Managing Smoke and Air Quality in the South Coast Air Basin

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Healthy Forest Initiative and Maintaining Air Quality

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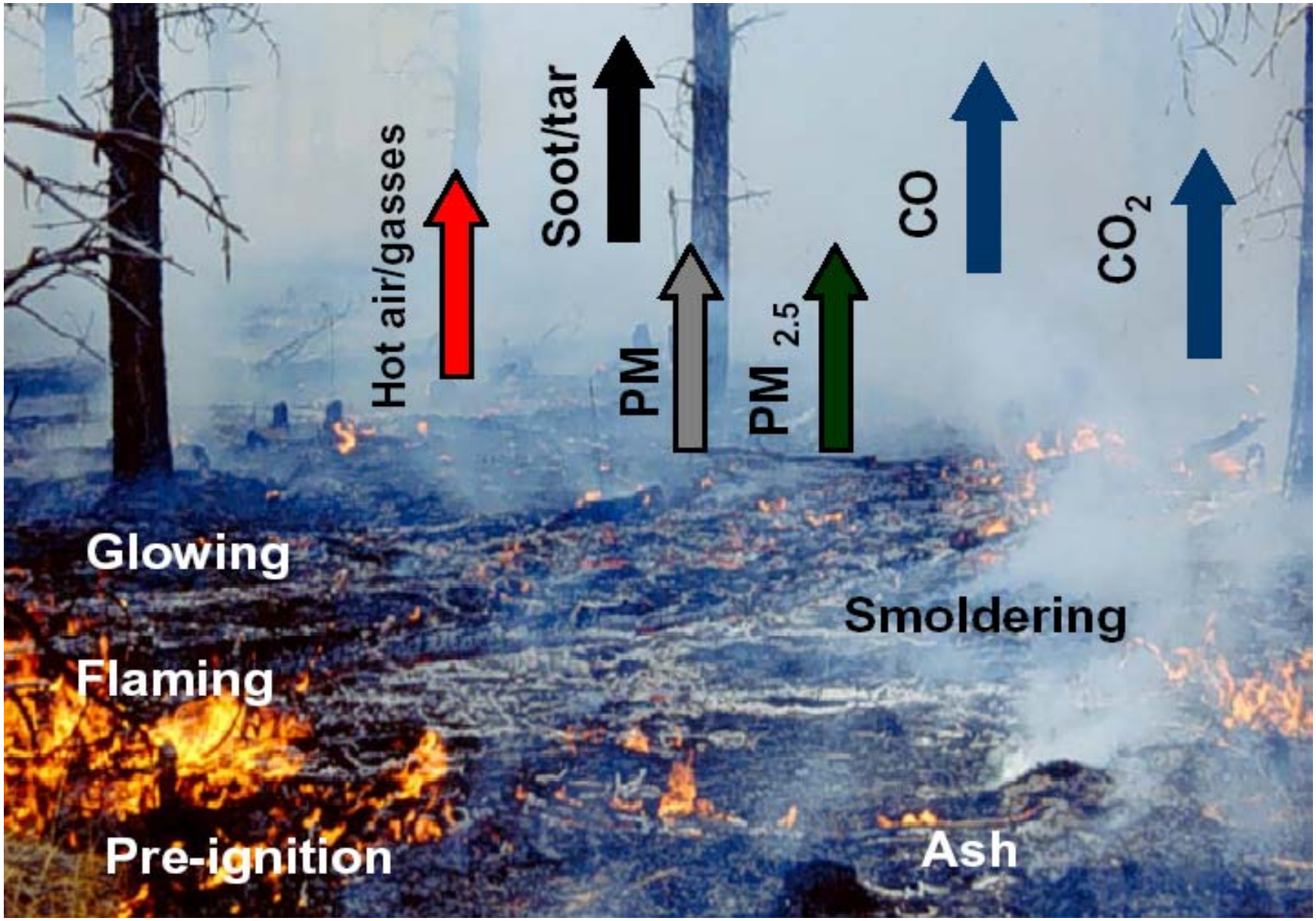
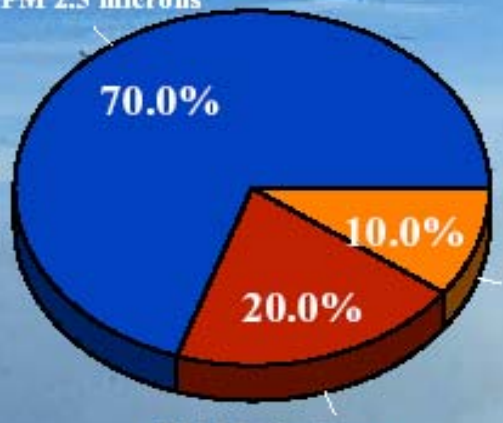
Medford, Oregon

FERA
Fire and Environmental Research Applications

Prescribed Fire Will be an Important Tool in Applying the Healthy Forest Legislation Across Forested and Rangeland Landscapes


Hot air/gasses
Soot/tar
PM
PM 2.5
CO
CO2
Glowing
Flaming
Pre-ignition
Smoldering
Ash

