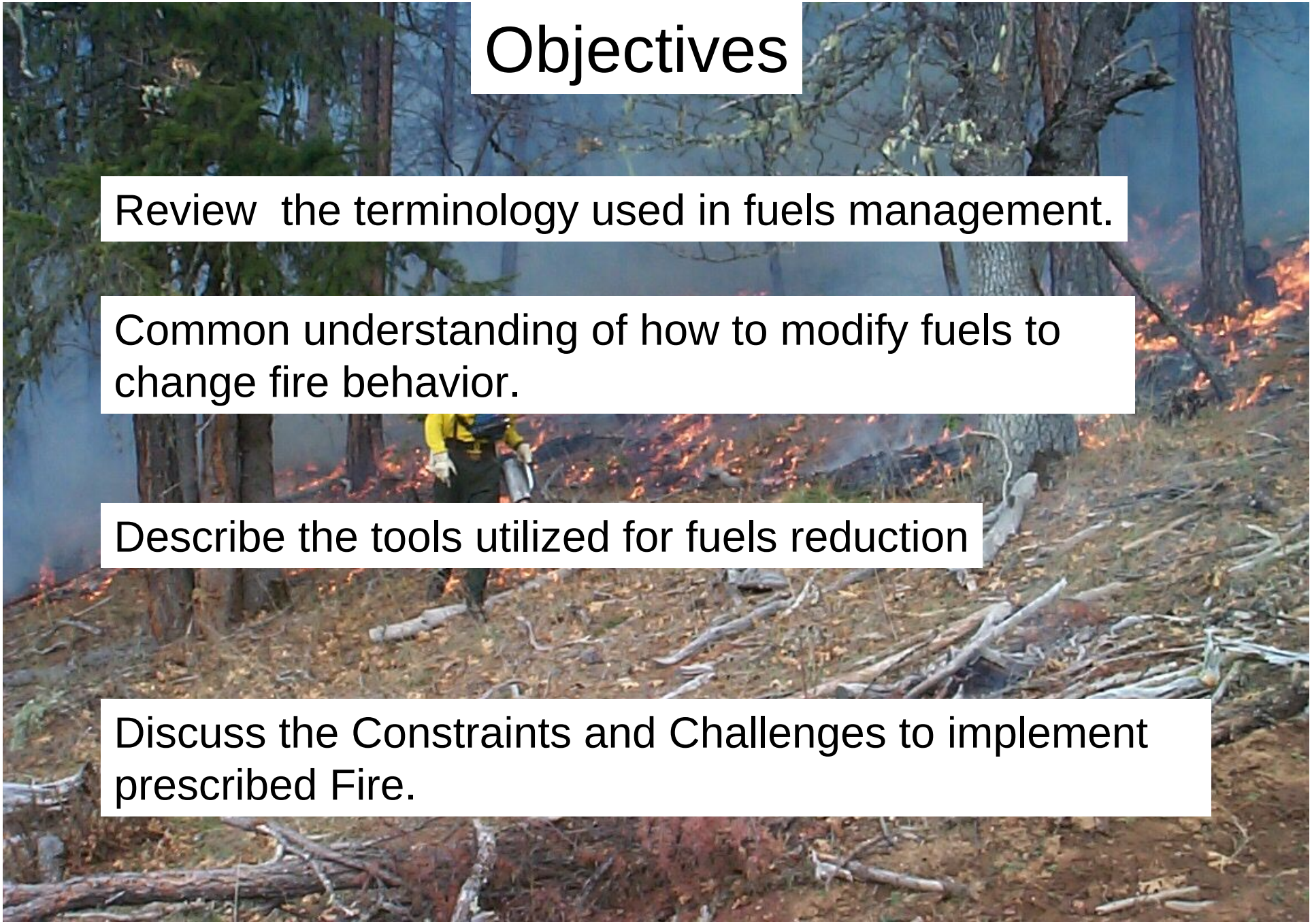
Treatments and methods to manipulate stand structure suitable for fuel reduction



Objectives

Review the terminology used in fuels management.

Common understanding of how to modify fuels to change fire behavior.

Describe the tools utilized for fuels reduction

Discuss the Constraints and Challenges to implement prescribed Fire.

FUELS MANAGEMENT - the manipulation, modification, and reduction of flammable vegetation to meet fire protection and land management goals. (SAF Forestry Handbook, 1984)

Factor that need to be evaluated in Fuels Management

- VALUES (at risk to wildfire)
- RISK (potential to ignite)
- HAZARD (potential to burn)

Rothermal Fire Spread Equation

$$R = \frac{(\text{REACTION INTENSITY})(\text{PROPAGATION FLUX RATIO})(1 + (\text{WIND COEFF}) + (\text{SLOPE COEFF}))}{(\text{BULK DENSITY})(\text{EFFECTIVE HEATING NUMBER})(\text{HEAT OF PREIGNITION})}$$

