



Silverton, CO on April 8, 2013 Courtesy: Mountain Studies Institute

Western Colorado Regional Air Quality Collaboration Call #12

February 25, 2014

# RESPONSE(S) TO REGIONAL DUST STORMS



# OVERVIEW

- ✘ Pollutants that Cause Dust Storms
- ✘ Origin(s) of Storms
- ✘ Potential Sources
  - + Natural vs. Anthropogenic (Man-Made)
- ✘ Community Impacts
  - + Health Advisories and Communication
  - + Understanding Local Sources and Controls
  - + Attainment status

# PARTICULATE MATTER (PM) IS A COMPLEX MIXTURE OF EXTREMELY SMALL SOLID PARTICLES AND LIQUID DROPLETS IN THE AIR.

- ✘ *primary particles* are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks or fires
- ✘ *secondary particles* form in complicated reactions in the atmosphere of chemicals such as sulfur dioxides and nitrogen oxides that are emitted from power plants, industries and automobiles



# WHAT IS PM<sub>10</sub>?

- ✘ PM<sub>10</sub> is all particles less than or equal to 10 micrometers in diameter (including all PM<sub>2.5</sub>)
- ✘ Sources are mainly geologic like:
  - + Wind blown dust
  - + Road dust both from paved roads mostly due to sanding and mud & dirt track-out
  - + Unpaved roads



