

LECTURE 10 & 11:  
MAY 21 & 27, 2014

# PLANNING AND MANAGEMENT

## ADAPTIVE MANAGEMENT & IMPACT AND RISK ASSESSMENT

Text Reference: Dearden and Mitchell (2012), Ch. 6, pp. 172-197

# Outline

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## □ Upcoming:

### □ May 22 (Thursday):

- Field Trip (Bare Point Water Treatment Plant)

### □ May 26 (Monday) **CHANGE:**

- Midterm exam

## □ Today:

### □ (lecture)

- Adaptive Management
- Environmental Impact Assessment
- Risk Assessment

### □ (field trip logistics)

- (discussion: progress on research paper) – structure; referencing;



*Source: Dearden and Mitchell (2012)*

# Preamble

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- **Key terms ('take-aways' from today's lecture)**
  1. Adaptive Environmental Management
  2. Environmental Impact Assessment
  3. Impact Assessment
  4. Risk Assessment
  5. Sustainability Assessment
  6. Stakeholders
  7. Stakeholder Engagement Processes



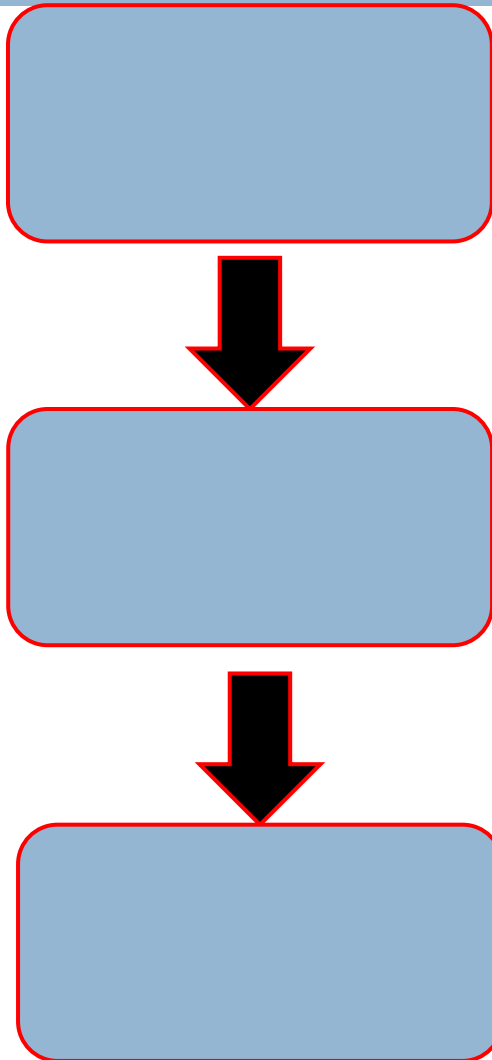
Will explore using a few case studies:

- Peel River Watershed (YK) Conservation Efforts & Challenges
- Mackenzie Valley Gas Pipeline EIA (“Berger Inquiry”)
- Landscape Stability (Mt St Helen’s; Skagit Valley Landslide (March 2014), Washington State)
- Antarctica Ice Sheet Thaw (revised rates, May 19, 2014)

- Aim is to use these to explore some of the issues around:
  - **Environmental Assessment;**
  - **Uncertainty** when evaluating environmental systems and making recommendations for management and/or public action;
  - Encouraging involvement of various **stakeholders** on a particular issue and or development decision;
  - The need for “**adaptability**” in managing systems who change in ways we didn’t anticipate;
- **Summary** ... review definitions of key concepts;

# Planning & Management (preamble)

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- **Known characteristics** of a system
  - {landscape, population, land use, climate, flora/fauna ....}
- Best “**model**” of how that system works
  
- **Expected outcomes** (scenarios) with some measure of uncertainty / certainty
  - → flood risk maps
  - → earthquake hazard assessment
  - → climate change forecasts
  
- **Conveying outcomes** to the public and developing collaborative strategies between stakeholders for best management approach

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# Peel River (YK) Watershed Protection Efforts

Case Study: conflict between recreational and ecological value,  
value to First Nations and industrial development

