

# SMOKE MANAGEMENT & YOU



# Objectives

Basic understanding of smoke impacts

Overview-NM Smoke Management  
Program

Show tools we use to inform YOU about  
smoke



# WHY do we manage smoke?



06/25/2011

To reduce the particulates that are released into the air from fire.



NWS20150515 NOAA-15 WYBRR DRPT RGB-CHEMICAL 05/15/2015 01:30 UTC



Colorado

Kansas

Oklahoma

New Mexico

Texas

WHY do we care about smoke impacts?

# PEOPLE can be impacted by Smoke

*INDIVIDUAL FIRE*

*OR*

*MULTIPLE FIRES STATEWIDE*

*OR*

*FIRE(S) FROM OTHER STATES,*

*(AZ., CA.)*





# INVERSION

An inversion acts like a lid,  
keeping rising air in the atmosphere from moving  
upward, trapping particulate matter.



# Particulate Matter

## Coarse



Dust Storm 7/2011 Courtesy NWS  
PHX. Office Tempe, AZ.

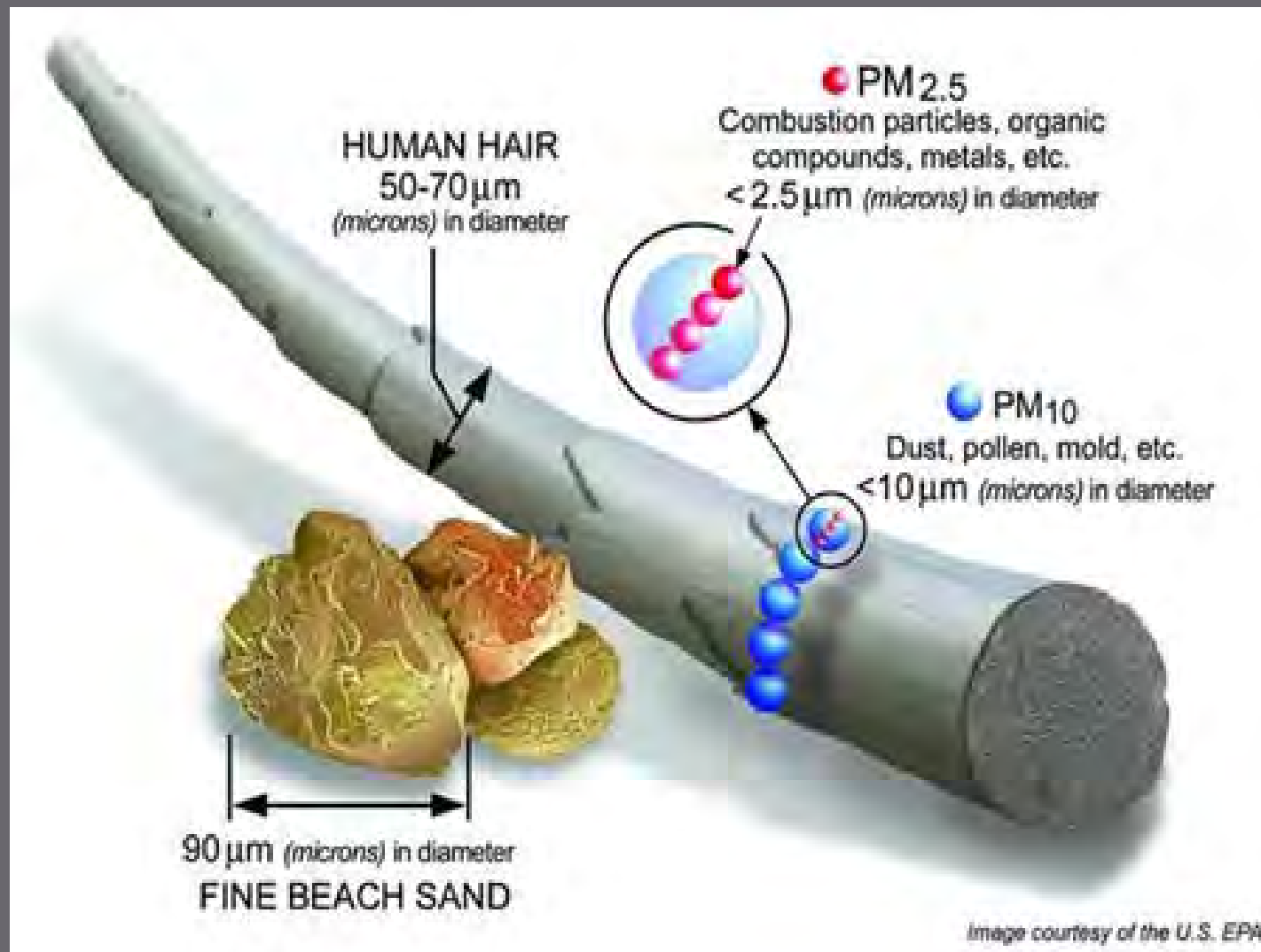
## Fine



Wallow Fire smoke taken from Eldorado  
2011-CStandish



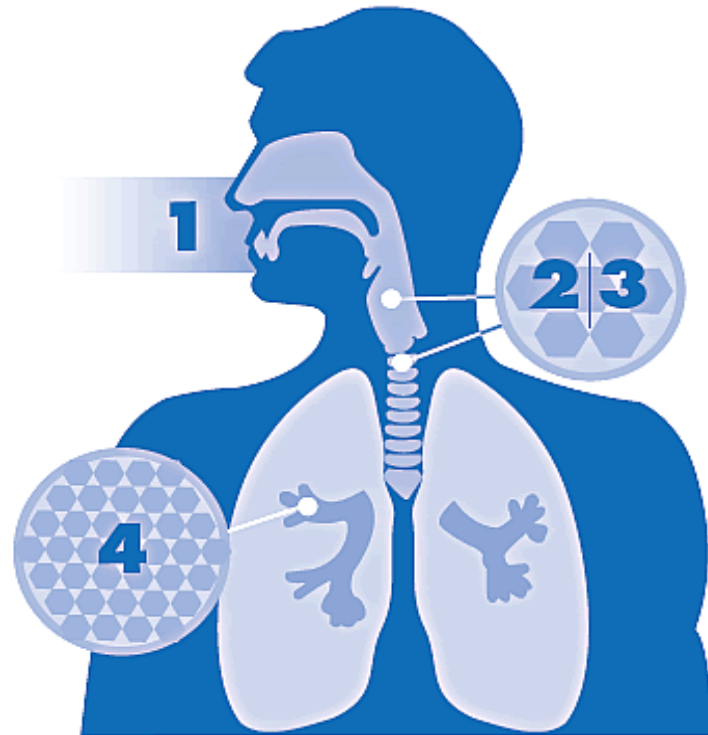
# HOW 'small' is small?



# ENTRY TO BODY

1. Through nose & throat
2. Larger PM 10 leaves through coughing, sneezing & swallowing
3. PM 2.5 can travel deep into the lungs & may cause adverse health effects.

## How Particulate Matter Enters Our Body



**1** Particulate matter enters our respiratory (lung) system through the nose and throat.

**2|3** The larger particulate matter (PM<sub>10</sub>) is eliminated through coughing, sneezing and swallowing.

**4** PM<sub>2.5</sub> can penetrate deep into the lungs. It can travel all the way to the alveoli, causing lung and heart problems, and delivering harmful chemicals to the blood system.