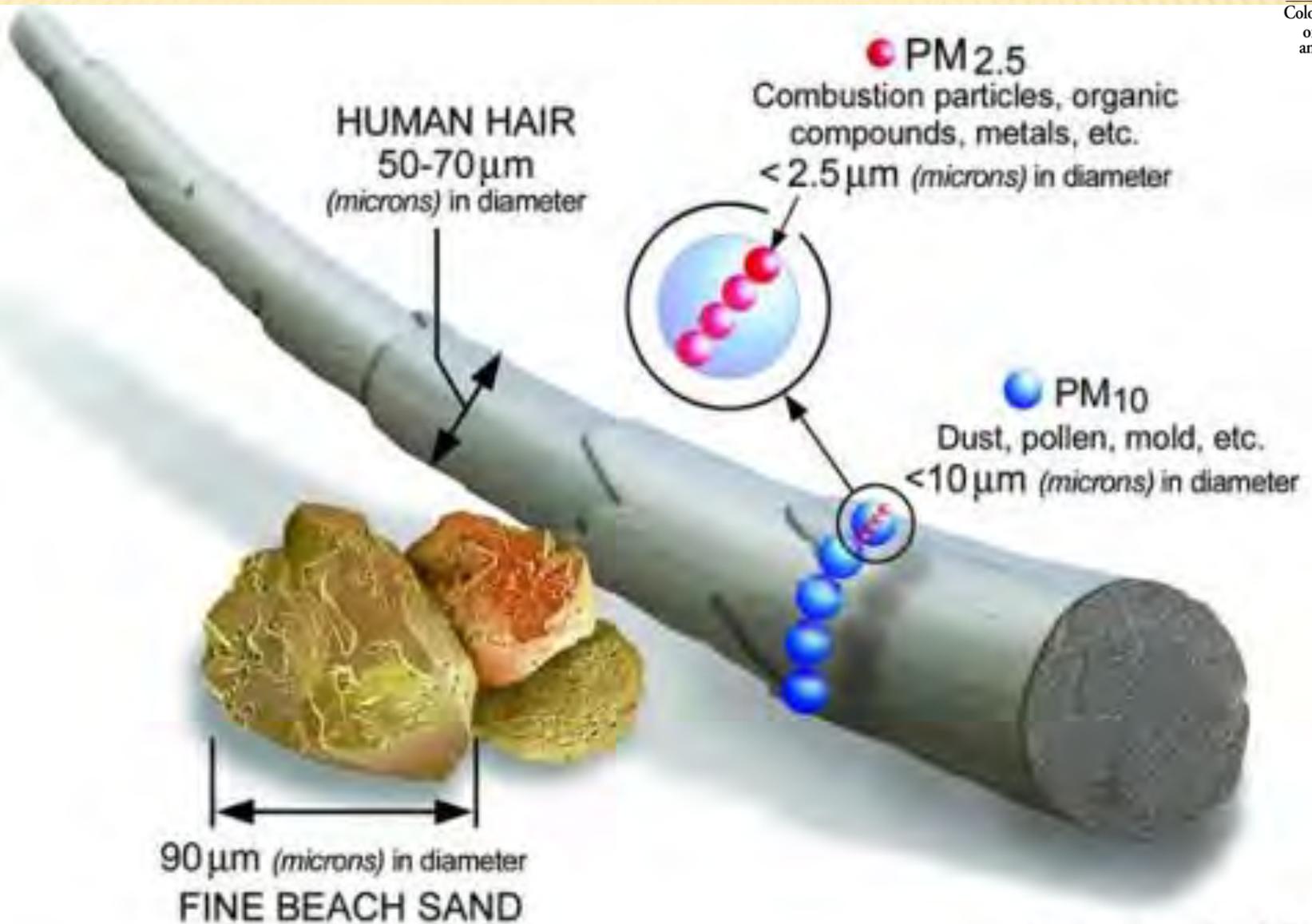


Image courtesy of the U.S. EPA

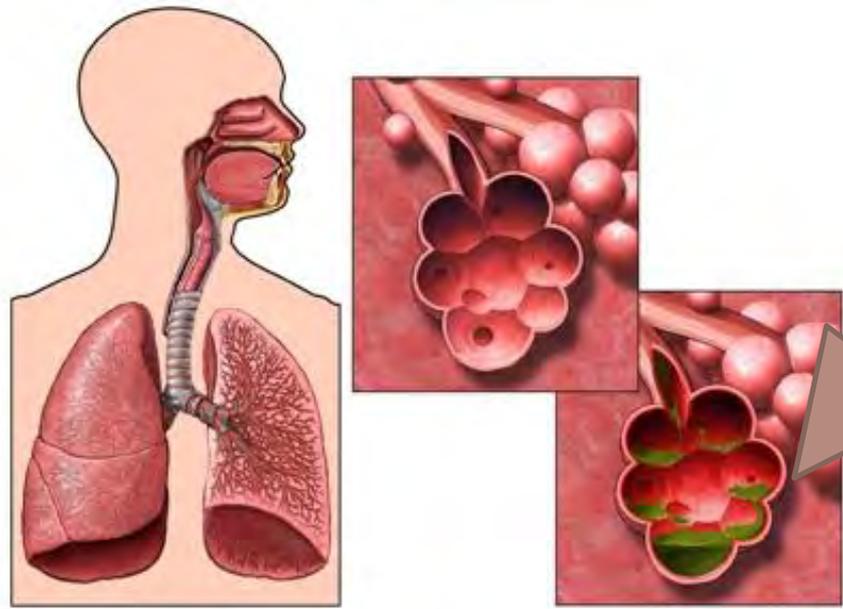


# PM<sub>10</sub> NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

| Primary/<br>Secondary    | Averaging Time | Level                        | Form  |
|--------------------------|----------------|------------------------------|---|
| primary and<br>secondary | 24-hour        | 150 $\mu\text{g}/\text{m}^3$ | Not to be<br>exceeded<br>more than<br>once per year<br>on average<br>over 3 years |

# WHY SHOULD WE BE CONCERNED ABOUT PM<sub>10</sub>?

- ✘ PM<sub>10</sub> passes through the throat and nose and enter the lungs (some may even get into the bloodstream)
- ✘ Once inhaled, these particles can affect the heart and lungs and cause serious health effects



