



# Northwest New Mexico Monitoring Network

Presentation to EPA Gas STAR  
November 9, 2011

Presented by Terry Hertel and Mark Jones  
New Mexico Environment Department



# Regional Air Quality Issues

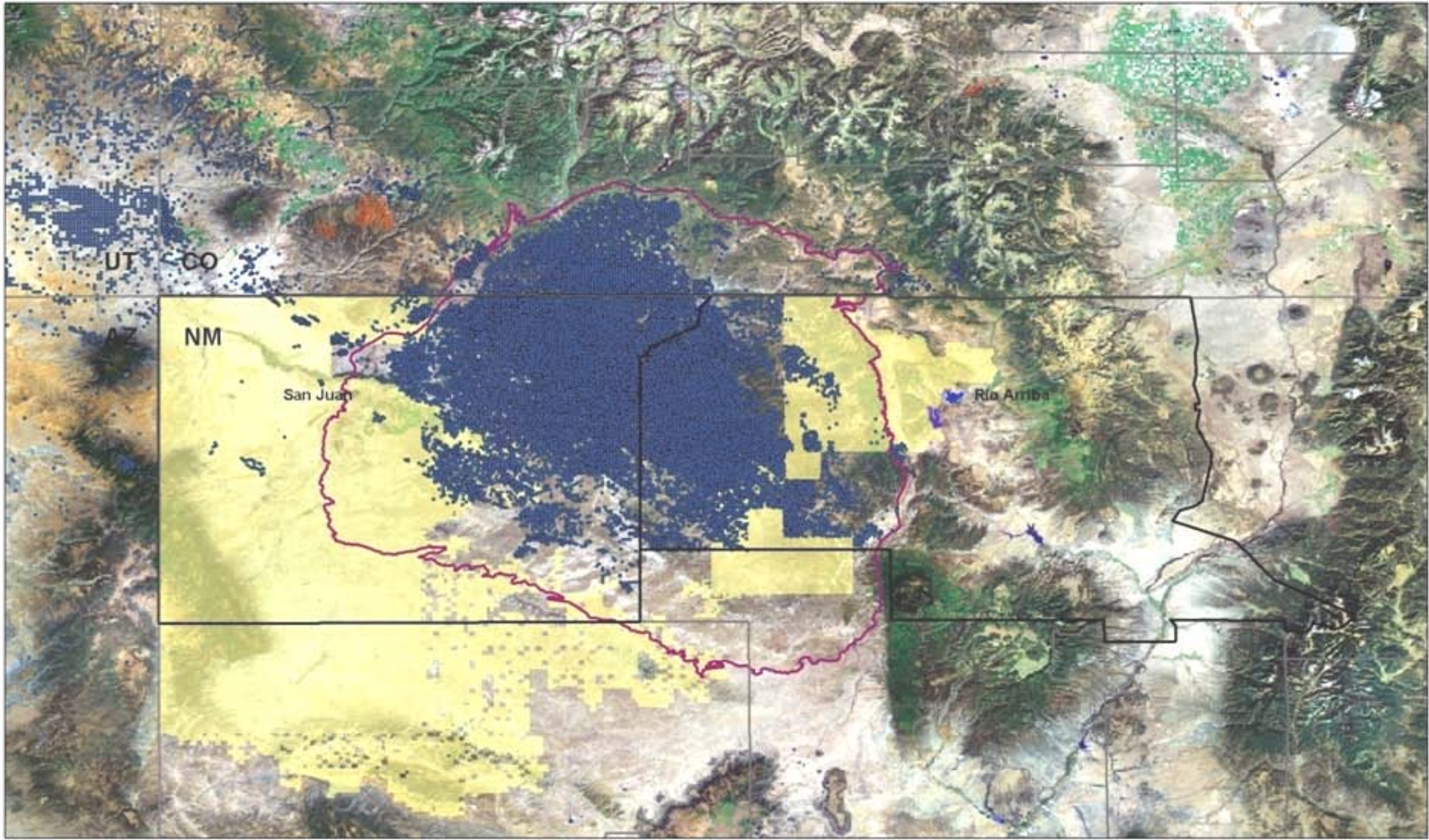
- Ozone
- NOx emissions
- VOC emissions
- Haze
- SOx emissions
- Fugitive Dust
- Smoke emissions
- Mercury Deposition