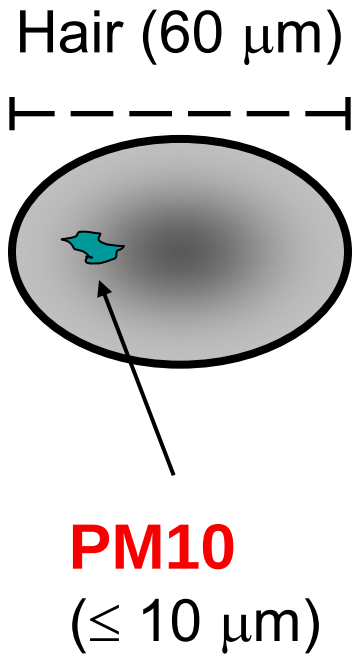
Particles in Smoke



A majority of the smoke particles are very small and less than 2.5 microns in diameter

Particulate Matter Health Effects

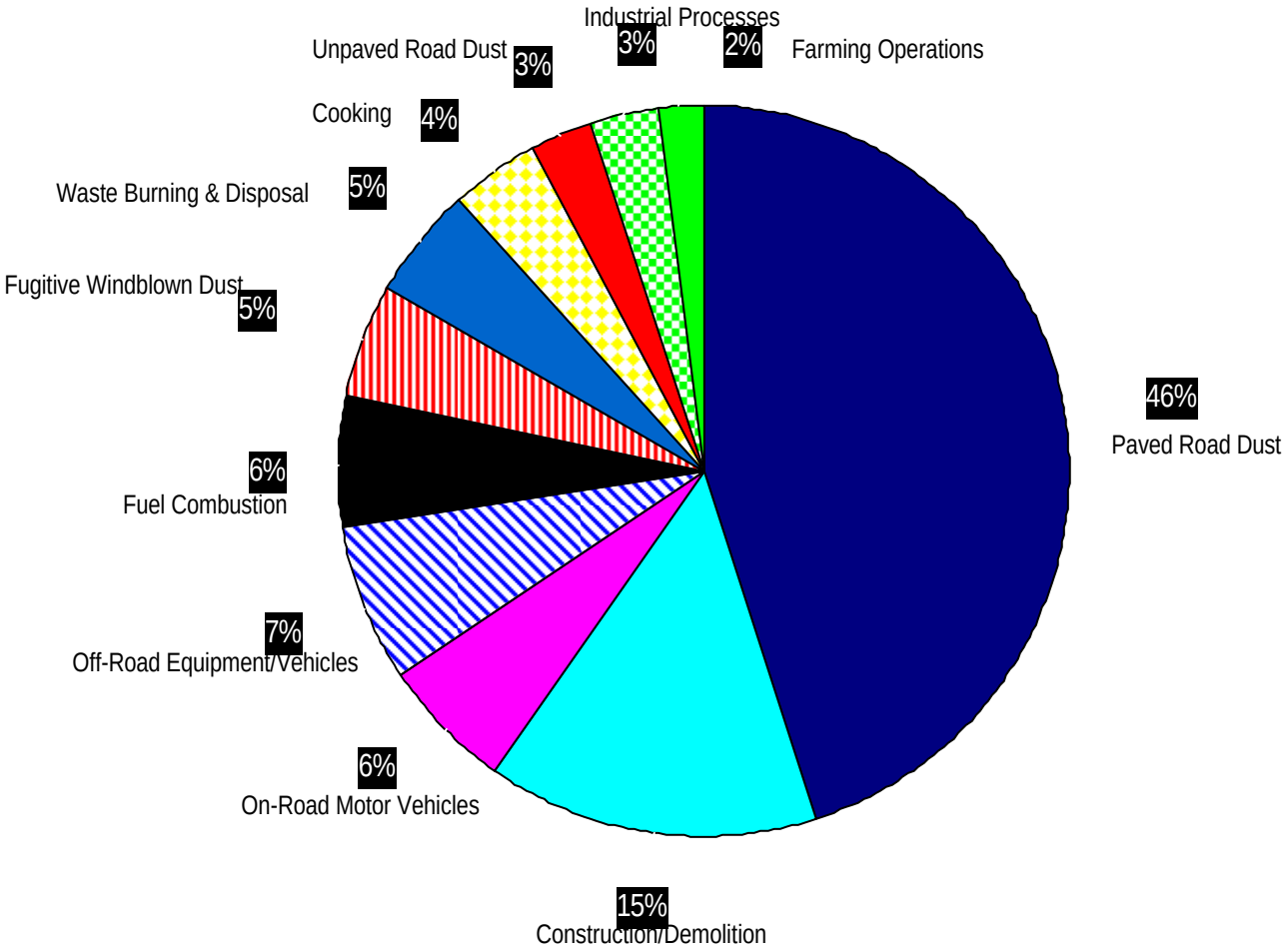
- Larger particles trapped, expelled
- PM10 bypasses the body's defenses and enters the lungs
- Slows lung function growth
- Worsens asthma
- Worsens bronchitis
- Can cause premature death



Smoke particles scatter about 85% of the light that strikes them

- Most smoke particles have a diameter in the range of .1 to .7 microns
- Visible Wavelengths: .4 -.7 microns