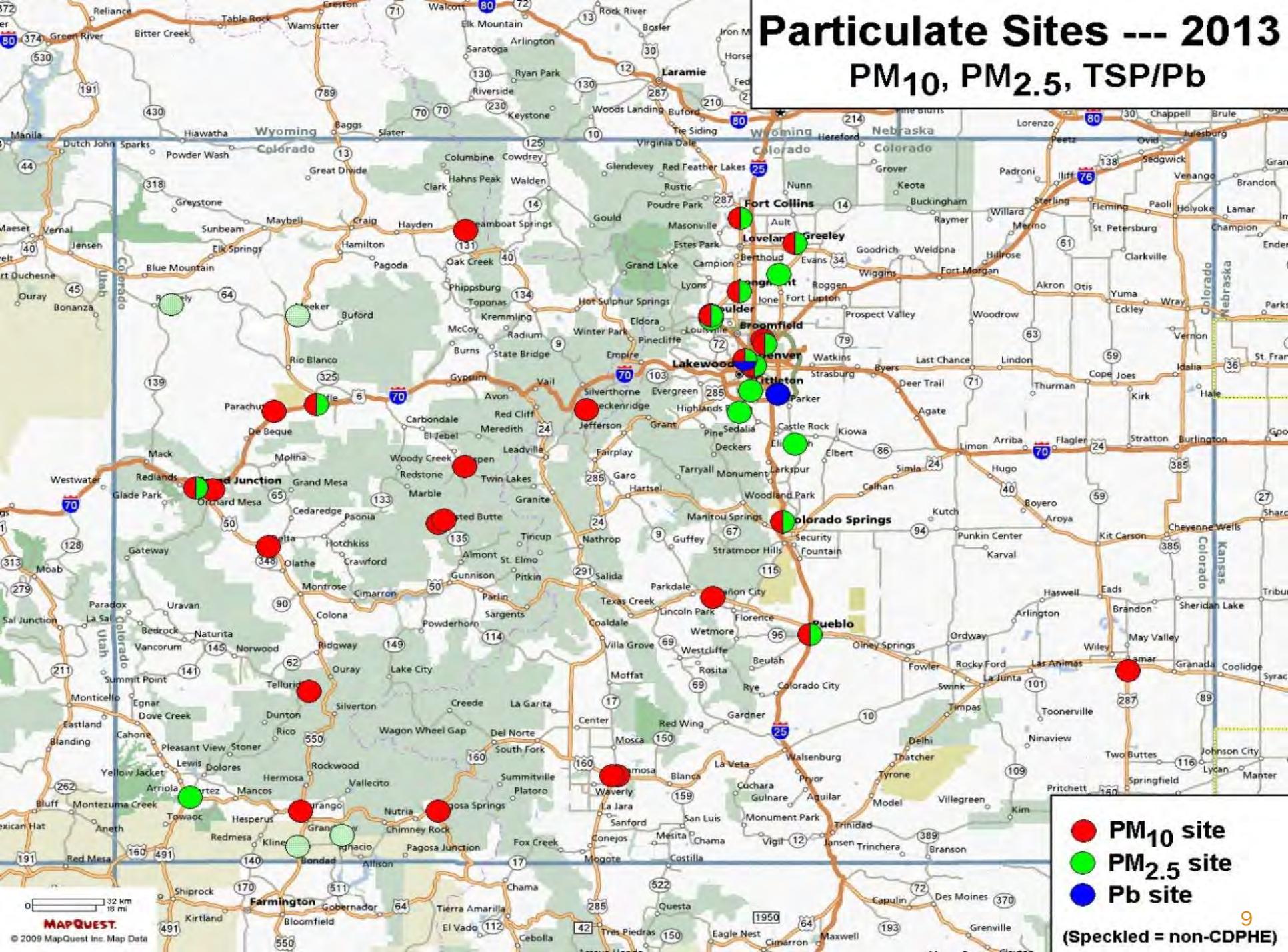
- premature death in people with heart or lung disease
- nonfatal heart attacks
- irregular heartbeat
- aggravated asthma
- decreased lung function
- increased respiratory symptom, such as irritation of the airways, coughing or difficulty breathing



The portion of the Colorado Plateau in Utah, Arizona, and New Mexico that exhibits widespread surface soil and sand erosion features in Google Earth imagery. Much of the highlighted area within Arizona is within the Painted Desert.

