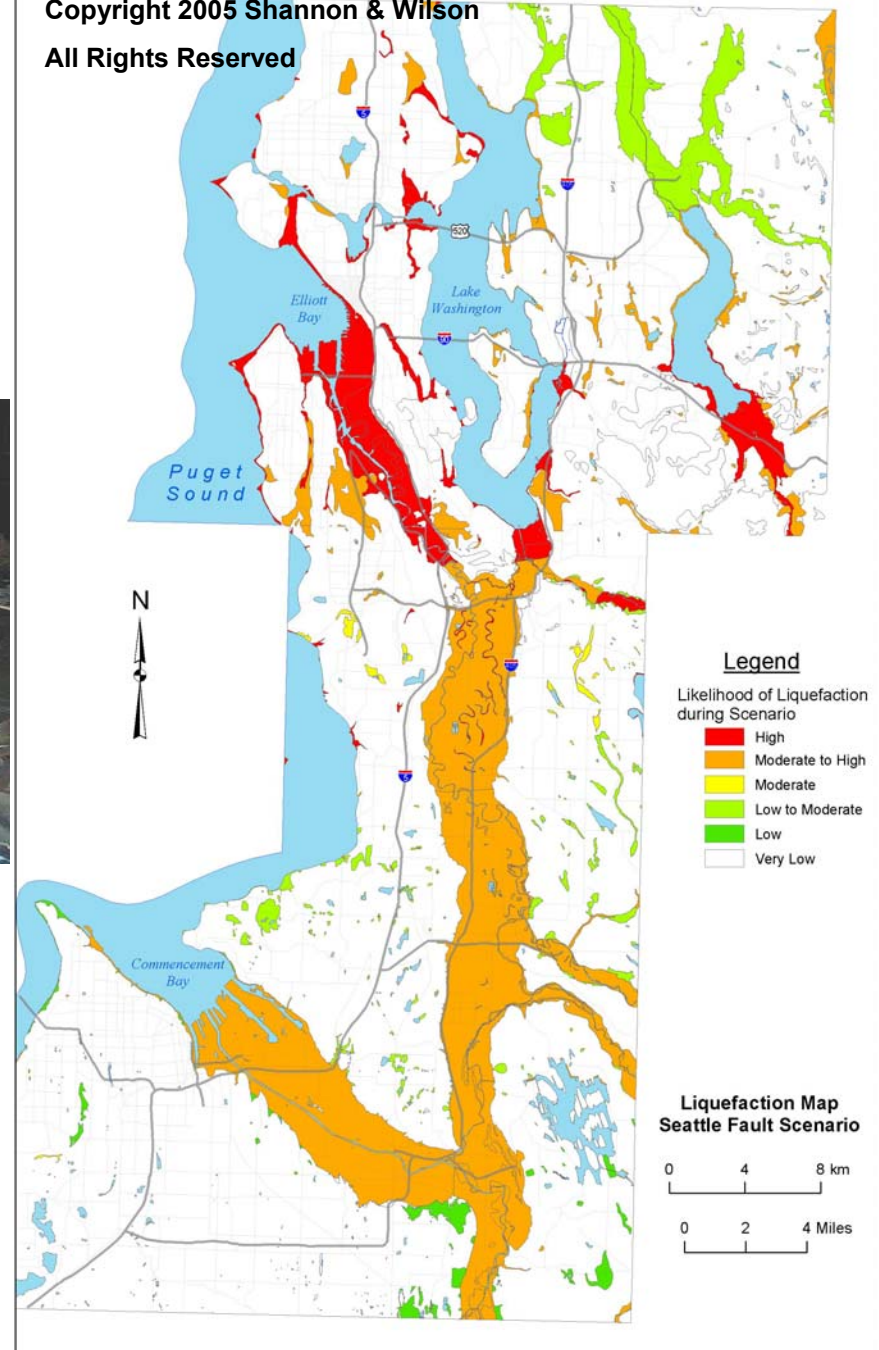
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First Ave S., 2001 Nisqually Earthquake
Photo by Monique Nykamp of Shannon & Wilson

Analyses by Bill Perkins of Shannon & Wilson and
Stephen Palmer of Washington State DNR

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Lateral Spreading



Seattle Fault
Earthquake
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1995 M6.9 Kobe Earthquake