# NM Smoke Management Program (SMP)

To protect health & welfare of New Mexicans  
from all sources of fire

To ensure & maintain visibility

To manage emissions from fire to reduce  
downwind impacts

The program applies equitably to all burners *with  
the exception of Tribal lands & Bernalillo County*

# NM Smoke Management Regulatory Requirements



**Notify both the Air Quality Bureau and Public**

**Use strategies for controlling smoke from prescribed fires**

**Burn when weather conditions are favorable to move smoke away from populated areas**



Observe & document smoke (visual monitoring)

Register burns

Smoke Management Education

Consider alternatives to burning

Track fire emissions



**COMMUNICATION IS THE KEY!**



# Expectations for managing smoke





# WHO ARE THE PLAYERS?



# Tools we use to inform

Monitoring & Modeling

Websites (see handouts)

Smoke Outlook

Daily morning conference calls with cooperators  
during wildfire season

Weekly prescribed fire conference calls with  
burners & meteorologists, as needed

It's all about communication!

# Smoke Monitoring

## Why monitor smoke?

Evaluate *impacts on communities*

Provide *feedback* to public, regulators, smoke forecasters, and managers.

*Verify* assumptions and predictions





# Smoke monitors



# http://www.satguard.com/usfs

Interagency Real Time Smoke Monitoring - Microsoft Internet Explorer provided by USDA Forest Service

File Edit View Favorites Tools Help

Address http://www.satguard.com/usfs/fleet.aspx?

USDA FOREST SERVICE  
Bureau of Land Management  
Fish & Wildlife Service

Home Real Time Data Historical Data About Smoke Monitoring Contact

- Real Time Data By Unit Number
- USFS
  - USFS dataram: 14: Junction City, California
  - USFS dataram: 16: Curlew area
  - USFS eBAM: 21: Salmon Mountains
  - USFS eSAM: 23: Selkirk Mountains
  - USFS dataram: 32: Fort Collins, Colorado
  - USFS eBam: 36: Willow Creek, California
  - USFS eBAM: 47 PM 2.5: East Tulare County area, California
  - FS BAM1020: 49 PM2.5: Kernville, California
  - FS BAM1020: 50 PM2.5: Pinehurst, California
  - FS AutoMet 51 PM2.5: Springville, California
  - USFS eBAM: 55 PM2.5: Sierra Nevada
  - USFS eBAM: 56: Sanger area, California
  - USFS eBAM: 72: Conconully, Washington
  - USFS eBAM: 73: Oroville area, Washington
  - USFS eBAM 74: Junction City, California
  - USFS eBAM 75: Callahan, California
  - USFS eBAM 76: Somes Bar area, California
  - Unit 88: El Portal, California
  - Unit 88: Riggins, Idaho
  - Unit 90: Riggins area, Idaho
  - D4 Code Test: San Diego area
  - eBam Code Test: 9850 Via Pasar, San Diego, CA 92126