# Particulate Sites --- 2013

## PM<sub>10</sub>, PM<sub>2.5</sub>, TSP/Pb



- PM<sub>10</sub> site
- PM<sub>2.5</sub> site
- Pb site

(Speckled = non-CDPHE)

# AREAS WITH MULTIPLE HIGH PM<sub>10</sub> (DUST) EVENTS

- ✘ Alamosa (2 sites)
- ✘ Pagosa Springs
- ✘ Delta
- ✘ Parachute
- ✘ Crested Butte
- ✘ Mt. Crested Butte
- ✘ Durango
- ✘ Grand Junction
- ✘ Clifton
- ✘ Lamar
- ✘ Telluride



Near Aspen, Colorado – April 2009





# HISTORICAL BLOWING DUST ADVISORIES

- ✘ 2014 so far: 14 advisories issued
- ✘ 2013: 18 advisories issued
- ✘ 2012: 16 advisories issued
- + Majority of spring advisories for western Colorado
  - ✘ Rangely, Grand Junction, Craig, Durango, Telluride, Gunnison, Delta, Alamosa, etc.
- + Fall/winter tends to be eastern/southern Colorado plains
  - ✘ Pueblo, Yuma, Lamar, La Junta, etc.

# PUBLIC NOTIFICATION TECHNIQUES

- × How can we protect public health from widespread dust particles?
  - + Health advisories
  - + Understand/target susceptible populations
  - + Local/regional communication
  - + Potential local source control



Dust storm approaching farm near Lamar, CO (Denver Post)