Photo by Donald Ballantyne/Steve Dickenson

Lateral Spreading

Photo from NGDC



1965 M6.5 Seattle-Tacoma Earthquake



Seattle Fault
Earthquake
Scenario

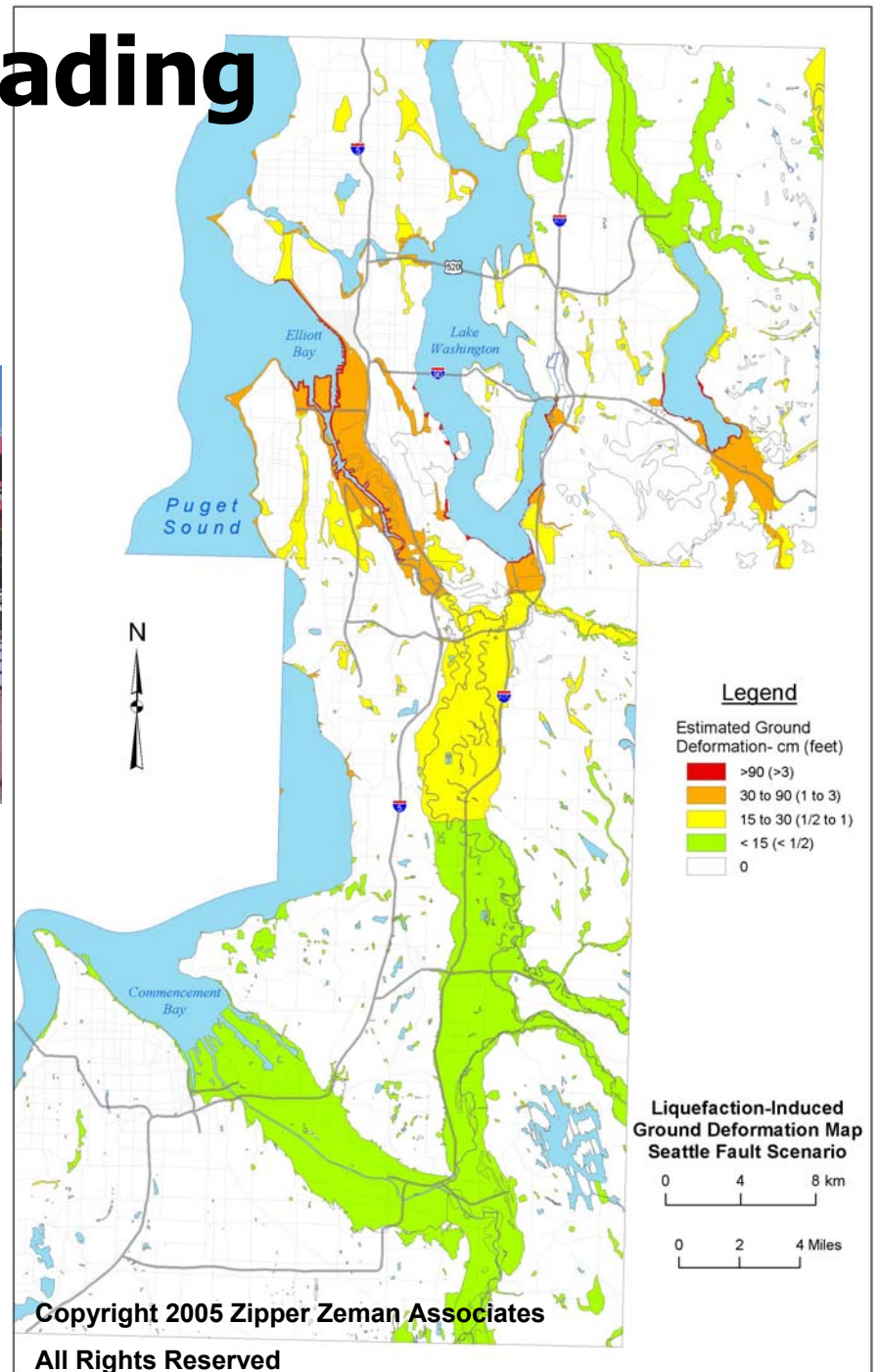
Lateral Spreading



Port Island Bridge, 1995 Kobe Earthquake
Photo courtesy of Steve Dickenson of OSU