FS BAM1020: 49 PM2.5 - Concentration ( $\mu\text{g}/\text{m}^3$ ) Map Detail

Select Date To View

mm dd yyyy  
2 19 2008

Previous Next

**Current Observations**

Updated: 2/19 12:00 pst

Concentration ( $\mu\text{g}/\text{m}^3$ ): 17

RTM09 (mg3): 0

RH (%): 25 %

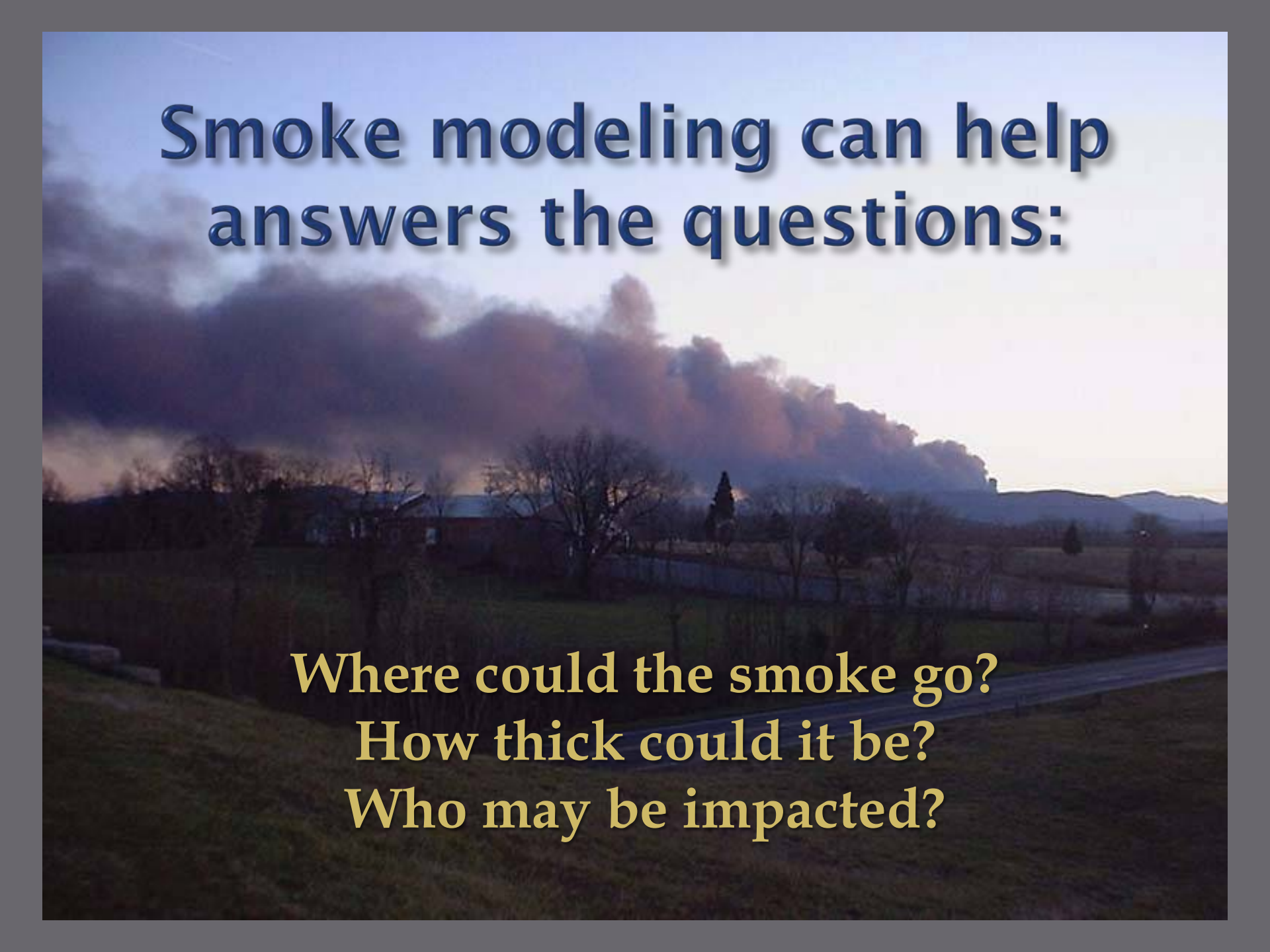
Conc ( $\mu\text{g}/\text{m}^3$ )

**Air Quality Index - Current Conditions**

$\mu\text{g}/\text{m}^3$	0	40.0	80.0	175.0	300.0	500.0
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Raw data presented for this site. Data must be interpreted with care. Data are provided for public awareness only. Contact your regional air quality manager for more information on validated raw data.