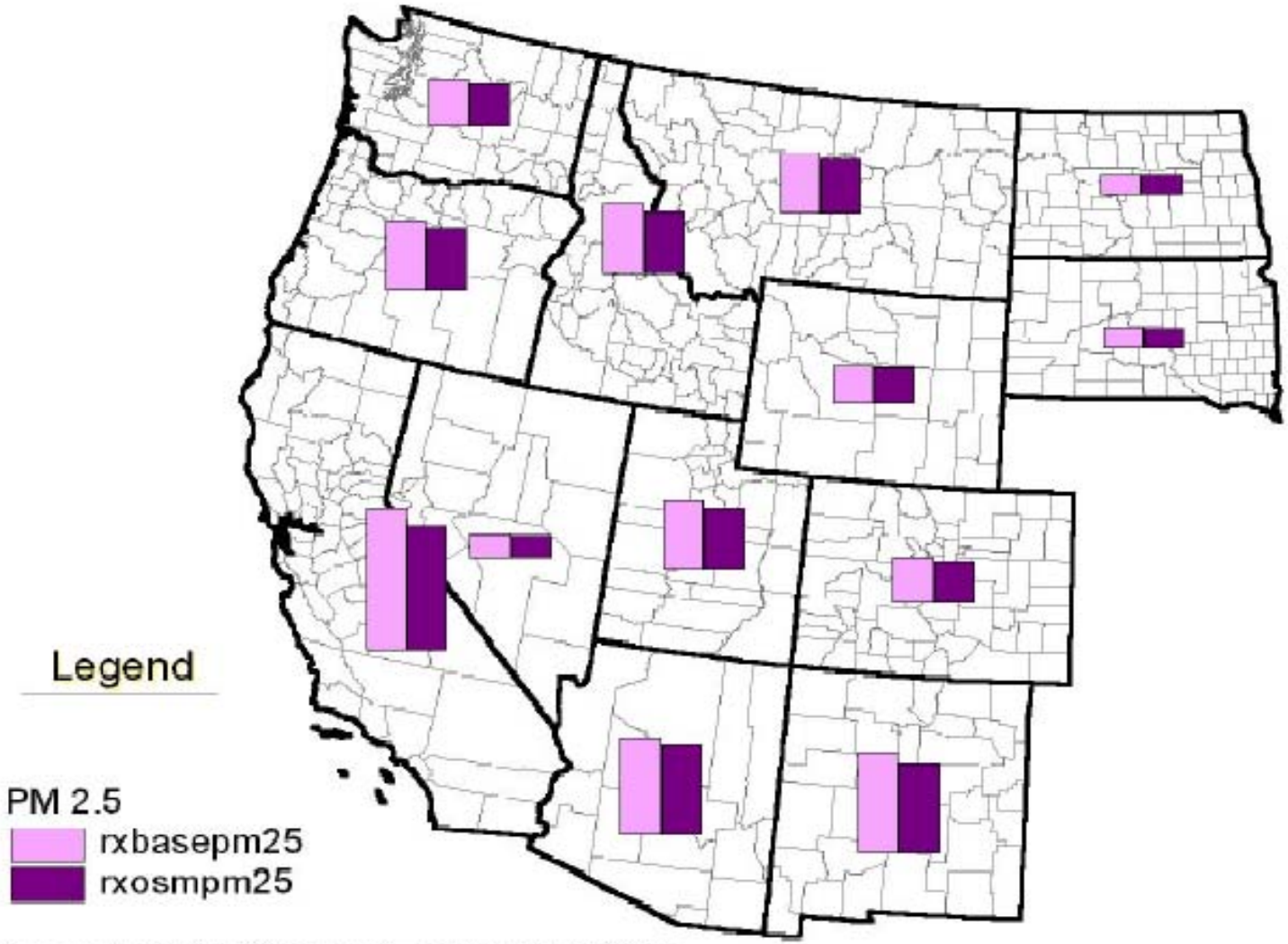
What are the Major Sources of Directly Emitted PM10 in 2006?



2006 PM10 = 292 tons/day

WRAP
FEJF-ETT

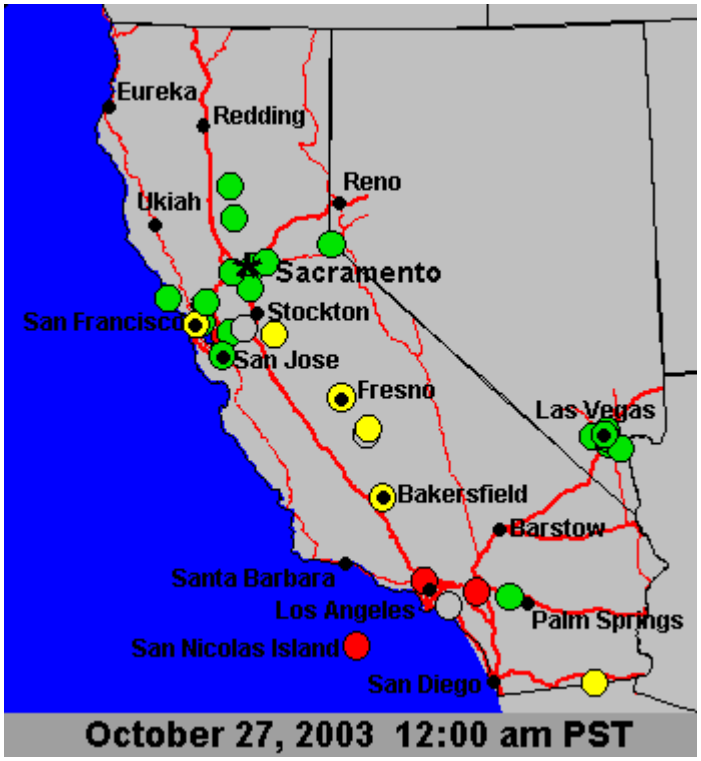
2018 Projected Emission Inventory
Rx Smoke Management Comparison

