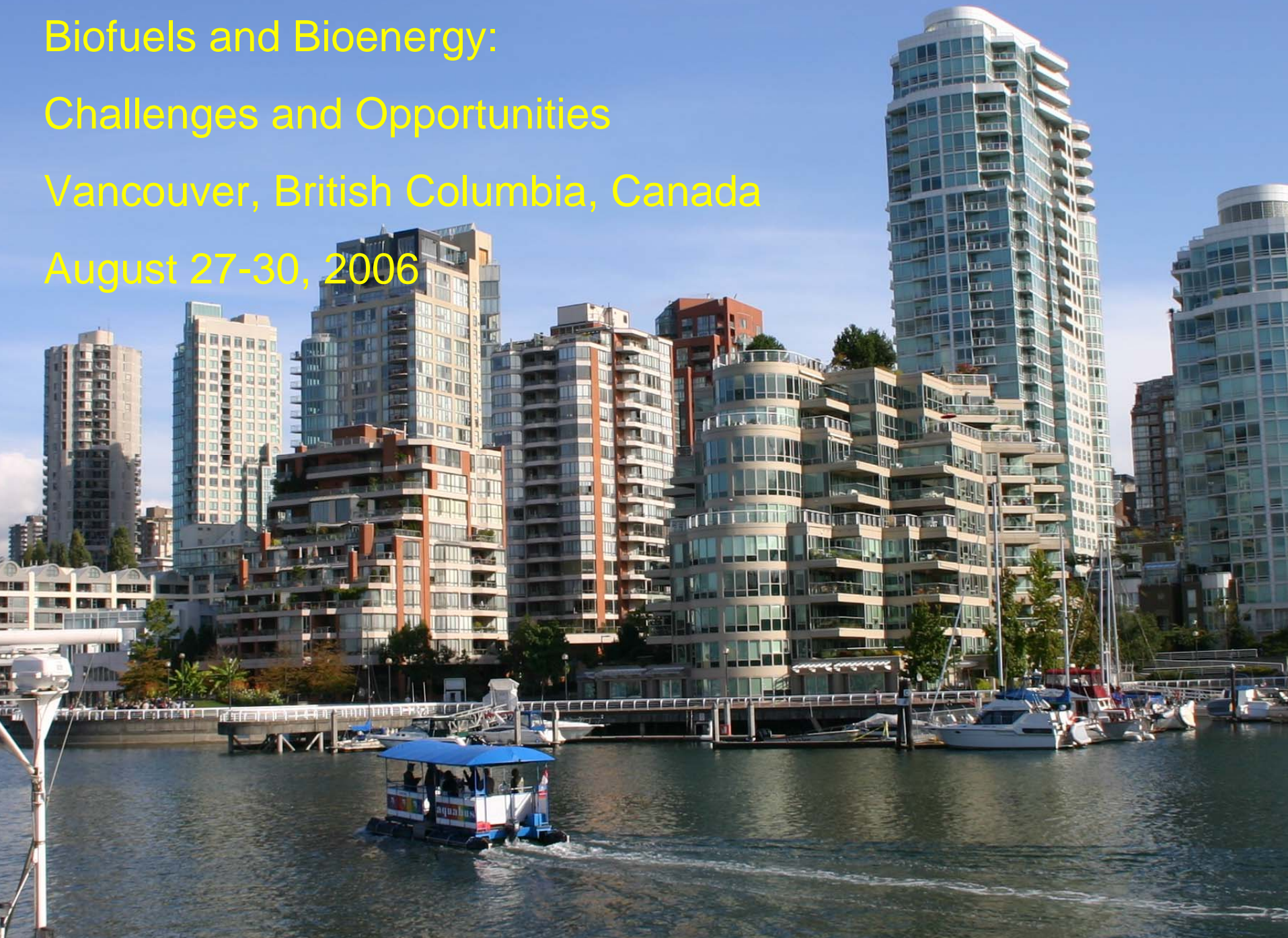


Biofuels and Bioenergy:
Challenges and Opportunities
Vancouver, British Columbia, Canada
August 27-30, 2006