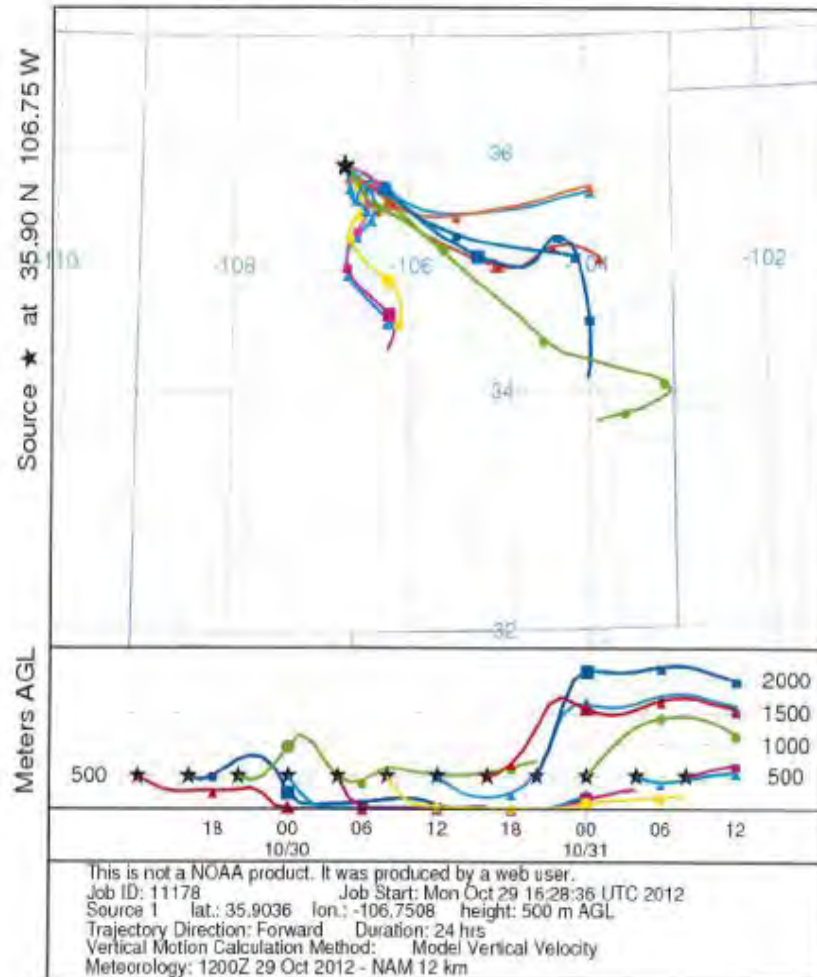


# **Smoke modeling can help answers the questions:**

**Where could the smoke go?  
How thick could it be?  
Who may be impacted?**

# Examples of modeling tools

NOAA HYSPLIT MODEL  
Forward trajectories starting at 1200 UTC 29 Oct 12  
12 UTC 29 Oct NAM Forecast Initialization



