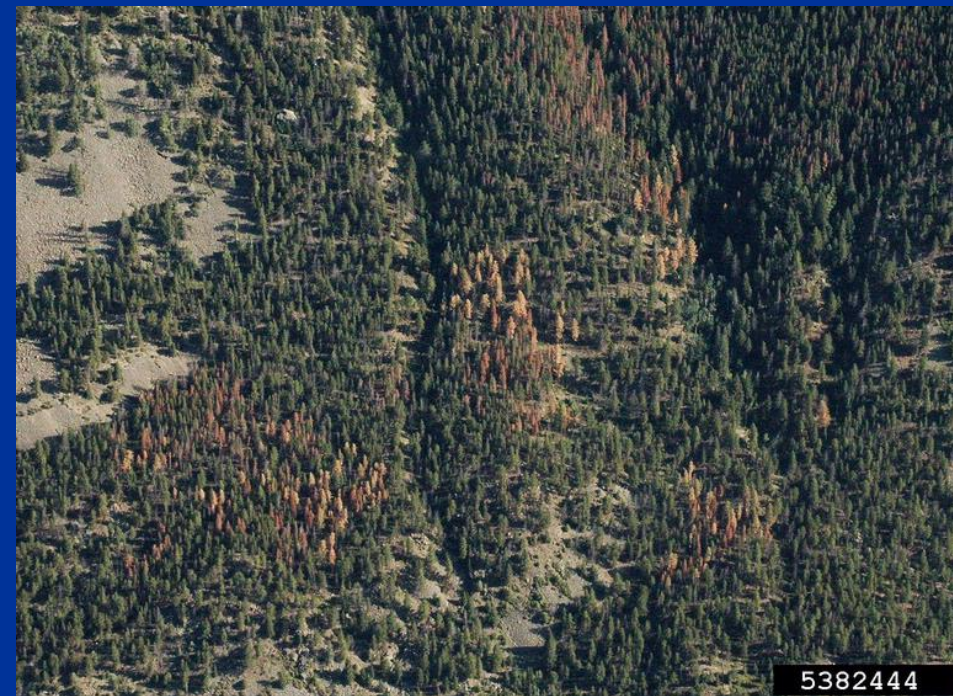
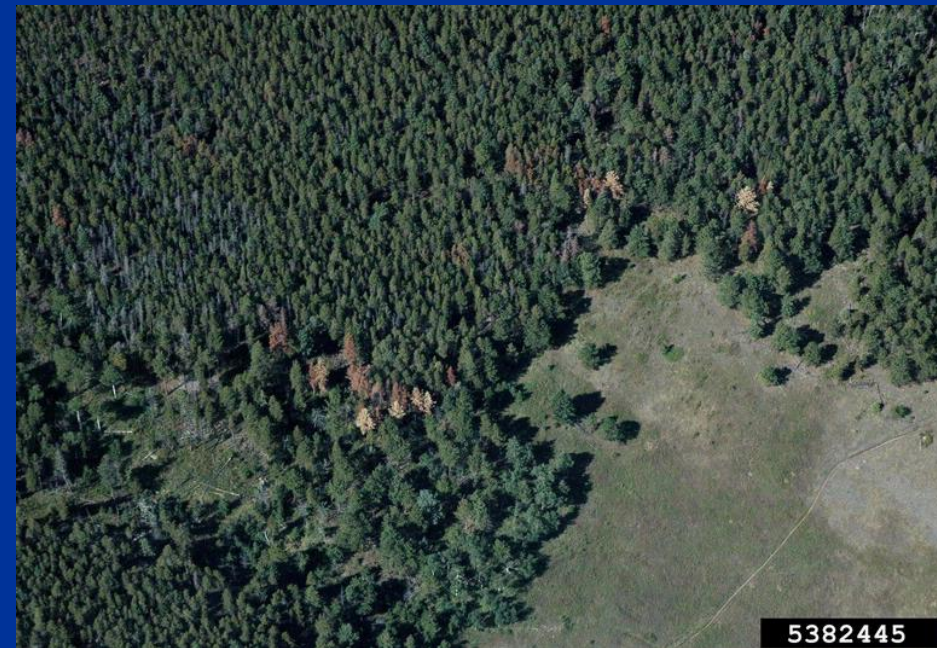


