

Landslide Mitigation

- Importance
- Hard vs. Soft Solutions
- Soft Solutions
- Hard Solutions

Landslide Mitigation

Importance

- Landslide Hazard is substantial:
 - In U.S.:
 - 25-50 deaths each year
 - \$6 billion in economic loss
- How do we prevent damage/death and control landslides?

Hard vs. Soft solutions

- Hard solutions= hazard reduction
 - Can you think of any ways to stop a landslide from posing a hazard?
- Soft solutions= vulnerability reduction
 - How might you reduce your vulnerability to landslides?
- Which approach do you think would work better? Why?

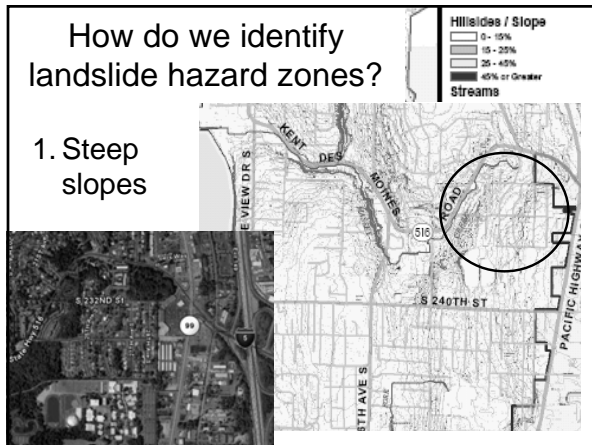
Soft Solutions

- Hazard mapping to identify landslide prone areas.
- Avoidance
- Zoning Laws

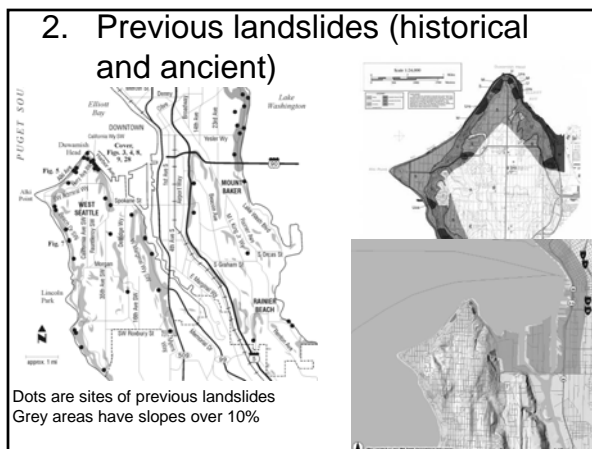
Soft solutions are the most cost effective and practical.

How do we identify landslide hazard zones?

1. Steep slopes



2. Previous landslides (historical and ancient)



Identifying ancient landslides can be tricky!



3. Geologically favorable conditions

- a. Water traps
- b. Foliation or Bedding planes
- c. Faults

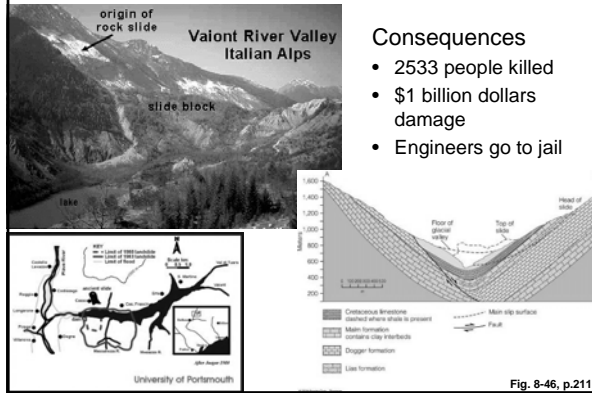
A. Water traps

Where are there water traps in the Glacial stratigraphy of Seattle?



Why would we find water traps on the steep hillsides?

B. Foliation or Bedding Planes: Vaiont Dam Landslide



- Consequences
- 2533 people killed
 - \$1 billion dollars damage
 - Engineers go to jail

C. Faults: The San Andreas Fault

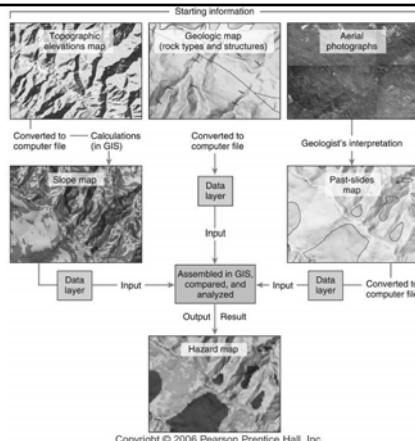
Why would a fault create conditions favorable for a landslide?