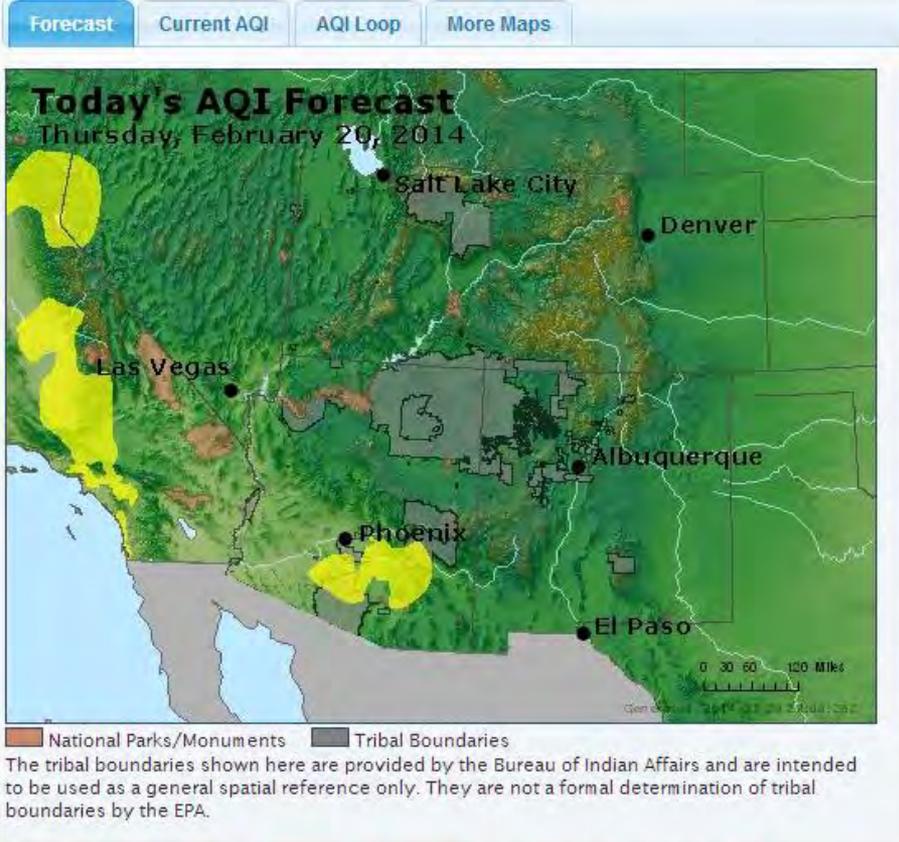
# AIR QUALITY INDEX/ADVISORY



- EPA-preferred method
- Health-based
- Consistent with most other areas
- Multi-pollutant
  - Used for PM<sub>2.5</sub> and ozone
- Conflict resolution (Example: No more Colorado “Red” advisory when AQI value is in the Green category)



[Air Quality Forecast & Colorado Smoke Advisories](#)



Good
Moderate
USG
Unhealthy
Very Unhealthy
Hazardous
! Action Day

- State Air Quality Resources**
- [American Lung Association \(ALA\) of Colorado](#)
  - [Colorado Air Quality Summary](#)
  - [Colorado DPHE - Air Pollution Control Division](#)
  - [Colorado DPHE - Contact Information](#)
  - [Colorado Department of Public Health & Environment \(DPHE\)](#)

| Click on the city name for more detailed information.<br><a href="#">printable summary</a> | FORECAST   |            | CURRENT AQI |
|--|------------|------------|-------------|
|  | Thu Feb 20 | Fri Feb 21 |             |
| <a href="#">Colorado River Valley</a>  | Good       | Good       | 29          |
| <a href="#">Colorado Springs</a>   | Good       | Good       | 34          |
| <a href="#">Denver</a>   | Good       | Good       | 40          |
| <a href="#">Fort Collins</a>   | Good       | Good       | 33          |
| <a href="#">Four Corners Area</a>  | Good       | Good       | 35          |
| <a href="#">Grand Junction</a>   | Good       | Good       | 5           |
| <a href="#">Greeley</a>  | Good       | Good       | 31          |
| <a href="#">Mesa Verde National Park</a>   | n/a        | n/a        | 35          |
| <a href="#">Rocky Mountain National Park</a>   | 44         | 45         | 36          |

*Sign up at [www.airnow.gov](http://www.airnow.gov)*



# NOTIFICATION TOOLS

- CDPHE has listserv for blowing dust events - please contact if you wish to sign up
- Currently, the best place to check for any advisories is at:  
[http://www.colorado.gov/airquality/colorado\\_summary.aspx](http://www.colorado.gov/airquality/colorado_summary.aspx)  
under “Other Areas”
  - **Statewide advisories are currently issued**
- APCD Facebook and Twitter pages are also great resources for blowing dust events:
  - <https://www.facebook.com/cdphe.apcd>
  - <http://twitter.com/#!/cdpheapcd>
- CDPHE also has both Facebook and Twitter page for statewide health and environmental news:
  - <http://www.facebook.com/CDPHE>
  - <https://twitter.com/#!/CDPHE>

# Colorado Air Quality Summary

[About the Air Quality Index \(AQI\)](#)  
[Today's Air Quality Summary \(detailed\)](#)

[Front Range  
Air Quality Forecast](#)

[Smoke Outlook](#)

## Air Quality Advisories

Denver:

No Advisories in Effect

No Indoor Burning Restrictions - There will adequate winds and mixing to keep pollutant and Visibility levels in the Good range on Friday. ([click for more...](#))

Other Areas:

No advisories at this time. ([click for more...](#))