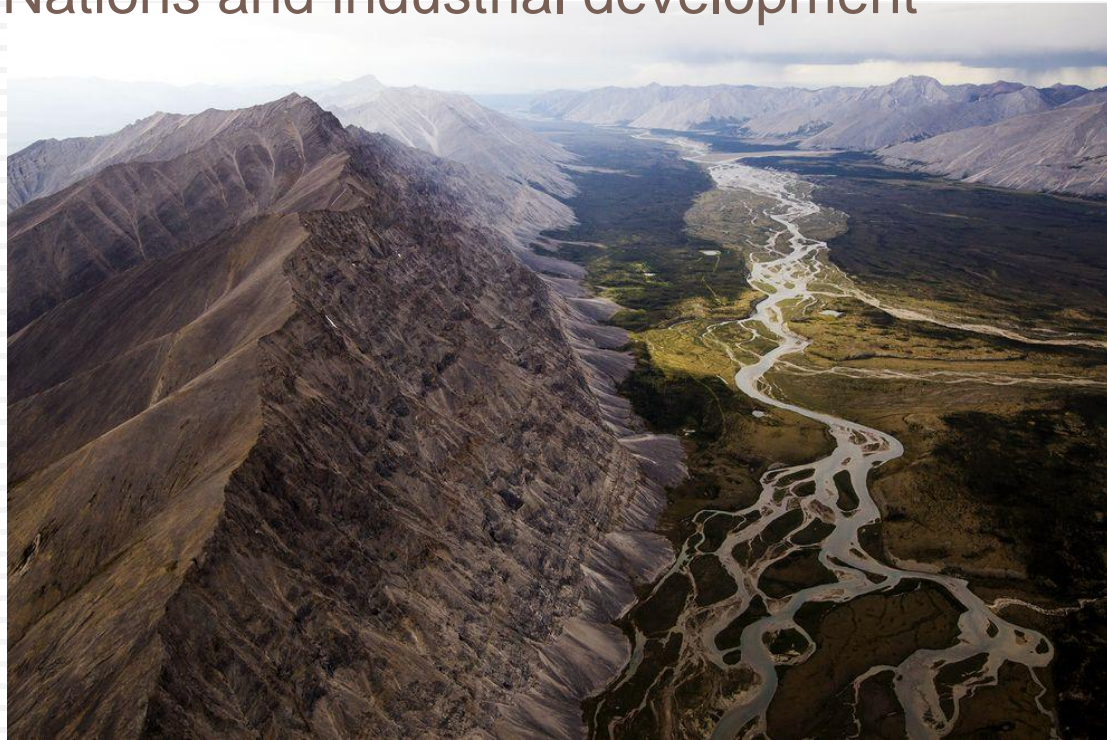


Photo Credit:  
National Geographic



# Peel River Watershed



# Thomas Berger leads watershed lawsuit v. Yukon development plan



- Significance of Thomas Berger?
- Justice *Berger* may be best known for his work as the Royal Commissioner of the *Mackenzie Valley Pipeline Inquiry* which released its findings in 1977



# Mackenzie Valley Pipeline Inquiry

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- Established 1974
- Investigated the **social**, **environmental** and **economic** impact of a proposed gas pipeline through Yukon and Mackenzie River Valley;
- Inquiry cost: \$5.3 million (CAN); 40,000 pages of text and evidence created;
- A '**watershed moment**' in Environmental Impact Assessment process



Northern Peel River Watershed

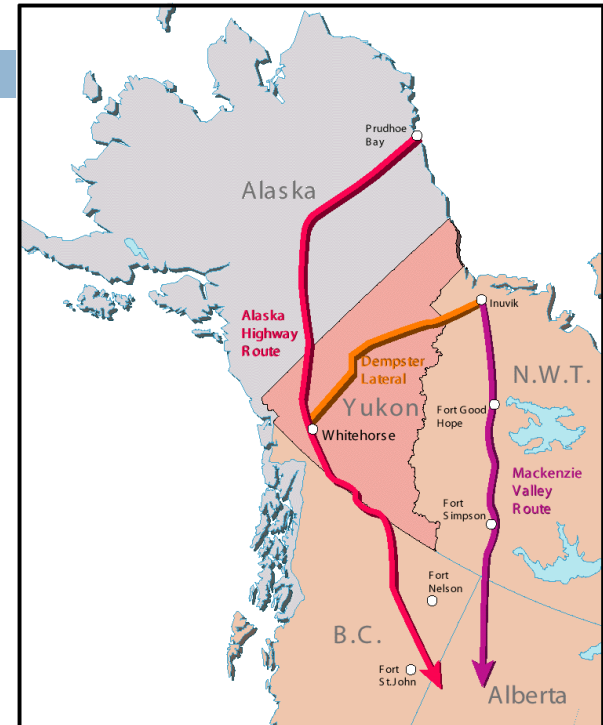
<http://www.canadiangeographic.ca/magazine/so07/indepth/community.asp>



# Mackenzie Valley Pipeline Inquiry

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- *“The Berger Inquiry **broke with tradition** by hearing evidence offered not only by the pipeline companies, but also by residents in more than 30 small communities in the NWT. It concluded by delaying any construction on the pipeline in the Mackenzie Valley and was seen as **a watershed moment in Aboriginal-Canadian relations**. In amassing over 40,000 pages of documentation, it also provided a unique and comprehensive window into the Dene and Inuvialuit political resurgence of the 1970s.”*



NORTHERN NATURAL GAS PIPELINE OPTIONS

<http://www.colorado.edu/geography/blanken/GEOG%206181%20Fall%202003/ryen/berger.html>

Source: Berger Inquiry Educational Resource Archive at Prince of Wales Northern Heritage Centre <http://www.pwnhc.ca/berger/>

# Peel River Watershed

## Thomas Berger leads watershed lawsuit v. Yukon development plan

Posted January 29, 2014 by Canadian Press in **Canada**

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(~5 minute video clip)

<http://commonsensecanadian.ca/VIDEO-detail/thomas-berger-leads-watershed-lawsuit-yukon-development-plan/>

# Ghosts of Futures Past – Tom Berger in the North, Canada, 2004, 52 minutes, HD



(Left to Right) Thomas Berger; Herb Norwegian Grand Chief of the Dehcho; David Suzuki

GHOSTS OF FUTURES PAST  
– TOM BERGER IN THE  
NORTH, CANADA, 2004, 52  
minutes, HD

GHOSTS OF FUTURES PAST – TOM BERGER IN THE NORTH, CANADA, 2004, 52 minutes, HD

<http://www.elanfilms.com/wp-content/uploads/2009/03/mackenzie-1811.jpg>

 [http://www.youtube.com/watch?feature=player\\_embedded&v=H4\\_S5gOXNf4](http://www.youtube.com/watch?feature=player_embedded&v=H4_S5gOXNf4)  
(7 minute promotional clip)