Use of Woody Biomass as a Source of Energy

Soil Resource Concerns of the USDA Forest Service
in the
Pacific Northwest



Steven W. Howes

USDA Forest Service

Portland, Oregon

Fire Killed and Damaged Trees, Siskiyou National Forest Oregon





Western Spruce Budworm Damage



**Overstocked stand with soil disturbance
caused by previous entries and grazing
activities**

Mechanized Harvesting Operation, Colville National Forest

Washington State



Healthy Forest Restoration

Act

2003

- Reduce wildfire risk to communities
- Improve commercial value of biomass that would otherwise contribute to fire risk
- Protect watersheds – address threats to forests from wildfire or other damaging agents.

USFS Strategic Plan

2004-2008

- **Goal 1:** Reduce risk of catastrophic wildfire
- **Goal 4:** Help meet energy needs of the nation



2005

Agency-wide strategy for improving woody biomass utilization

- Increase utilization of woody biomass
- Help offset costs
- Provide economic opportunities to rural communities
- Enhance public benefits

Organic Administration Act of 1897

“No national forest shall be established except to improve or protect the forest within its boundaries or for the purpose of securing favorable conditions of water flow and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States.”



Multiple Use and Sustained Yield Act of 1960

- Official policy: National Forests are to be managed for multiple uses.
- “Sustained yield of several products and services means the achievement and maintenance in perpetuity of a high level or annual output of the various renewable resources without impairment of the productivity of the land.”

National Environmental Policy Act 1969

- Environmental impacts of proposed action
- Adverse environmental impacts
- Alternatives to proposed action
- Relationship of short-term uses and enhancement of long-term productivity
- Irreversible and irretrievable commitment of resources

National Forest Management Act 1976

- Requires development of Forest Plans
- Specify guidelines that timber will be harvested only where:
 - Soil or other watershed values will not be irreversibly damaged
 - Adequate restocking within 5 years
 - Protection where harvests likely to seriously and adversely affect watershed condition.



FSM 2520.2 R6 Supplement 2500-98-1

Policy: Design and implement management practices which maintain or improve soil and water quality. Emphasize protection over restoration.

Policy: The following regional standards are thresholds beyond which soil quality is adversely affected:

Leave a minimum of 80 percent of an activity area in an acceptable soil quality condition.

An aerial photograph of a forested hillside. Several distinct, light-brown, eroded paths or gullies run diagonally across the slope, cutting through the dense green coniferous forest. These paths represent areas of soil disturbance. The text 'Detrimental Soil Disturbance' is overlaid in yellow at the top, and a list of four types of disturbance is in the center.

Detrimental Soil Disturbance

- **Compaction**
- **Displacement**
- **Puddling**
- **Severe soil burning**



Detrimental Soil **Disturbance**

Definitions

Thresholds

Change in soil properties

Area extent

Weaknesses of Current Standards

- Not Validated
- Do not Account for Soil Differences
- Difficult to Measure Against
- Communication and Application Inconsistent (i.e. roads)
- Vague About Dealing with Disturbance from Previous Entries
- Applied to Activity Areas (Harvest Units)

