Landslide Hazards: A Stealth Threat to the Nation

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Presenters

Dr. Scott Burns, Professor, Department of Geology – Portland State University
Portland, OR

Dr. Susan Cannon, Project Chief
USGS Landslide Hazards Program's Wildfire and Debris Flow Hazards Project
Denver, CO

Dr. Jeffrey Keaton, Vice President
National Geotechnical Practice Leader
AMEC Environment & Infrastructure, Inc.
Los Angeles, CA

Dr. Scott Burns
Department of Geology
Portland State University

Landslide Hazards: A Stealth Threat to the Nation

Landslides: the Stealth Threat

- Different names: process and material moved
- Everywhere and Effects
- Triggers
- Essentially no insurance
- Reactivation of old landslides
- Landslide mapping using LiDAR

Loess: Earthflows

Calvary Cemetery

Slumps

Building on the scarp

Building on the toe

Debris Flows: slurries in drainages

Wilson River Highway, Oregon, 1996

Debris Flows

Dodson, OR, 1996: Royse Debris Flow (home) and Highway 84

Debris Flows Can Be Deadly

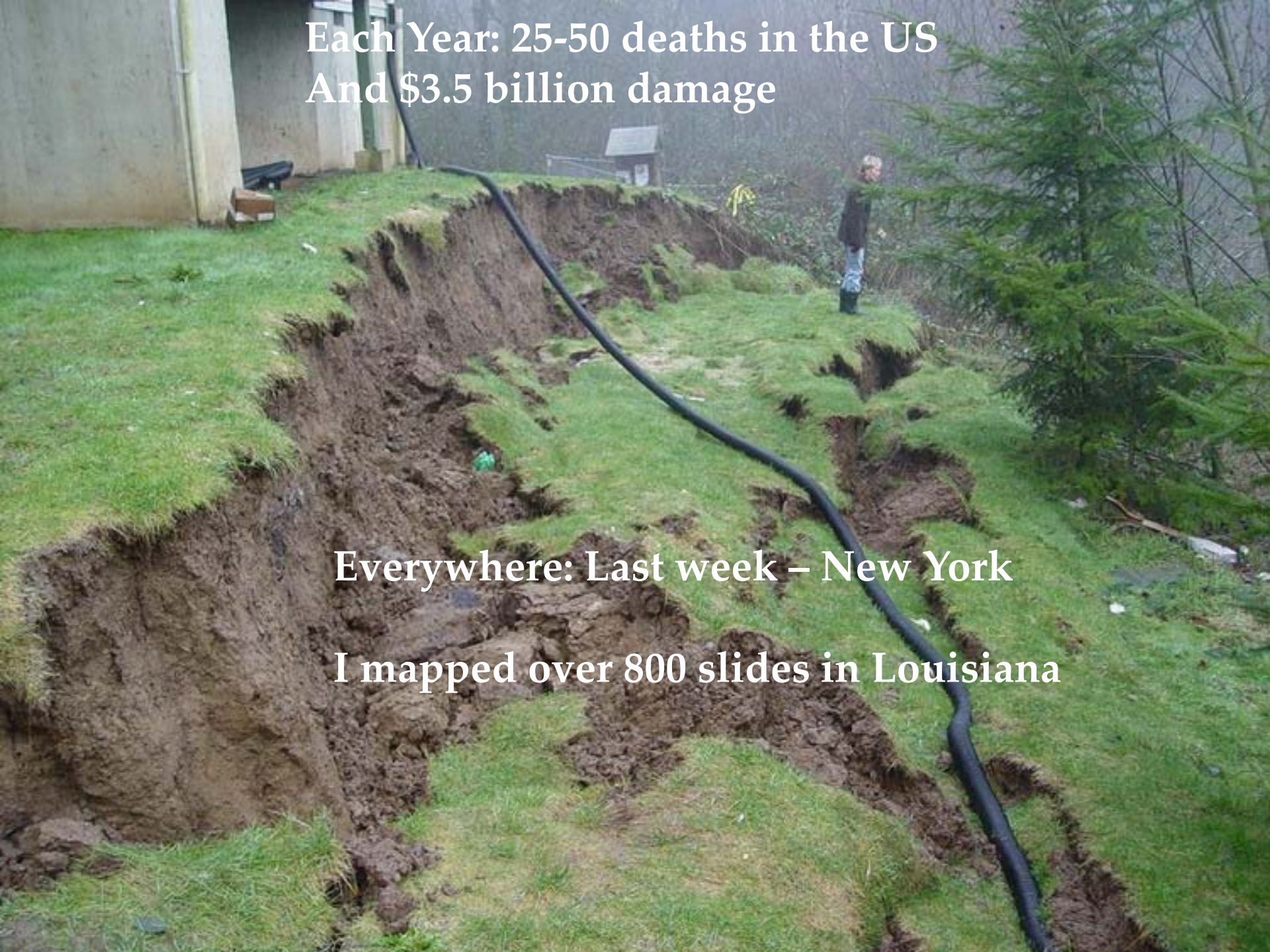
Douglas Country
Debris Fan Home

Douglas County
Valley Bottom Home

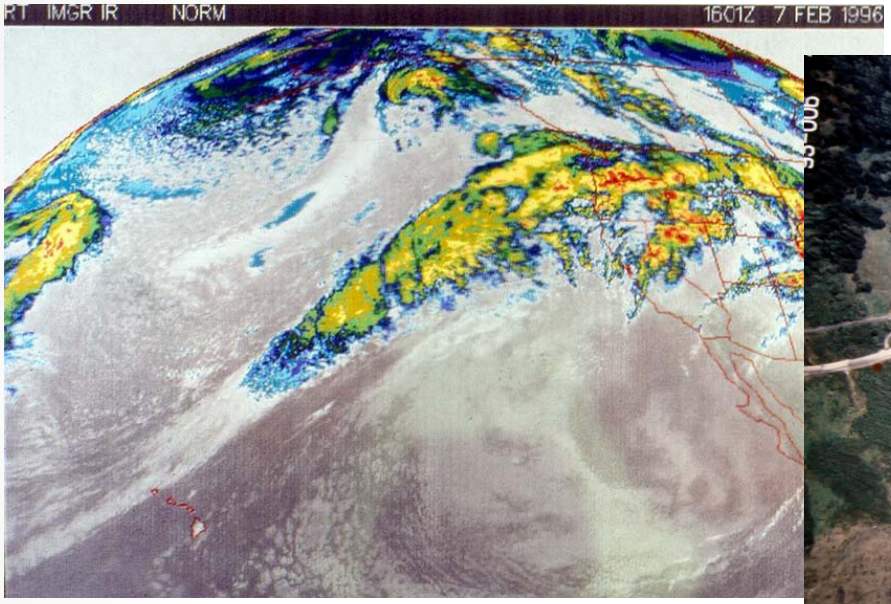
Debris Avalanche

Mt. Shasta, Northern California

prehistoric debris avalanche

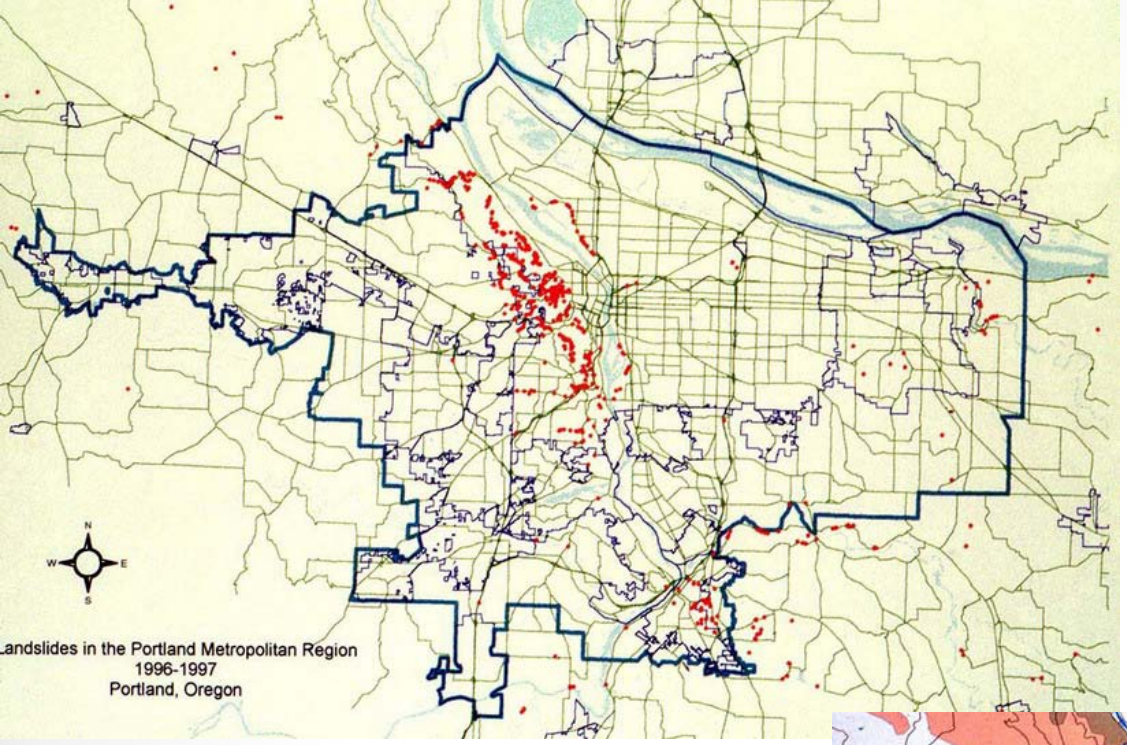

Each Year: 25-50 deaths in the US
And $3.5 billion damage
Everywhere: Last week – New York
I mapped over 800 slides in Louisiana