REACTION INTENSITY: SURFACE/VOLUME, MOISTURE EFFECT, MINERAL EFFECT, PACKING RATIO, HEAT, LOAD

PROPAGATION FLUX RATIO: PACKING RATIO, SURFACE/VOLUME

WIND COEFF: WIND, SURFACE/VOLUME, PACKING RATIO

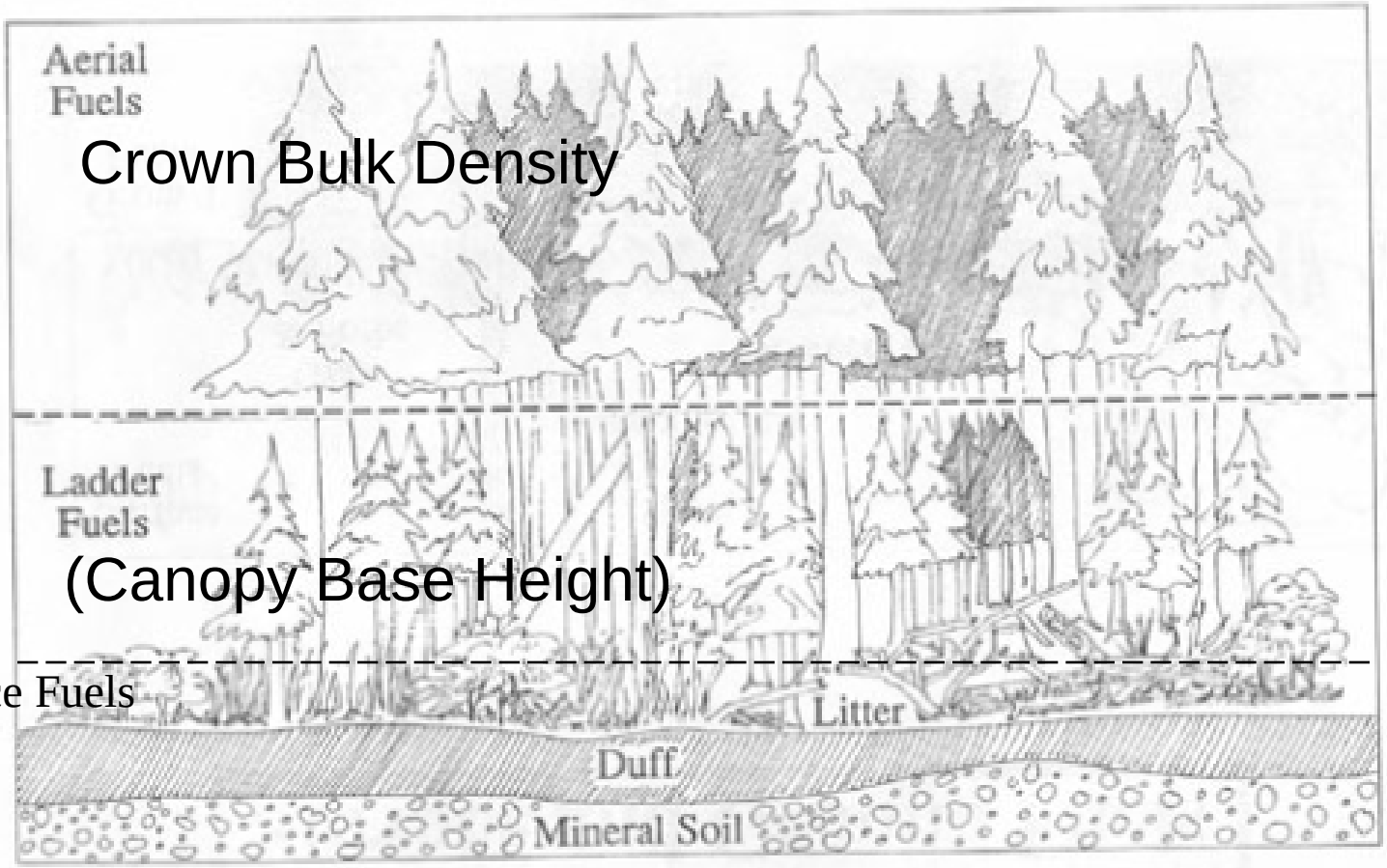
SLOPE COEFF: PACKING RATIO, SLOPE

BULK DENSITY: LOAD, DEPTH

EFFECTIVE HEATING NUMBER: SURFACE/VOLUME

HEAT OF PREIGNITION: MOISTURE CONTENT

Aerial and Ladder Fuels



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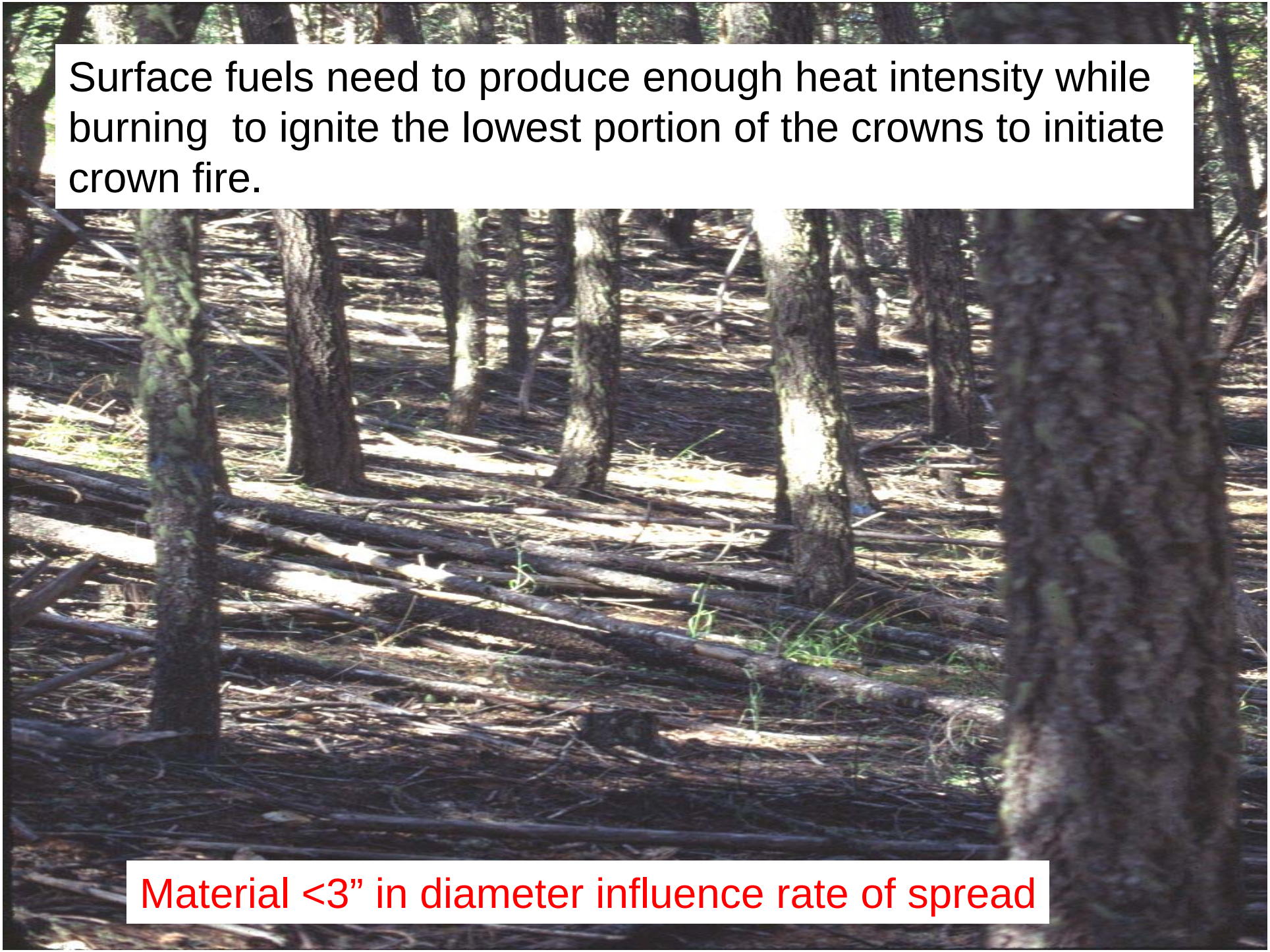
Assessment for the Potential Of Crown Fire Activity