# Four Corners Emission Sources



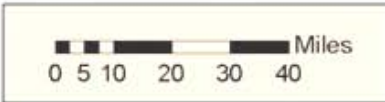
11/9/2011

# Four Corners Active Oil and Gas Locations

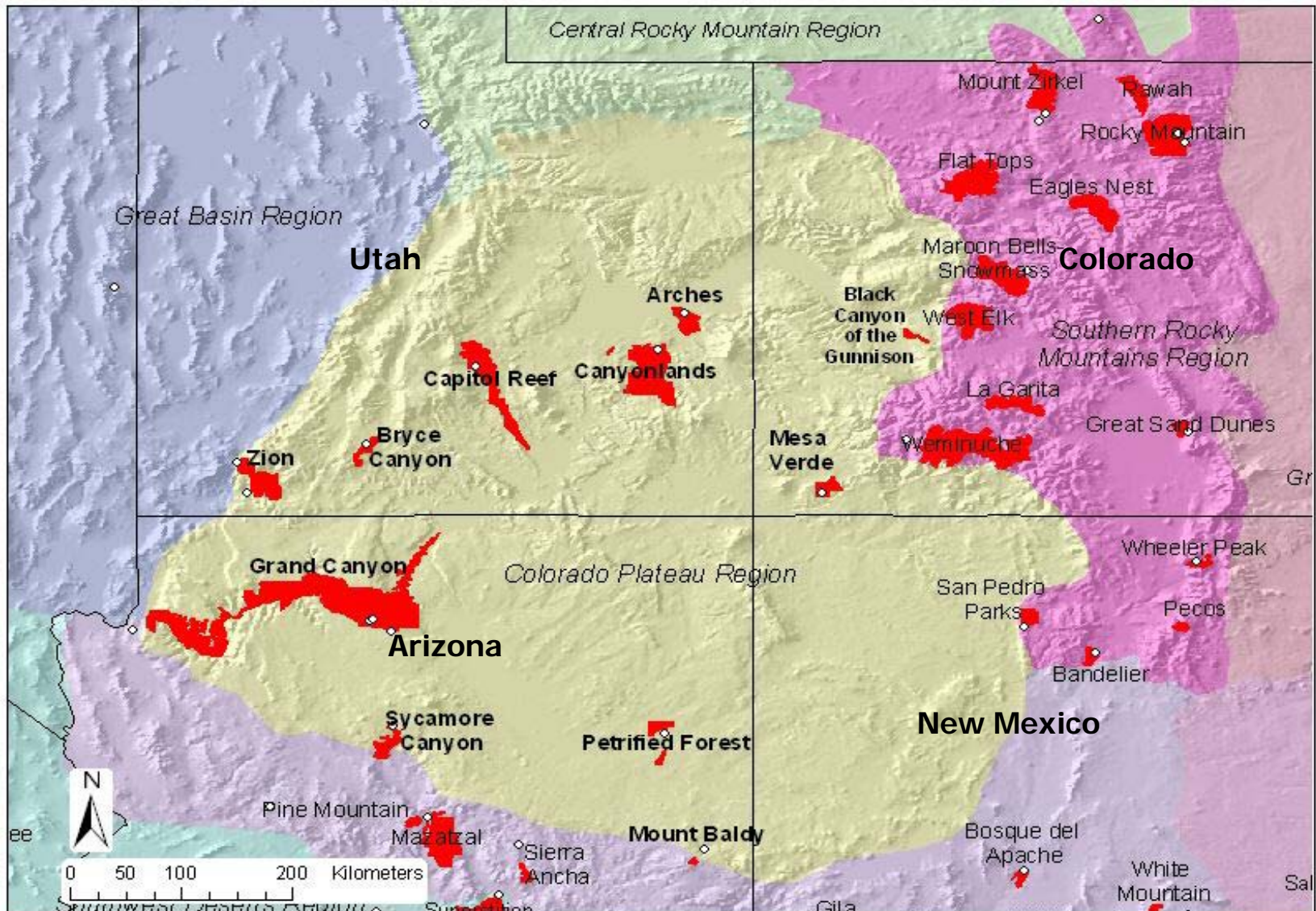


**Legend**

- County Boundaries
- Well Locations
- San Juan Basin
- Tribal Lands



# Class I Areas in the Four Corners



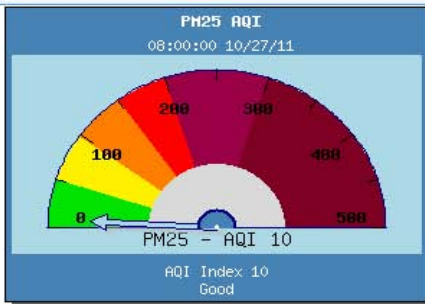
# Criteria Pollutants

- See NM Air Quality Bureau – Air Monitoring Network (real-time monitoring page): <http://air.nmenv.state.nm.us/>