Climatic Triggers



Pineapple Express hits Portland

Arizona Inn landslide, Highway 101



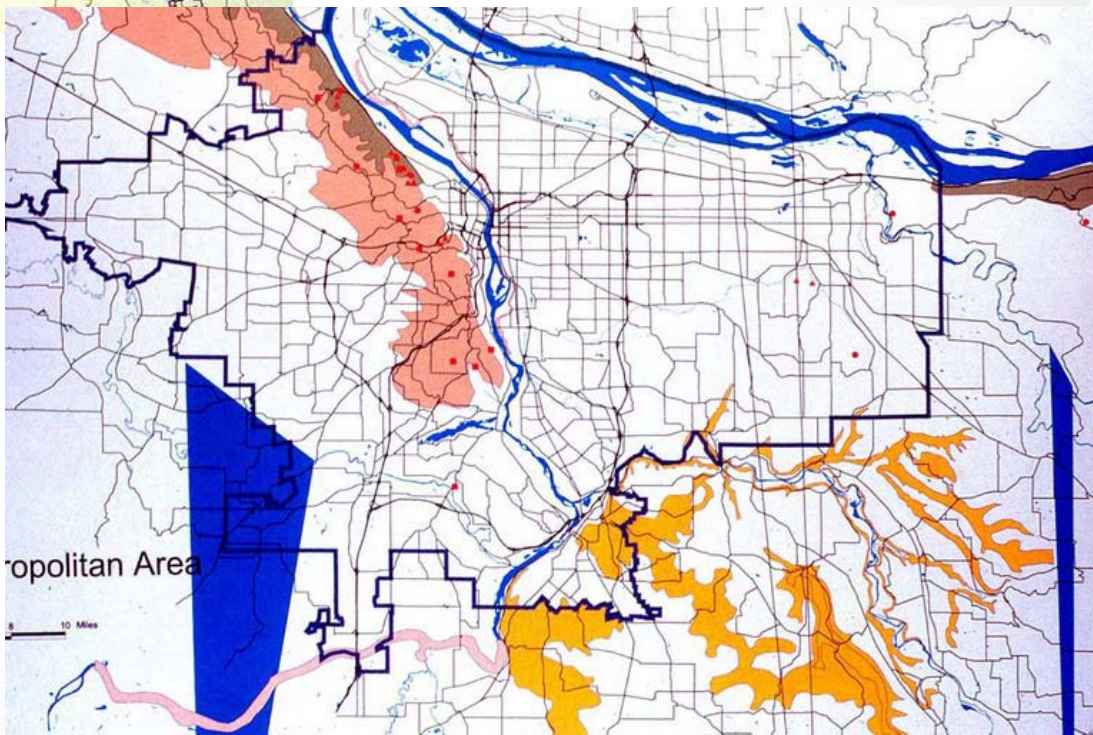
Portland, Oregon

1996

Landslides zones

Landslide Distribution

Geology is important

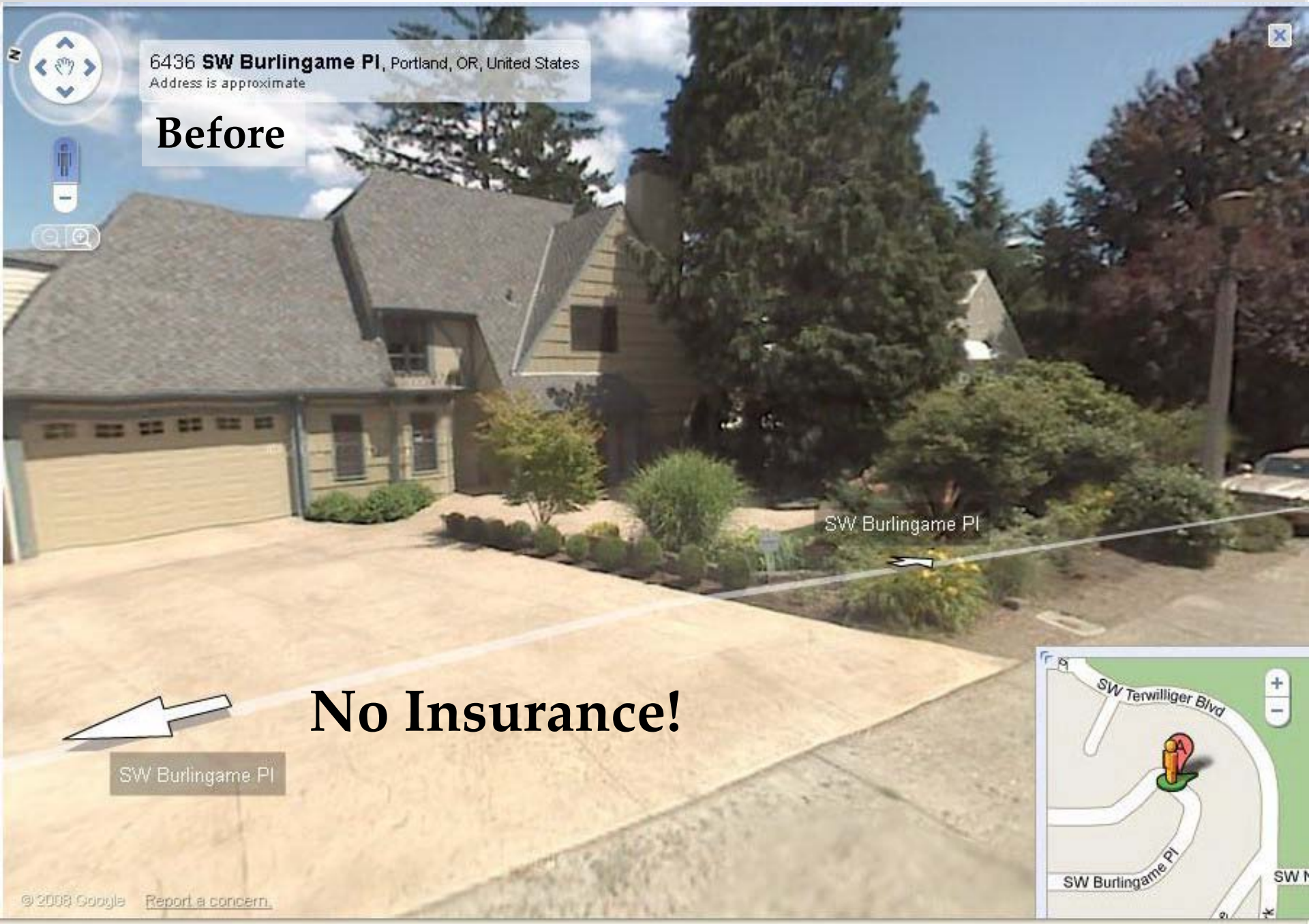


Earthquake Triggers: Damage

Nisqually Quake, 2001, M = 6.8

Renton, WA

Highway 101, Olympia, Washington


6436 SW Burlingame Pl, Portland, OR, United States
Address is approximate
Before
SW Burlingame Pl
No Insurance!
SW Burlingame Pl
SW Terwilliger Blvd
SW Burlingame Pl
© 2008 Google
Report a concern