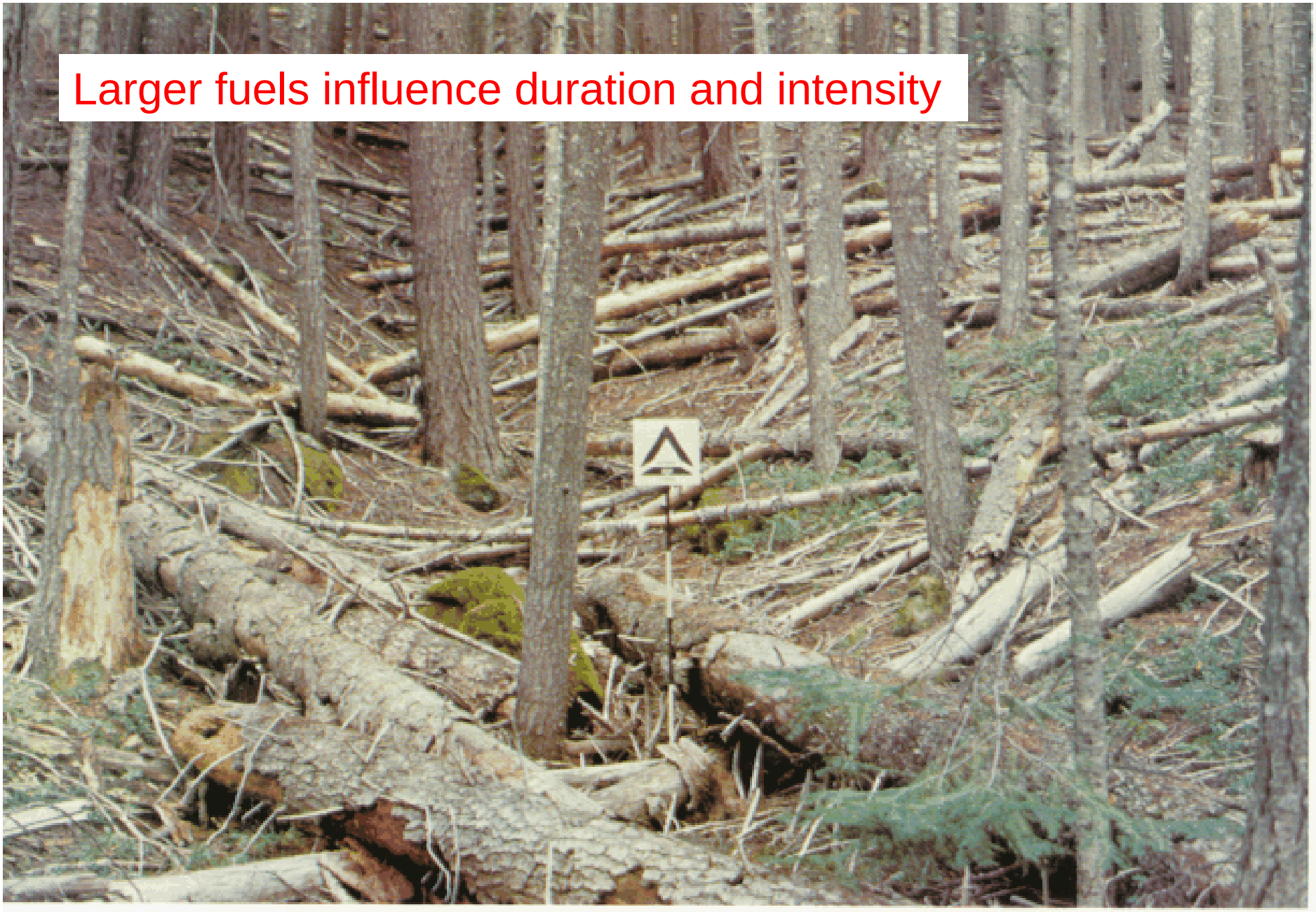
1) Surface Fuel Loading

2) Ladder Fuels

Average height from the surface fuel to the lowest crowns of trees. (canopy base height)

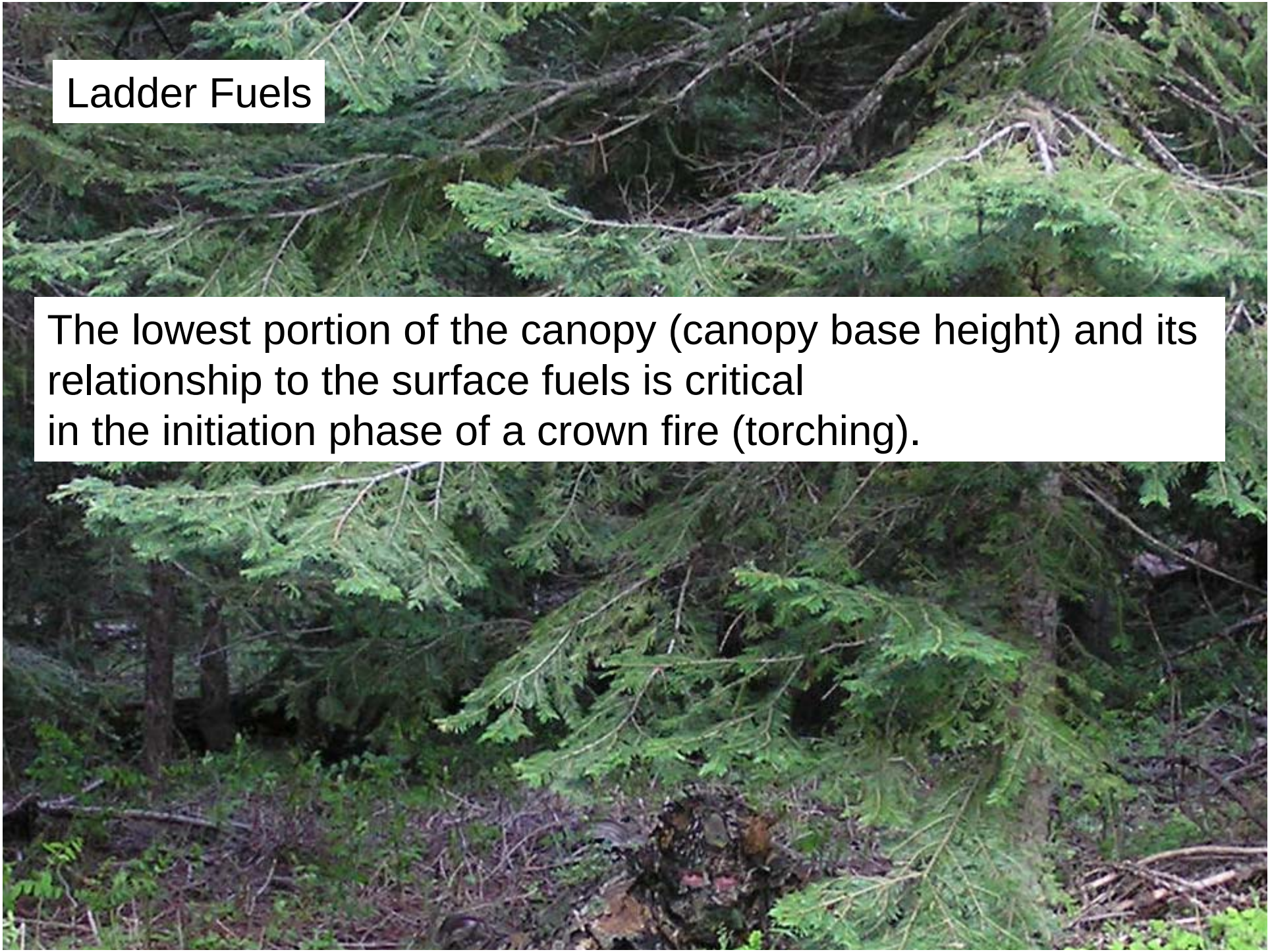
3) Volume of crown fuel present (crown bulk density)