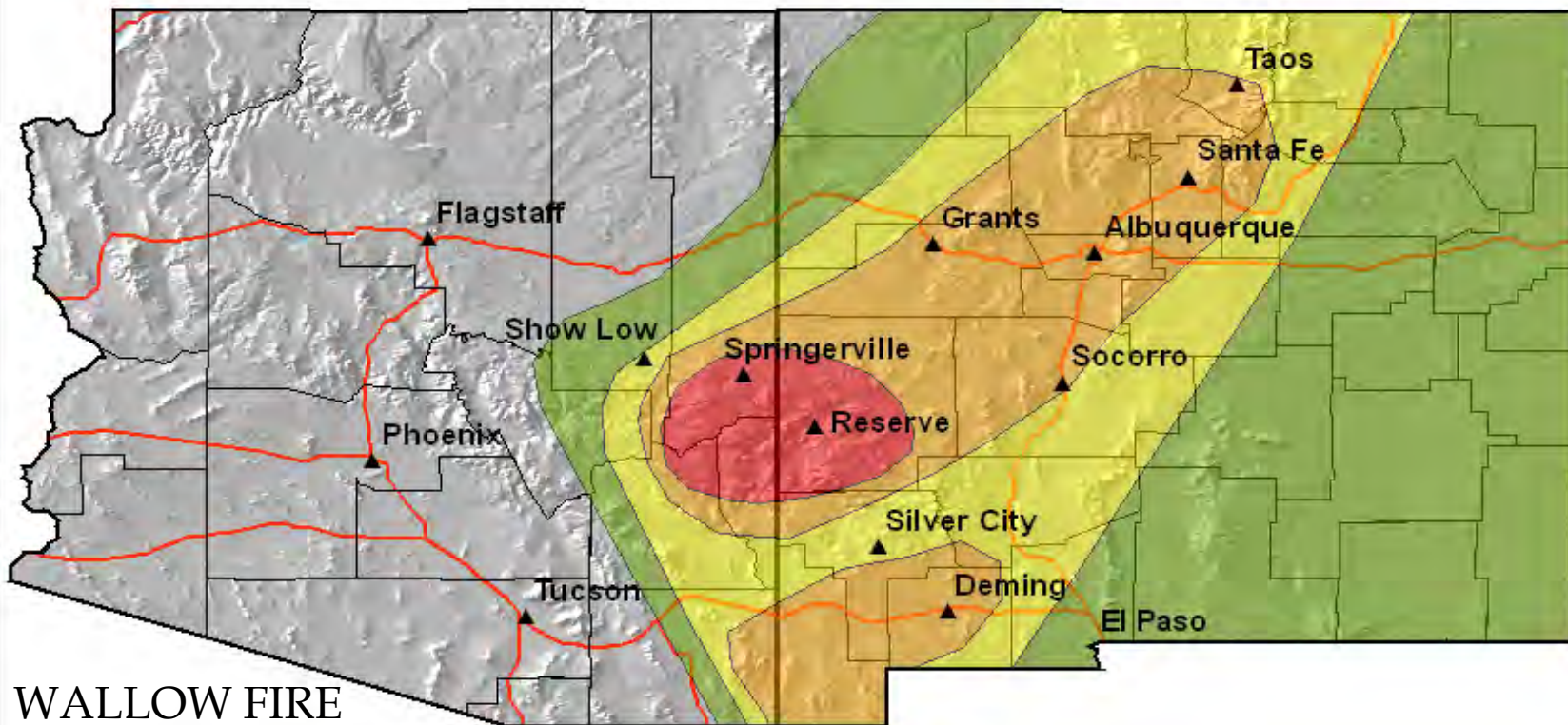
Where could the smoke be heading?



# Projected Wildfire Air Quality Impacts

Valid: June 11-12, 2011

Updated: 1500 MDT 6/11/11



WALLOW FIRE

## Air Quality Index (AQI) Adjective Rating

- |   |  |
|---|--|
|  LIMITED IMPACT (AQI = GOOD) |  UNHEALTHY FOR SENSITIVE GROUPS         |
|  MODERATE                    |  UNHEALTHY / VERY UNHEALTHY / HAZARDOUS |

