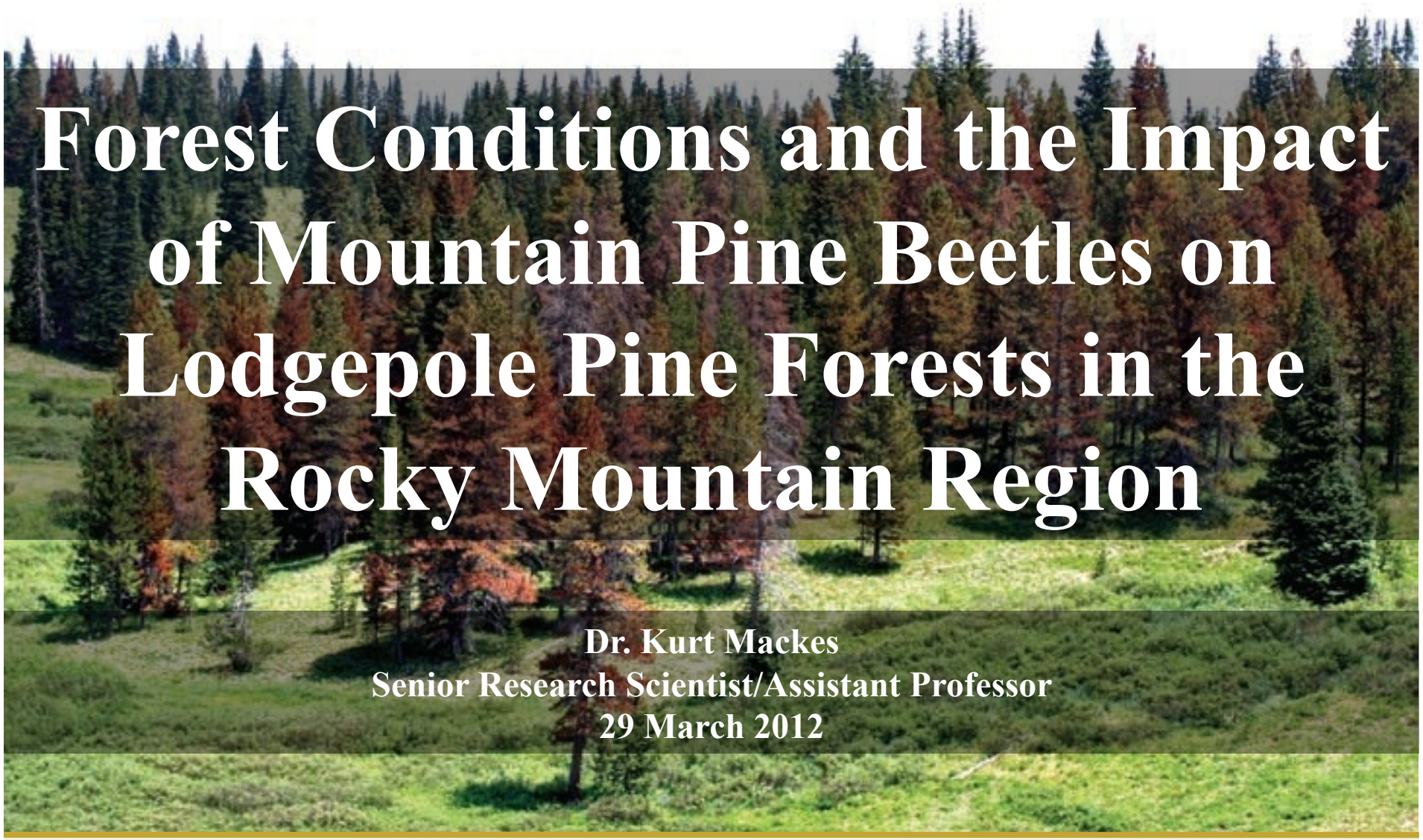

Forest Conditions and the Impact of Mountain Pine Beetles on Lodgepole Pine Forests in the Rocky Mountain Region