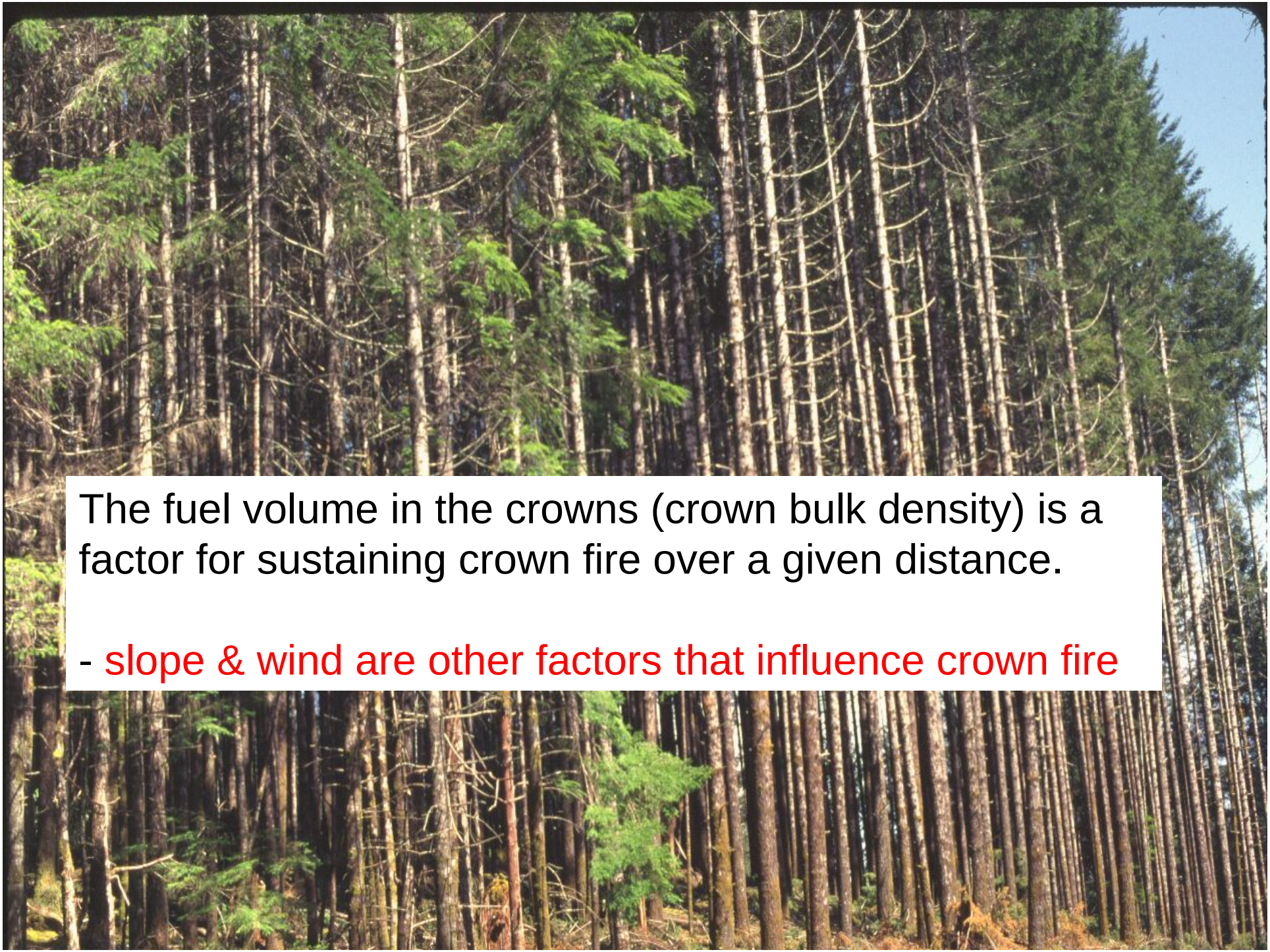

Surface fuels need to produce enough heat intensity while burning to ignite the lowest portion of the crowns to initiate crown fire.
Material <3” in diameter influence rate of spread


Larger fuels influence duration and intensity
2-MC-4

Rate of spread? intensity? duration?
With this fuel loading – need a crown fire to damage a stand?

1-DFHD-3


Ladder Fuels
The lowest portion of the canopy (canopy base height) and its relationship to the surface fuels is critical
in the initiation phase of a crown fire (torching).



The fuel volume in the crowns (crown bulk density) is a factor for sustaining crown fire over a given distance.

- slope & wind are other factors that influence crown fire

Tools for Managing:

* Surface Fuel Loading

* Average height from the surface fuel to the lowest crowns of trees.

Volume of crown fuel present

Commercial Thinning

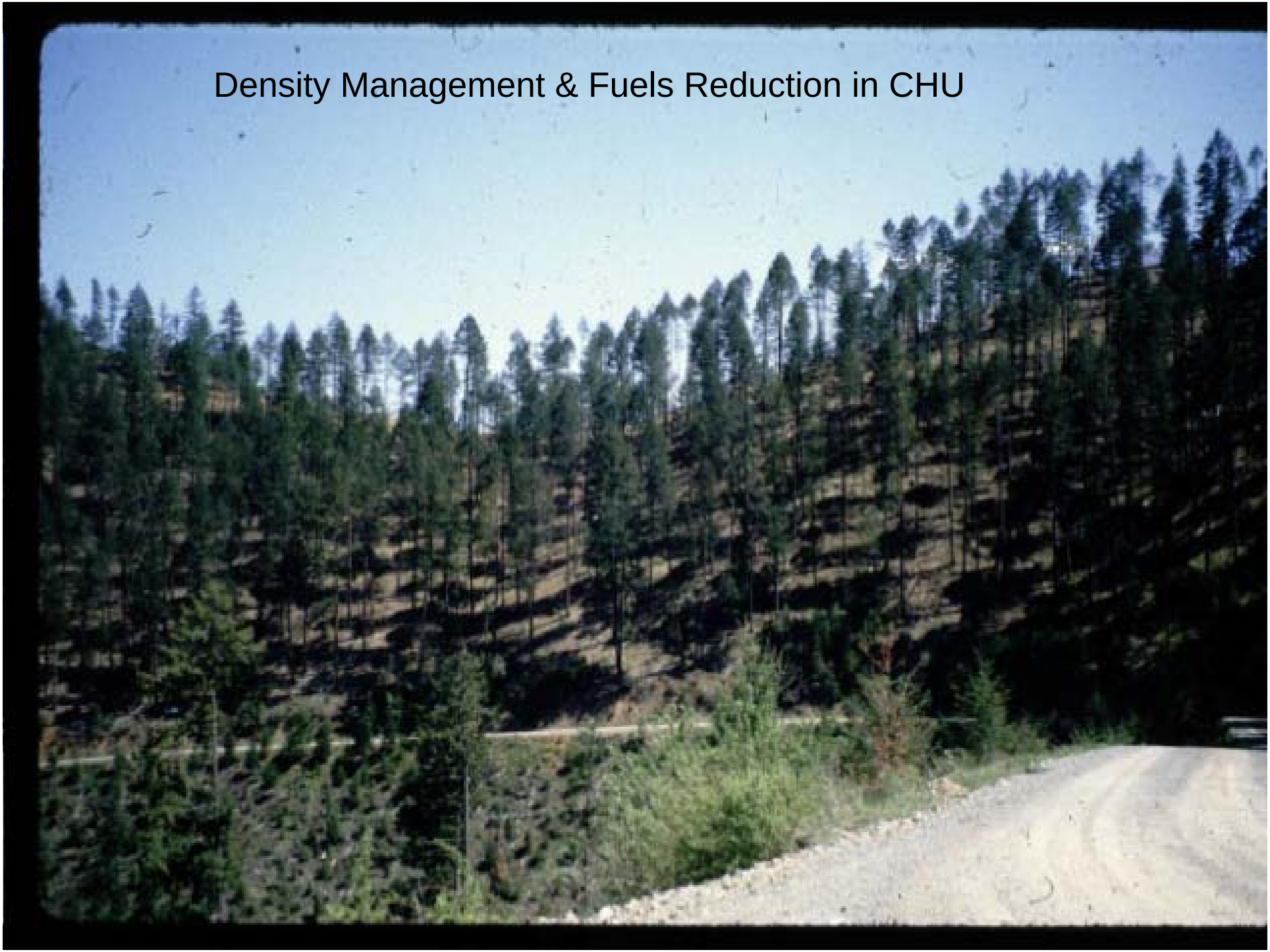
Thinned removing the smallest diameter trees.