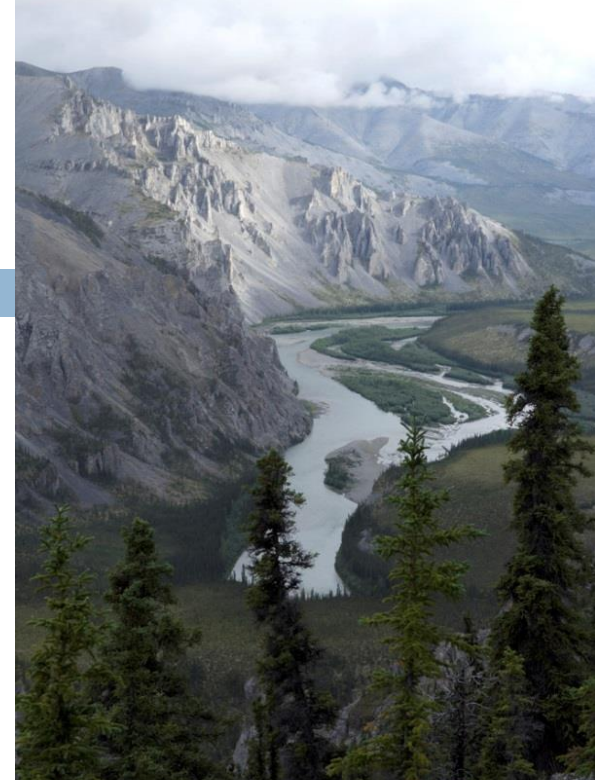
# Peel R. Watershed (NE Yukon)



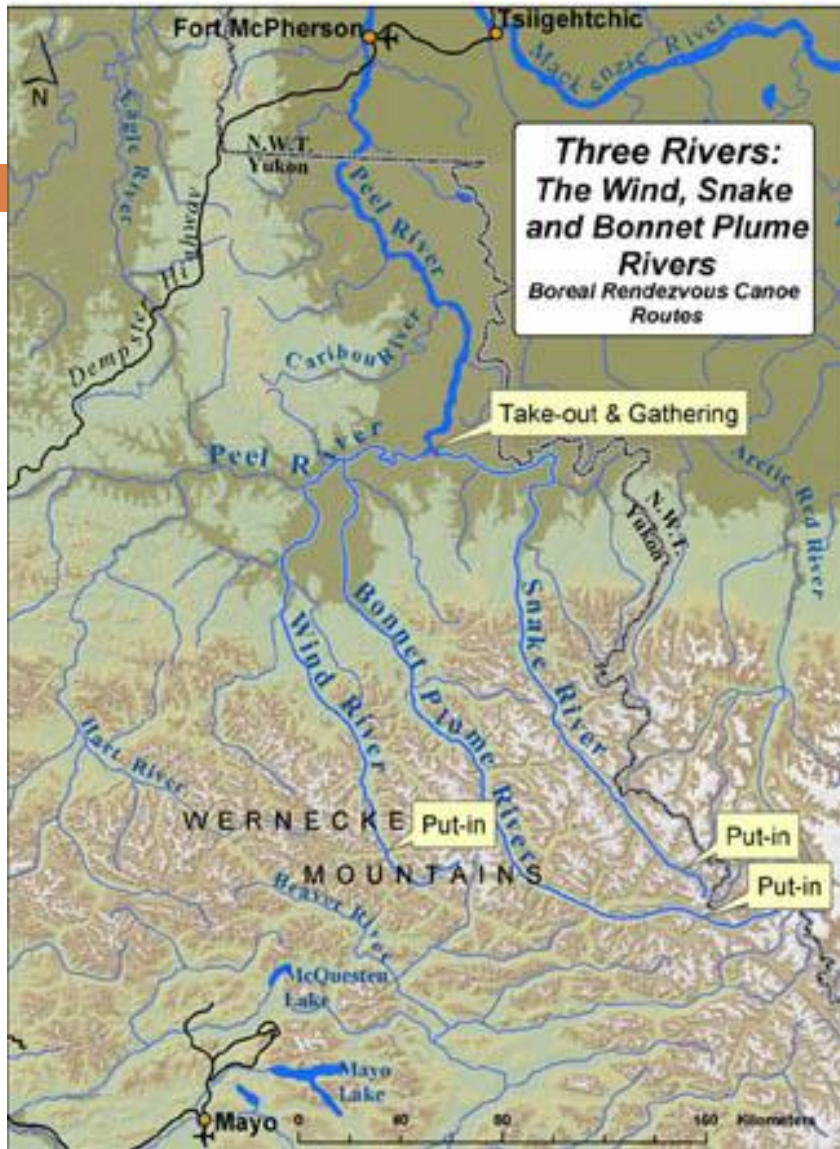
[http://www.canadiangeographic.ca/magazine/jun11/images/snakeriver\\_map1\\_lg.jpg](http://www.canadiangeographic.ca/magazine/jun11/images/snakeriver_map1_lg.jpg)

*Photo credit:*  
Marten Berkman  
**Hart River**

*Photo credit:*  
Jill Pangam  
**Wind River**







The Canadian Parks and Wilderness Society (CPAWS) lends support to Watershed Meeting in Mayo with Yukon First Nations and community elders for land use planning and protection of Peel River watershed. Its Three Rivers Campaign is set to launch a Canadian tour this April (2007), and hopes to bring further attention to this magnificent watershed and canoeing routes. The CPAWS website is an excellent resource, and provides extensive news and trip reports for the Wind, Snake, and Bonnet Plume Rivers.