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29 March 2012

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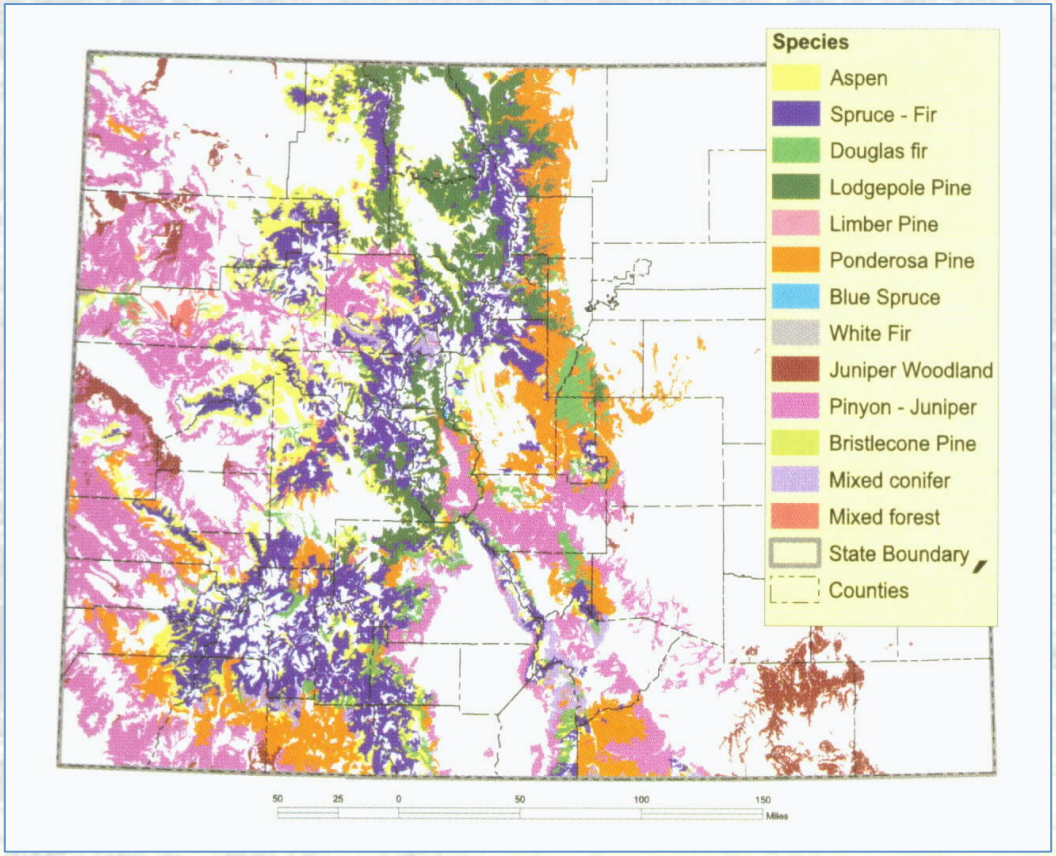
Forest Conditions

The Problem?

State of Colorado Forests

- 22.6 million acres of forestland
- Much of it is under stress!



Overcrowded?