Town of Wrightwood 1969



Putting it all back together



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But that is not enough!

- One must then prevent inappropriate building in high risk areas.
- Currently in most of the state, this is only determined by slope (>15%)
- This is part of the Critical Areas Ordinance

Why don't we do more soft solutions?

The debate over restrictions

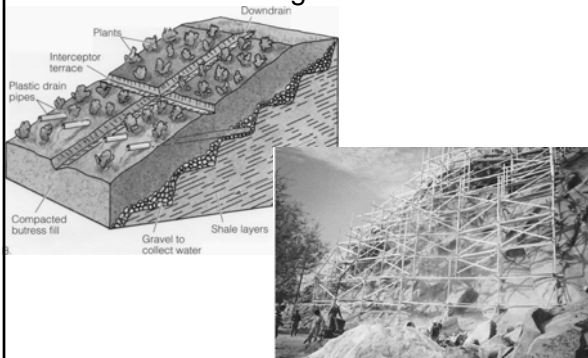
Property Rights

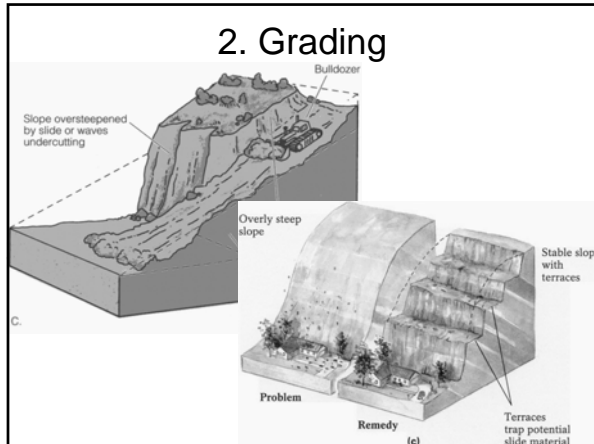
vs.

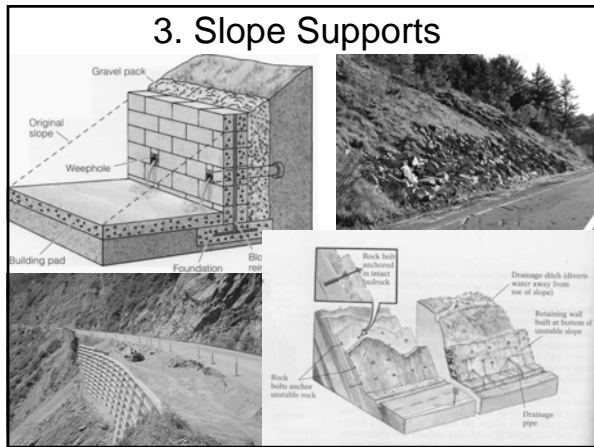
Community Planning

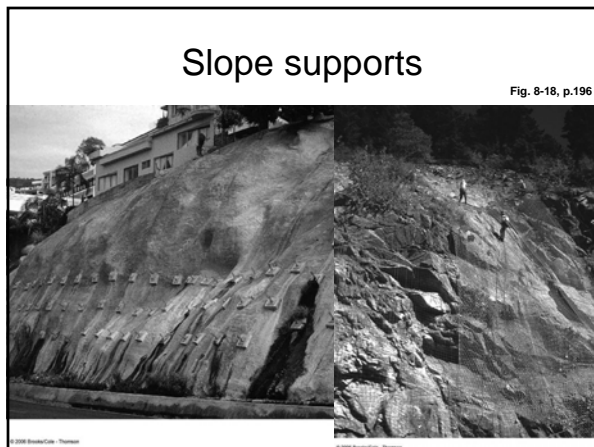
"Relaxing of 'Critical Areas' restrictions proposed"
Headline: SEATTLE POST-INTELLIGENCER Friday, September 17, 2004

Hard Solutions 1. Drainage Control









4. Diversion Walls and Catch Basins

- What do you think this consists of?
- Can you think of any problems with this approach?

Catch Basins



Rate the vulnerability in this photo



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Fig. 8-61, p.218