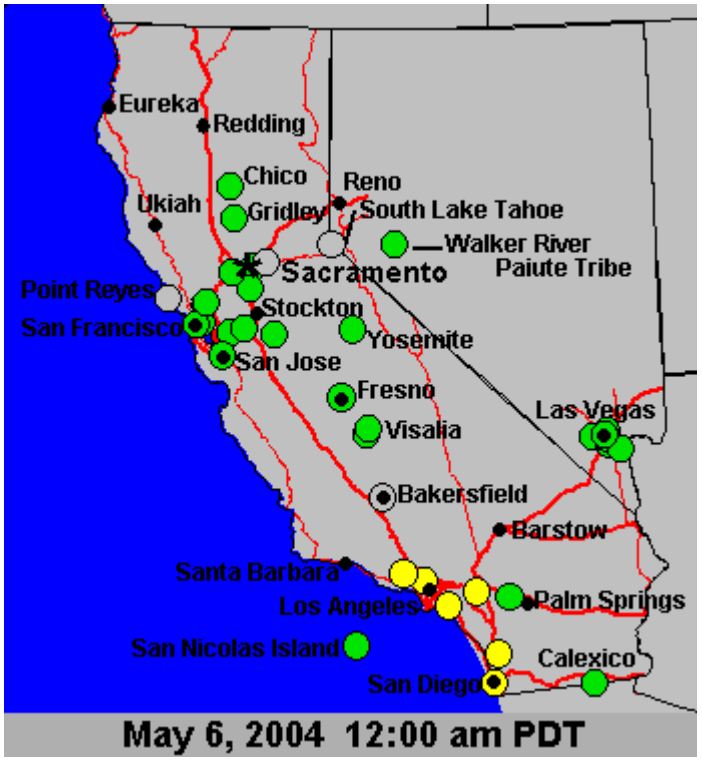


For the Western Regional Air Partnership - Fire Emissions Joint Forum

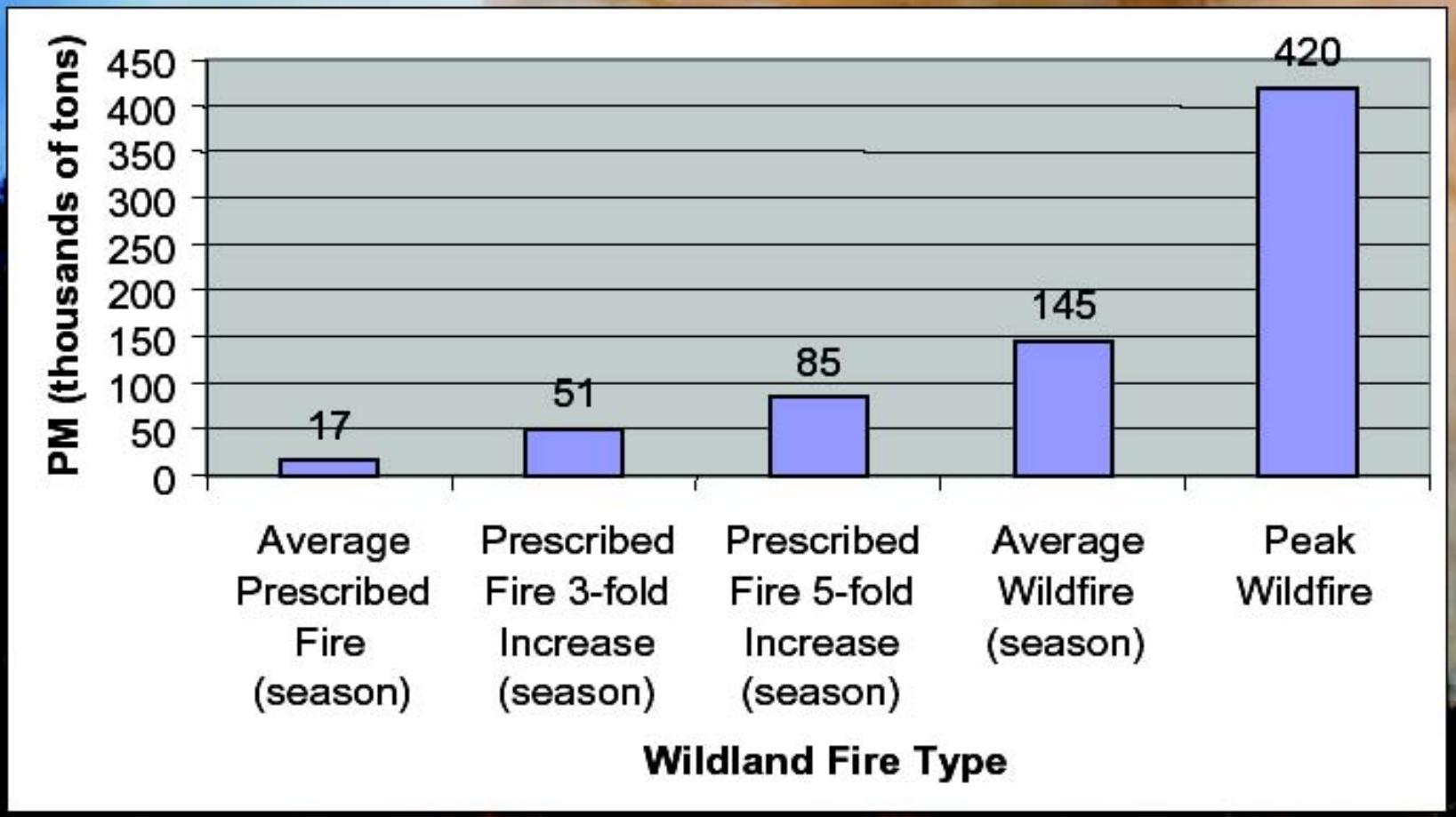
2003 02 12

PM2.5 Emissions
Old Fire & Corona Fire





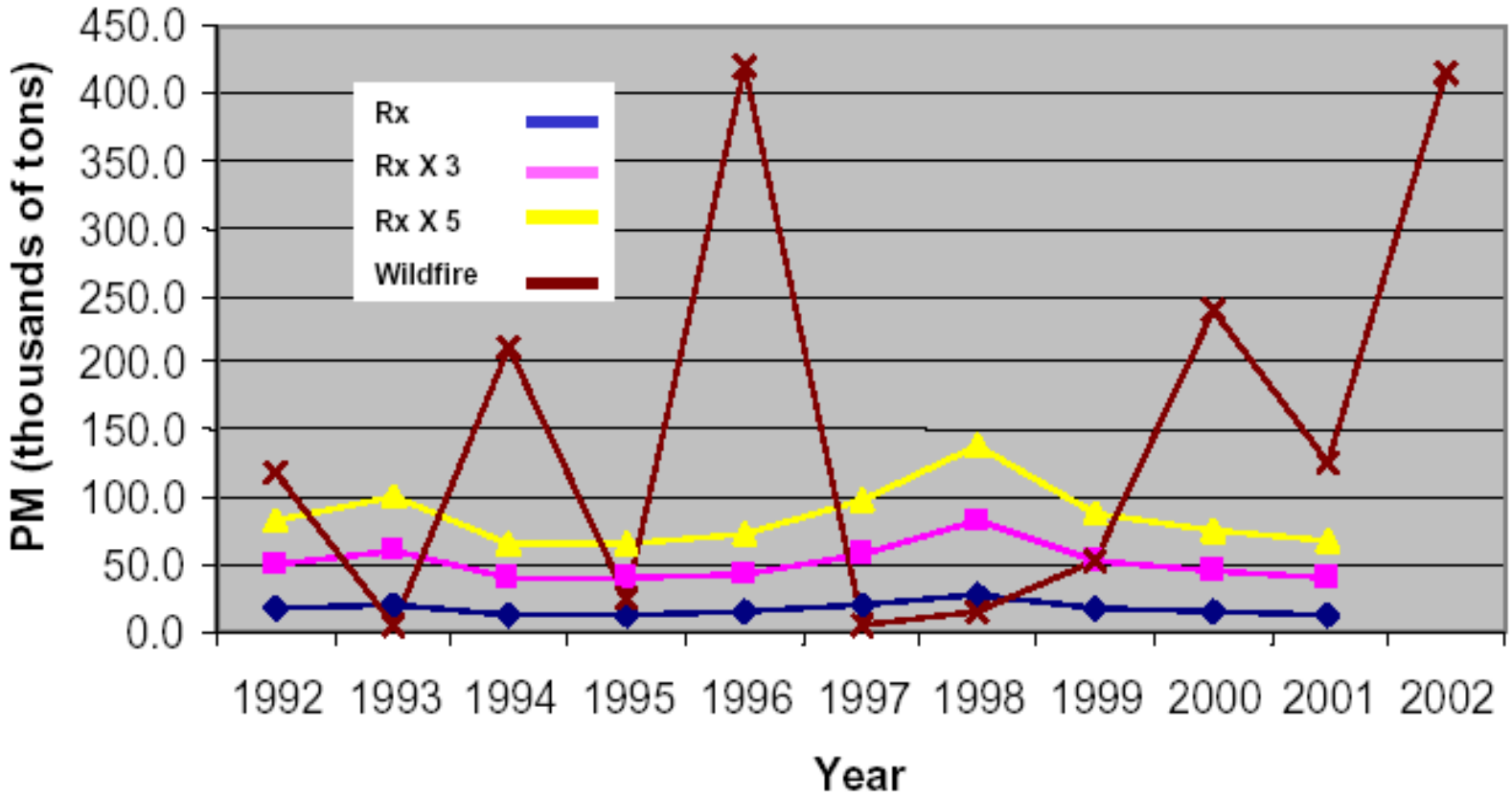
Why will there be an impact on air quality???



Assumed 12 tons/acre consumed for prescribed fires and 36 tons/acre for wildfires

Acres and consumption statistics for prescribed fires taken from 2001 Oregon Smoke Management Report

What Are The Tradeoffs of Wildfire and Prescribed Fire Emissions?



- **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

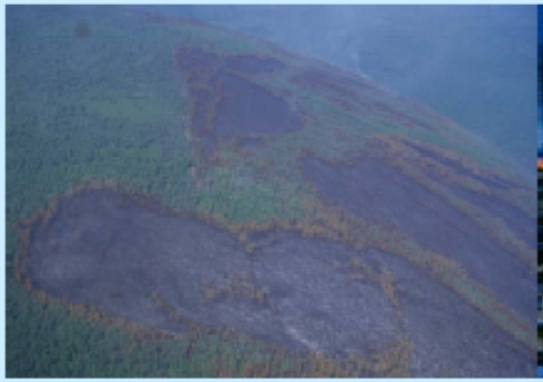
Smoke Management Techniques

- 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.