Periodic Drought

Insects & Disease

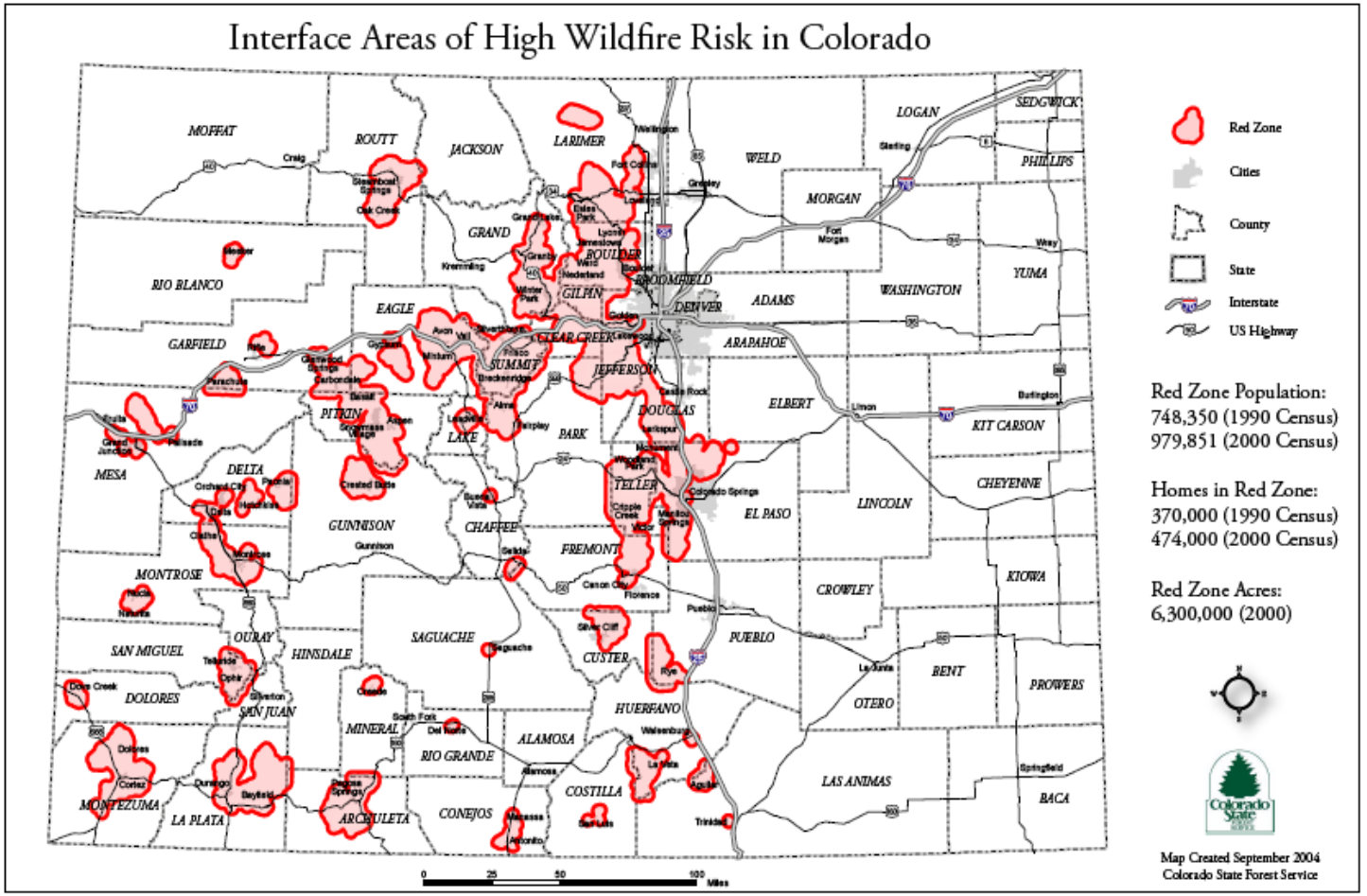
Pinyon Ips beetle

Mountain pine beetle

Spruce beetle

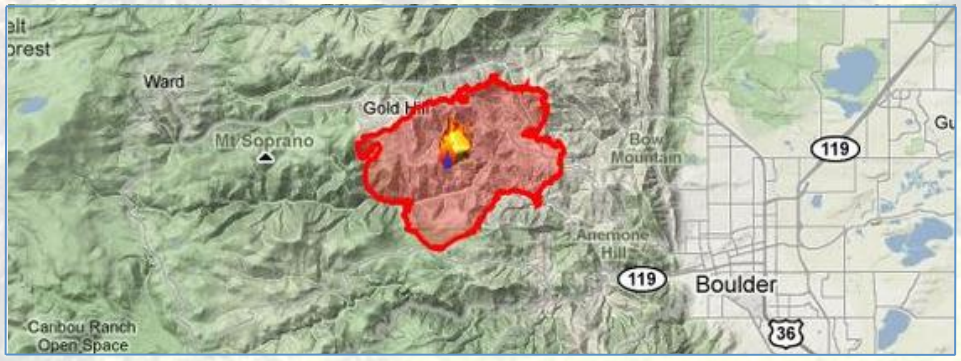
Wildfire

Colorado "Red Zone"



Fourmile Canyon Fire (Boulder County)

- 6,181 acres burned in September 2010 (Source: InciWeb)
- Suppression costs were $10.2 million as of September 14, 2010 (Source: InciWeb)
- Nearly 170 homes destroyed (National Underwriter, 9/21/2010)
- Insured property losses of $217 million (National Underwriter, 9/21/2010)
- Additional direct losses such as damage to roads, power lines, etc. and other cost associated with rehabilitation and special value losses are still being determined



Ecological Considerations

How do we manage forest growth and mitigate condition problems?

Prescribed burning

Mechanical removal

Combination of both

Forest Restoration Thinning

Before

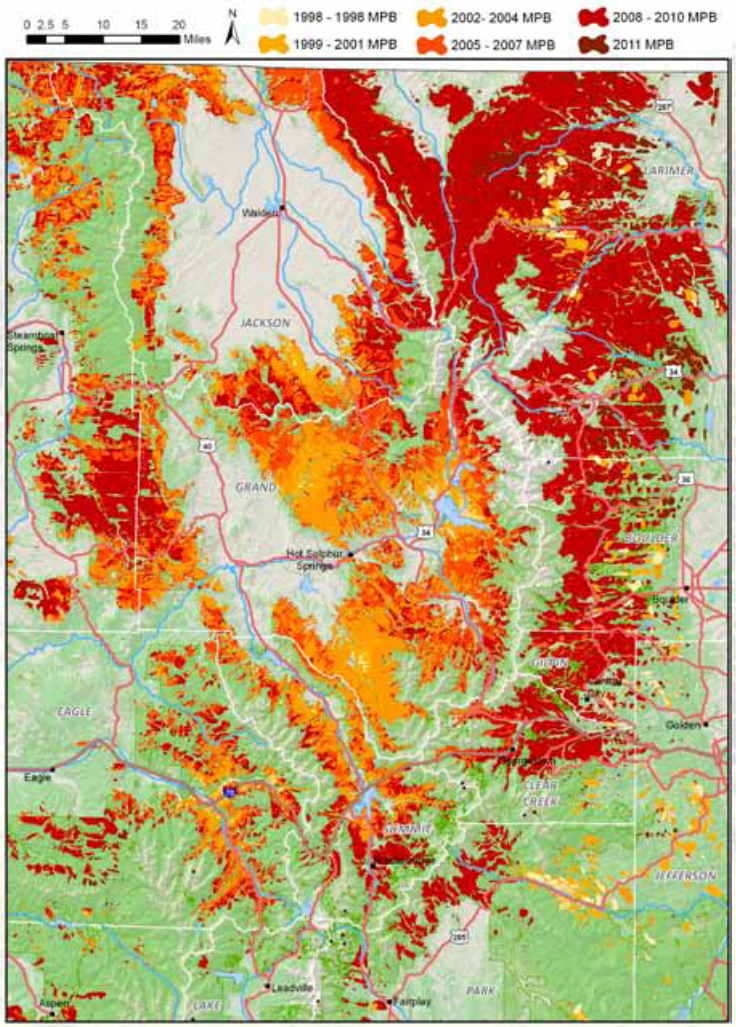
After

Thinning in Ponderosa Pine Zones - Size of Trees Removed

- Yield averages 10 to 15 tons per acre (Colorado Front Range)
- 80 to 96% of commercial size trees removed were between 5 and 11.9 inches
- Trees larger than 12 inches comprised up to 18%