Potential Impacts of Mountain Pine Beetle on Northern Front Range Ponderosa Pine Forests



5382444

Larimer County – MPB-killed ponderosa pine



5382445

Clear Creek County – A mix of MPB-killed lodgepole and ponderosa pines

Photos: William Ciesla

MPB Impacts on Colorado's Ponderosa Pine Forests

Photo: William Ciesla

- McCambridge's Lory State Park study followed the 1965 – 1978 MPB epidemic on the Front Range
- Arkansas Valley MPB epidemic from 1996 – 2004

South Park, Park County, 2005



Lory State Park MPB Epidemic

- The mountain pine beetle epidemic began in 1965; 300 trees were killed throughout the park that year
- The epidemic reached its peak from 1974-1976, when losses in the park were 20,000 trees per year
- The epidemic ended in 1978





Lory State Park Ponderosa Pine Density Impact (trees/acre)

	Entire Lory Park Forest	Area of Severe Mortality	Areas of Moderate/ Scattered Mortality
Pre- Outbreak	369	561	420
MPB-Killed	92 (25%)	273 (49%)	86 (20%)
Residual	277	288	334



Lory State Park Ponderosa Pine Diameter Impact

	Entire Lory Park Forest	Area of Severe Mortality	Areas of Moderate/ Scattered Mortality
Pre- Outbreak	8.9''	8.0''	9.0''
MPB-Killed	10.3''	9.6''	10.2''
Residual	8.3''	5.4''	8.5''



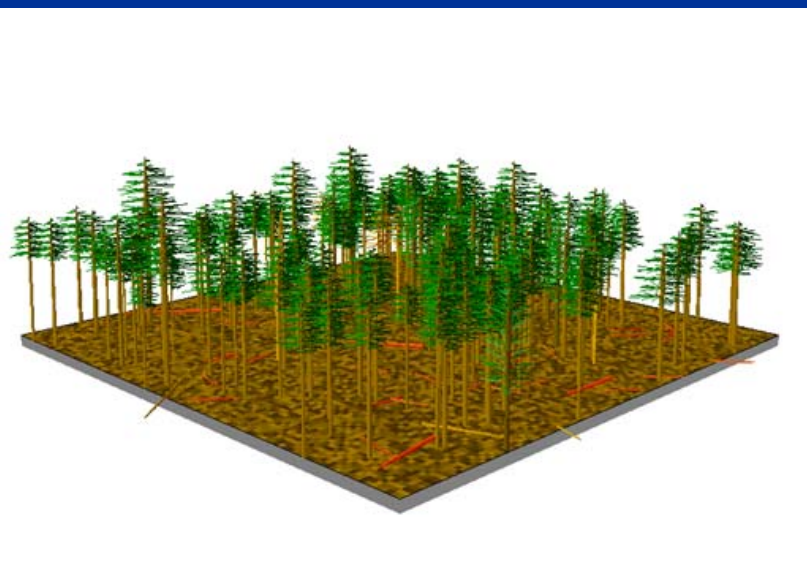
Ponderosa Pine MPB Mortality by Diameter Class – Entire Park Forest

Diameter Class	Trees Killed
1-3 inch	8%
5 inch	19%
7 inch	36%
9 inch	43%
11 inch	42%
13 inch	43%
15 inch	41%
17 inch	30%
19-35 inch	26%