Seattle Fault
Earthquake
Scenario

Analyses by David Baska of Zipper Zeman Associates



Landsliding

Photo courtesy Nisqually Clearinghouse



Seattle Fault
Earthquake
Scenario

2001 M6.8 Nisqually Earthquake

Landsliding

Photo courtesy USGS

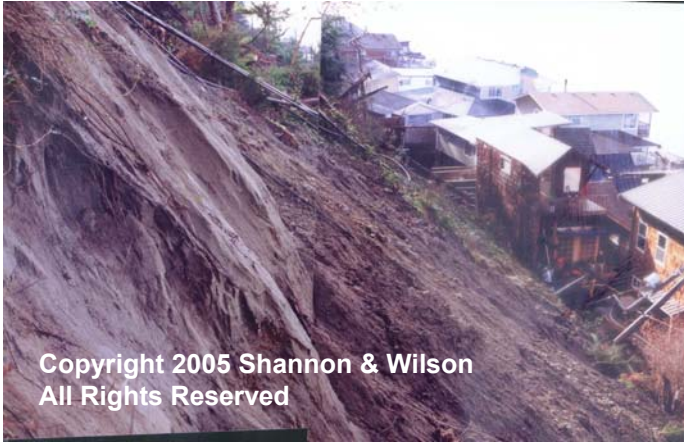


1994 M6.7 Northridge Earthquake

Seattle Fault
Earthquake
Scenario

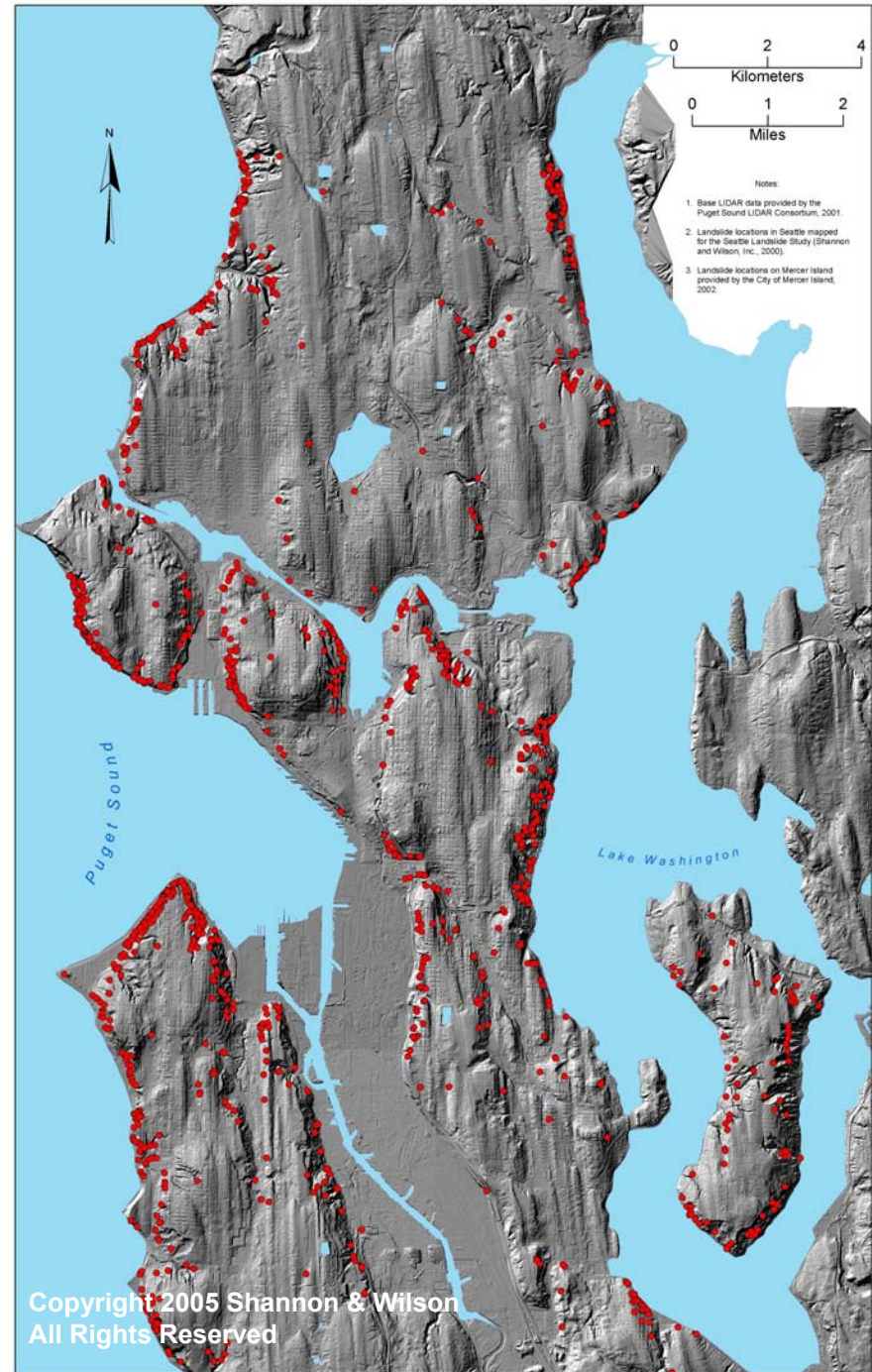


Landsliding



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Salmon Beach landslide, 2001 Nisqually Earthquake
Photo by Ted Hopkins, Shannon & Wilson



Compiled by Bill Laprade and Bill Nashem of
Shannon & Wilson for City of Seattle and
by City of Mercer Island

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The Good News



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