### Key

| Scale - Air Quality Index (AQI) |                                       |
|---------------------------------|---------------------------------------|
| 0 - 50                          | <b>GOOD</b>                           |
| 51 - 100                        | <b>MODERATE</b>                       |
| 101 - 150                       | <b>UNHEALTHY</b> for sensitive groups |
| 151 - 200                       | <b>UNHEALTHY</b>                      |
| 201 - 300                       | <b>VERY UNHEALTHY</b>                 |
| 301 - 500                       | <b>HAZARDOUS</b>                      |

| Scale - Visibility Standard Index |                        |
|-----------------------------------|------------------------|
| 0 - 50                            | <b>GOOD</b>            |
| 51 - 100                          | <b>MODERATE</b>        |
| 101 - 200                         | <b>POOR</b>            |
| 201 - 300                         | <b>EXTREMELY POOR</b>  |
|                                   | <b>WEATHER LIMITED</b> |
|                                   | <b>NOT AVAILABLE</b>   |

[What is an Action Day?](#)

## Current - Air Quality Summary

|                            | Current - Air Quality Index (AQI) <small>4PM</small> | Highest AQI (so far) Today <small>2/20/2014</small> | Highest AQI Yesterday <small>2/19/2014</small> |
|----------------------------|--|---|--|
| Install on your website... | Denver Metro <b>GOOD</b>                             | Denver Metro <b>GOOD</b>                            | Denver Metro <b>GOOD</b>                       |
|                            | Colorado Springs <b>GOOD</b>                         | Colorado Springs <b>GOOD</b>                        | Colorado Springs <b>GOOD</b>                   |
|                            | Ft Collins - Greeley <b>GOOD</b>                     | Ft Collins - Greeley <b>GOOD</b>                    | Ft Collins - Greeley <b>GOOD</b>               |
|                            | Grand Junction <b>GOOD</b>                           | Grand Junction <b>GOOD</b>                          | Grand Junction <b>MODERATE</b>                 |
|                            | Colo. River Valley <b>GOOD</b>                       | Colo. River Valley <b>GOOD</b>                      | Colo. River Valley <b>MODERATE</b>             |

Denver's current visibility: **GOOD**

Ft. Collins' current visibility: **NOT AVAILABLE**

(VSI is calculated between 12PM and 4PM local time)

[More about air quality forecasting regions...](#)

## Forecast - Air Quality Summary

| Thursday              | Ozone       | Fine Particulates    | Carbon Monoxide      | Nitrogen Dioxide     |
|-----------------------|-------------|----------------------|----------------------|----------------------|
| Denver - Boulder      | <b>GOOD</b> | <b>GOOD</b>          | <b>GOOD</b>          | <b>GOOD</b>          |
| Colorado Springs      | <b>GOOD</b> | <b>GOOD</b>          | <b>GOOD</b>          | <b>NOT AVAILABLE</b> |
| Ft. Collins           | <b>GOOD</b> | <b>GOOD</b>          | <b>GOOD</b>          | <b>NOT AVAILABLE</b> |
| Greeley               | <b>GOOD</b> | <b>GOOD</b>          | <b>GOOD</b>          | <b>NOT AVAILABLE</b> |
| Grand Junction        | <b>GOOD</b> | <b>GOOD</b>          | <b>GOOD</b>          | <b>NOT AVAILABLE</b> |
| Colorado River Valley | <b>GOOD</b> | <b>GOOD</b>          | <b>NOT AVAILABLE</b> | <b>NOT AVAILABLE</b> |
| Four Corners Area     | <b>GOOD</b> | <b>NOT AVAILABLE</b> | <b>NOT AVAILABLE</b> | <b>NOT AVAILABLE</b> |
| Friday:               | Ozone       | Fine Particulates    | Carbon Monoxide      | Nitrogen Dioxide     |



# BLOWING DUST ADVISORY EXAMPLE



Colorado Department  
of Public Health  
and Environment

## Air Quality Notifications

### Blowing Dust Advisory

Issued for portions of western Colorado

Issued by Colorado Department of Public Health and Environment

Issued at 10:00 AM Monday, October 28, 2013

**Affected Area:** portions of western Colorado, including Montezuma, Dolores, San Miguel, Ouray, Montrose, Delta, Mesa, Garfield, Rio Blanco and Moffat counties. Cities include, but are not limited to Cortez, Dove Creek, Nucla, Montrose, Delta, Grand Junction, Rangely, Meeker and Craig.