[Air Quality Bureau](#) -- [Air Monitoring Trailer](#) -- [How to Use this Website](#)

Preferences Website Information



| AQI 10<br>Good |            |              |            |
|----------------|------------|--------------|------------|
| Solar Rad      | 108.2 w/m2 | Wind Max     | 5.3 m/s    |
| Temp_2m        | 2 DegC     | NOXppm       | 0.012 ppm  |
| Temp_10        | 1.0 DegC   | NOppm        | 0.003 ppm  |
| Delta_T        | -0.6 DegC  | NO2ppm       | 0.010 ppm  |
| Wind Speed S   | 3 m/s      | O3           | 0.013 ppm  |
| Wind Dir S     | 170.8 Deg  | PM25         | 2.8 ug/m3L |
| Sigma          | 16.2 Deg   | Visual Range | 193 Km     |

[Hover Over the Table for Instant Charts](#)

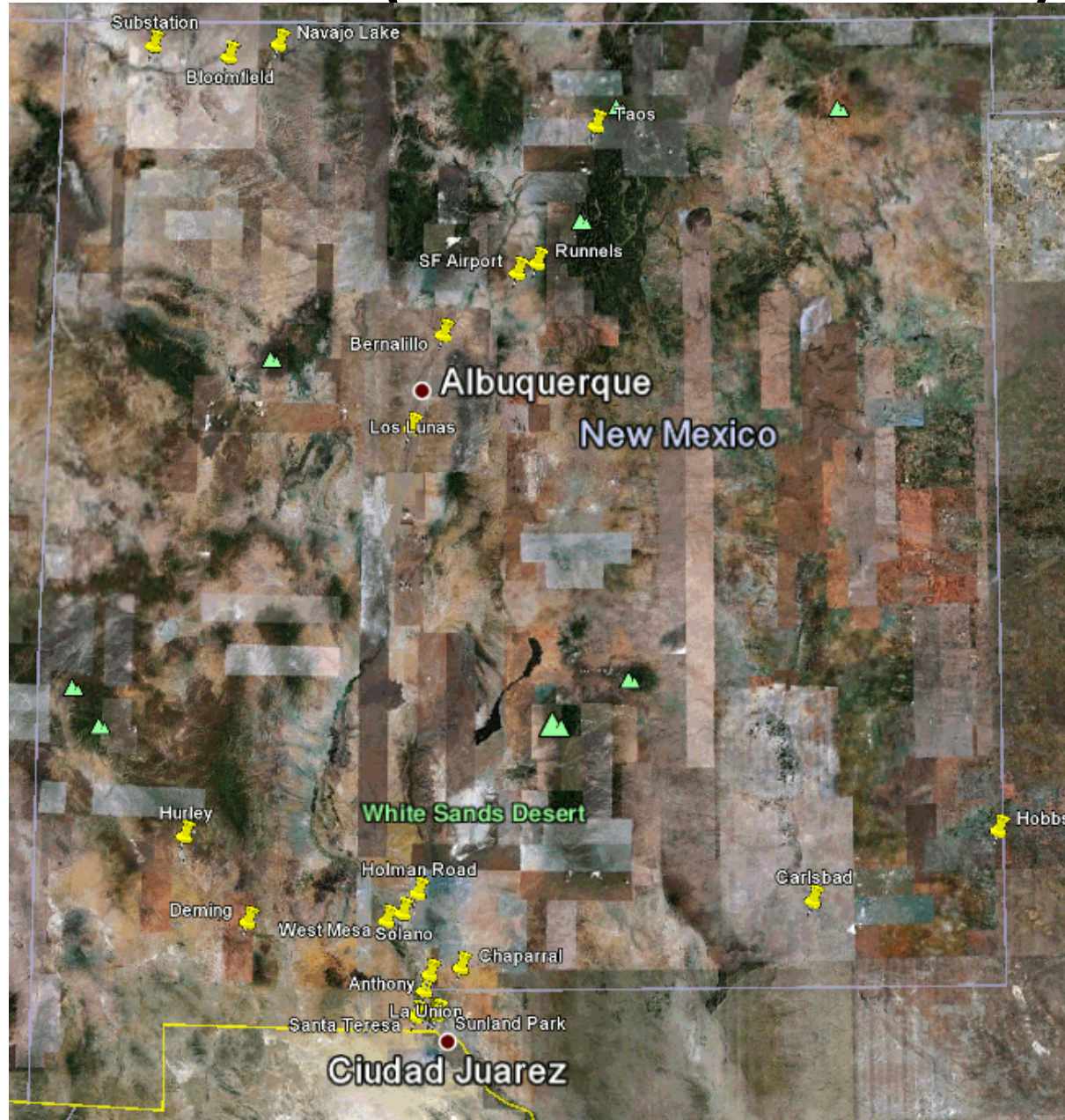
[Click Here For Hourly Historical Data](#)