The Impact of Mountain Pine Beetle on Lodgepole Pine Forests

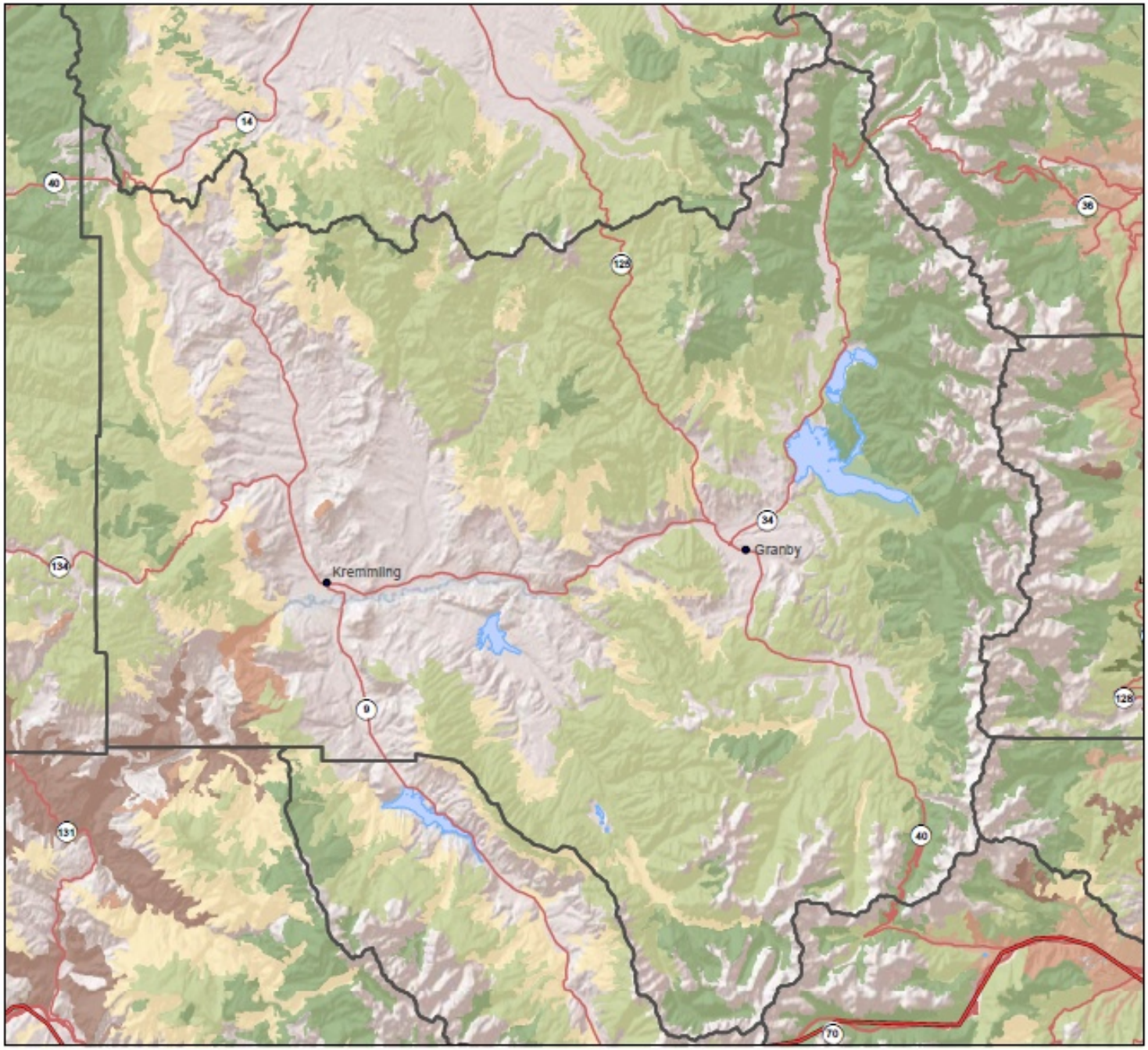
- Mountain Pine Beetle Progression, 1996 – 2011
- 3.3 million acres of pine forest (lodgepole and ponderosa pine) impacted in Colorado to date



Source: 2011 Report on the Health of Colorado,s Forest

1. Welcome to Grand County, Colorado

- Grand County is located in north-central Colorado
- About half of Grand County is forested
- About 82% of these forested acres are managed by the *federal* government



Grand County

Legend

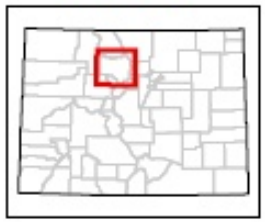
Lakes

Forest Type

- Spruce fir
- Lodgepole pine
- Aspen
- Douglas fir
- Ponderosa pine
- Rocky Mtn. bristlecone pine
- Pinyon juniper