**Advisory in Effect:** 12:00 PM Monday 10/28/2013 to 7:00 PM Monday 10/28/2013

**Public Health Recommendations:** If significant blowing dust is present and reducing visibility to less than 10 miles across a wide area, *People with heart or lung disease, older adults, and children in the affected area should reduce prolonged or heavy indoor and outdoor exertion.*

**Outlook:** Strong gusty winds in advance of a cold front will bring an increased threat for blowing dust Monday afternoon. Areas of blowing dust are possible throughout the advisory area, but will be most likely in far west-central portions of Colorado near the Utah state line including western parts of Montrose, Mesa, Garfield and Rio Blanco counties. Hazardous travel conditions will be possible Monday afternoon on I-70 from Palisade west through Grand Junction and to the Utah state line. The threat for blowing dust will diminish Monday evening.

For the latest Colorado statewide air quality conditions, forecasts, and advisories, visit:

[http://www.colorado.gov/airquality/colorado\\_summary.aspx](http://www.colorado.gov/airquality/colorado_summary.aspx)



# LOCAL GOVERNMENT & COMMUNITY PARTICIPATION

- ✘ Link CDPHE Air Quality Summary website to yours
- ✘ Take photos on event days and send to APCD
- ✘ Work with local hospitals, doctors, schools, retirement homes to inform susceptible populations (e.g. asthmatics)

# POTENTIAL LOCAL SOURCES & CONTROLS

## ✘ Towns/Cities:

- + Vehicles on Streets and Highways
- + Building Construction and Demolition Activities
- + Unpaved Shoulders, Parking Lots, Vacant Lots, and Alleys
- + Leaf Blowers

## ✘ Rural

- + Areas of Exposed Ground
- + Unpaved Roads
- + Farming Operations
- + Off-Road Vehicles



# POTENTIAL LOCAL SOURCES & CONTROLS

## ✘ Businesses

- + Sand and Gravel Operations
- + Concrete and Asphalt Batch Plants
- + Mining and Mineral Processing
- + Food & Agricultural Processing
  - ✘ Grain dryers/mills, fertilizer plants, etc.





# WHAT CAN BE DONE?

- ✘ Encourage businesses to be good neighbors
- ✘ Know who has or needs a permit
- ✘ Think Pollution Prevention
  - + Minimize Surface Area Disturbed
  - + Limit Dusty Work on Windy Days
  - + Apply Dust Suppression Measures when needed
  - + Clean up dusty spills immediately
  - + Grow vegetative cover
  - + Use wind erosion controls



# WHEN IS AN APEN OR PERMIT NEEDED?

| APEN AND PERMIT REPORTING THRESHOLDS FOR ATTAINMENT AND NONATTAINMENT AREAS |                            |                               |                            |                               |
|---|----------------------------|-------------------------------|----------------------------|-------------------------------|
|   | APEN                       |                               | Air Permit                 |                               |
| Pollutant Category  | Attainment (tons per year) | Nonattainment (tons per year) | Attainment (tons per year) | Nonattainment (tons per year) |
| Volatile organic compounds  | 2                          | 1                             | 5                          | 2                             |
| PM-10 and PM-2.5  | 2                          | 1                             | 5                          | 1                             |
| Total suspended particulates  | 2                          | 1                             | 10                         | 5                             |
| Carbon monoxide   | 2                          | 1                             | 10                         | 5                             |
| Sulfur dioxide  | 2                          | 1                             | 10                         | 5                             |
| Nitrogen oxides   | 2                          | 1                             | 10                         | 5                             |
| Lead  | 100 pounds per year        | 100 pounds per year           | 200 pounds per year        | 200 pounds per year           |
| Other criteria pollutants <sup>1</sup>                                      | 2                          | 1                             | 5                          | 2                             |