1NL Navajo Lake 03:00:00 10/27/11



# NM (statewide sites)



# Envista Data Acquisition Software



| Station                | Date Time     | Solar Rad | Temp_2m | Temp_10 | Delta_T | Wind Speed S | Wind Dir S | SO2   | NOX   | NO    | NO2   | O3    | PM25   | PM25_Load | PM10   |
|------------------------|---------------|-----------|---------|---------|---------|--------------|------------|-------|-------|-------|-------|-------|--------|-----------|--------|
|                        |               | w/m2      | C°      | C°      | C°      | m/s          | Deg        | ppm   | ppm   | ppm   | ppm   | ppm   | µg/m3L | %         | µg/m3S |
| 1H San Juan Substa     | 10/31 8:00 AM | 339.8     | 5.4     | 5.0     | -0.4    | 3.7          | 92.7       | 0.000 | 0.035 | 0.020 | 0.014 | 0.009 |        |           |        |
| 1NL Navajo Lake        | 10/31 8:00 AM | 328.5     | 4.2     | 3.4     | -0.7    | 4.1          | 31.1       |       | 0.008 | 0.003 | 0.005 | 0.015 | 2.6    | 34        |        |
| 1ZB Bloomfield         | 10/31 8:00 AM | 350.3     | 6.5     | 7.8     | 1.2     | 1.8          | 138.6      | 0.001 | 0.028 | 0.014 | 0.013 | 0.014 |        |           |        |
| 2LL Los Lunas          | 10/31 8:00 AM | 360.3     | 7.6     | 7.1     | -0.5    | 0.9          | 40.3       |       |       |       |       | 0.012 | 5.1    | 33        |        |
| 2ZJ Bernalillo         | 10/31 8:00 AM | 354.0     | 6.6     | 6.4     | -0.2    | 2.1          | 14.3       |       |       |       |       | 0.011 |        |           |        |
| 3HM Santa Fe Runnels   | 10/31 8:00 AM |           |         |         |         |              |            |       |       |       |       |       | < Samp | 28        |        |
| 3SFA Santa Fe Airport  | 10/31 5:00 AM | 0.0       | 1.3     | 1.2     | 0.0     | 5.1          | 5.2        |       |       |       |       | 0.018 | 3.5    | 42        |        |
| 3ZD Taos Fire Station  | 10/31 8:00 AM | 343.7     | 3.9     | 3.3     | -0.6    | 0.9          | 304.5      |       |       |       |       |       | 14.0   | 37        |        |
| 5ZR Carlsbad           | 10/31 8:00 AM | 376.2     | 11.0    | 9.4     | -1.6    | 1.2          | 50.6       |       | 0.009 | 0.004 | 0.005 | 0.018 | 8.5    | 50        |        |
| 5ZS Hobbs Jefferson    | 10/31 8:00 AM | 503.6     | 13.1    | 12.7    | -0.3    | 2.6          | 207.8      |       | 0.019 | 0.003 | 0.015 | 0.031 | 10.9   | 52        |        |
| 6CM Anthony            | 10/31 8:00 AM |           |         |         |         | 0.5          | 321.2      |       |       |       |       |       | 11.9   | 60        | 78     |
| 6O La Union            | 10/31 8:00 AM | 450.6     | 9.8     | 9.7     | -0.1    | 1.0          | 15.2       |       |       |       |       | 0.014 |        |           |        |
| 6WM West Mesa          | 10/31 7:00 AM |           |         |         |         | 0.2          | 160.4      |       |       |       |       |       |        |           | 14     |
| 6ZG Sunland Park       | 10/28 8:00 AM | 378.5     | 8.7     | 8.1     | -0.5    | 3.1          | 122.3      |       |       |       |       | 0.015 | 6.2    | 60        | 22     |
| 6ZK Chaparral          | 10/31 7:00 AM | 223.1     | 7.1     | 6.8     | -0.2    | 1.2          | 1.2        |       |       |       |       | 0.021 |        |           | 59     |
| 6ZL Holman Rd          | 10/31 8:00 AM | 443.5     |         | 13.7    |         | 0.8          | 3.9        |       |       |       |       |       |        |           | 12     |
| 6ZM Desert View        | 10/31 8:00 AM | 360.2     | 13.1    | 10.5    | -2.6    | 1.2          | 356.6      |       | 0.025 | 0.014 | 0.010 | 0.016 | 6.6    | 46        | 28     |
| 6ZN Santa Teresa       | 10/31 8:00 AM | 354.0     | 15.0    | 13.5    | -1.4    | 2.6          | 79.6       |       | 0.016 | 0.005 | 0.011 | 0.030 | 10.1   | 54        |        |
| 6ZQ Solano Drive       | 10/31 8:00 AM |           |         |         |         |              |            |       |       |       |       | 0.010 |        |           |        |
| 7E Deming Airport      | 10/31 8:00 AM | 355.1     | 13.5    | 13.0    | -0.5    | 4.0          | 61.7       |       | 0.009 | 0.003 | 0.005 | 0.029 |        |           | 28     |
| 7T Hurley Smelter      | 10/31 8:00 AM | 327.0     | 17.2    | 14.6    | -2.6    | 0.9          | 57.3       | 0.000 |       |       |       | 0.022 |        |           |        |
| Air Monitoring Trailer | 10/31 8:00 AM |           |         |         |         | 1.1          | 58.0       | 0.000 | 0.008 | 0.002 | 0.006 | 0.009 | 7.0    | 23        |        |