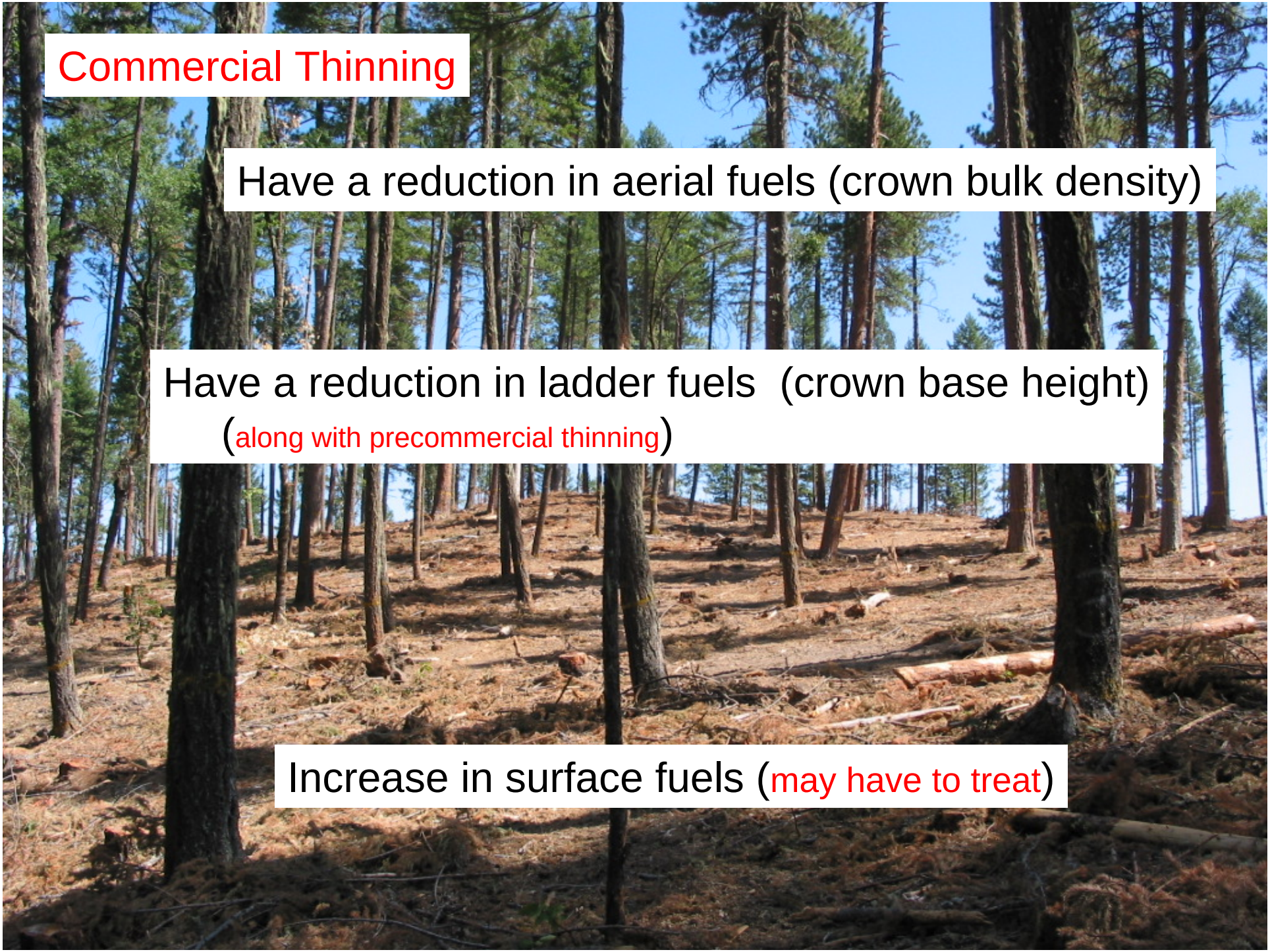
Increases Tree vigor.

Reduces crown bulk density and some of the available ladder fuels.

Commercial Thinning – removes >8” dbh
Non-Commercial Thinning removes < 8“ dbh (ladder fuels)

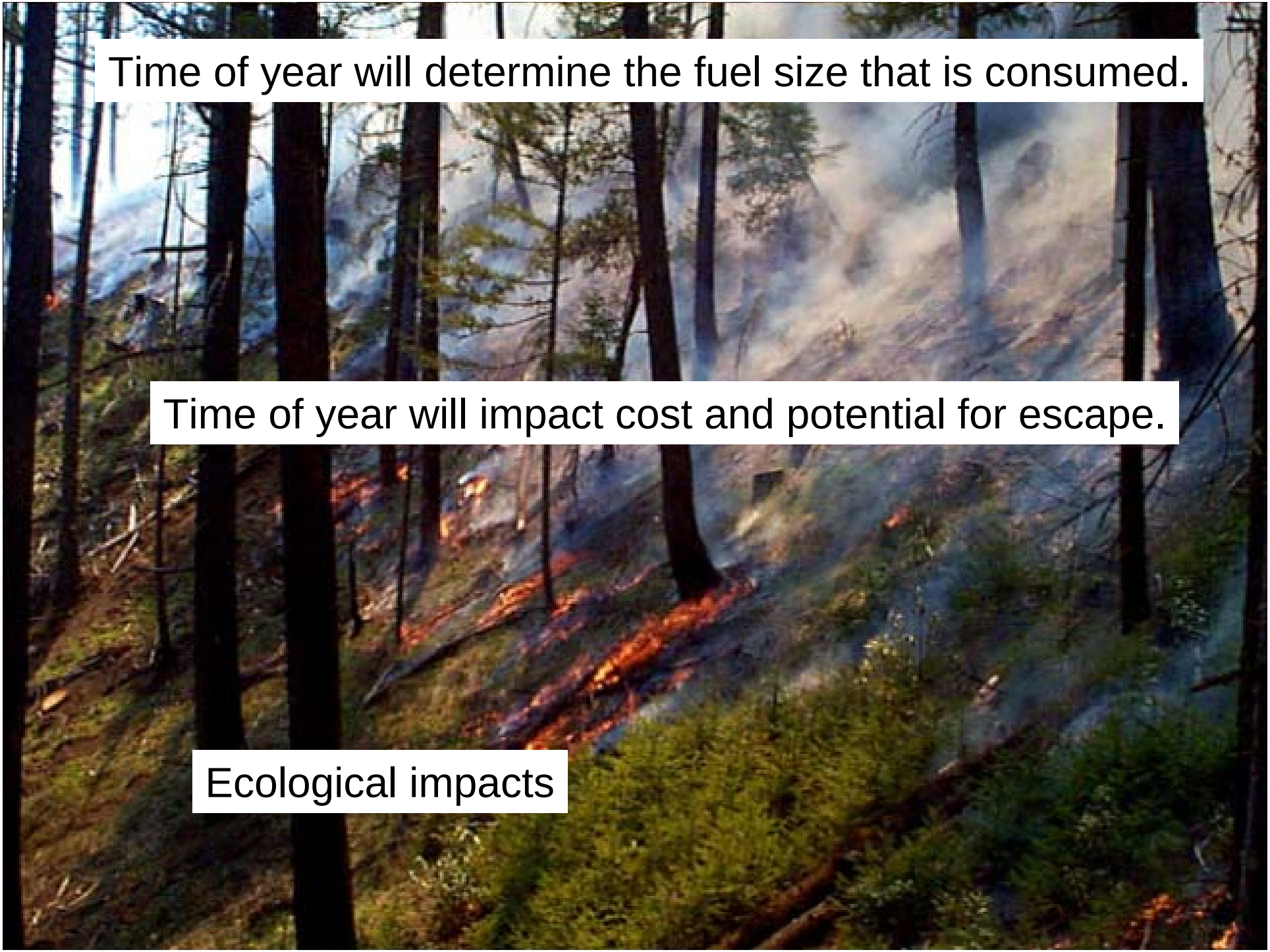
Density Management & Fuels Reduction in CHU