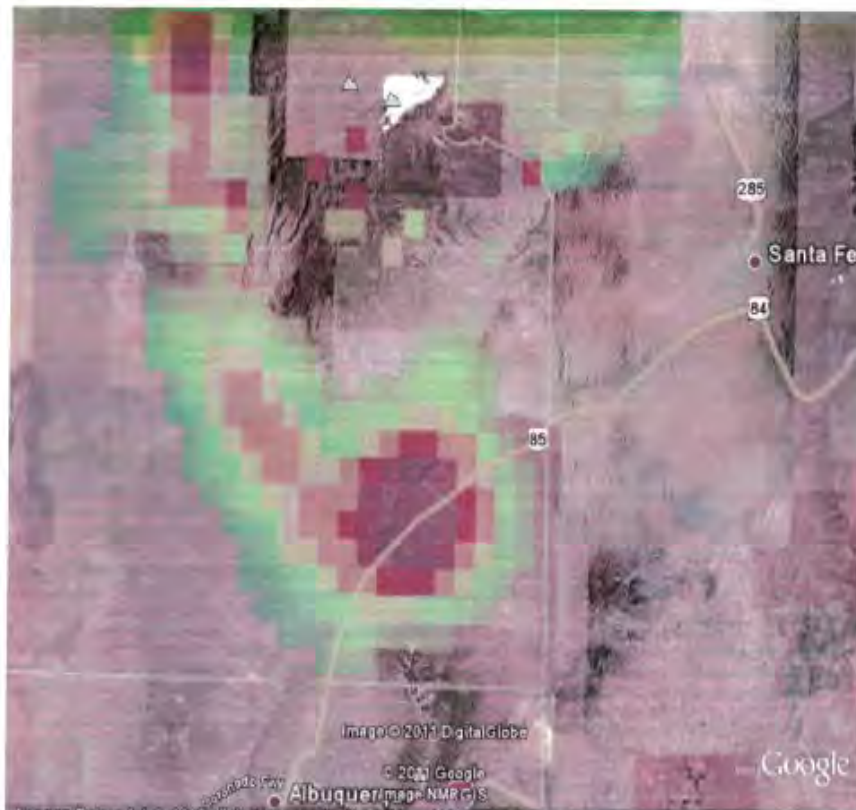
\*\*\*EXAMPLE OF PRODUCTS



# Potential Visibility Concerns on I-25

## Potential Visibility Concerns on I-25 between Albuquerque and Santa Fe tonight, July 1, into tomorrow morning.

Experimental smoke modeling of the Los Conchas fire predicts that there will be smoke that could reduce visibility on I-25 tonight between 10 pm and 4 am tonight. Heaviest smoke is expected after midnight for about an hour. The model run was a joint effort from the USFS Airfire Team using high resolution meteorological data provided by National Atmospheric Release Advisory Center at Lawrence Livermore National Laboratory. There is uncertainty in the model as wind patterns have been light and variable, and smoke movement may be more terrain driven. The model is also sensitive to both meteorological assumptions as well as assumptions regarding fire activity. However, this prediction was based on the best information at the time.





## SOUTHWEST COORDINATION CENTER (SWCC)



Cooperation Through Coordination

Updated 1600 MDT June 20, 2011

Contact: Pete Lahm, Forest Service, 505-842-3597

Significant smoke impacts from ongoing wildfires are expected to remain concentrated closer to active fire areas as winds subside, with general impacts continuing across southwest New Mexico and adjacent eastern Arizona and a portion of north-central New Mexico to include Santa Fe.

Transport winds will decrease significantly and become more northwesterly as high pressure builds over Arizona. This will constrain general smoke impacts to areas near and south-southeast of the fires, but potentially expand nighttime and morning impacts in drainages feeding away from fire areas due to stronger nighttime inversions. With this, the most significant impacts will remain focused near and downwind of the Wallow Complex to include the communities of Alpine, Luna, and Reserve and may extend to include Clifton. Other considerable impacts are expected in the vicinity of the Parhaco Fire to include Nambé Pueblo, Santa Fe, and the Upper Pecos River valley.

Near the Wallow Complex in both Arizona and New Mexico, areas may experience periods of Unhealthy air quality levels. Expect heaviest concentrations immediately downwind of fire activity and in adjacent drainages. If heavy smoke is present, then outdoor activities should be minimized where possible and caution observed when driving in reduced visibility. Some of these same areas may also experience periods with visibility of 1.5 – 2.5 miles, which is indicative of air that is unhealthy for all groups, including Sensitive Groups (those with asthma, lung or heart disease, children, older adults, and recent science indicates pregnant women). Take this into consideration when deciding whether or not to participate in outdoor activities, recognizing that conditions can change quickly and these projections are based on anticipated weather conditions and fire activity.