R6 Soil Monitoring Protocol

1983

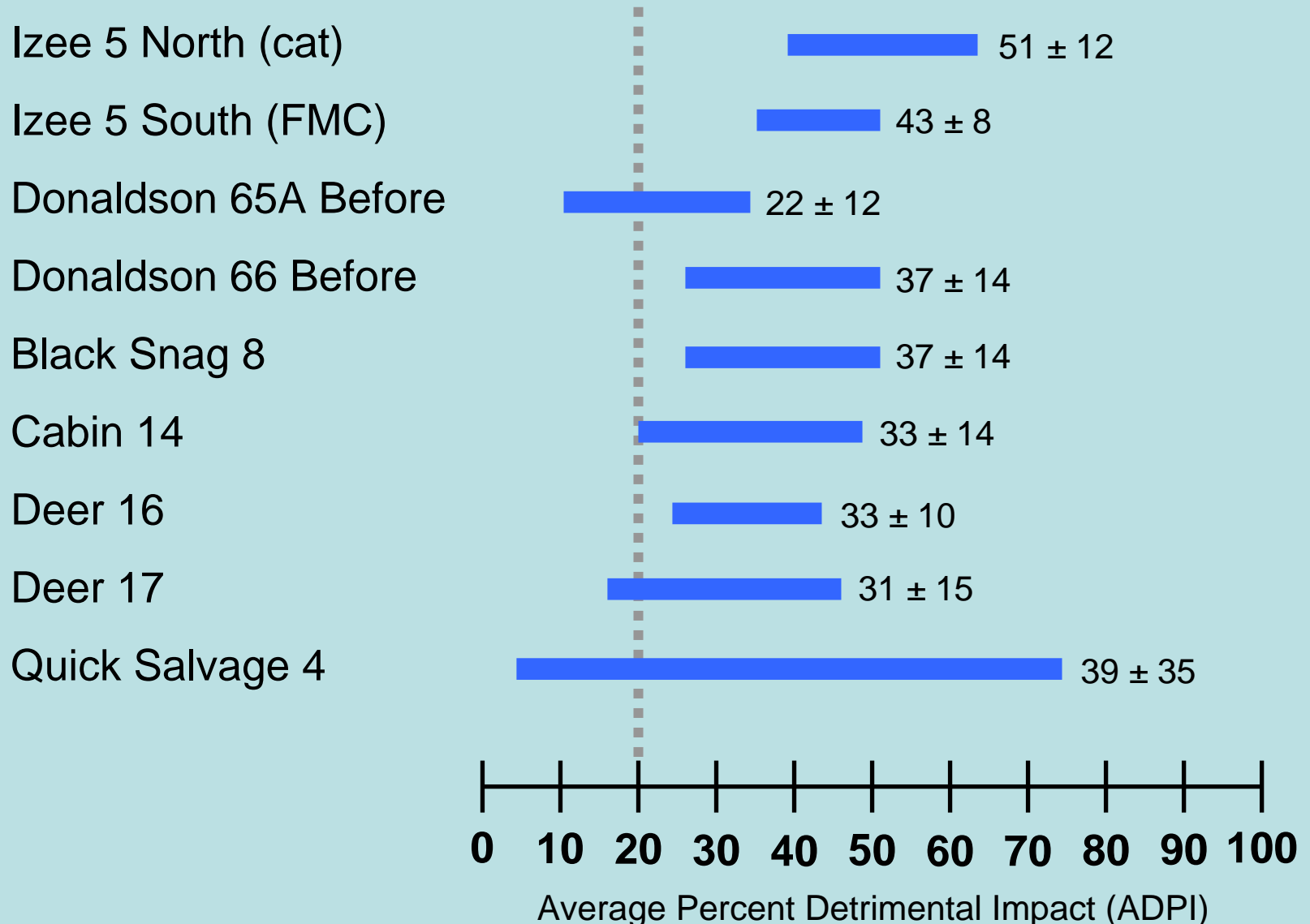
- Representative, unbiased sample
- Sample all conditions at one time
- Consistent results with repeated sampling
- Control level of precision