<http://northernwaterways.com/blog/?paged=8>

# Peel Commission

- Established by Yukon Territorial Government and First Nations in 2004;
- Consulted widely over a 7 year period
- In 2009, Peel Commission Recommendations:
  - ▣ 80% of watershed to be recommended to be protected
  - ▣ 20% for oil, gas, mineral development
- One of last remaining ecologically intact watersheds in N America, 7 times the size of Yellowstone National Park
- Significance:
  - ▣ People travel the world over to paddle these waters
  - ▣ Cultural significance



# McPherson rallies to protect the Peel watershed



<http://www.yukonwildrivers.ca/wp-content/uploads/Upper-Snake-R-canyon-JSP.jpg>

From: srj.ca - It was standing-room-only for the Yukon government's Peel River watershed land use plan meeting in Fort McPherson Feb. 12. (Photo: Mary Walden)





Link to a petition that is being circulated to help protect it.

[https://secure.avaaz.org/en/petition/Government of Yukon Protect the Peel/?tDMnrab](https://secure.avaaz.org/en/petition/Government_of_Yukon_Protect_the_Peel/?tDMnrab)



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# Hazards: Skagit Valley, Washington State

Landslide Risk

Volcanic Risk

Seismic Risk

Major Landslide: March 2014

# 14 dead; 176 reports of people missing in mile-wide mudslide

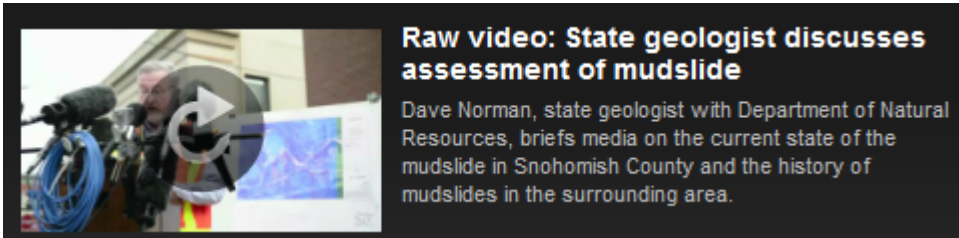
Officials said they have received 176 reports of people missing as rescuers continue to search the debris from a milewide mudslide in Snohomish County.



Source: Seattle Times, March 24, 2014

# Skagit Valley Slide (video links)

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- <http://seattletimes.com/flatpages/video/mediacenterbc3.html?bctid=3387727468001>



- <http://seattletimes.com/flatpages/video/mediacenterbc3.html?bctid=3387727468001>

## At least 18 People Unaccounted for After Massive Washington ...



Newsroom · 193 videos

Subscribe 46

163 views

👍 0 👎 0

<http://www.youtube.com/watch?v=uptl8dcCJnl>



WHAT CAUSED THE OSO WASHINGTON MUDSLI...

Self-guided Google Earth  
recapture of possible  
relationship to recent  
logging



<http://www.youtube.com/watch?v=3y9RQKgEgTs>





Google Earth Image (March 31, 2014) –  
approximately 9 days after failure on March 22.





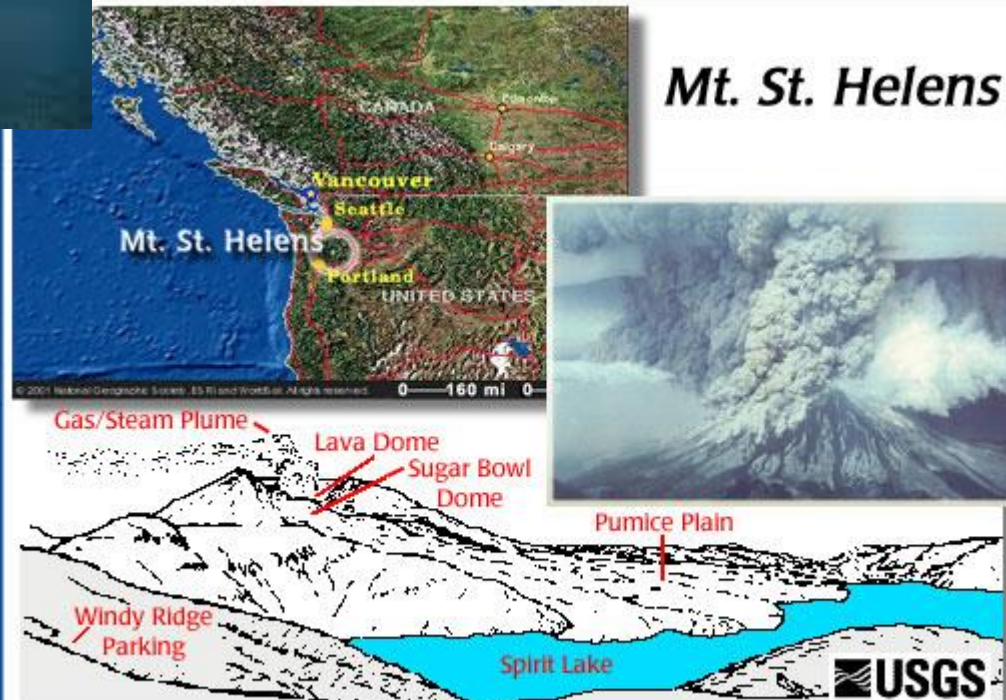
<http://seattletimes.com/ABPub/2014/03/22/2023202605.jpg>