# Northwest NM Sites



# Northwest NM Monitoring Stations



Substation



Bloomfield



Navajo Lake



## Farmington-Four Corners Area Air Quality Monitoring Site Information

| <b>Site Name/ID</b> | <b>GPS Location</b>  | <b>Elevation (ft)</b> | <b>Parameters Monitored</b>   |
|---------------------|----------------------|-----------------------|---|
| Farmington/1FO      | 36.46260, -108.09499 | 5640                  | PM 2.5 and PM10   |
| Airport/1ZF         | 36.73747, -108.23367 | 5490                  | Passive NH <sub>3</sub>   |
| Bloomfield/1ZB      | 36.44313, -107.58388 | 5635                  | O <sub>3</sub> , NO <sub>2</sub> , SO <sub>2</sub> , Met  |
| Substation/1H       | 36.47516, -108.28485 | 5390                  | O <sub>3</sub> , NO <sub>2</sub> , SO <sub>2</sub> , Met, Passive NH <sub>3</sub>                         |
| Navajo Lake/1NL     | 36.48351, -107.39058 | 6480                  | O <sub>3</sub> , NO <sub>2</sub> , PM 2.5, Met, Visibility,<br>Wet Deposition Hg, Passive NH <sub>3</sub> |

# TEOM Particulate Monitor



# Gaseous Monitors Ozone, Nitrogen Dioxide, and Sulfur Dioxide





# What is Ground Level Ozone?

- Ozone (O<sub>3</sub>) is a gas composed of three oxygen atoms.
- Created by a chemical reaction between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC) in the presence of strong sunlight.
- Unstable, can be consumed by fresh NO<sub>x</sub> emissions.
  - O<sub>3</sub> levels can increase at the location where NO<sub>x</sub> emissions are reduced (NO<sub>x</sub> scavenging/disbenefit)
- In the earth's lower atmosphere, ground-level ozone adversely affects public health, flora and fauna.
  - "Good" ozone occurs naturally in the stratosphere approximately 6 to 30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful rays.



# Ozone and Public Health

Exposures to ozone can:

- Reduce lung function, making it more difficult for people to breathe as deeply and vigorously as normal,
- Irritate the airways, causing coughing, sore or scratchy throat, pain when taking a deep breath and shortness of breath,
- Inflammation and damage the airways,
- Increase frequency of asthma attacks,
- Increase susceptibility to respiratory infection, and
- Aggravate chronic lung diseases such as asthma, emphysema and bronchitis.