Your eyes are your best tools to determine if it's safe to be outside. Remember: if visibility is 10 miles or up, the air quality is Good; six to nine miles, air quality is Moderate; three to five miles, air quality is Unhealthy for Sensitive Groups; one and a half to two and a half miles, air quality is Unhealthy; one to one and a quarter miles, air quality is Very Unhealthy; and one mile or less, air quality is Hazardous.



# Air Quality Guide for Particle Pollution

Adjective	Concentration PM 2.5 (ug/m3- 24 hr. avg.)	Cautionary Statement	Health Effects Statement
Good	0-15	None	
Moderate	16-35	Unusually sensitive people should consider reducing prolonged or heavy exertion	
Unhealthy for Sensitive Groups	36-65	People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion.	Increasing likelihood of respiratory symptoms in sensitive individuals, aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly.
Unhealthy	66-150	People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion	Increased aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; increased respiratory effects in general population.
Very Unhealthy Alert	151+	People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy	Significant aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; significant increase in

# VISIBILITY CHART

## YOUR EYES ARE YOUR BEST TOOLS TO DETERMINE IF IT'S SAFE TO BE OUTSIDE

The NM Air Quality Bureau monitors air pollution throughout the state to ensure that air quality standards are being met. Because wildfires often occur in remote areas, and the smoke impacts are transitory, monitoring wildfire smoke levels is often difficult. Given the highly visible nature of wildfire smoke, it is possible to make visual estimates of smoke levels. Generally the worse the visibility, the worse the smoke. The table below shows this relationship and how to estimate potential health effects.

Visibility range	Health category	Health effects	Cautionary statements
10 miles and up	Good	None expected.	None.
6 to 9 miles	Moderate	Possible aggravation of heart or lung disease.	Unusually sensitive people should consider limiting prolonged or heavy exertion.
3 to 5 miles	Unhealthy for sensitive groups	Increasing likelihood of respiratory or cardiac symptoms in sensitive individuals, aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly.	People with heart or lung disease, the elderly, children and pregnant women should limit prolonged or heavy exertion and limit time spent outdoors.
1 1/2 to 2 1/2 miles	Unhealthy	Increased aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; increased respiratory effects in general population.	People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion and stay indoors and avoid exertion. Everyone else should reduce prolonged or heavy exertion and limit time spent outdoors.
1 to 1 1/4 miles	Very unhealthy	Significant aggravation of heart or lung disease, premature mortality in persons with cardiopulmonary disease and the elderly; significant increase in respiratory effects in general population.	People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone should avoid prolonged or heavy exertion, stay indoors and avoid exertion.
Less than 1/2 mile	Hazardous	Serious aggravation of heart or lung disease, premature mortality in persons with cardiopulmonary disease and the elderly; serious risk of respiratory effects in general population.	Everyone should avoid any outdoor activity.

Source: Wildfire Smoke. A Guide for Public Officials. 2008.

<http://www.epa.gov/ttnamfi/files/tambien/smoke/wildcat.pdf>. Based on levels of particulate matter less than 2.5 microns in diameter.

The procedure for making this observation is:

1. Face away from the sun.
2. Determine the limit of your visual range by looking for targets at known distances (miles).
3. Visual range is that point at which even high contrast objects totally disappear.
4. Use the values above to determine the local forest fire smoke category

# ACTIONS YOU CAN TAKE

- ▣ Stay inside your home, unless you are asked to evacuate.  
Do not run evaporative cooler - air conditioner OK
- ▣ Shelter at American Red Cross Center, if set up
- ▣ Visit with relatives away from the area
- ▣ If you are experiencing symptoms, visit an urgent care center, emergency room or contact your medical provider
- ▣ Stay informed

# WRAP UP

Where there are fire adapted ecosystems, there will be smoke.

Understanding smoke impacts is complex.

The New Mexico Smoke Management Program is designed to minimize emissions from prescribed fire.

Communicating information about smoke to YOU is a high priority.

**Let's talk & learn from one another!**





**QUESTIONS?**

*Thank you for your time!*

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