# Mt St Helen's

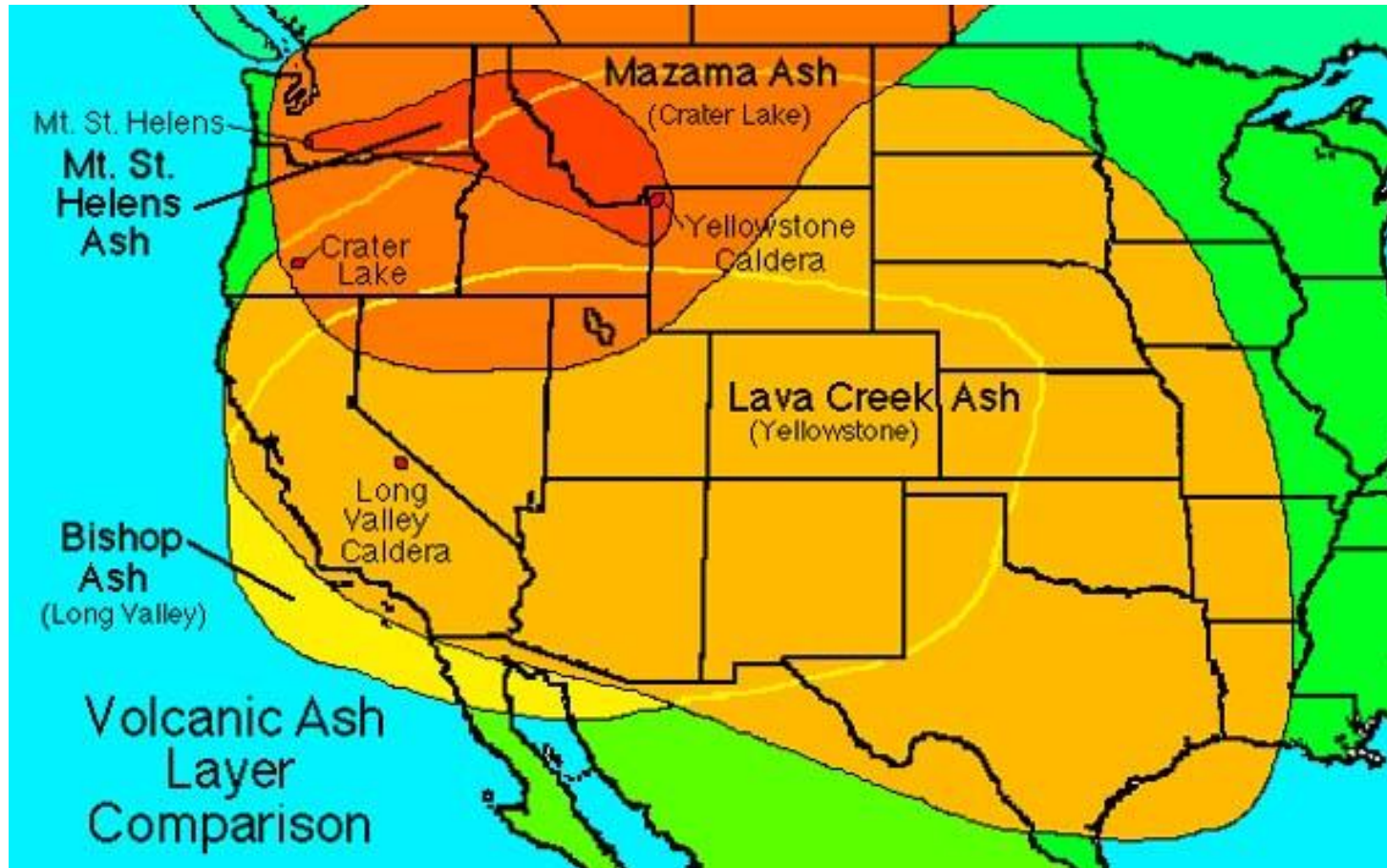
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- Before and after 1980 eruption