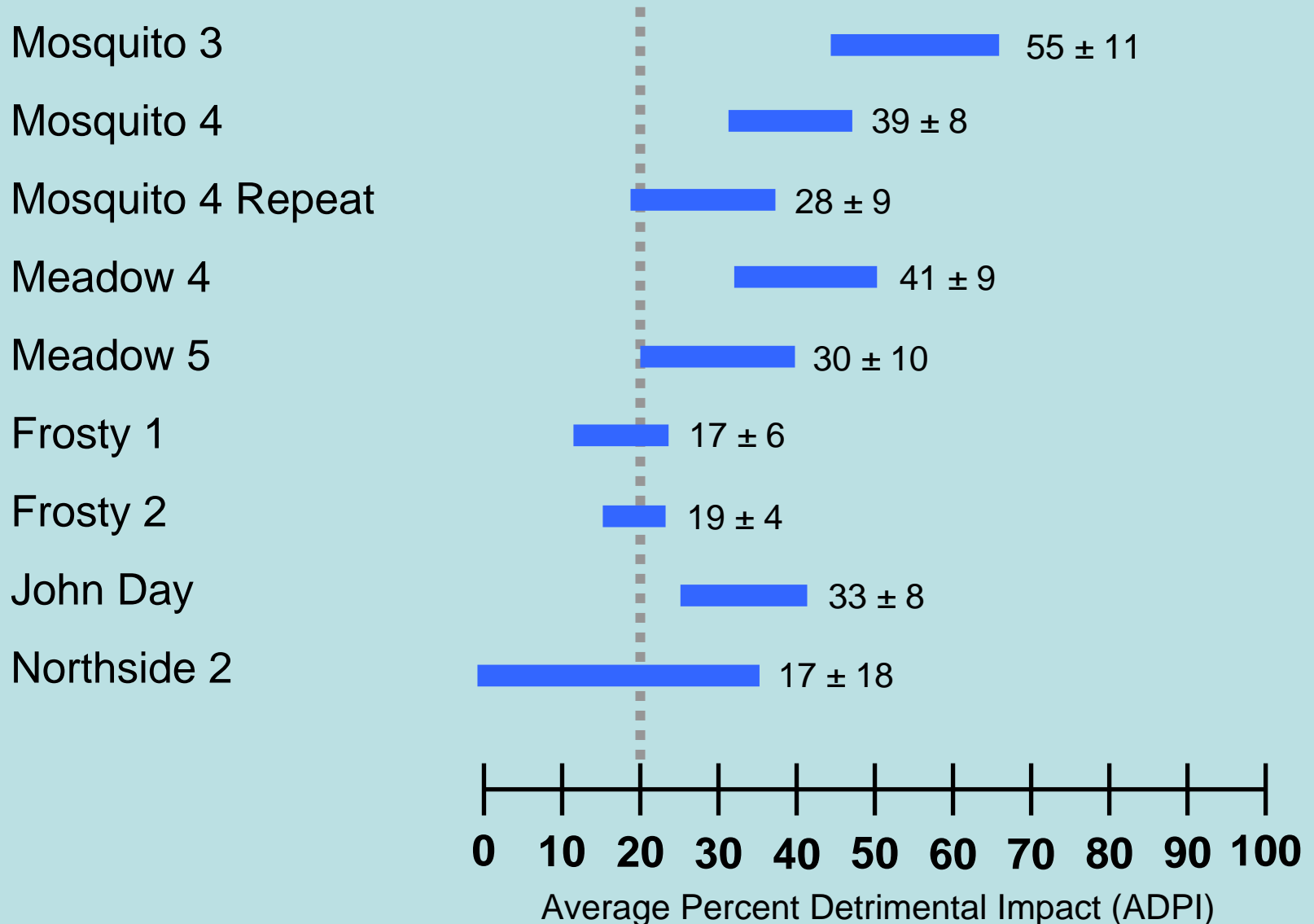
Remains of small diameter wood processing mill
and cogeneration facility, North Powder, Oregon,
2006