After
October 8, 2008


AP

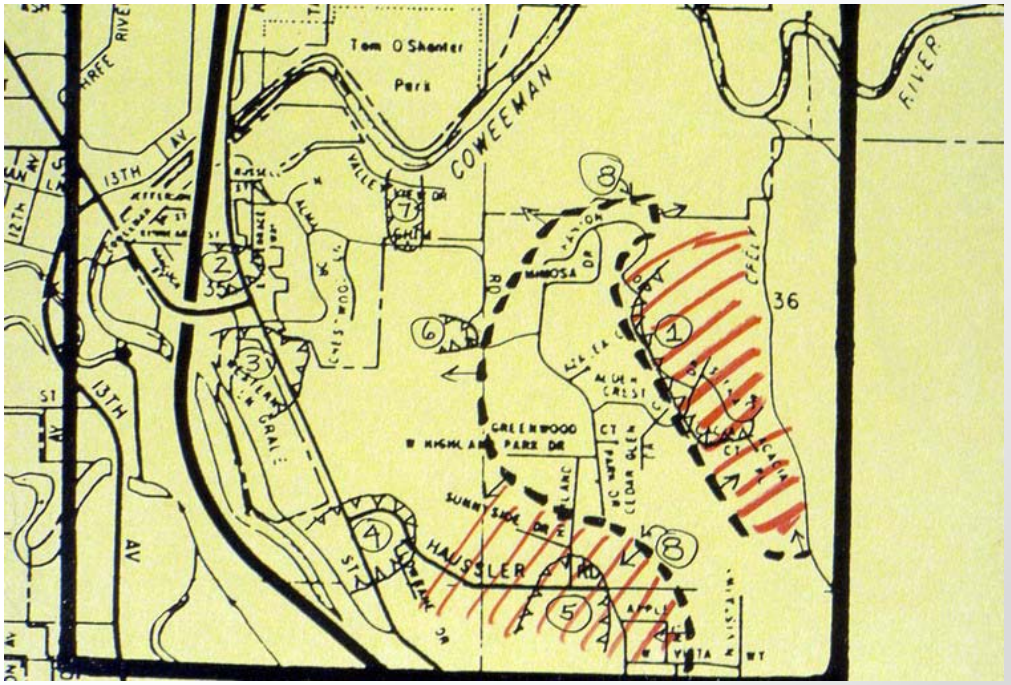

January 1, 2009: 3” rain in 24 hours

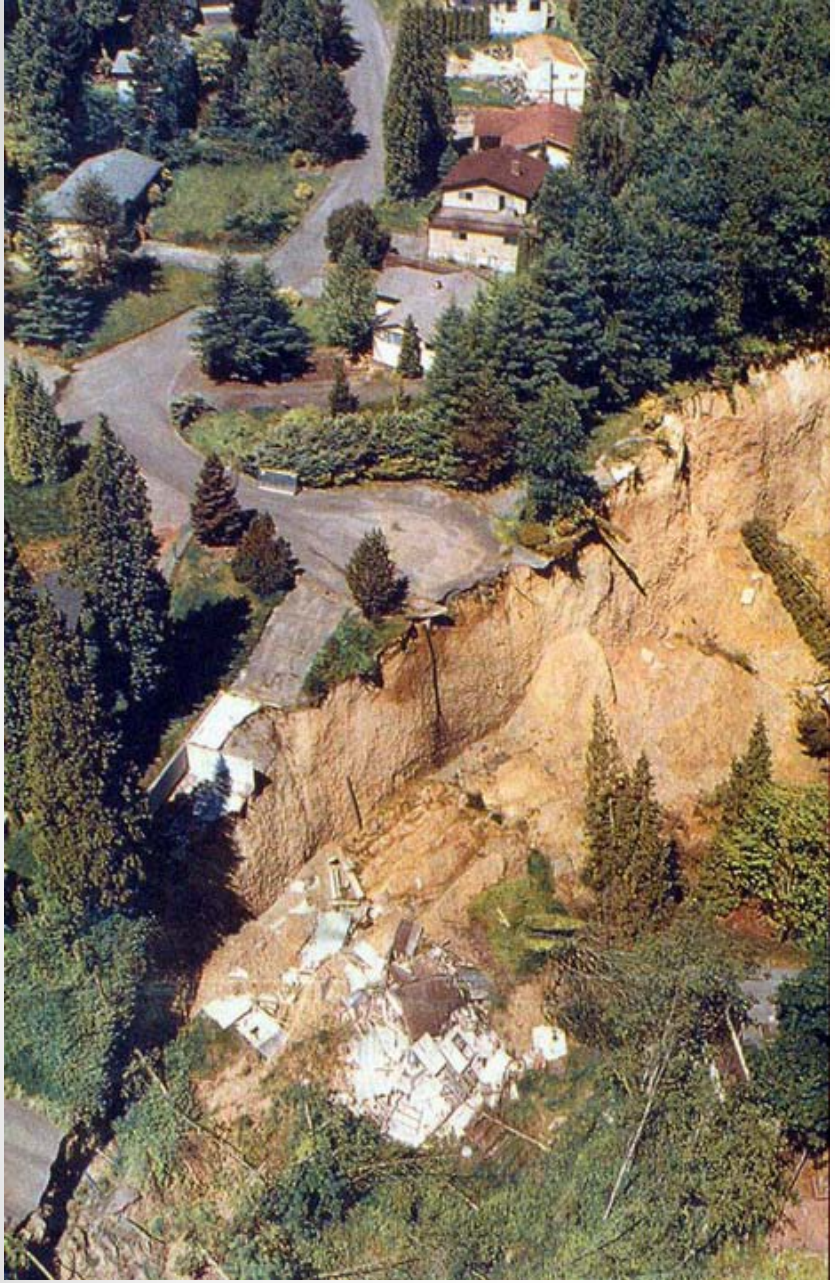
Reactivation of Old Landslides

Kelso, Washington

1998

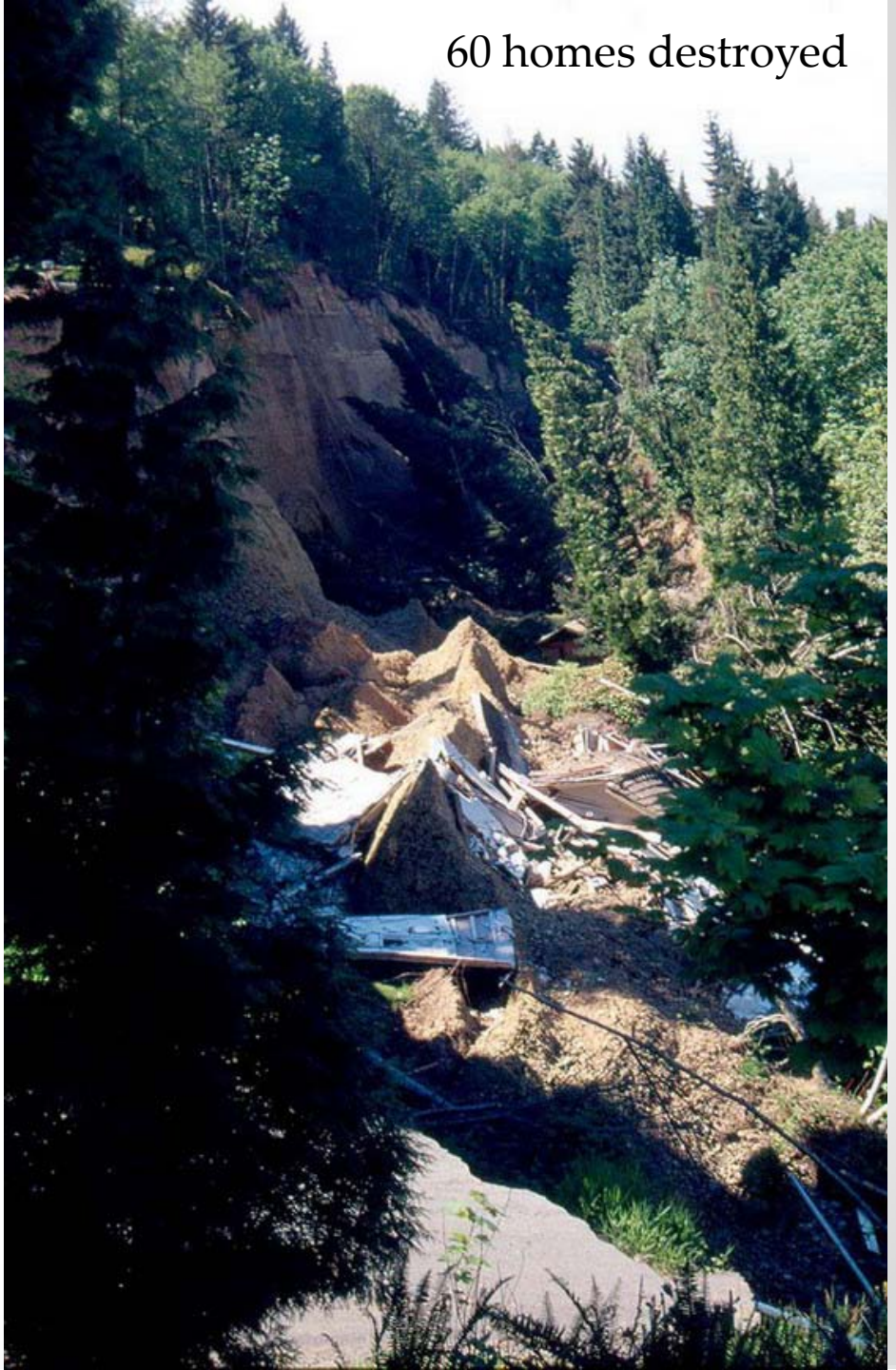