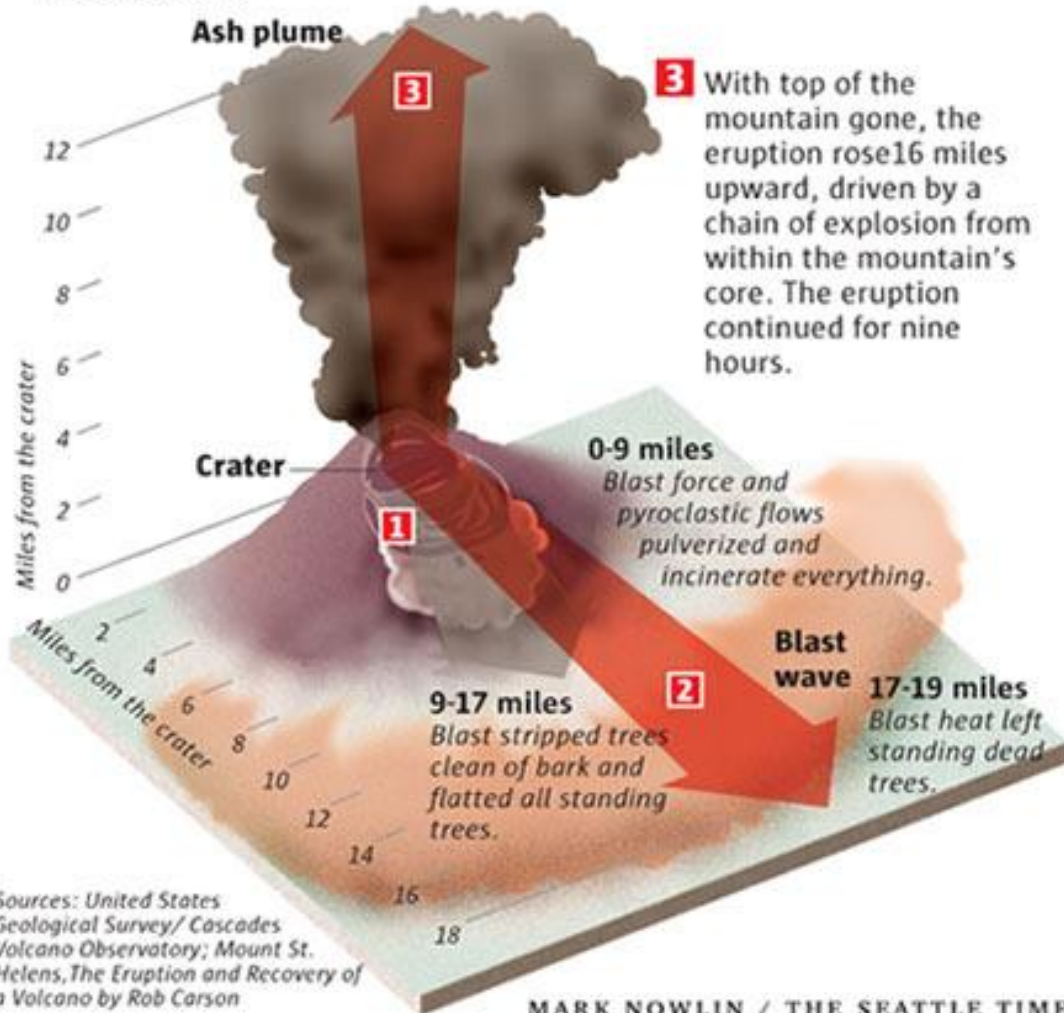




# May 18th, 1980

At 8:32 a.m. an earthquake signaled the beginning of Mount St. Helens' eruption.

- 1** Magma rising inside the mountain over a period of weeks created a bulge on the northside. At 8:32 a.m., a 5.1 magnitude earthquake broke the bulge loose, causing the northside to dissovle into a massive avalanche.
- 2** The avalanche released built up pressure from magmatic gases, resulting in a northern lateral explosion. The blast created a 17-18 mile fan-shaped path of destruction.