# Ozone and the Environment

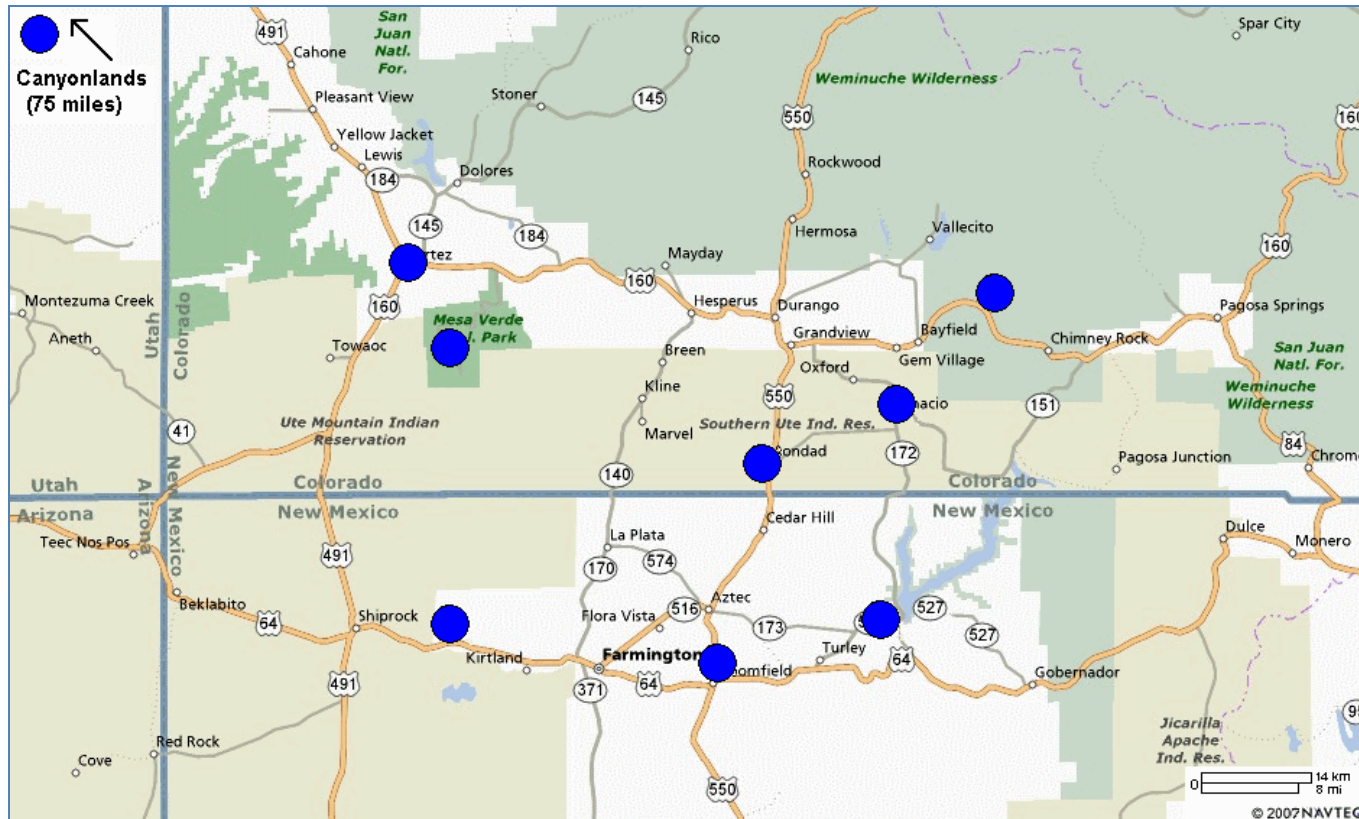
- Ozone can cause damage to plants and crops.
- When sufficient ozone enters leaves of a plant it can:
  - Interfere with ability of sensitive plants to produce and store food
  - Visibly damage leaves of trees and other plants