Largest landslide involving houses in the United State's history





77 ho

Kelso damage - $25 million



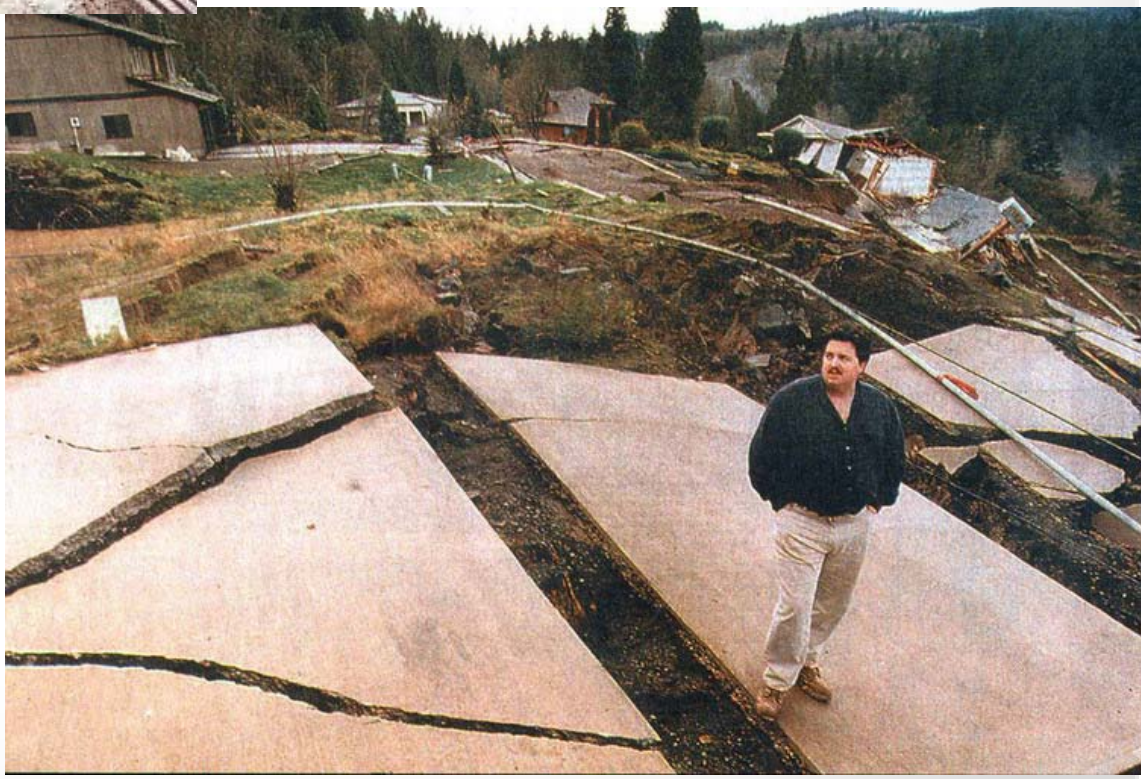
Reactivation of Old Slides

Kelso, Washington
1998

Kelso: initially mapped as "stable" area;