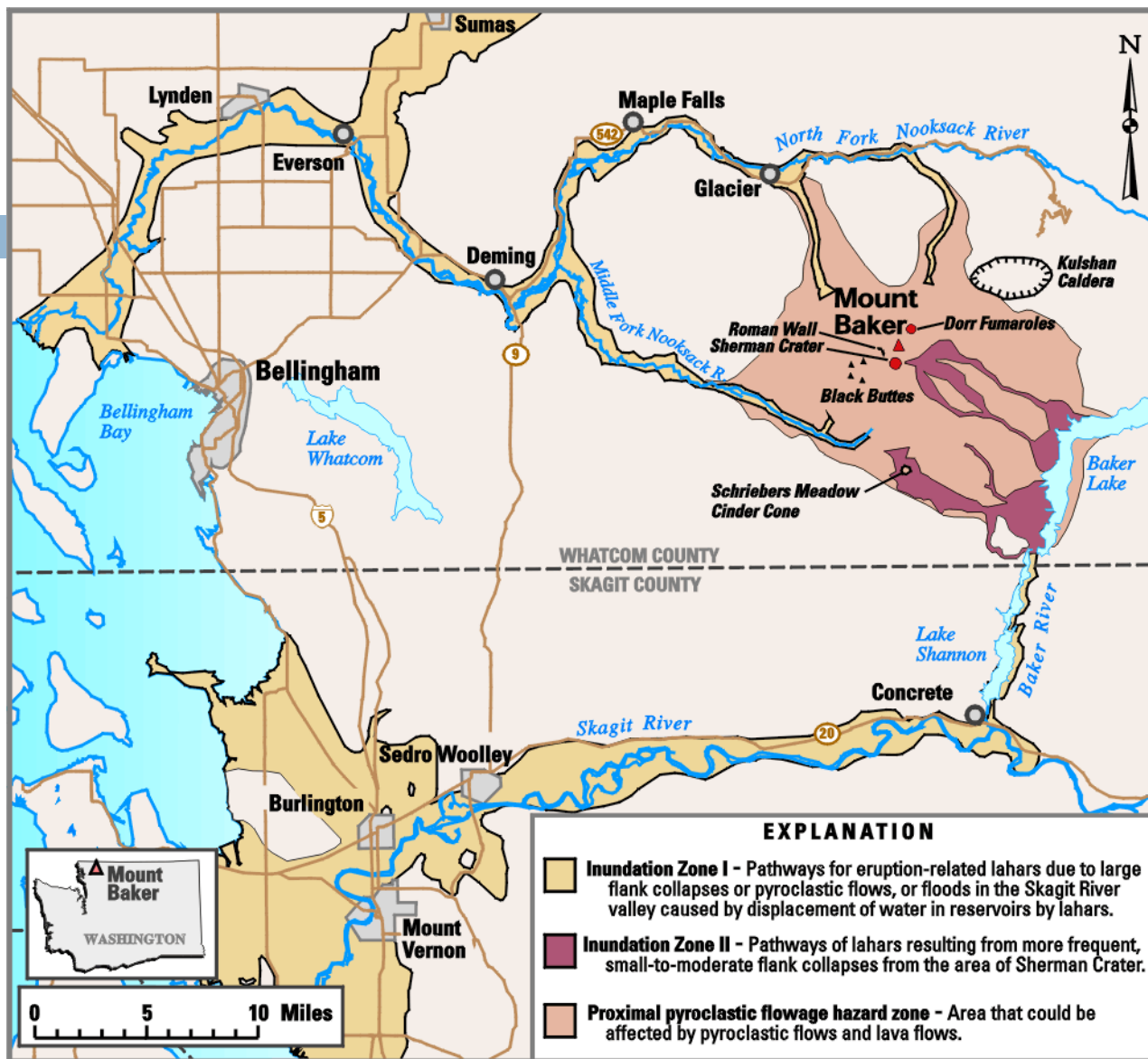




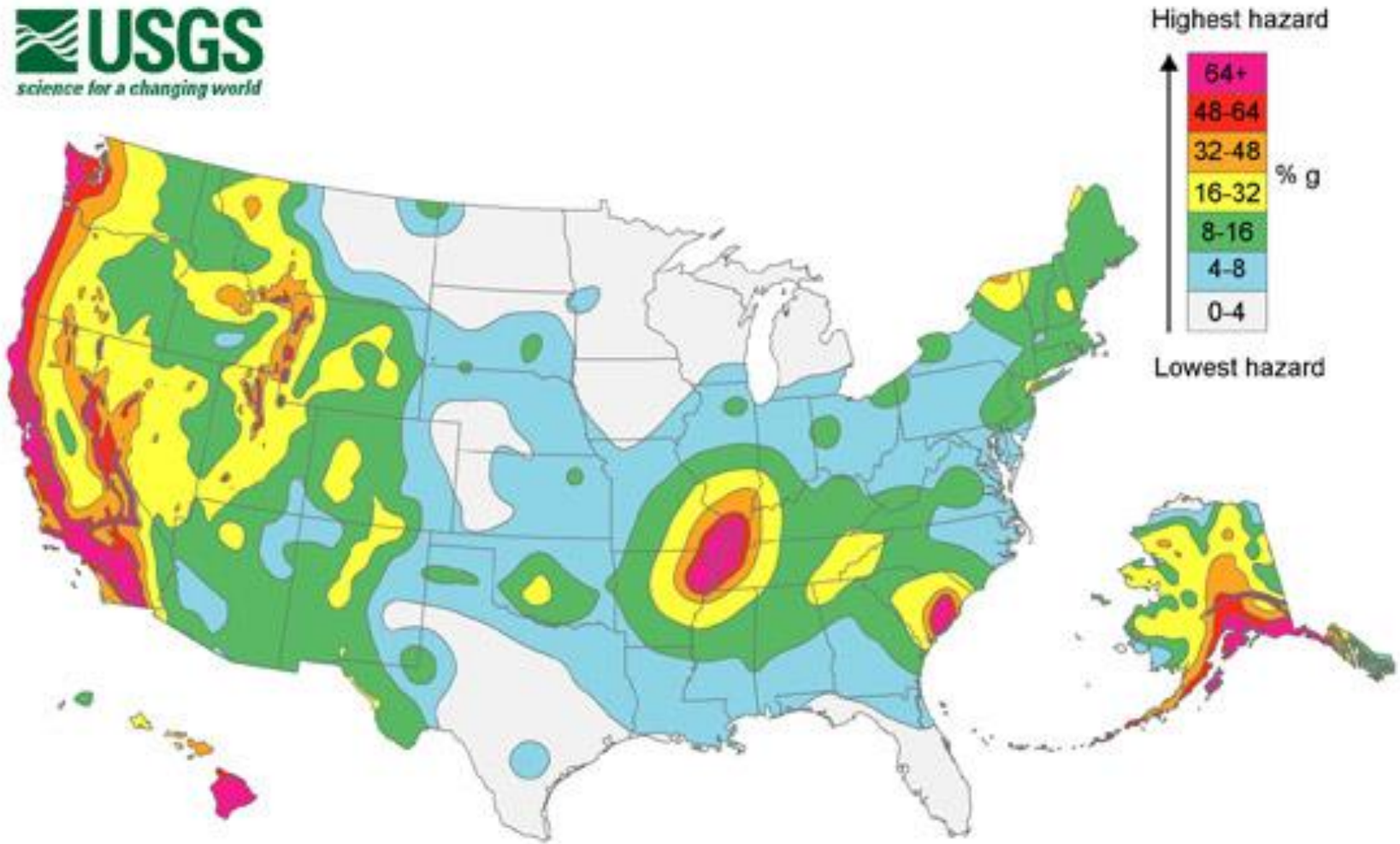


**Mount St. Helens from the Lahar Viewpoint, 1985**  
**Photo credit: Jim Nieland**





<http://pubs.usgs.gov/fs/2000/fs059-00/images/map-large.gif>



Earthquake hazard map for the United States (credit: USGS)  
Read more: <http://www.smithsonianmag.com/science-nature/earthquake-in-washington-dc-61068454/#VmJKb5kCvvsEes0x.99>

**Disaster Risk Reduction (DRR)** – See international guest statement Bakti Setiawan, Planning Professor, Indonesia, p. 193)

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- In the context of several major natural disasters having recently struck Indonesia with large numbers of fatalities and displaced persons;
- “**Spatial Planning**” ... the efficient use of spaces;
- Its link to DRR ... four possible roles emerge:
  1. Making decisions about land use or zoning plans;
  2. Keeping vulnerable areas free from development;
  3. Following recommendations for legally binding land use or zoning plans;
  4. Undertaking hazard modification.