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

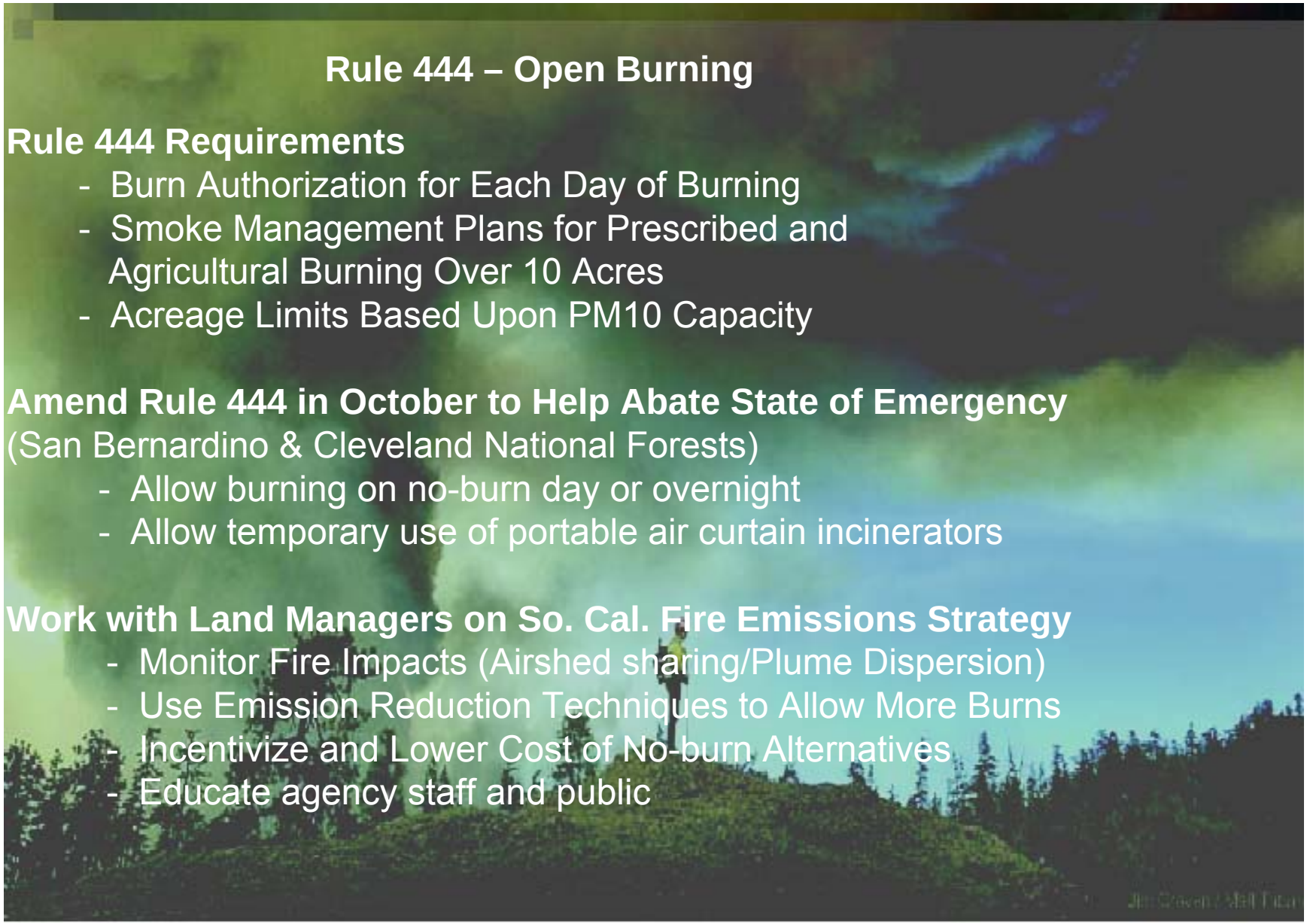
backing fire



mosaic burning

jackpot burning

rapid mopup



Rule 444 – Open Burning

Rule 444 Requirements

- Burn Authorization for Each Day of Burning
- Smoke Management Plans for Prescribed and Agricultural Burning Over 10 Acres
- Acreage Limits Based Upon PM10 Capacity

Amend Rule 444 in October to Help Abate State of Emergency
(San Bernardino & Cleveland National Forests)

- Allow burning on no-burn day or overnight
- Allow temporary use of portable air curtain incinerators

Work with Land Managers on So. Cal. Fire Emissions Strategy

- Monitor Fire Impacts (Airshed sharing/Plume Dispersion)
- Use Emission Reduction Techniques to Allow More Burns
- Incentivize and Lower Cost of No-burn Alternatives
- Educate agency staff and public