Commercial Thinning
Have a reduction in aerial fuels (crown bulk density)
Have a reduction in ladder fuels (crown base height)
(along with precommercial thinning)
Increase in surface fuels (may have to treat)

Treatment of surface fuels

Reduce surface fuels & some ladder fuels


Time of year will determine the fuel size that is consumed.
Time of year will impact cost and potential for escape.
Ecological impacts

Manual Treatment

Handpiling:
Treats fuel: <6” in diameter and 2’ and longer

Manual Treatments: (Ave. Costs)

- Thinning(<8”dbh) $459 / acre
- Slashbuster $400 / acre
- Pile & Cover $575 / acre

Burning Treatments: (Ave Costs)

- Pile Burn $ 50 / ac
- Underburn $250 / ac

Example of Average Unit Cost (manual treatment):
Thin + Pile + Pile Burn = $1,084 / acre

Why not just underburn?

Constraints and Challenges

Smoke Management

Federal Class I Areas

Washington

1. North Cascades National Park
2. Mount Rainier National Park
3. Olympic National Park
4. Alpine Lakes Wilderness
5. Glacier Peak Wilderness
6. Goat Rocks Wilderness
7. Mount Adams Wilderness
8. Pasayten Wilderness

Oregon

9. Mount Hood Wilderness
10. Mount Jefferson Wilderness
11. Mount Washington Wilderness
12. Three Sisters Wilderness
13. Diamond Peak Wilderness
14. Mountain Lakes Wilderness
15. Crater Lake National Park
16. Kalmiopsis Wilderness

California

17. Redwood National Park
18. Marble Mountain Wilderness
19. Yolla-Bolly/Middle Eel Wilderness

● PM10* Nonattainment Areas

* PM10 = particulate matter 10 microns in diameter

– Local Considerations (outside designated areas)