- Question: How do the principles of DRR (disaster risk reduction) apply to the Skagit Valley Example?

# 2014 Oso mudslide

From Wikipedia, the free encyclopedia

Coordinates:  48°16′57″N 121°50′53″W

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On Saturday, March 22, 2014, at 10:37 a.m. local time, a major [mudslide](#) occurred 4 miles (6.4 km) east of [Oso, Washington](#), United States, when a portion of an unstable hill collapsed, sending mud and debris across the North Fork of the [Stillaguamish River](#), engulfing a rural neighborhood, and covering an area of approximately 1 square mile (2.6 km<sup>2</sup>). As of April 30, 2014, the slide had killed 41 people;<sup>[2]</sup> 2 more remained missing.<sup>[4]</sup>


## Contents [\[hide\]](#)

- 1 Overview
- 2 Casualties and damage
- 3 Federal aid
- 4 Controversy
  - 4.1 "Completely unforeseen"
  - 4.2 Logging
- 5 Ground activity surrounding the slide
- 6 Geological context
- 7 History of slide activity
- 8 See also
- 9 Notes
- 10 References
- 11 External links

## 2014 Oso mudslide



Oso mudslide on March 29, 2014


<b>Date</b>	March 22, 2014
<b>Time</b>	10:37 a.m.
<b>Location</b>	Oso, Washington
<b>Coordinates</b>	 <span><span><span><span>48°16′57″N</span> <span>121°50′53″W</span></span></span></span>
<b>Cause</b>	Suspected soil saturation from heavy rainfall. <sup>[1]</sup>
<b>Deaths</b>	41 <sup>[2]</sup>
<b>Injuries</b>	4 serious <sup>[3]</sup>
<b>Missing</b>	2 <sup>[4]</sup>
<b>Property damage</b>	49 homes and other structures destroyed <sup>[5]</sup>

Wikipedia information (current to May 21, 2014)

## 2014 Oso mudslide



Oso mudslide on March 29, 2014

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Wikipedia information (current to May 21, 2014)



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# Antarctic Ice Sheet

Date: May 19, 2014

## Antarctic ice sheet disappearing at twice the rate predicted

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Q: Need for  
“Adaptive”  
Management  
Strategies?

Almost 160 billion tonnes of ice is being lost every year in 'dramatic changes'

<http://www.independent.co.uk/environment/climate-change/antarctic-ice-sheet-disappearing-at-twice-the-rate-predicted-9398468.html>



Date: May 19, 2014

## Glaciers stuck in an irreversible thaw

Video:

Vast glaciers in West Antarctica seem to be locked in an irreversible thaw linked to global warming that may push up sea levels for centuries. .

<http://link.brightcove.com/services/player/bcpid753144093001?bckey=AQ~~,AAAkVf4sTE~,ZHihQoc0Mak3KW61gTbGinrWzI69us3-&bclid=0&bctid=3561821174001>

<http://www.independent.co.uk/environment/climate-change/antarctic-ice-sheet-disappearing-at-twice-the-rate-predicted-9398468.html>



# Summary – key concepts ... definitions

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- **Key terms ('take-aways' from today's lecture) and relationships to case studies explored ...**
  1. **Adaptive Environmental Management**
    - “adaptive management ... primarily concerned with learning-by-doing in a scientific way to deal with uncertainty” (p.177, D&M 2012)
    - E.g., Antarctic ice sheet ablation / melt / sea level rise
  2. **Environmental Impact Assessment**
    - “determining and managing .... the potential and real impacts of proposed or existing human actions and their alternatives on the environment (physical, biological, chemical, human health, social, ...) (p.178, D&M 2012)
    - E.g. Berger Inquiry; Peel River protection efforts

# Summary – key concepts ... definitions

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## 3. Risk Assessment

- ▣ “focuses on determining ***the probability or likelihood*** of an environmentally or socially negative event of some specified magnitude”
- ▣ E.g., Oso landslide; hazard assessments

## 4. Sustainability Assessment

- ▣ A more recent innovation along the same lines as what EIA was challenging us to do.... “ensuring that environmental matters are considered along with economic and technological matters” (p. 184, D&M 2012)

## 5. Stakeholders & Stakeholder Engagement Processes

- ▣ “those folks having a right to participate in resource and environmental management decisions” (p. 174, D&M 2012)
- ▣ E.g., First Nations, community environmental groups, communities, resource companies, government officials, etc who participate in EIA processes like the Berger Inquiry.

## Looking Ahead to the next lectures

**May 22:**(Field trip): ***Bare Point Water Treatment Plant***  
(leave classroom at 11 am)

**May 26:** Mid-term exam (**covers to end of Chapter 4**)

**May 27& 28:** Climate Change: definitions and scientific evidence of

Read ahead (Chpt. 7, pp. 201 →)



# References

- Dearden, P and Mitchell, B. 2012. *Environmental Change and Challenge*, Fourth Edition, Don Mills, Ontario: Oxford University Press {Chapter 6: 'Planning and Management: Process, Method and Product'}