In Summary

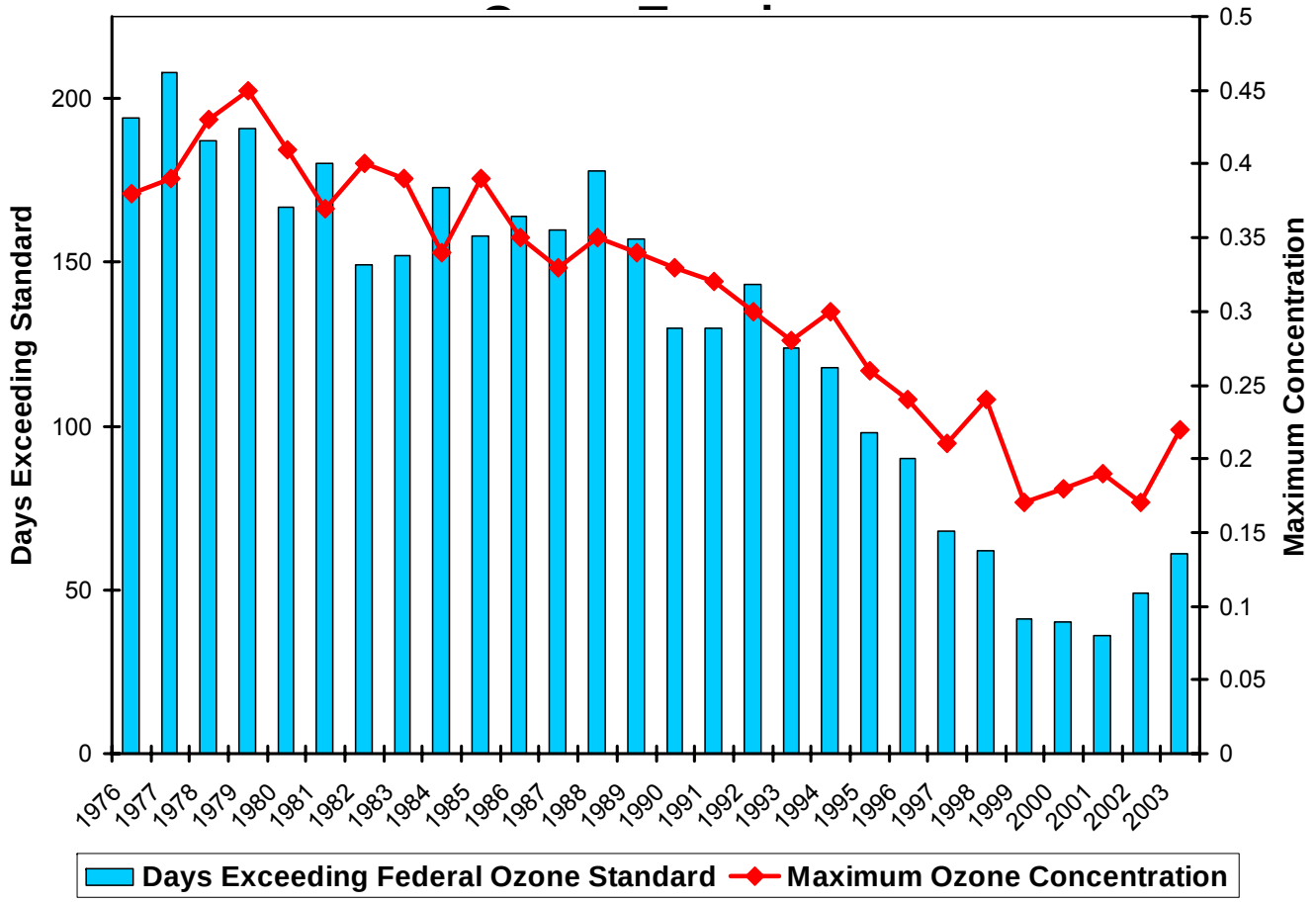
- There will be a ramp-up of prescribed burning
- Management of smoke will be required
  - Smoke management strategies will be used
  - Emissions and impacts will be tracked, assessed and monitored
  - Good fire plans developed
  - Open communication will be required
  - Research and development will need to continue

Air is a resource!

What are the Major Sources of Air Pollution?

- On-Road Mobile Sources
  - Passenger Cars, Light / Med. / Heavy Duty Vehicles
- Off-Road Mobile Sources
  - Construction Equipment
  - Trains/Ships/Aircraft
- Point Sources
  - Refineries
  - Chemical Plants
  - Power Plants
- Area Sources
  - Paints and Coatings
  - Fueling
  - Solvents
  - Consumer Products

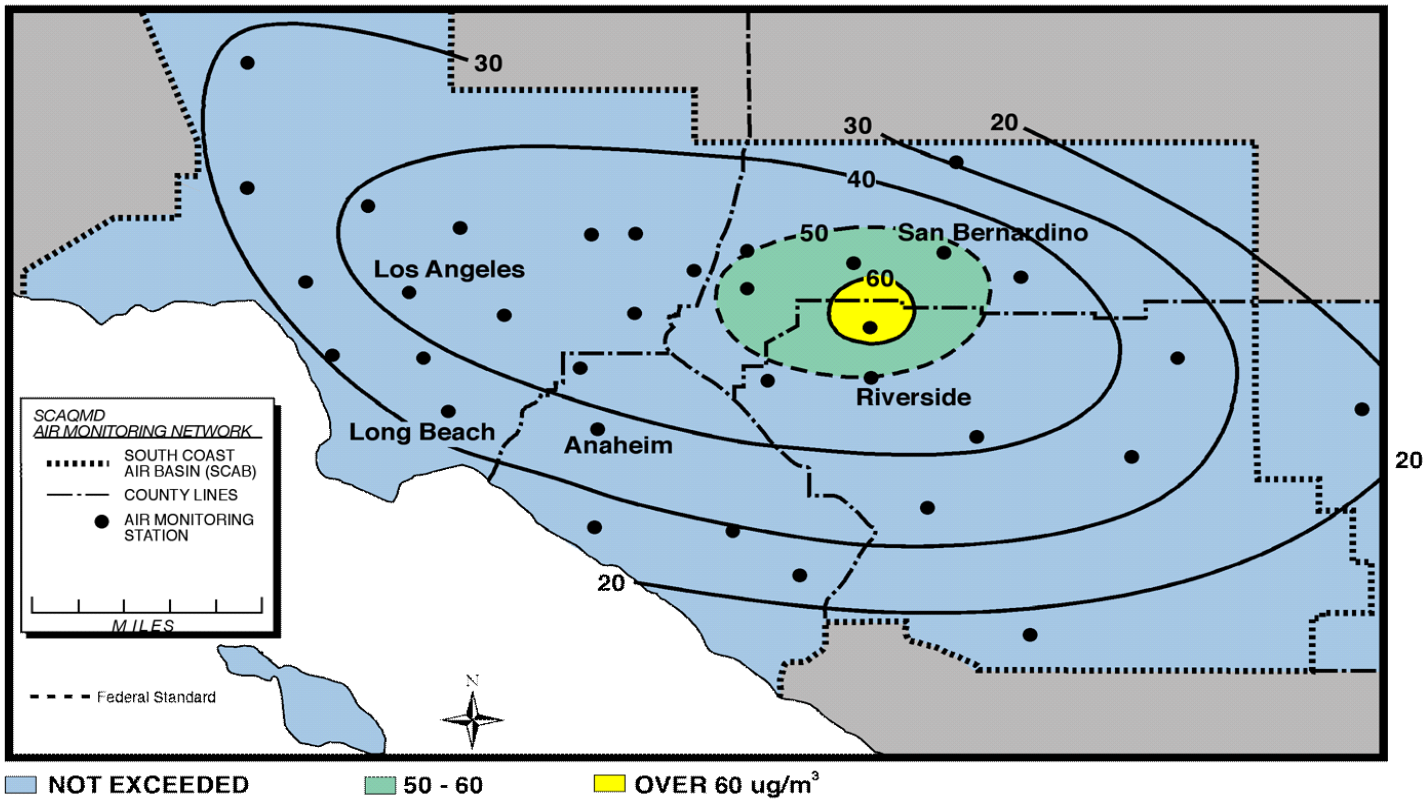
Ozone Emissions (1976 – Present)