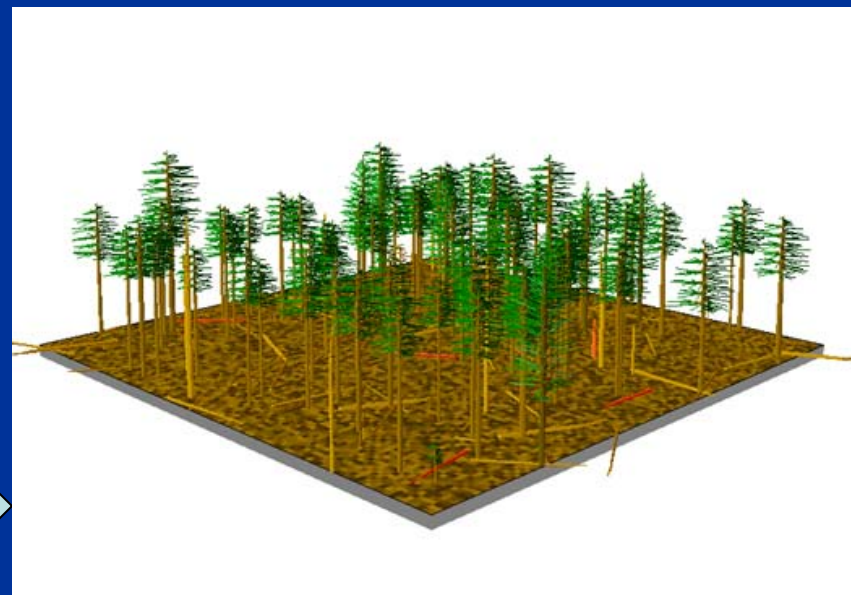


Lory State Park Areas of Moderate Mortality

Lory State Park Pre-Epidemic Stand Conditions



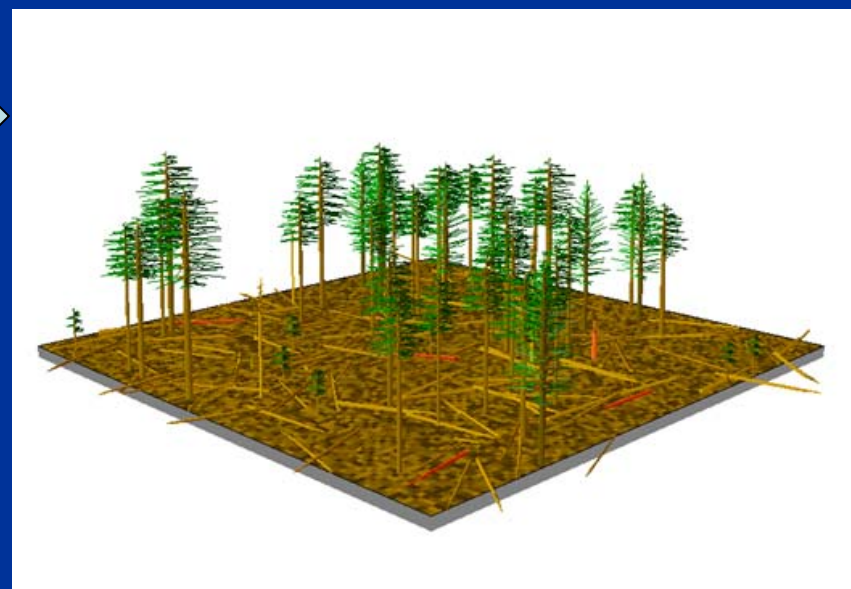
87 %



Lory State Park Post-Epidemic Stand Conditions

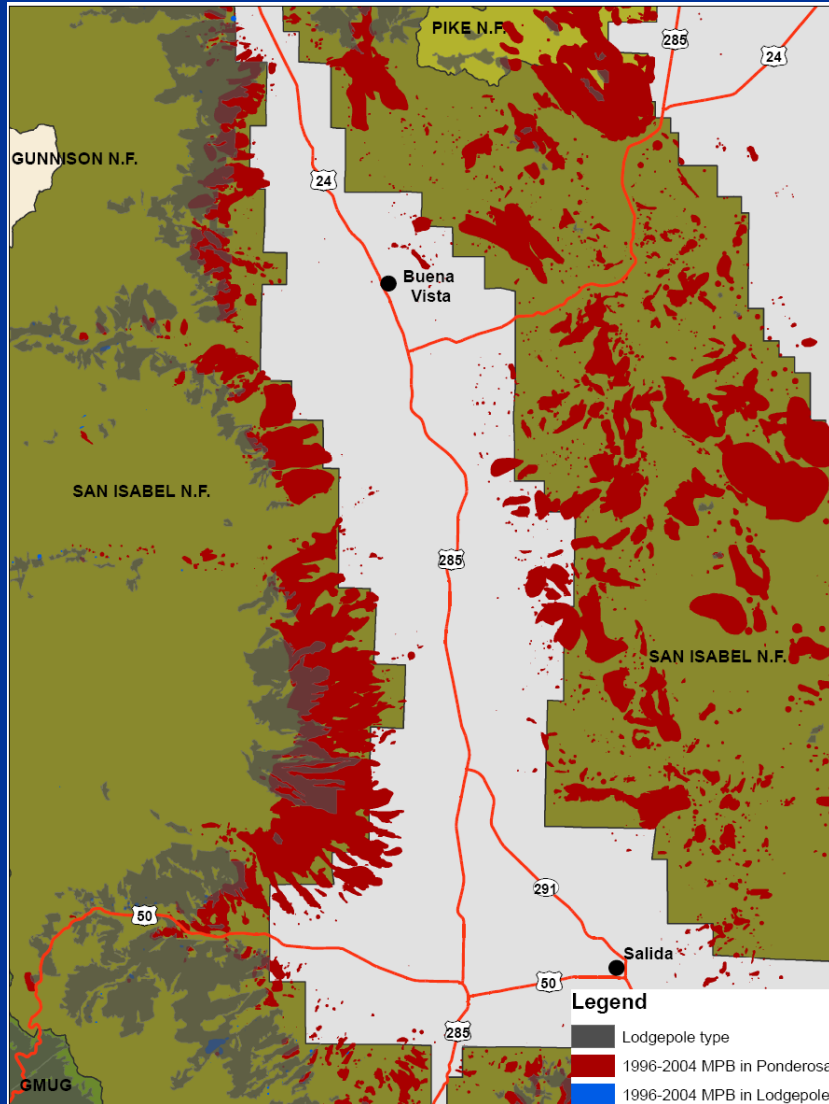


13 %



Lory State Park Area of Severe Mortality

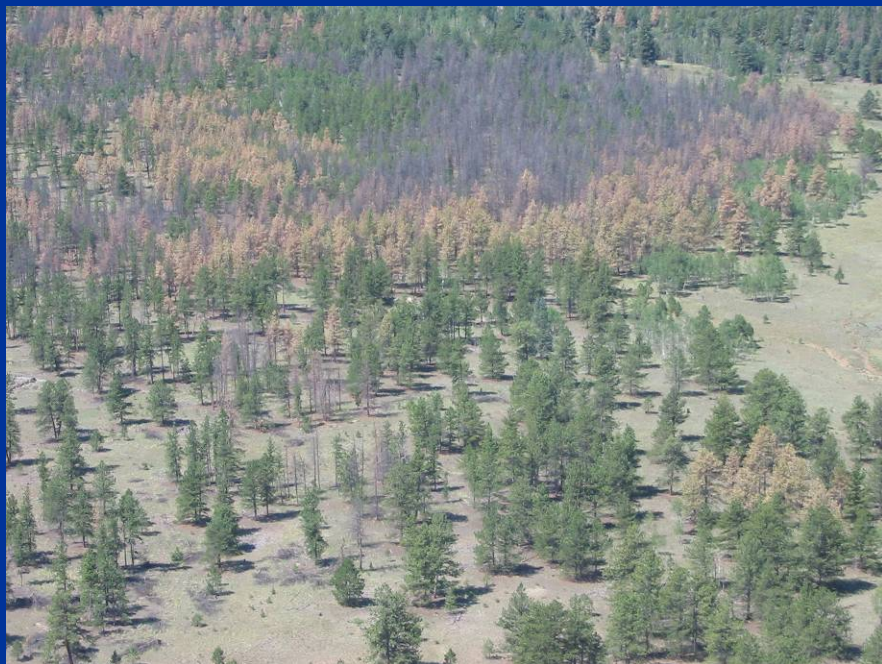
The Arkansas Valley MPB Epidemic



Photos: Sam Schroeder



The Arkansas Valley MPB Epidemic



Photos: Sam Schroeder

The mountain pine beetle epidemic in the Arkansas Valley and adjacent South Park (Chaffee and Park Counties) resulted in severe losses of ponderosa pine on 40% of the acreage in this forest cover type.



In severely impacted areas, most ponderosa pine trees were killed leaving Douglas-fir trees and a few surviving ponderosa pines



Potential MPB Impacts in Ponderosa Pine along the northern Front Range

- Losses are likely to be more severe in dense ponderosa pine forests adjacent to large diameter lodgepole pine forests infested with mountain pine beetle
- Losses are likely to be more severe in high-density versus low-density ponderosa pine forests