-Type of Burning impacts emissions

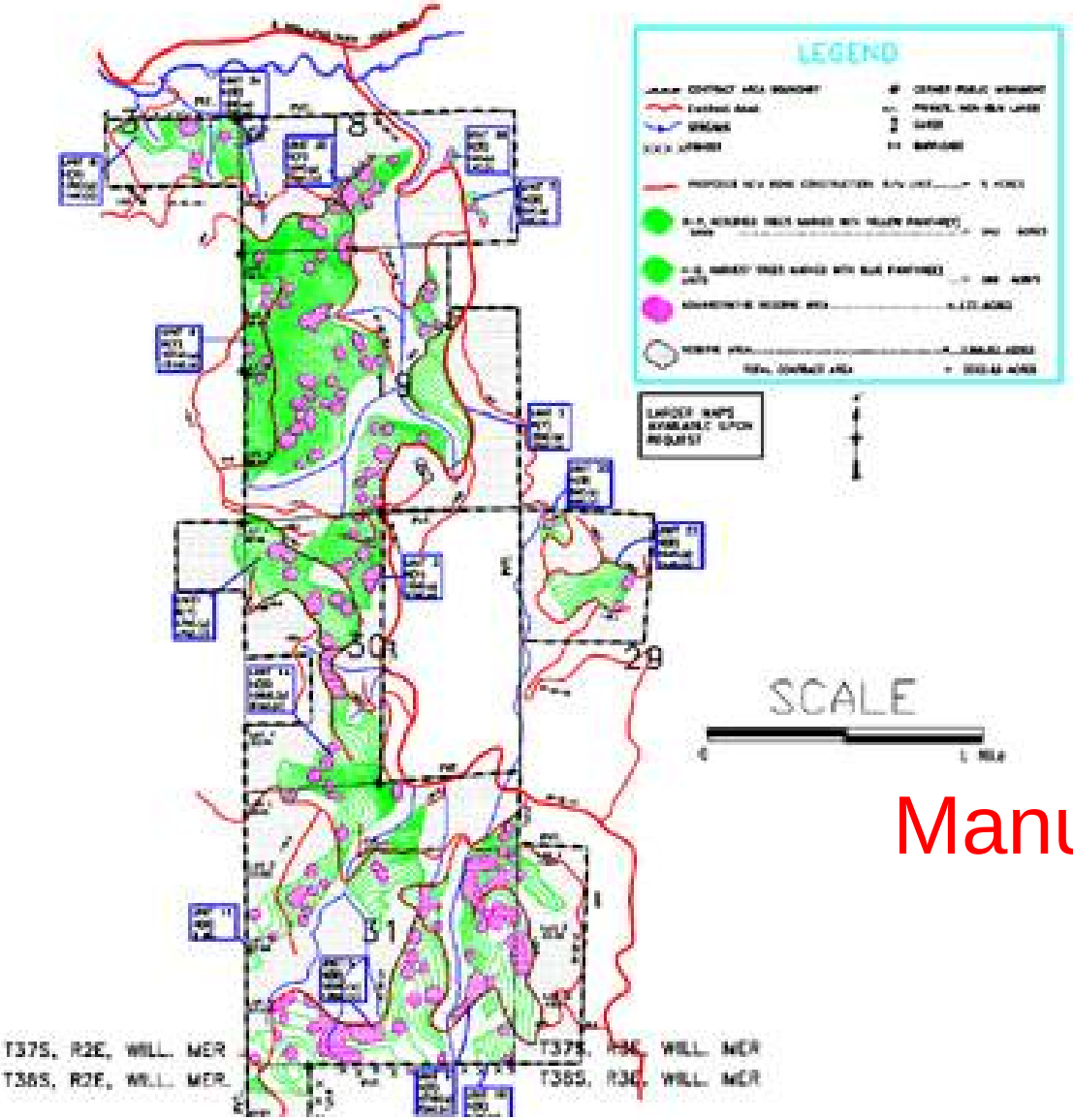
Stand Objectives

Survey and managed Species

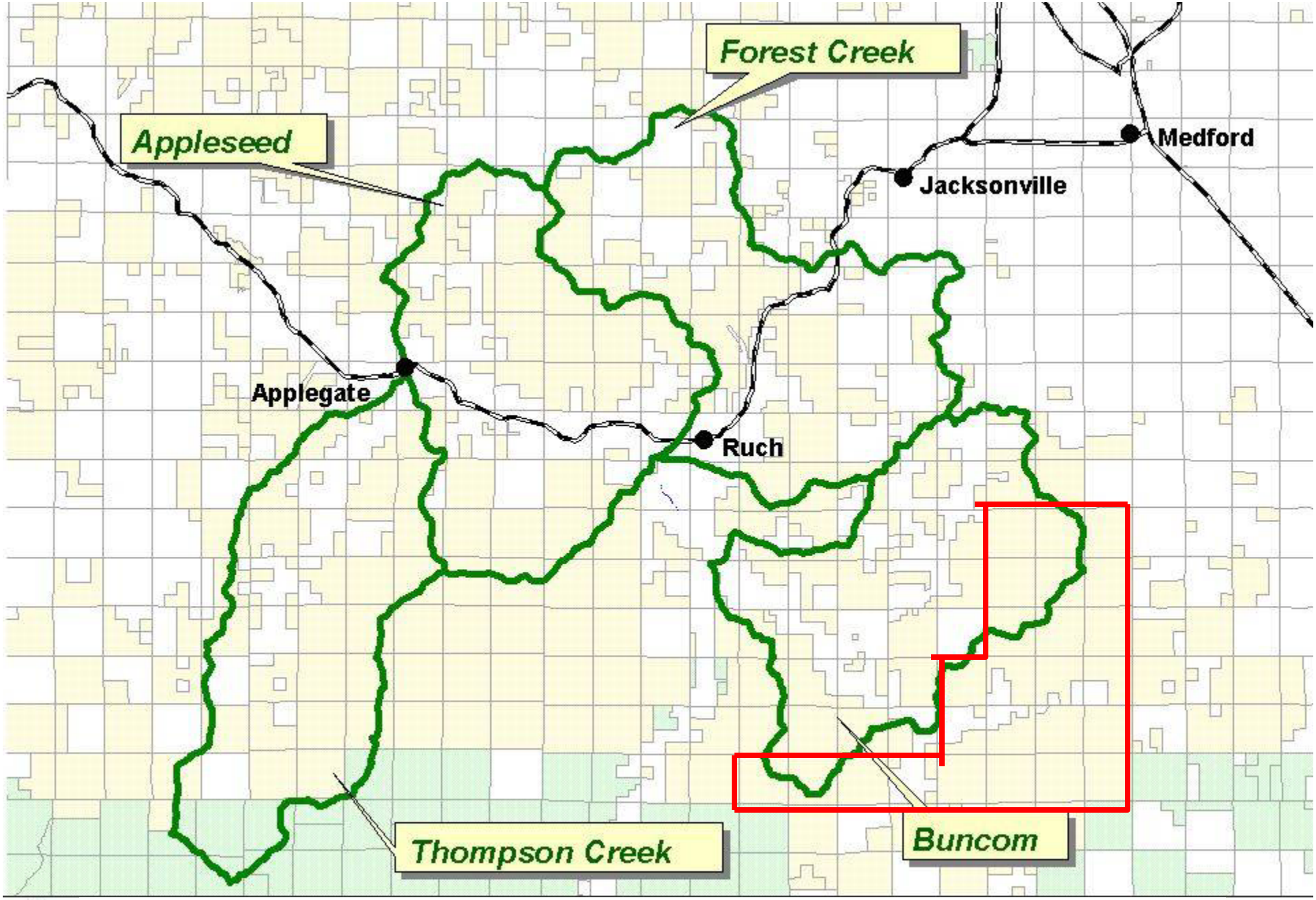
Seasonal Constraints – may conflict with a burn window

Costs to conduct surveys

Survey and Managed Species



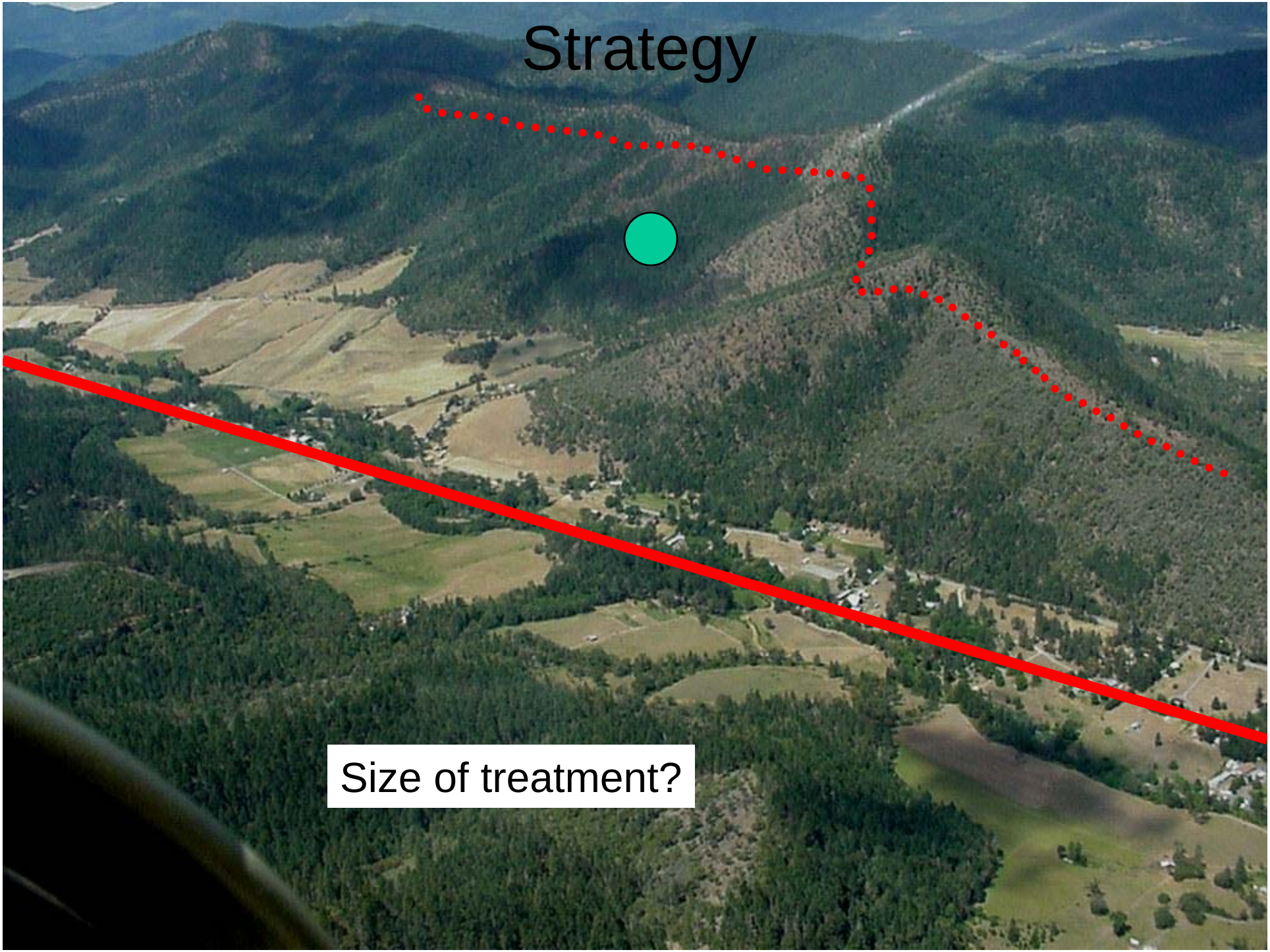
Manual treatment



Size of Landscape Treatments

10/04/00

Strategy



Accountability

GAO

Are we treating high priority areas?