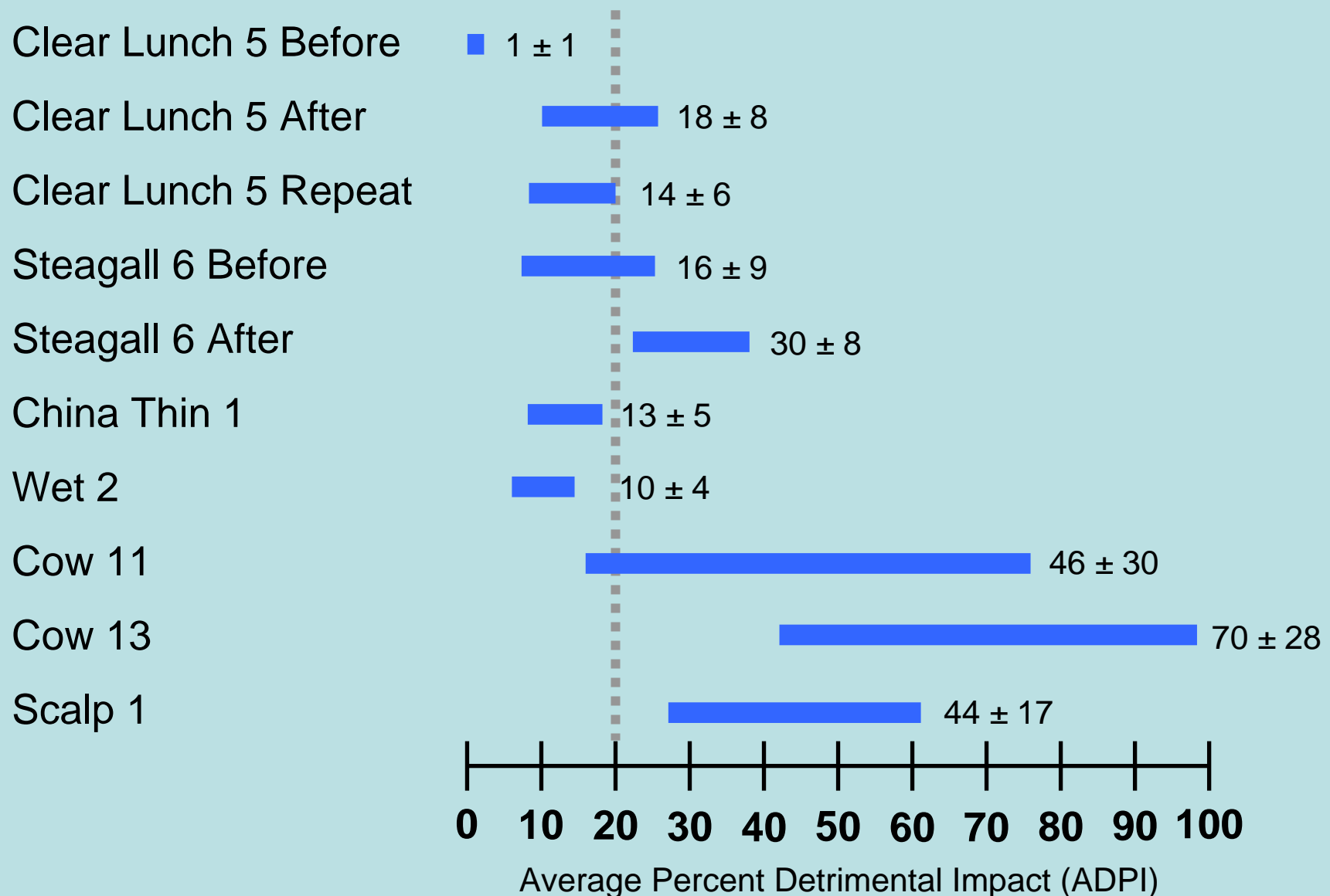
Total Soil Damage \pm 90% Confidence Level