- In mixed species stands, high stand density will likely contribute to increased losses of the ponderosa pine component of the stand
- Losses will be patchy in pattern across the landscape, rather than the extensive, landscape-level losses observed in lodgepole pine forests



Ponderosa Pine Restoration/Fuels Treatments for the northern Front Range

- Restoration/fuels reduction treatments should prove beneficial in creating stands that are less attractive to dispersing beetles
- Benefits of treatments accrue immediately following treatment because they create a forest structure that is less attractive to dispersing beetles; vigor improves in remaining trees over time
- Treatments should favor reducing tree density to the lower range of acceptable trees per acre
- Retain some healthy, small diameter (< 7 inch) trees in patches across the stand to hedge against the potential for severe losses in the overstory
- Provide opportunities for natural regeneration of ponderosa pine in treated stands over the next 10-15 years
- Enhance aspen stands where available and appropriate



Ponderosa Pine Impacts – Words of Caution for the Front Range

- High populations of MPB in high-elevation lodgepole pine forests may contribute to more severe losses as the beetle spreads into ponderosa pine forests
- The MPB impacts in Lory Park may not reflect very well the severity of impact to ponderosa pine forests over the course of the current epidemic
- MPB impacts may be more severe if drought conditions prevail during the course of this epidemic – the Arkansas Valley MPB epidemic occurred during a severe drought, which may have contributed to the more significant impact to ponderosa pine forests during that epidemic

**Will the Mountain Pine Beetle Epidemic Spread from
Lodgepole Pine into Ponderosa Pine along the Northern Front
Range Counties of Colorado?**

Report to the Joint Ecology Working Group

**Front Range Fuels Roundtable and the
Colorado Bark Beetle Cooperative**

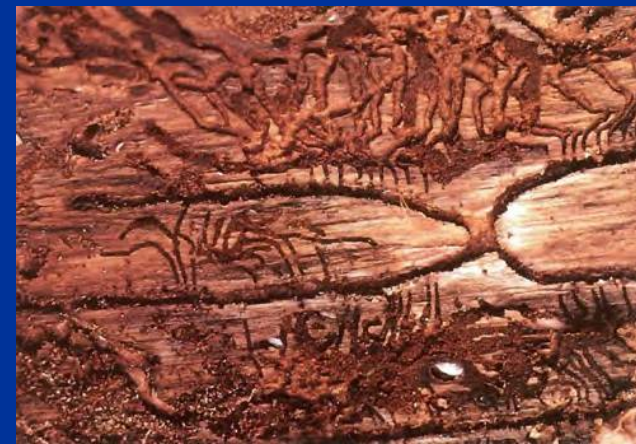


**Prepared by Jeff Witcosky
Forest Health Management
March 24, 2009**

Pine Engraver Beetle



Ips pini



Egg Gallery



Pine Engraver Beetle

Photo: Irene Shonle



Lodgepole pines killed by the pine engraver, Gilpin County