0 5 10 Miles

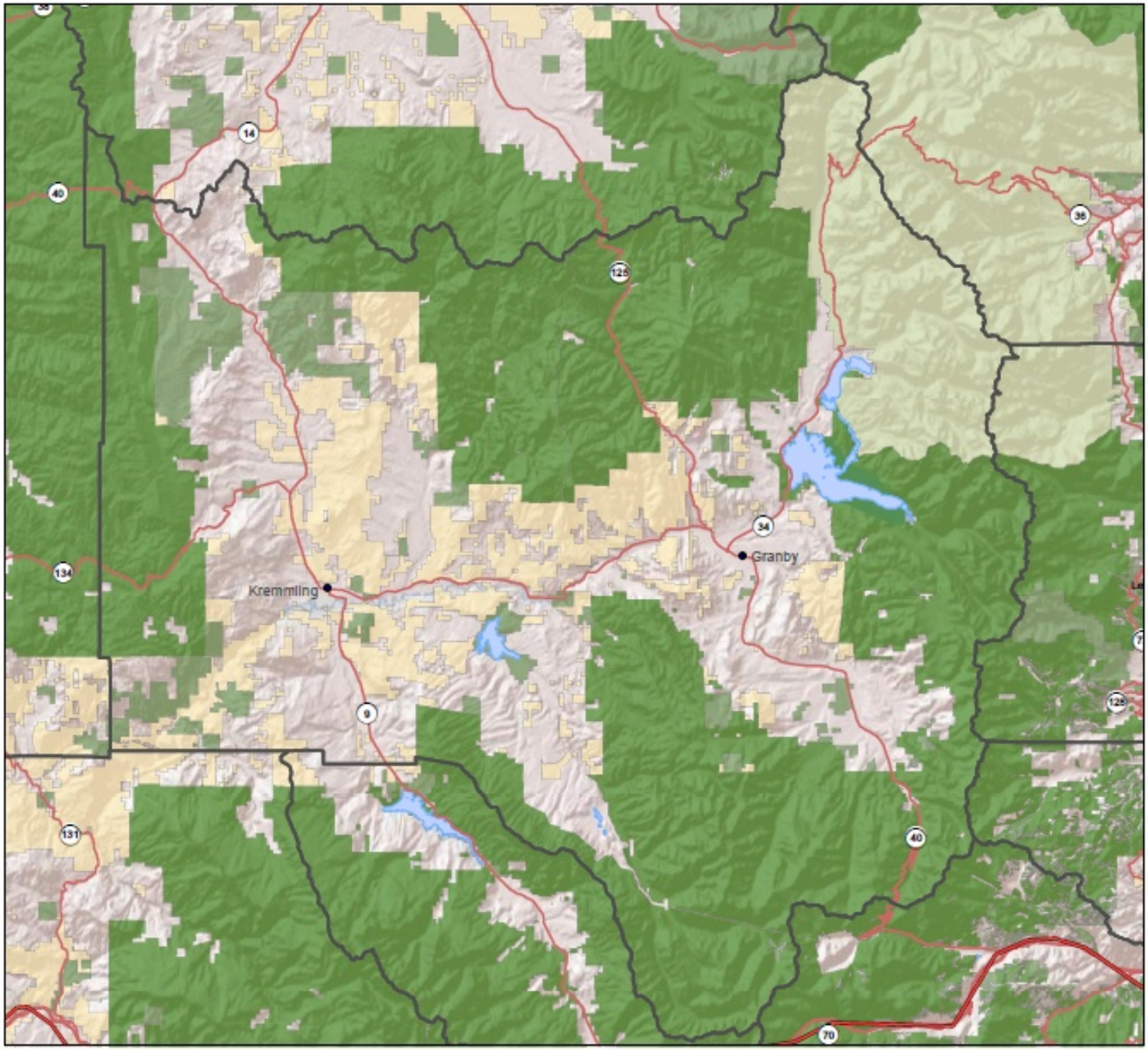
Area of Interest



This map was produced using the GAP Vegetation Dataset From Colorado Division of Wildlife 1998.

Colorado State Forest Service

Created Aug. 2010 By MST



Grand County

Legend

Lakes

Land Owner

Bureau of Land Mgmt.

Forest Service

National Park Service

SLB/County/Other

Miles

0 5 10

Area of Interest

This map was produced using the COMaP v8 Dataset

Theobald, D.M., G. Wilcox, S.E. Linn, N. Peterson, and M. Lineal. 2008. Colorado Ownership, Management, and Protection v8 database. Human Dimensions of Natural Resources and Natural Resource Ecology Lab, CSU Fort Collins, CO. www.nrel.colostate.edu/projects/comap

Colorado State Forest Service

Created Aug. 2010 By MBT

Table 1.1: Acreage Totals by Jurisdiction and Forest Type in Grand County, Colorado
Source: Davis 2008a