What are the Main CAA Requirements Achieved by the 2003 AQMP?

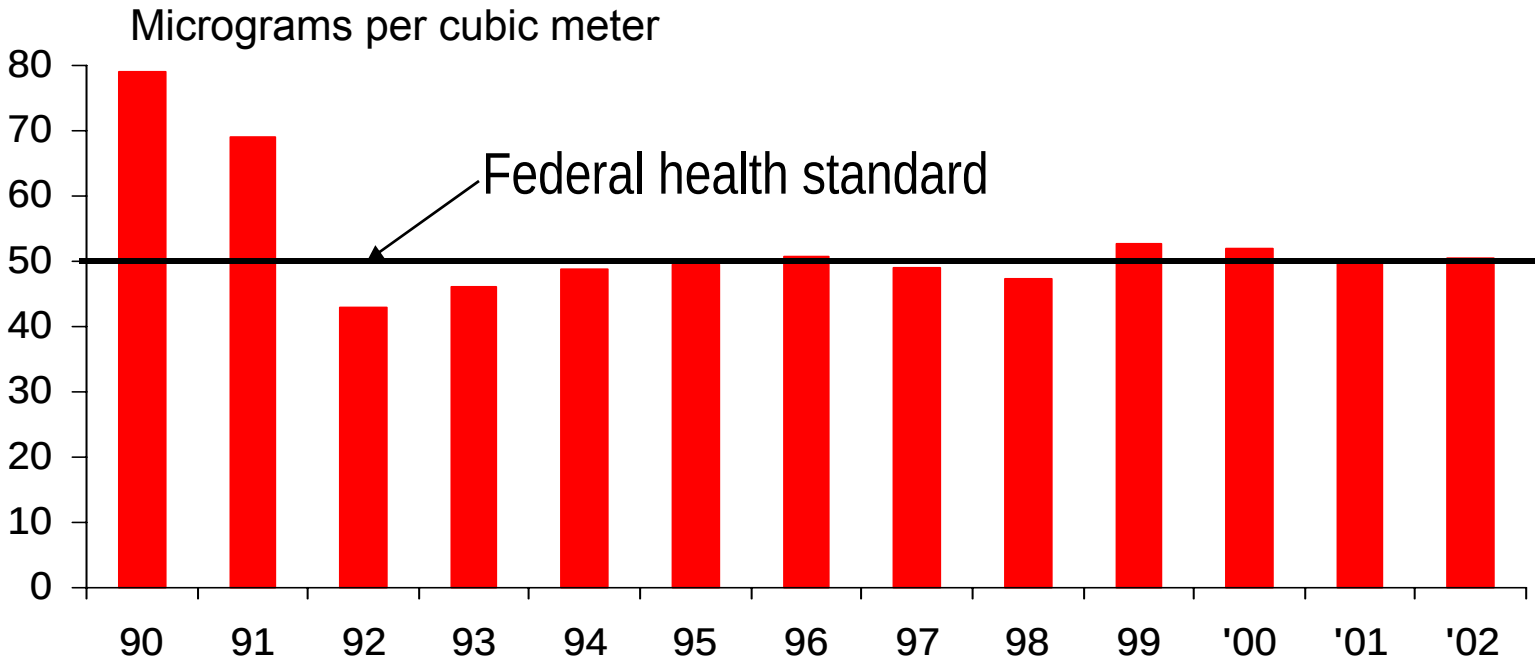
- Attainment Demonstration with Federal Standards
  - Carbon Monoxide
  - PM10 (by 2006)
  - 1-Hour Ozone (by 2010)
- Expeditious Progress Toward Attainment of State Standards and New Federal Standards (8-Hour Ozone and PM2.5)

What is the Maximum Annual Average PM10 Concentration in the District?



2001
Annual Average Concentration Compared to Federal Standard
(50 µg/m^3, annual arithmetic mean)

Annual Average PM10*



* Excludes blowsand events under EPA's Natural Events Policy

Daily PM10 under standard except high wind days

- 1997-1999: 3 events
- 2000-2002: 7 events