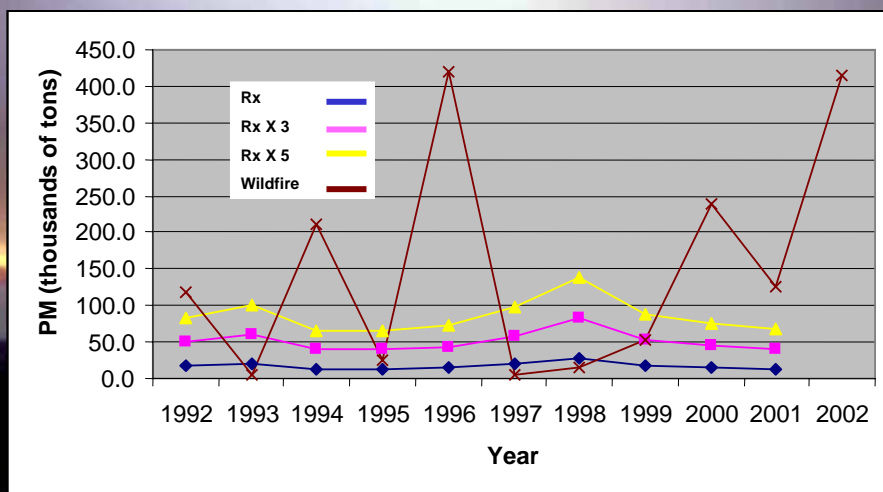


What Are The Tradeoffs of Wildfire and Prescribed Fire Emissions?



Wildfire and Prescribed Fire Tradeoffs

- **Wildfires**

- Occur during dry season, more fuel consumed and more smoke produced
- Not planned so cannot take advantage of smoke management strategies or direct smoke away from sensitive areas
- Large amount of smoke can lead to strong inversions, pooling smoke.
- May not occur

Wildfire/Prescribed Fire Tradeoff

- **Prescribed fire**

- Generally consumes less fuels/ produces 2 to 4 times less smoke
- Fire is planned so can burn when meteorological conditions are favorable to disperse and direct smoke away from sensitive areas.
- Can employ smoke reduction strategies

Exceeding National Ambient Air Quality Standards

- Exceedences are rarely caused by prescribed fire but are common from wildfire;
- Vulnerability can be reduced through:
 - modeling,
 - communication,
 - emission reduction techniques,
 - meteorological scheduling,
 - good fire planning,
 - monitoring.

9. 18. 2002

If we are going to ramp-up prescribed burning, we must consider operational smoke management strategies to reduce smoke impacts

Smoke Management Techniques

- There are two general approaches to managing the effects of wildland fire smoke on air quality:
 - Use techniques that reduce emissions produced for a given area treated
 - Redistribute the emissions through meteorological scheduling and by sharing the airshed to reduce impacts.
 - *** (dilution, emission reduction, avoidance) ***

Smoke Management Techniques

- May be used independently or in combination
- Influenced by:
 - Land management objectives
 - The type and amount of vegetation being burned or treated
 - Safety considerations
 - Cost
 - Laws and regulations

Smoke Management Techniques

- **Reduce Emissions**

- Reduce area burned
- Reduce fuel load
- Reduce fuel production
- Reduce fuel consumed
- Schedule burning before new fuels appear
- Increase combustion efficiency

backing fire



mosaic burning



jackpot burning



rapid mopup

Smoke Management Techniques

- **Redistribute Emissions**

- Burn when dispersion is good
- Avoid sensitive areas
- Share the airshed
- Burn smaller units



good dispersion



avoid sensitive areas

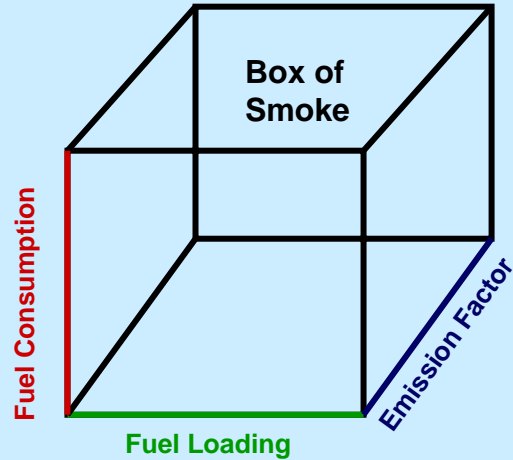


share airshed

Reducing the Amount of Emissions

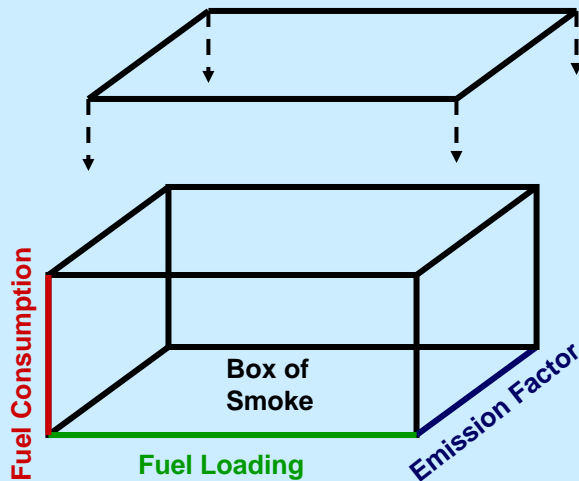
To reduce the amount of smoke:

Reduce one or more of the legs



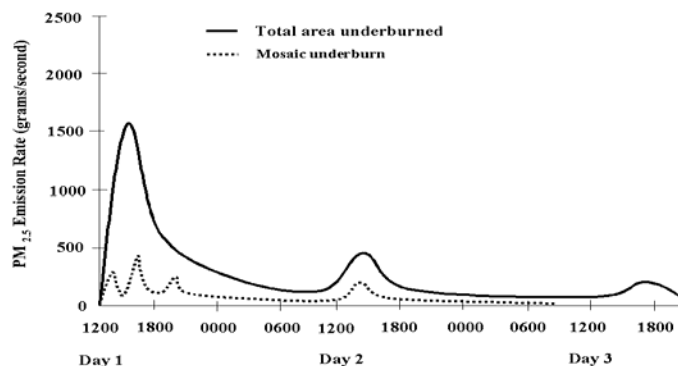
To Reduce Emissions

Reduce one or more of the “legs”



Reducing the Amount of Emissions

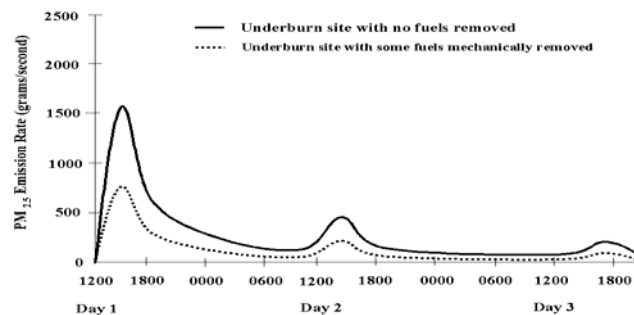
- **Reduce the area burned**
 - Burn fuel concentrations
 - Isolate fuels
 - Mosaic burning



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Reducing the Amount of Emissions

- **Reduce Fuel Load**
 - Mechanical removal



Reducing the Amount of Emissions

- **Reduce Fuel Load**
 - Mechanical processing
 - Firewood sales



Reducing the Amount of Emissions

- **Reduce Fuel Load**
 - Biomass for electrical generation
 - Biomass utilization



Reducing the Amount of Emissions

- **Reduce Fuel Load**
 - Grazing



Reducing the Amount of Emissions

- **Reduce Fuel Production**
 - Chemical Treatment



Reducing the Amount of Emissions

- **Reduce Fuel Production**

- Site conversion
- Land use change

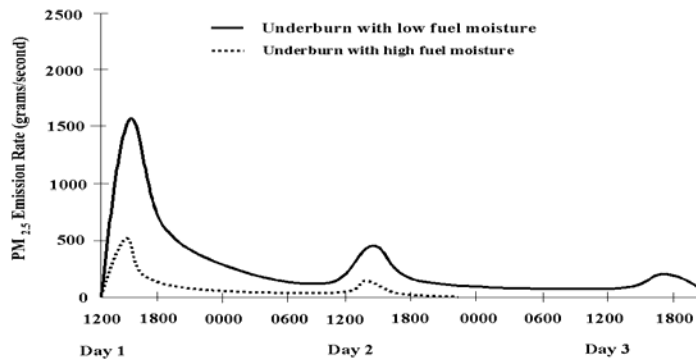


Reducing the Amount of Emissions

- **Reduce Fuel Consumed**

- High moisture in large woody fuels
- Moist litter and duff





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Reducing the Amount of Emissions

- **Reduce Fuel Consumed**

- Burn before precipitation
- Burn before large fuels cure



Reducing the Amount of Emissions

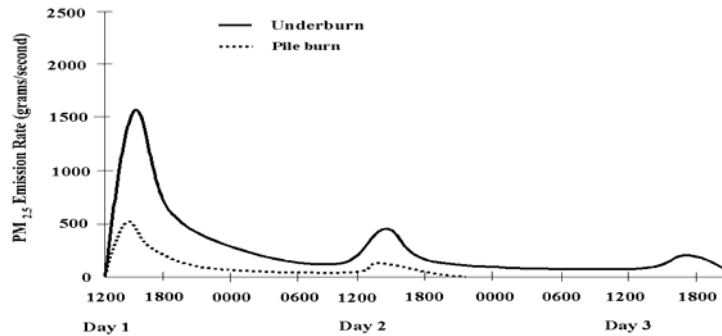
- **Schedule Burn before New Fuels Appear**
 - Burn before litter fall
 - Burn before green-up



Reducing the Amount of Emissions

- **Increase Combustion Efficiency**
 - Burn piles or windrows





Reducing the Amount of Emissions

- **Increase Combustion Efficiency**
 - Backing fires
 - Dry conditions



Dry conditions...

...lead to more efficient burning and less emissions may be produced.

However, more emissions may be produced because more large fuels and duff are available to burn.