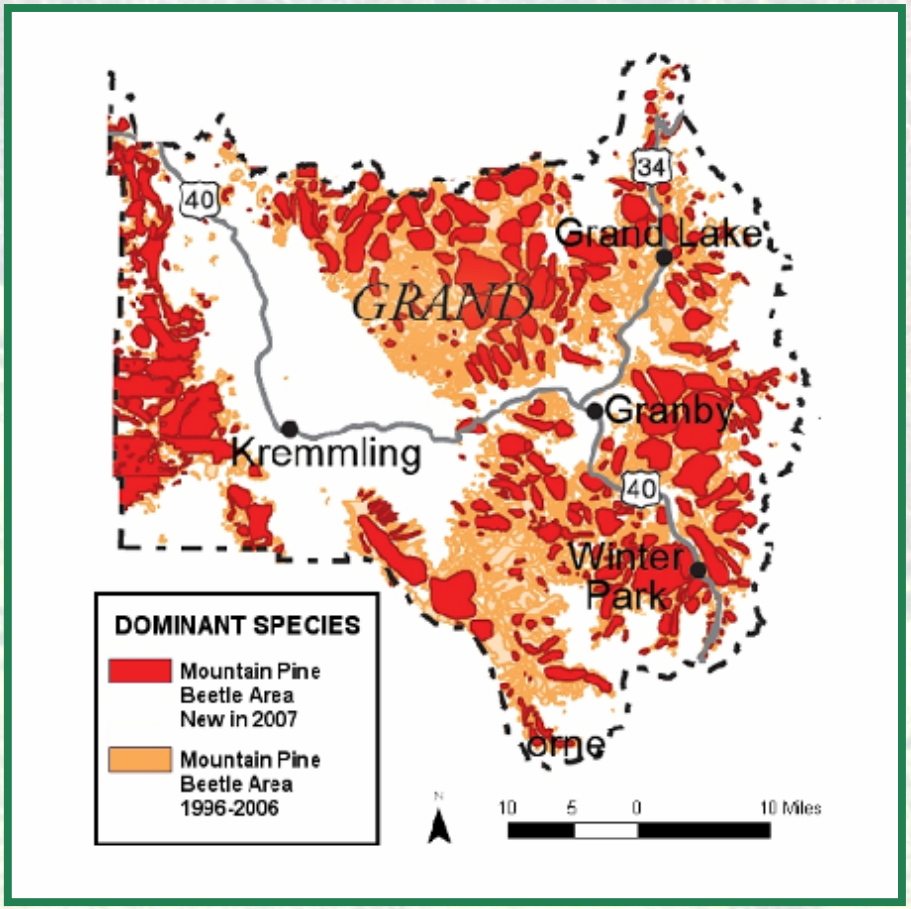
Jurisdiction	Number of Acres	Forested Acres	Lodgepole Pine (LPP) Acres	LPP Acres on Slopes < 40%
BLM	422,812	123,331	83,911	68,940
National Forests	340,497	282,802	224,616	181,240
National Parks	96,275	58,111	41,060	28,211
Natl. Rec. Area	31,677	18,518	15,356	13,167
Private	163,006	104,516	68,261	55,112
State Land Board	38,967	10,651	4,589	4,136
State Wildlife Areas	13,357	4,656	625	413
Wilderness	88,619	52,133	32,778	22,846
Unknown	373	157	72	60
TOTALS:	**1,195,583**	**653,308**	**471,268**	**374,125**

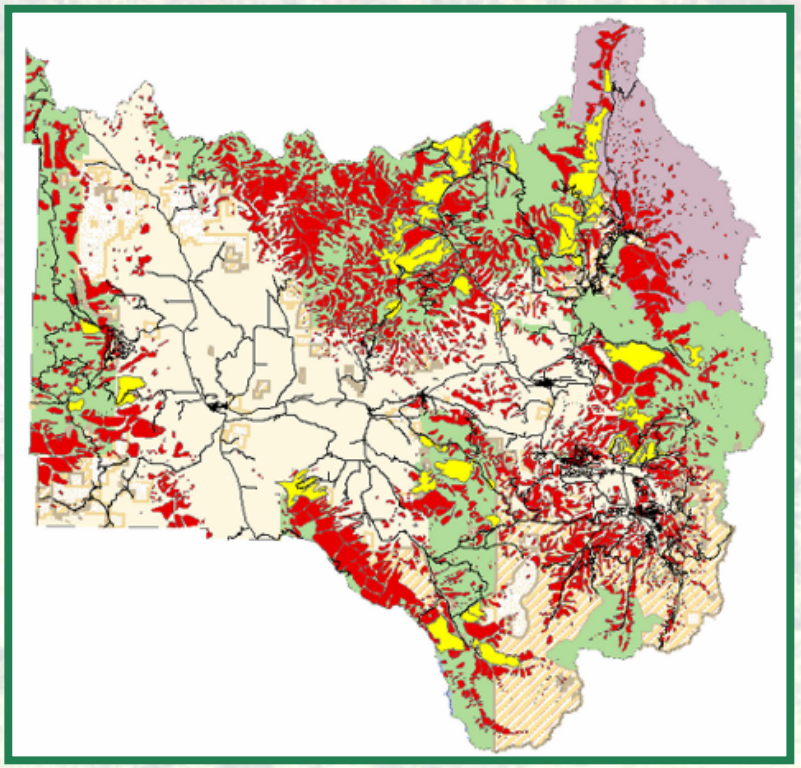
Source: Davis, Brian. 2008. Graduate Research Assistant, Department of Forest, Rangeland, and Watershed Stewardship, Colorado State University