WUI vs. high values at risk outside of the WUI.

Are treatments effective?

Are we compromising effective treatments to meet other objectives?

Are we treating in the WUI?

Reporting System (Targets)

Political Aspects

Fires of 2000
National Fire Plan

Fires of 2002

Bush's forest plan: Making it happen

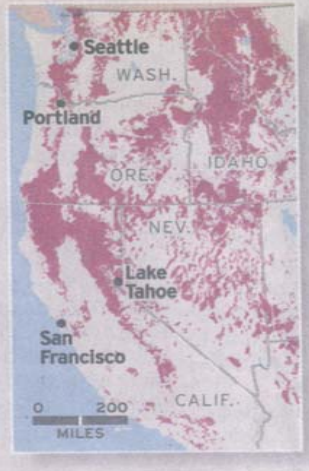
The pileup of fuels in Western forests means fire risk. Lands most vulnerable to catastrophic ... ican West – are the first to be targeted for thinning, or controlled logging, by the directive of President Bush. Congress began to formulate an approach to the logging, but the U.S. Forest Service has stepped in, also at Bush's behest, to speed things along. The sequence:

- President Bush in August toured Oregon fire sites and announced an initiative to reduce built-up tinder, but he offered few specifics on how it would work.
- Congress immediately began debating competing proposals to carry out the president's plan but on Wednesday appeared deadlocked on whether thinning projects should be exempt from court review.
- The U.S. Forest Service has drawn up plans to exempt certain projects from environmental reviews that might otherwise slow them down but left the door open to appeals in court. This streamlined approach will be open to public comment before adoption.

PHOTOS BY BRUCE ELY/THE OREGONIAN/Aug. 1

Flames tear through a dense forest west of Selma.

Area with greatest potential for catastrophic wildfires



Aug. 22

President Bush (right) and a Bureau of Land Management official tour a burned area near Ruch, in the Squires Peak fire.

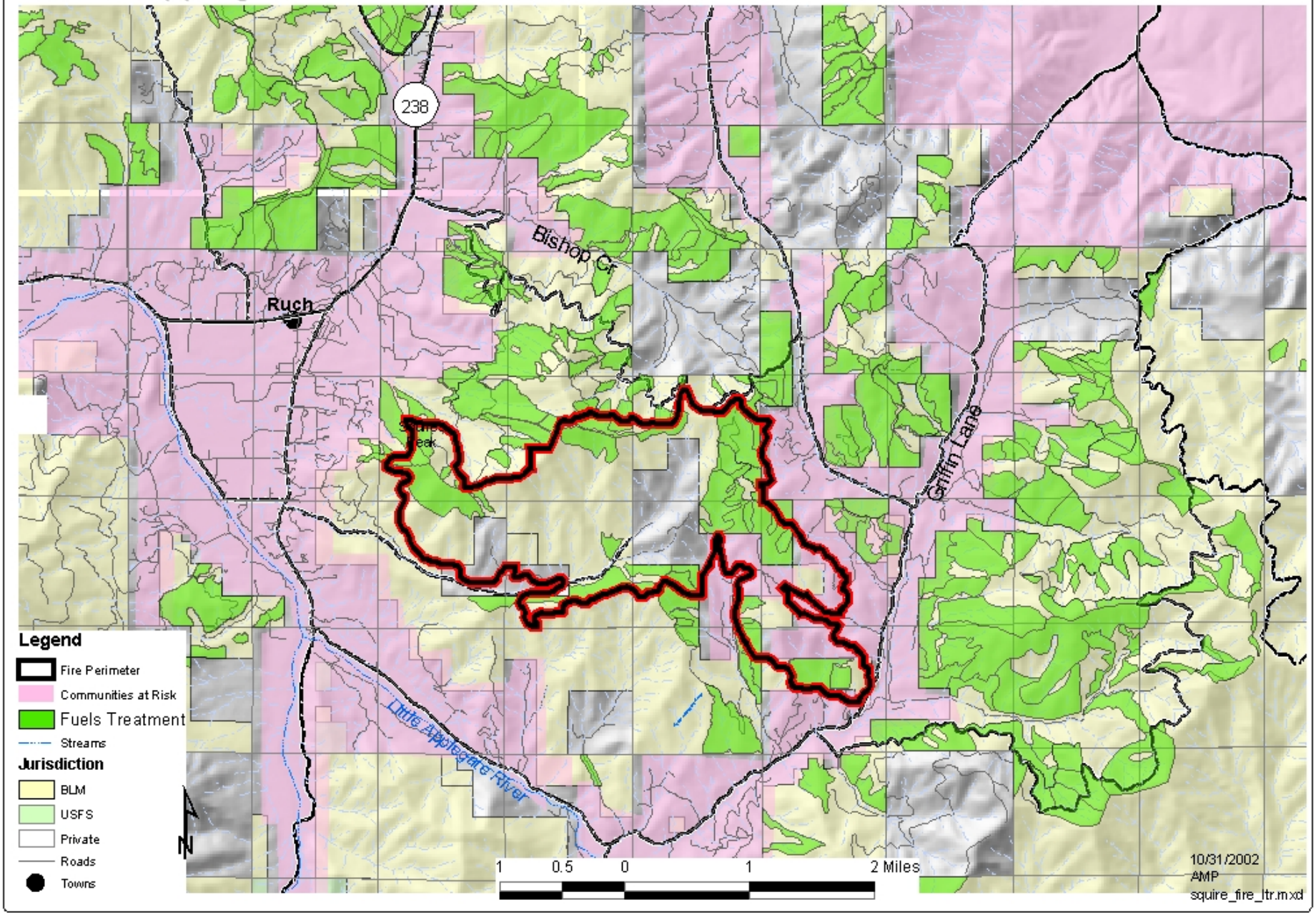
DERRIK QUENZER/THE OREGONIAN

San Diego 2003

Healthy Forests Restoration Act

- Passed on November 21, 2003
- 20 million acres federal land at high risk of catastrophic wildfire
- Authorize $760 million for tree-thinning projects (half in WUI)
- Requires federal courts to balance environmental consequences of thinning vs. the no- action.

Field Trip

Medford District BLM
Ashland Field Office
Middle Applegate Fuels Treatment Units

SQUIRES FIRE