Total Soil Damage \pm 90% Confidence Level



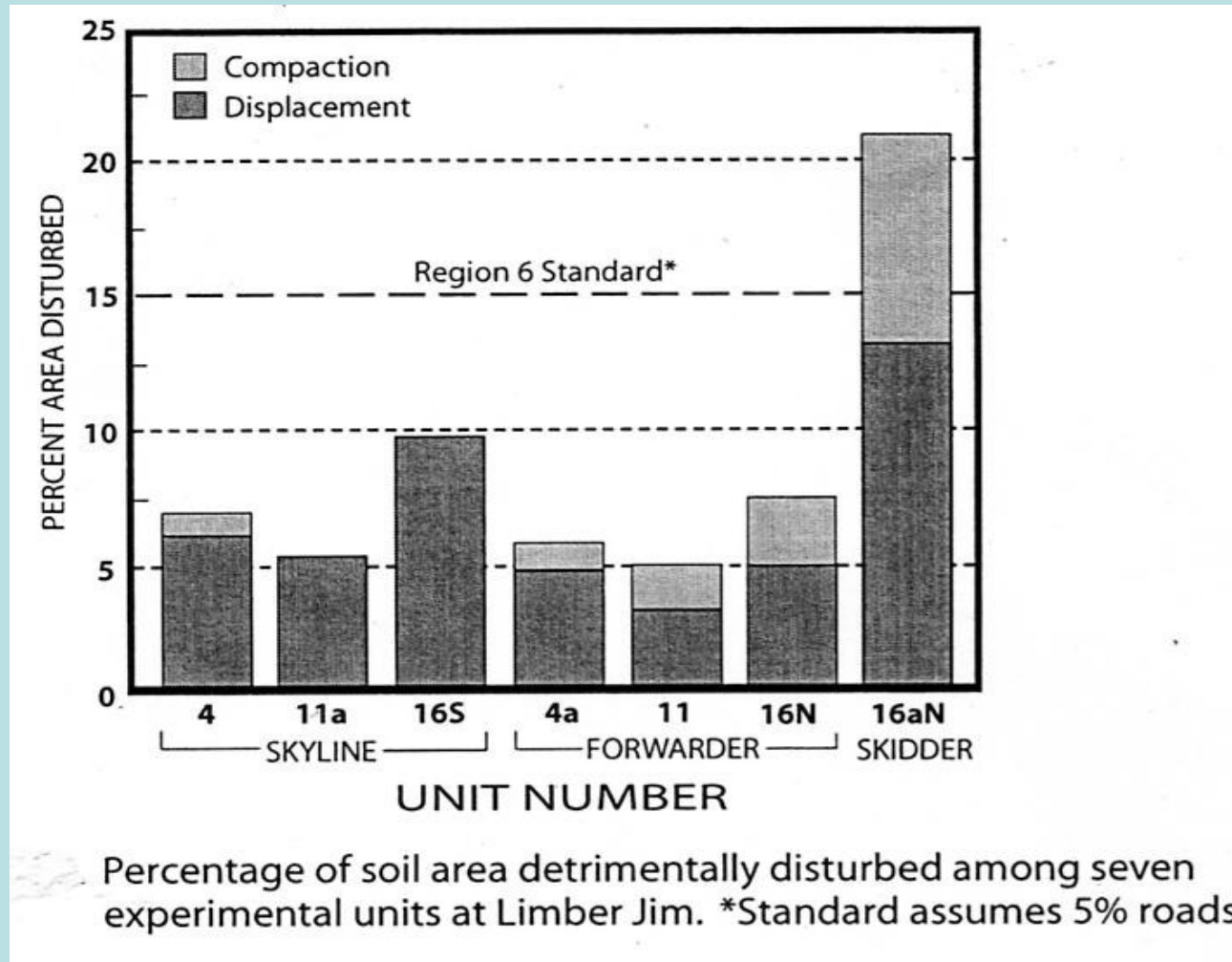
Total Soil Damage \pm 90% Confidence Level



District	Sale Unit	Soil	Harvest		Past Entries	Area of Detrimental Disturbance
			No.	Type	Method	No.
Entiat	Pa Bear 2B	41/42	Select	Skidder	2	35
	Pa Bear 2A	41/42	Select	Skidder	5	74
	Baked Spud 8	42	Thin	Proc/ Forw	3	79
Leavenw.	Williams 31	350	Select	Tractor skid	2	29
	Williams 85	?	Select	Tractor skid	2	38
	Williams 45	45	Select	Tractor skid	6	45

Detrimental Soil Disturbance

Limber Jim Fuel Reduction Project



Beschta Report

- Severely burned sites
- Erosive sites
- Fragile soils
- Riparian areas
- Steep slopes



Legal Challenges

Court Decisions

- “I am reluctantly compelled, because of the **absence of sufficient soil productivity analysis**, to comply with Ninth Circuit precedent and find that the Forest Service has run afoul of both NEPA and NFMA in approving Basin Creek Hazardous Fuels Reduction Project. This means that until the law is complied with in at least this one area, **the project cannot move forward.**”