2. The Preliminary Assessment: Methods

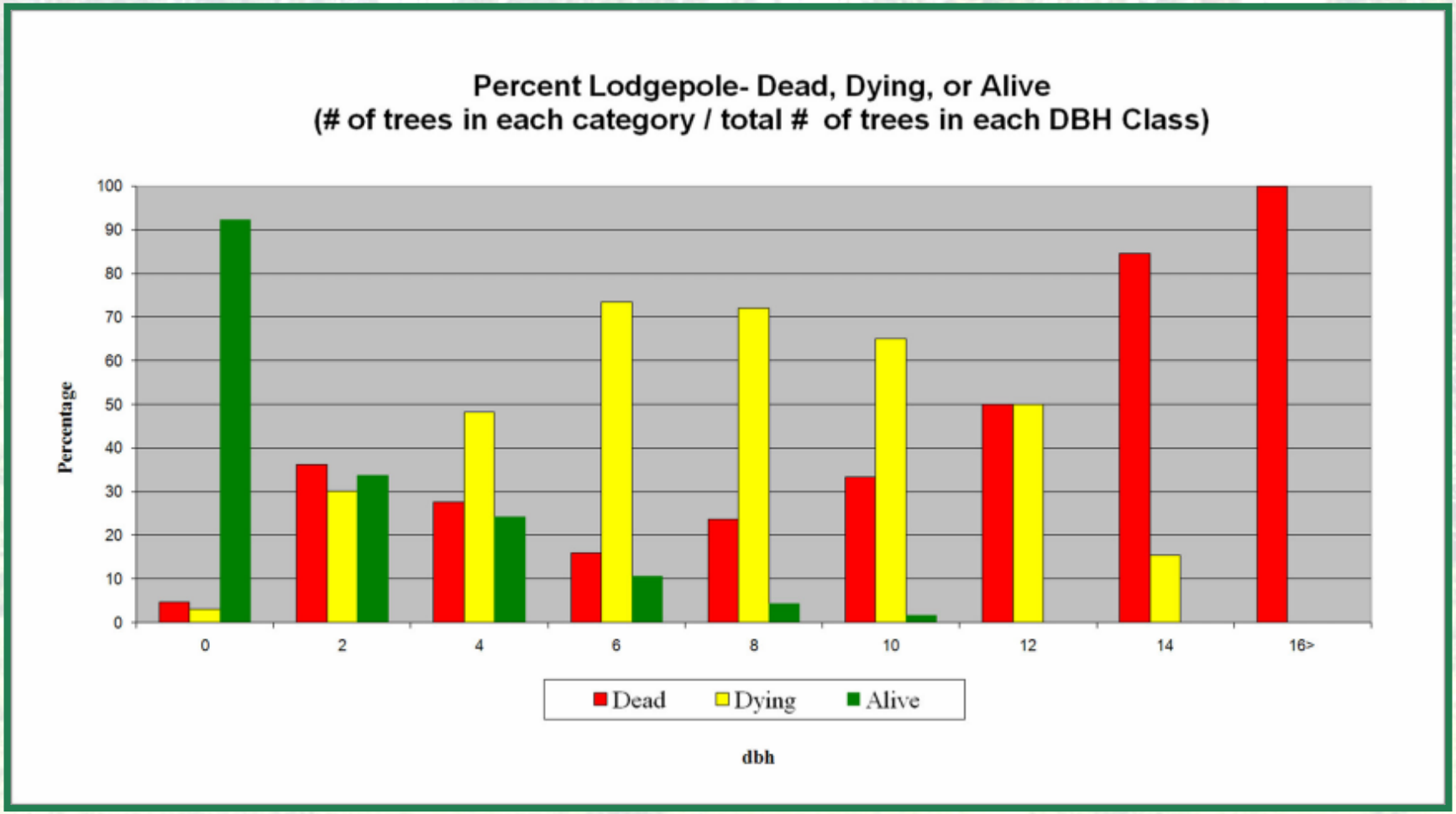
1. 21’ x 21’ (about 1/100th of an acre) plots were evaluated
2. Generally one 1/100th acre plot was randomly located in each of the 48 study areas selected within the county
3. The diameter at breast height was measured for each tree located within a plot (saplings and seedlings were counted)
4. Trees were then characterized

2. The Preliminary Assessment: Plots





2. The Preliminary Assessment: Mortality



3. Impacts and Value Lost: Factors

1. MPB treatment costs
2. Lost timber value
3. Stand rehabilitation costs
4. Watershed impacts
5. Wildlife habitat impacts
6. Recreation and tourism
7. Reduction in property values
8. Public safety issues

The Problem!

Lost Timber Value: Assumptions

- The stumpage value for lodgepole pine sawlogs was assumed to range between $0.00 and $100.00 per 1,000 board feet of lumber (based on log scale).
- Assumed stumpage value of timber for POL: $0.00 to $50.00

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Lost Timber Value: Assumptions (cont.)

- Based on mortality data collected as part of this study, it was assumed that statistically all mature lodgepole pine timber has already been killed or would be in the near future.
- Also, based on mortality data, it was estimated that 4,130 cubic feet (56.8 bdt) of POL and 4,890 cubic feet (67.3 bdt) of sawlogs per acre could be removed..

Value of Lost Timber

- Based on the aforementioned assumptions, the timber value loss in Grand County is estimated to exceed $1 billion ($1.11 billion).
- About 80% of this lost timber is located on slopes of 40% or less, i.e. acres more likely to be treated (estimated value $881 million)

4. Utilization Options: Wood Quality Issues

- Utilization depends on wood quality. Wood quality can be impacted by a number of factors:

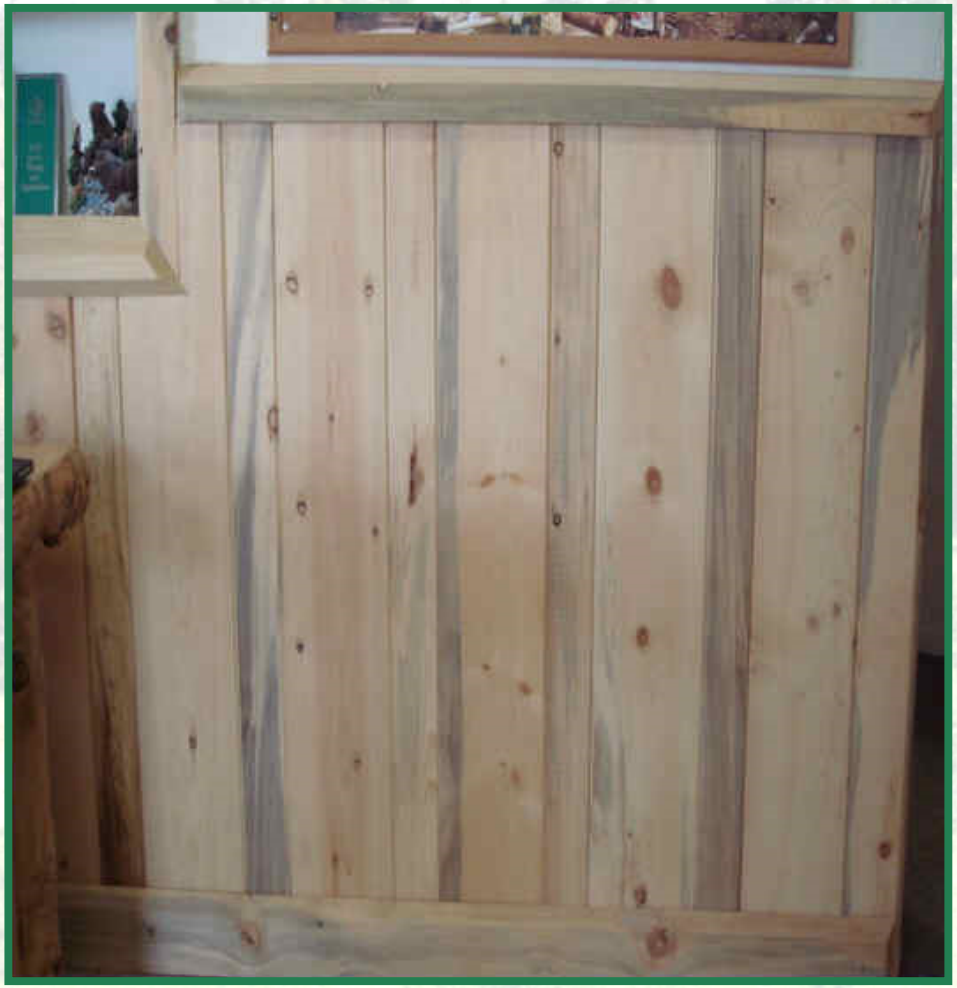
1. Blue-Stain
2. Wood Checking
3. Wood Deterioration
4. Rate-of-Fall

4. Utilization Options: Posts & Poles

- Beetle-killed trees can serve as posts and poles, often in close proximity to where the trees were harvested.

4. Utilization Options: Lumber

- Beetle-killed lumber exhibiting blue-stain maintains much of its physical integrity



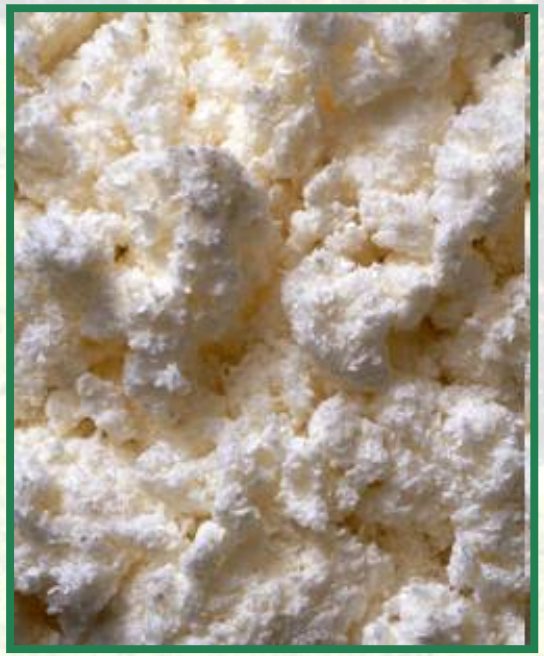
4. Utilization Options: Biomass/Bioenergy





4. Utilization Options: Wood Fiber

- Includes pulp (paper), particleboard, and oriented strand board (OSB)



4. Utilization Options – Challenges

- Timber killed by MPB undergoes rapid rate of degradation within 2 years after death
- In general: 2 years for solid sawn products (blue-stain is an issue)
- At least 5 to 7 years for oriented strand board and wood pellets
- Longer (10 years or more) for biomass energy applications

5. Markets Development Potential

- Lodgepole pine mortality exceeds 90% for trees over 8" DBH in Grand County
- There are significant impacts that result from this mortality
- Timber value losses will continue to accrue with passage of time

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5. Markets Development Potential

- Only a small percentage of mortality on public lands will be salvaged and utilized.
- Numerous research projects have been funded by the CSFS, USFS, and others to investigate the potential for increasing the amount of beetle-killed pine utilized, primarily as a means to increase the number of acres treated.
- Projects to date have had limited success at best and more market development research is needed.


Thank you!
Questions?