

## Management options for reducing short and long-term fire risk in mountain pine beetle-infested forests (*JFSP 09-1-06-16*)

**Background** - Overstory mortality caused by current mountain pine beetle attack surpasses the extent and severity of forest disturbance experienced by the public or the land management community in recent memory. The perceived increase in wildfire risk has prompted a rapid management response aimed at reducing hazardous fuels on federal, state and private forest land across northern Colorado and southern Wyoming. In spite of the scope of the outbreak, managers will treat only a fraction of the landscape altered by bark beetles. The implications of current management will however, alter fuel profiles, fire behavior and other services delivered from these forest ecosystems for the coming century.



**Project Objectives** - This project is being conducted as part of an operational-scale comparison of management alternatives for treating lodgepole pine-dominated forests that have been severely-impacted by bark beetles. We will characterize the effectiveness of widely-implemented practices to:

- 1) Quantify how management alternatives employed to address bark beetle outbreaks influence current and future fuel characteristics, fire behavior and wildfire effects and,
- 2) Evaluate how these options influence forest production, water delivery, watershed conservation and related ecosystem services.

### Management Alternatives

- Fuel Reduction - Whole Tree Harvest Salvage
- Water Delivery – Salvage and Retain Logging Slash to Increase Surface Roughness
- No Action – Untreated Bark Beetle-Killed Stands



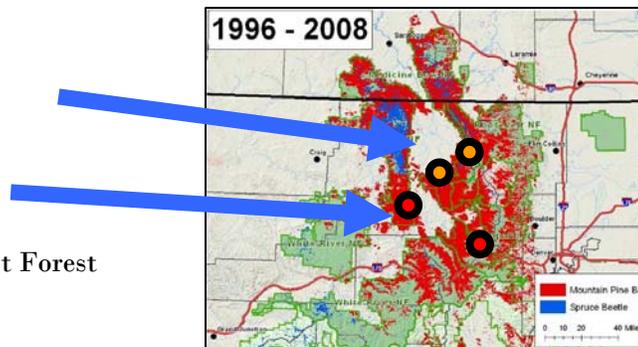
### Management-Research Study Areas

#### North Platte Basin

- 1) Colorado State Forest
- 2) Routt NF - Parks RD

#### Upper Colorado Basin

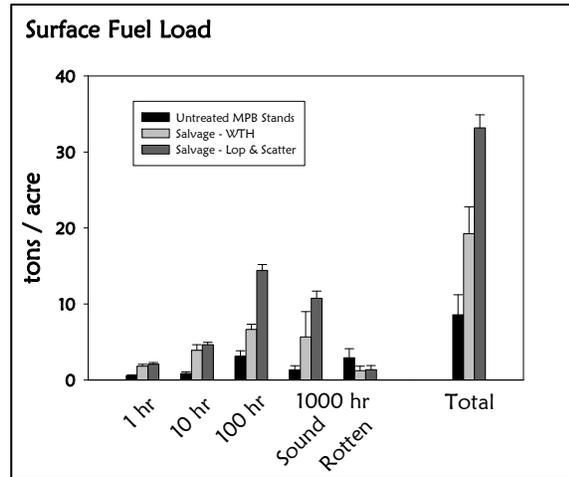
- 3) Arapaho-Roosevelt NF  
– Sulphur RD / Fraser Expt Forest
- 4) Routt NF – Yampa RD



**Post Treatment Fuel Profile**

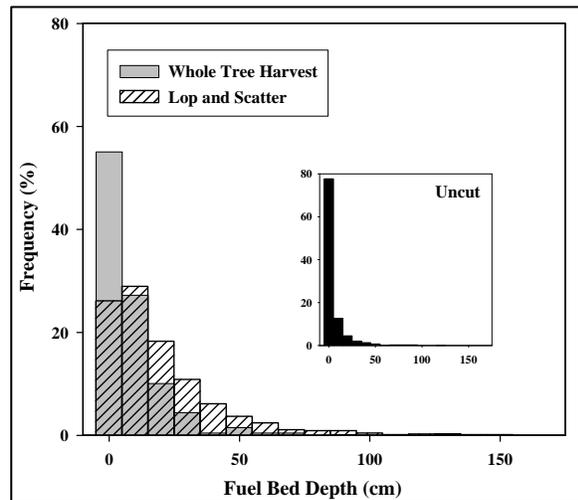
Harvest of beetle-killed overstory trees will immediately lower crown fire risk, but the long-term effects of management on fire risks are less certain.

- MPB salvage operations create 4-fold more activity fuels (1 + 10 hr) and 3-fold more total surface fuels than uncut MPB stands.
- Lop and scatter management retains more 100 hr, sound 1000 hr and total fuels than WTH.
- Windthrow of residual canopy fuels in uncut stands will create total surface fuels that exceed those in managed areas.



Rapid recovery of understory and ladder fuels is stimulated by certain management operations and may increase wildfire risk during the decades after treatment.

- Tree seedling regeneration and herbaceous fuel loads are highest in WTH salvaged prescriptions.
- Deeper fuel bed depth in lop and scatter may inhibit production of ladder and herbaceous fuels and extend the lifespan of fuel reduction operations.



**Project Status and Timeline**

- JFSP Funds Received (June 2009)

**Arapaho-Roosevelt NF – Fraser Experimental Forest Sites**

- Fuel Sampling Completed (Aug 2009)

**Colorado State Forest and Routt NF Sites**

- Harvesting completed, study sites selected, transects and plots established, fuel moisture instrumentation installed. (Sept 2009)
- Fuel Sampling Completed (Aug 2010)

**Project Researchers**

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**Project Partners**

USFS Rocky Mountain Research Station  
 Colorado State Forest Service  
 NFs - R2 Bark Beetle Initiative  
 Colorado Water Conservation Board  
 Joint Fire Science Program  
 Colorado Forest Restoration Institute  
 Denver Water