Reducing the Amount of Emissions

- **Increase Combustion Efficiency**

- Rapid mop-up
- Aerial ignition/
mass fire



Reducing the Amount of Emissions

- **Increase Combustion Efficiency**
 - Air curtain incinerators



Redistributing Emissions

- Burn when dispersion is good
- Share the airshed





Redistributing Emissions

- Avoid sensitive areas
- Burn smaller units



Redistributing Emissions

- Burn more frequently
- Scavenging/vent column into cloud



Frequent burning



Scavenging

Smoke Management Techniques

Smoke Management strategies are not without potential negatives and must be prescribed and used with careful professional judgment and full awareness of possible tradeoffs.

- Can prevent accomplishment of objectives
- Can increase future smoke episodes
- Can cause negative impacts on other valuable resources through soil compaction, loss of nutrients, impaired water quality, etc.
- Can be expensive

Case 1

This is a ponderosa pine stand. The prescribed fire objective is to prepare the site for natural regeneration by exposing 60 percent mineral soil.



Case 1

What are the smoke management and prescribed fire objective conflicts?



Case 1

Conflicts include:

- Low fuel moisture is required to consume litter and duff to expose 60% mineral soil.

The tradeoff is producing large quantities of smoke.

- This results in less buoyant smoke.



Case 2

This is a ponderosa pine/mixed conifer stand. The prescribed fire objective is to retain the large logs for wildlife and organic layer around the trees to reduce mortality.

What are the smoke management and prescribed fire objective conflicts?

Case 2

Conflicts include:

- The fuels will be wet to reduce consumption, thus there will be little smoke produced and limited smoldering.
- May not meet fuel reduction objectives



Case 3

This is a long leaf pine understory burn in a 5-year-old rough. The objective is to reduce accumulation of large wood, litter, duff, shrubs and grasses.



What are the smoke management and prescribed fire objective conflicts?

Case 3

Conflicts include:

- To meet burn objective of reducing fuel accumulation, fuels will have to be dry. This creates the potential for fuels to smolder for a long time.
- Smoke across the highway
- High cost for mop-up



Case 4

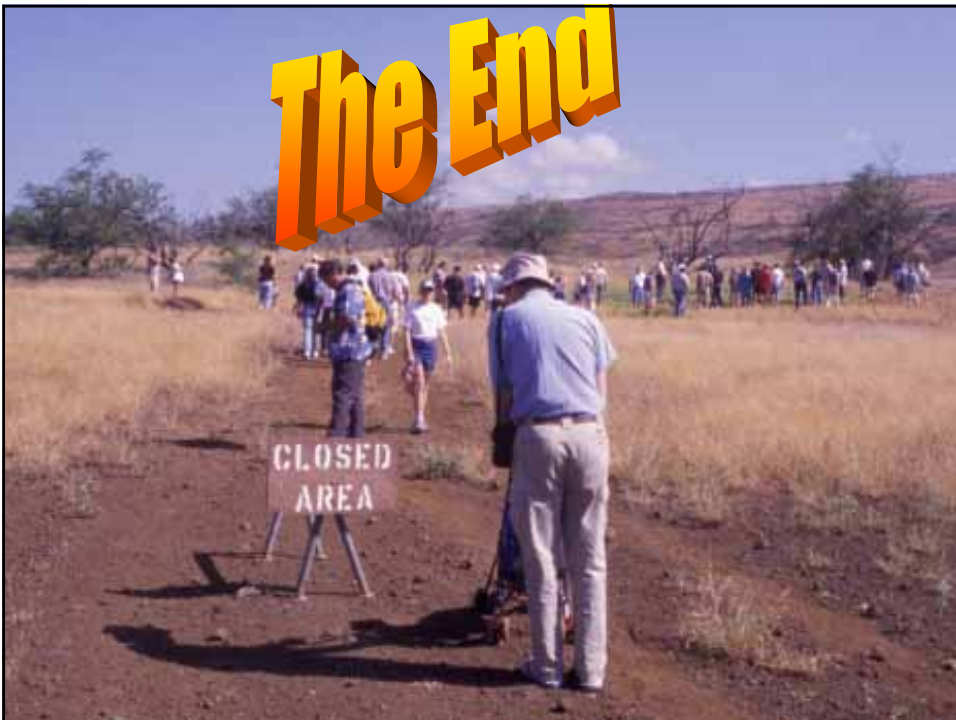
This is a dense, partially dead mixed conifer site in Montana. A contract was let to thin the stand and chip the debris on site followed by a prescribed burn.

What are the smoke management and prescribed fire objective conflicts?



Case 4

- No prescribed fire and smoke management objective conflicts.
- Thinning and chipping with removal will reduce fuel load and reduce the amount of smoke.
- There may be an impact on soil, wildlife, water quality.
- If chips are not removed, may cause future fire and smoke problem.



Do not drop cigarette ends
on the floor, as they burn the
hands and knees
of customers as they leave.

NOTICE-PUBLIC BAR

OUR PUBLIC BAR IS PRESENTLY
NOT OPEN BECAUSE IT IS
CLOSED. MANAGER