» *US District Court Judge Donald Malloy, June 9, 2006*

Adaptive Management Process

Forest Soil Conservation

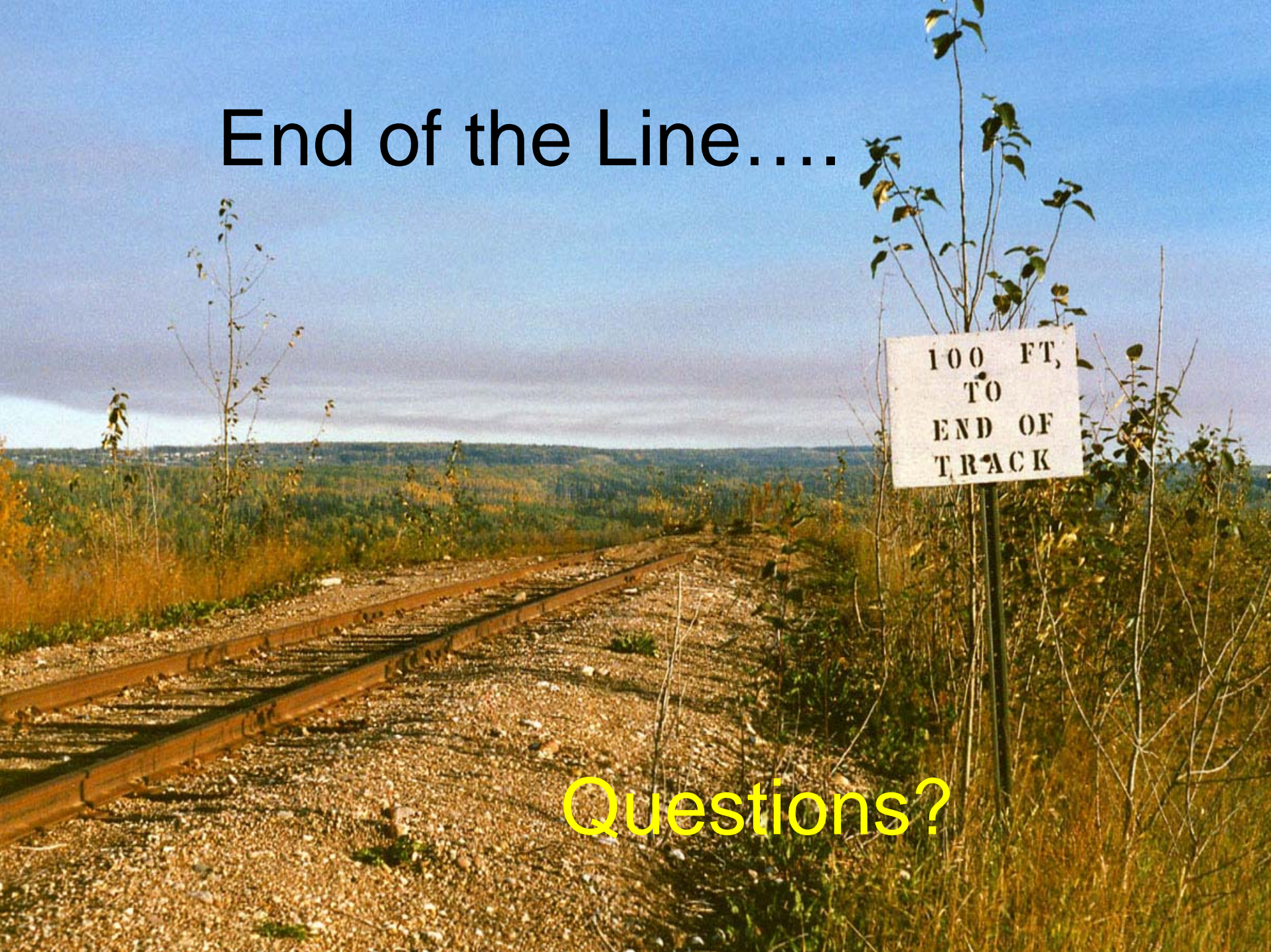
- A common language for soil disturbance
- Visually-based soil disturbance monitoring and classification systems
- Reliable, site specific methods to rate soils for their risk of incurring detrimental soil disturbance
- Validation
 - Effects of soil disturbance on vegetation growth and hydrologic function

Summary

- US Forest Service committed to increased use of woody biomass and restoring forest health
- Must still meet legal requirements
- Must be able to withstand external challenges in a credible manner
- Must implement an adaptive management program for forest soil conservation



End of the Line....



Questions?