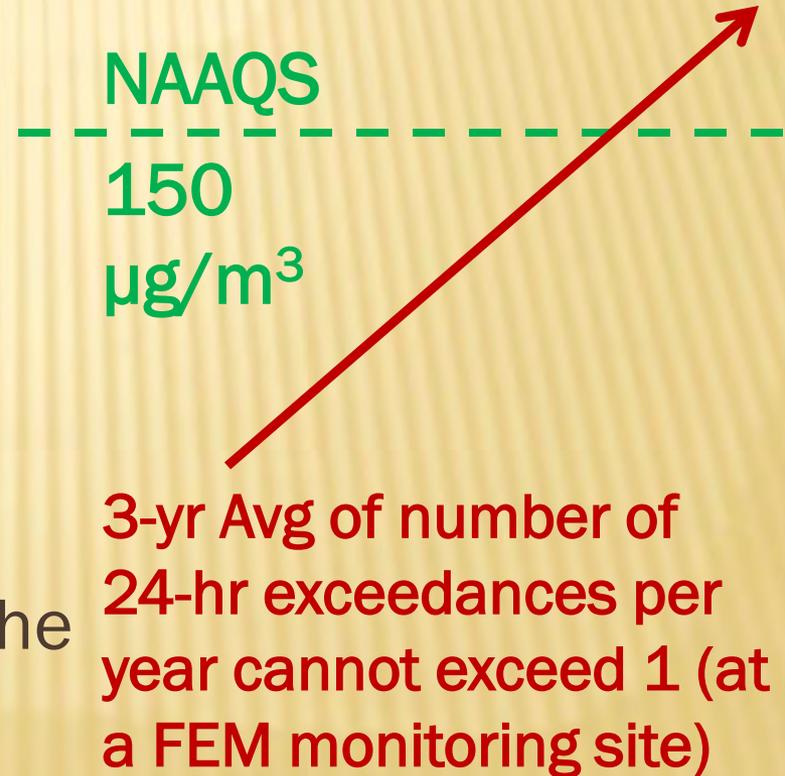
# WHAT COULD HIGH PM<sub>10</sub> CONCENTRATIONS MEAN FOR A COMMUNITY?

- An average of >1.0 exceedance(s) in a three-year period is cause for an area to be designated nonattainment unless EPA concurs with state that exceedance(s) was due to exceptional events
- This could lead to a “non-attainment” designation by EPA for the area
- Non-attainment designation could mean:
  - loss of flexibility in addressing air quality issues
  - More community resources committed to controls
  - More stringent, enforceable dust control programs



# “NONATTAINMENT” MEANS NOT MEETING THE NAAQS WHICH SIGNIFIES THAT THE AIR IS UNHEALTHY TO BREATHE.

- ✘ Once designated as nonattainment, must develop a state implementation plan (SIP) within 3 yrs
  - + The SIP outlines the enforceable measures that the state will take in order to improve air quality



# WHEN A BLOWING DUST EXCEPTIONAL EVENT HAPPENS WE NEED TO ASK:

- + Are levels due to regional blowing dust or local sources?
- + Are Best Available Control Measures (BACM) implemented?
- + Could the high levels of  $PM_{10}$  been prevented by reasonable controls?
- + Local knowledge key part of Exceptional Event documentation





Rifle Air Quality website – dust storm arriving

## QUESTIONS/DISCUSSION!

Lisa Devore – 303-692-3117 – [Lisa.Devore@state.co.us](mailto:Lisa.Devore@state.co.us)