fastest movements where storm drains

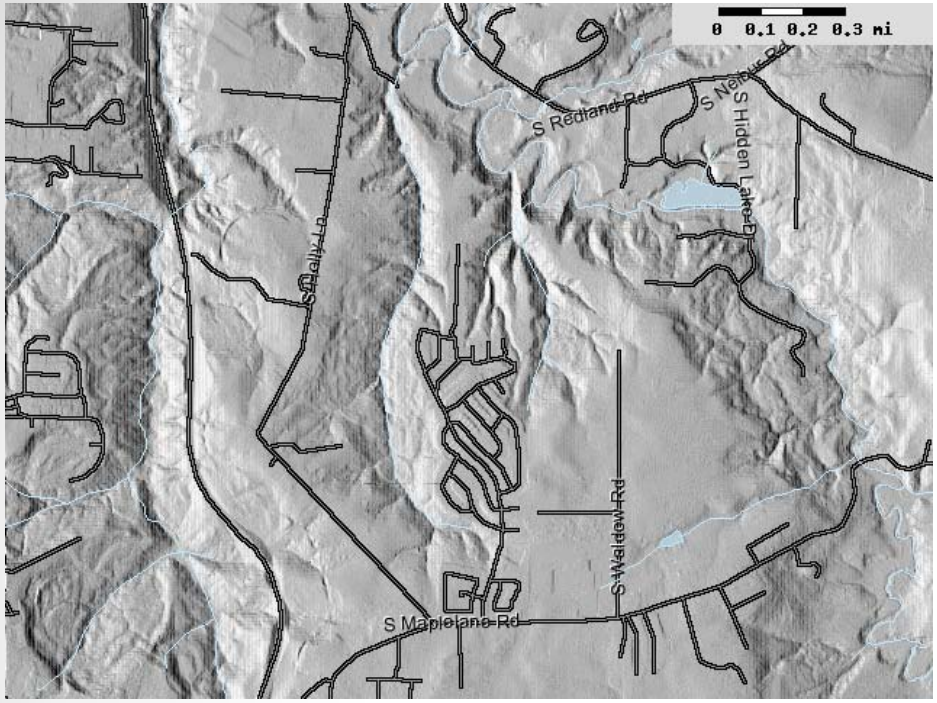
Reactivation of Old Slides

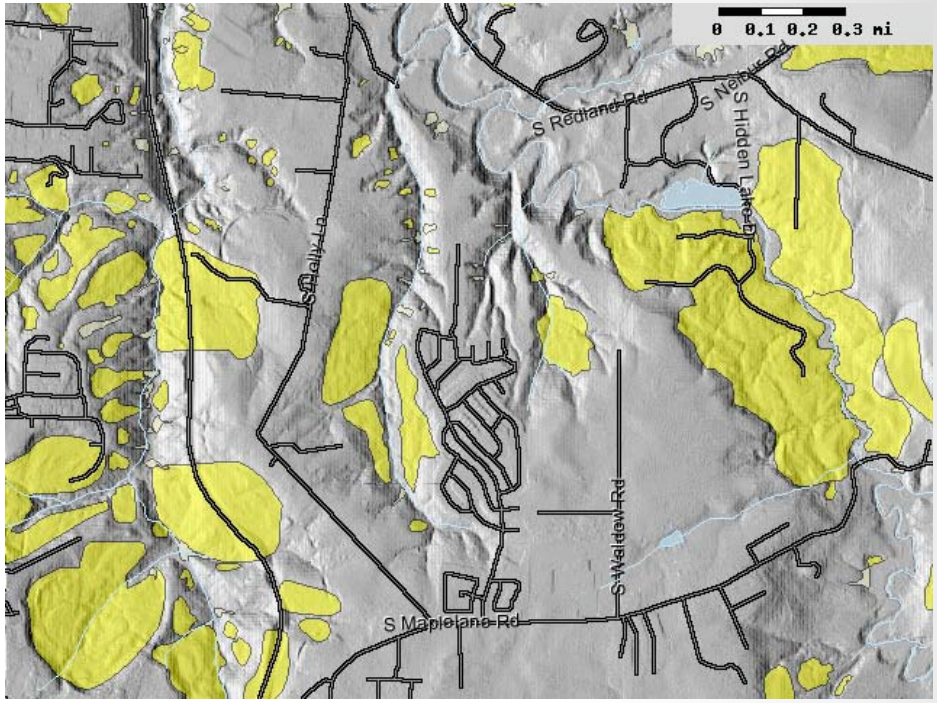


Reactivation of Old Slides

Kelso: Cause was slow buildup of pore pressure in slide over time; cutting off of toe was also probably a trigger

Mapping Landslides Using LiDAR



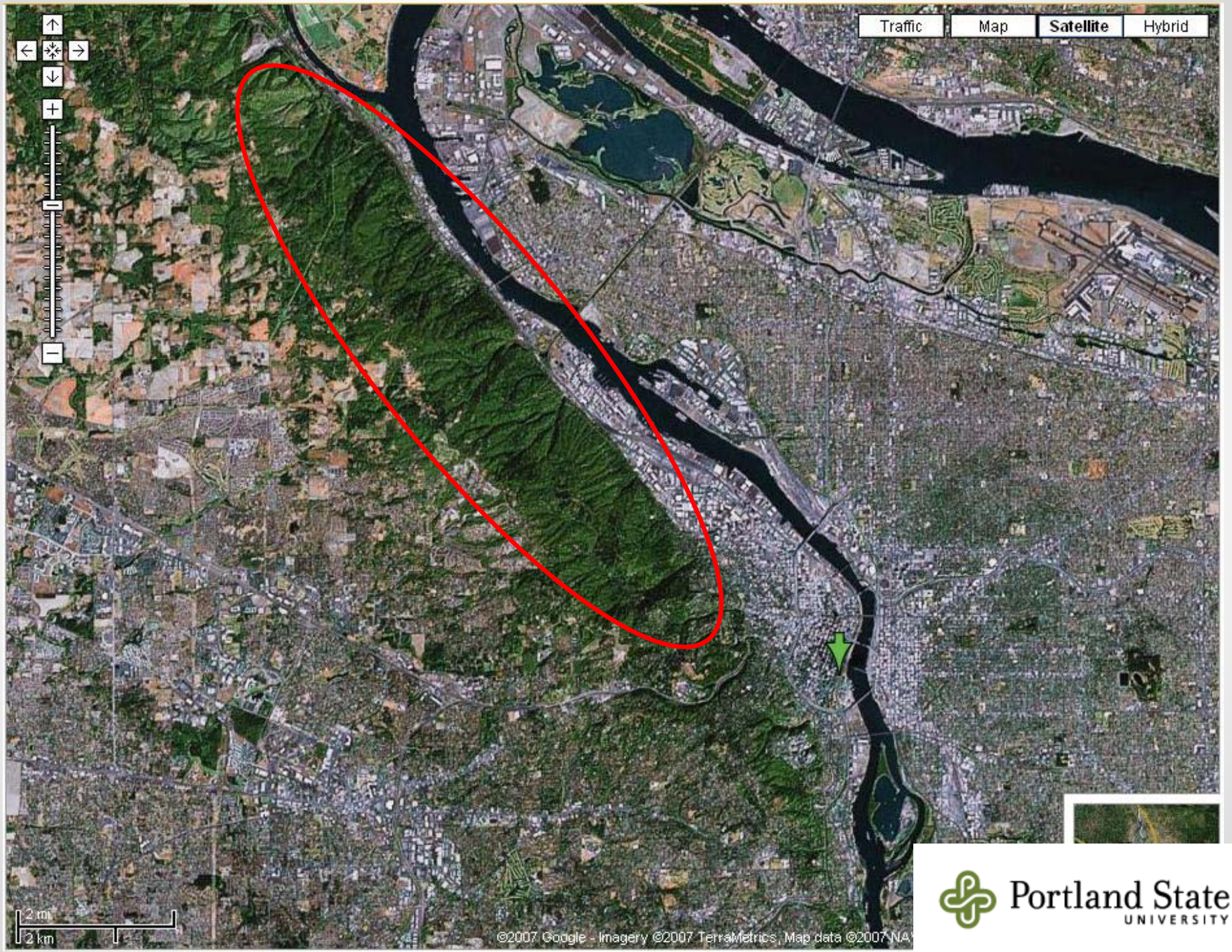


Yellow = landslide


February 17, 2007

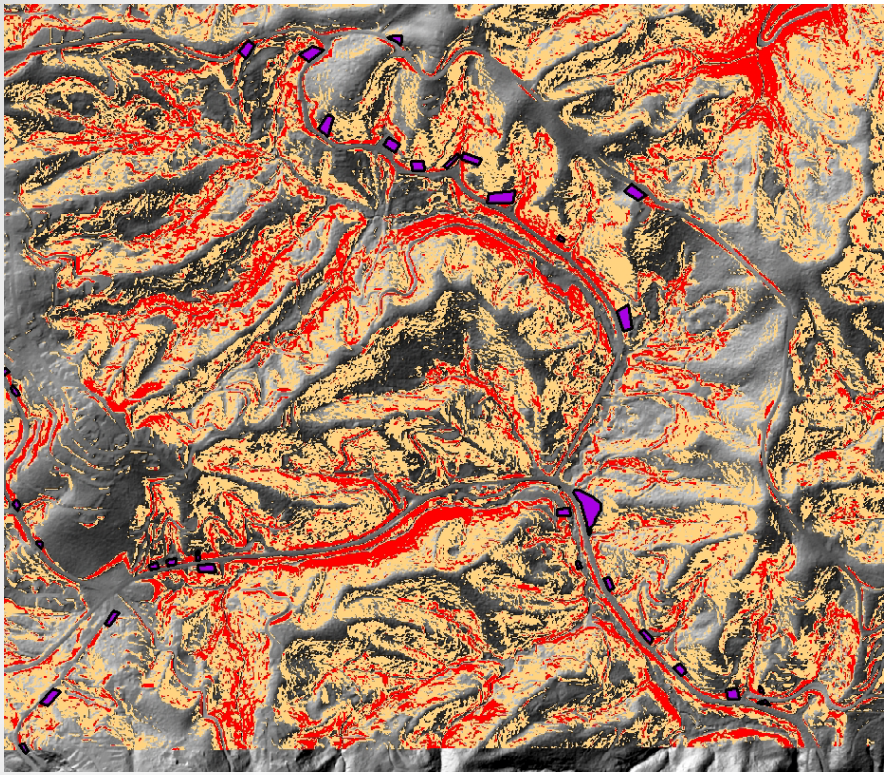

February 17, 2007

Stevenson, Washington 2008



Portland State
UNIVERSITY

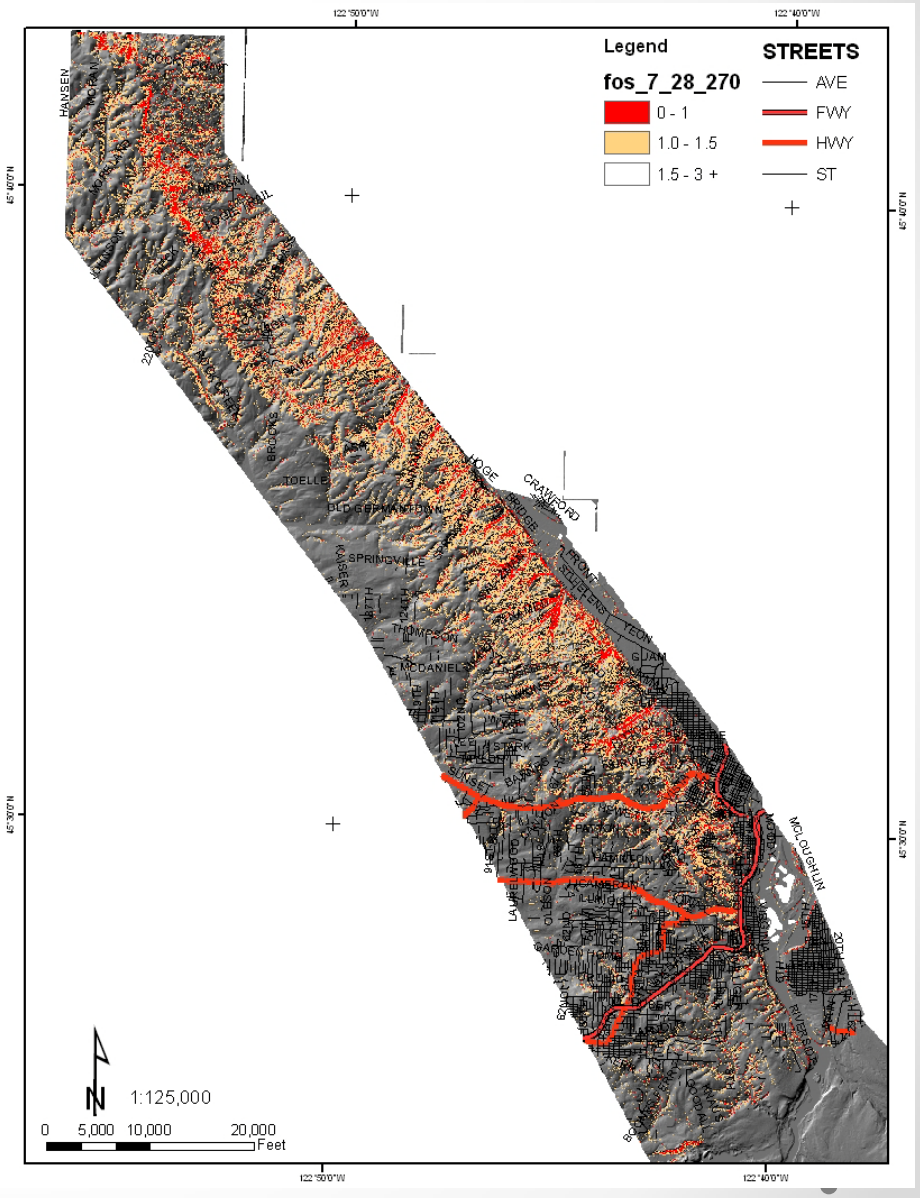
Landslide Susceptibility Map of West Hills

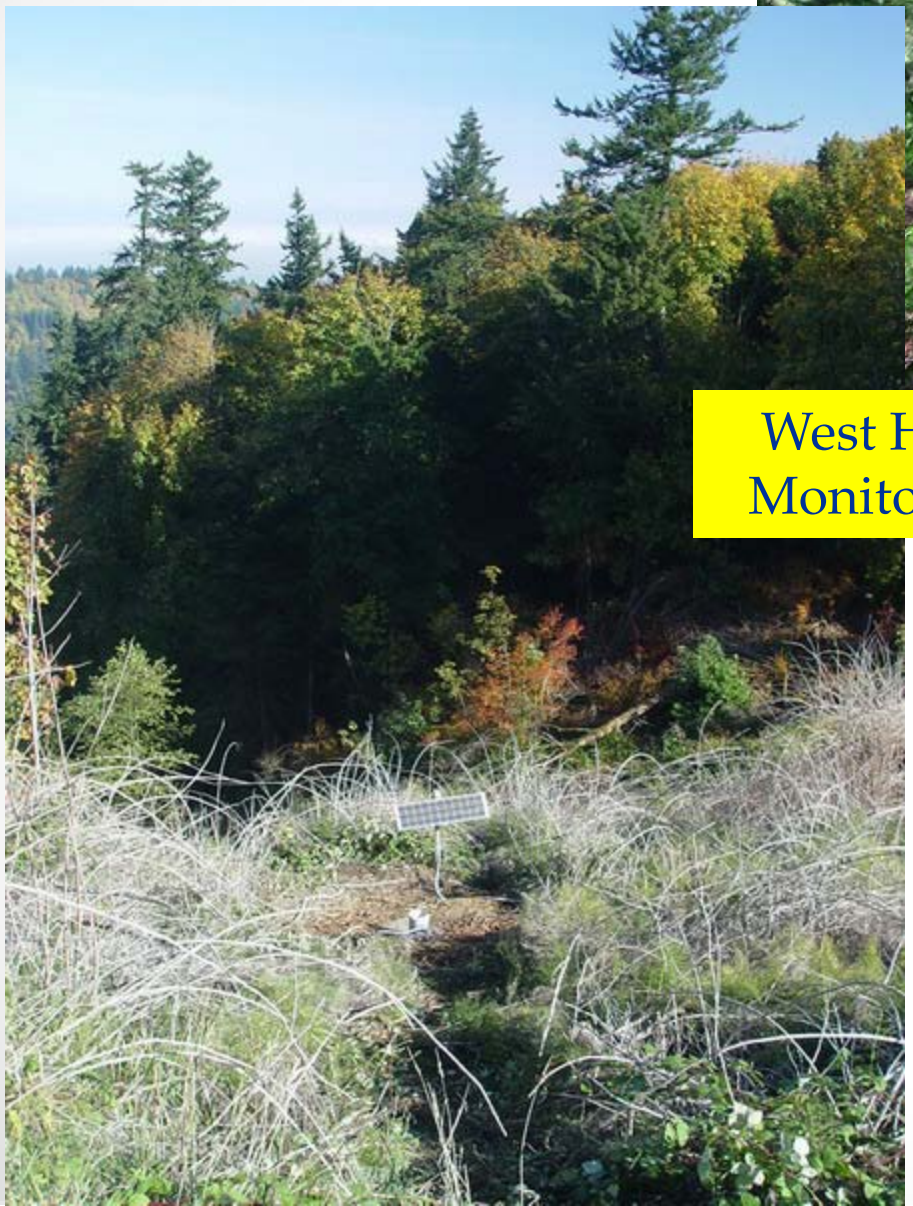


Phi = 27

Cohesion = 270

Thickness = 8





West Hills Soil Monitoring Site

Whether Big or Small, Landslides must be studied

Castle Lake slide, Washington

Scooper slide – not fixed

Thank You

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