Photos from  
US EPA



# The Current 75 ppb Primary Standard



Comparison the current Federal Ozone standard: 0.075 ppm  
2008 - 2010

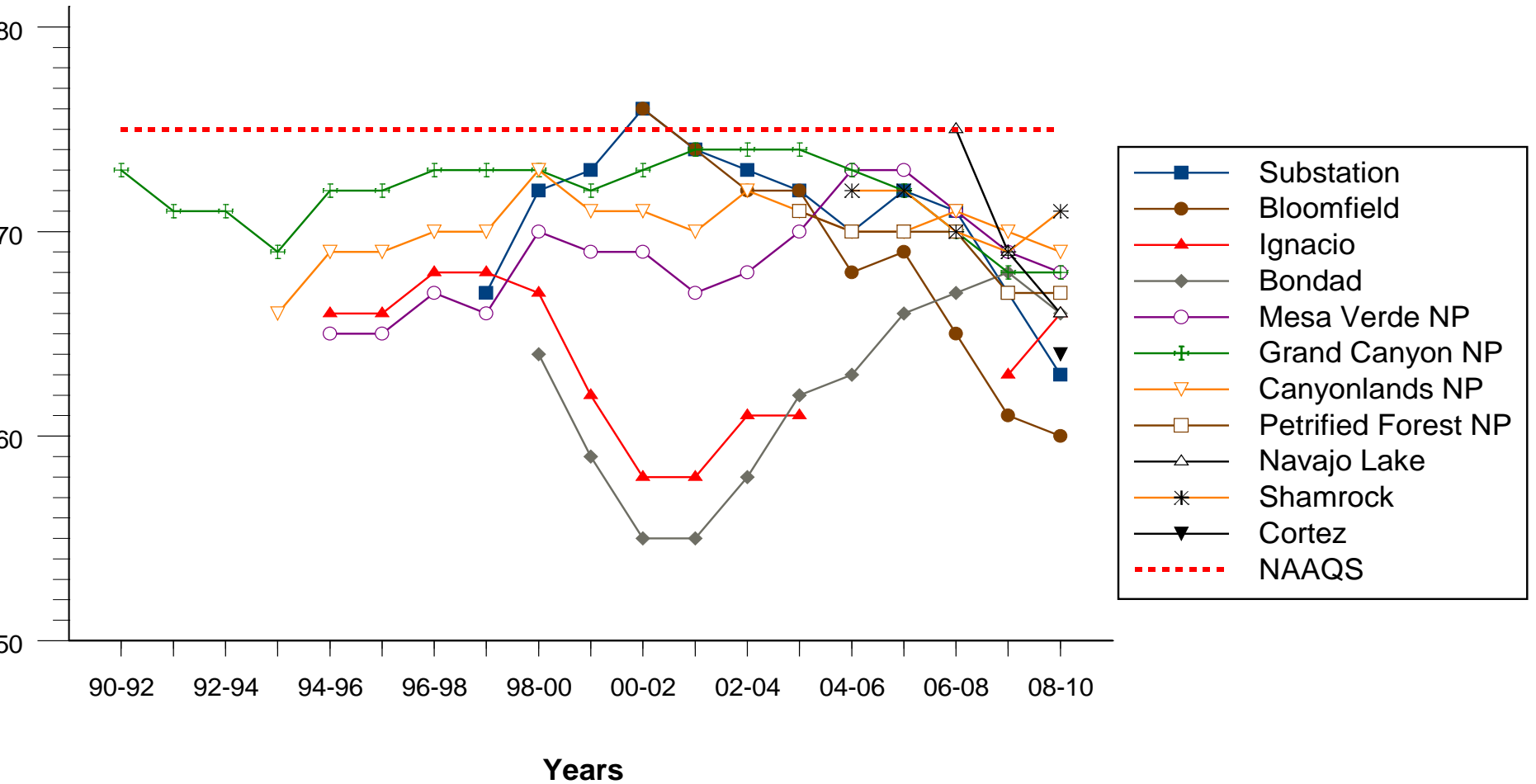
Ozone Standard: 3-year avg. of 4th max. 8-hr. values

|  |  |
|--|--|
| <p><b>● Above level of standard (Site in operation 3+ years)</b><br/>(Based on 3-year avg. of 4th max.)</p>        | <p><b>● Below level of standard (Site in operation 3+ years)</b><br/>(Based on 3-year avg. of 4th max.)</p>        |
| <p><b>● Above level of standard (&lt; 3 Years of data)</b><br/>(Based on avg. of 4th max. for available years)</p> | <p><b>● Below level of standard (&lt; 3 Years of data)</b><br/>(Based on avg. of 4th max. for available years)</p> |

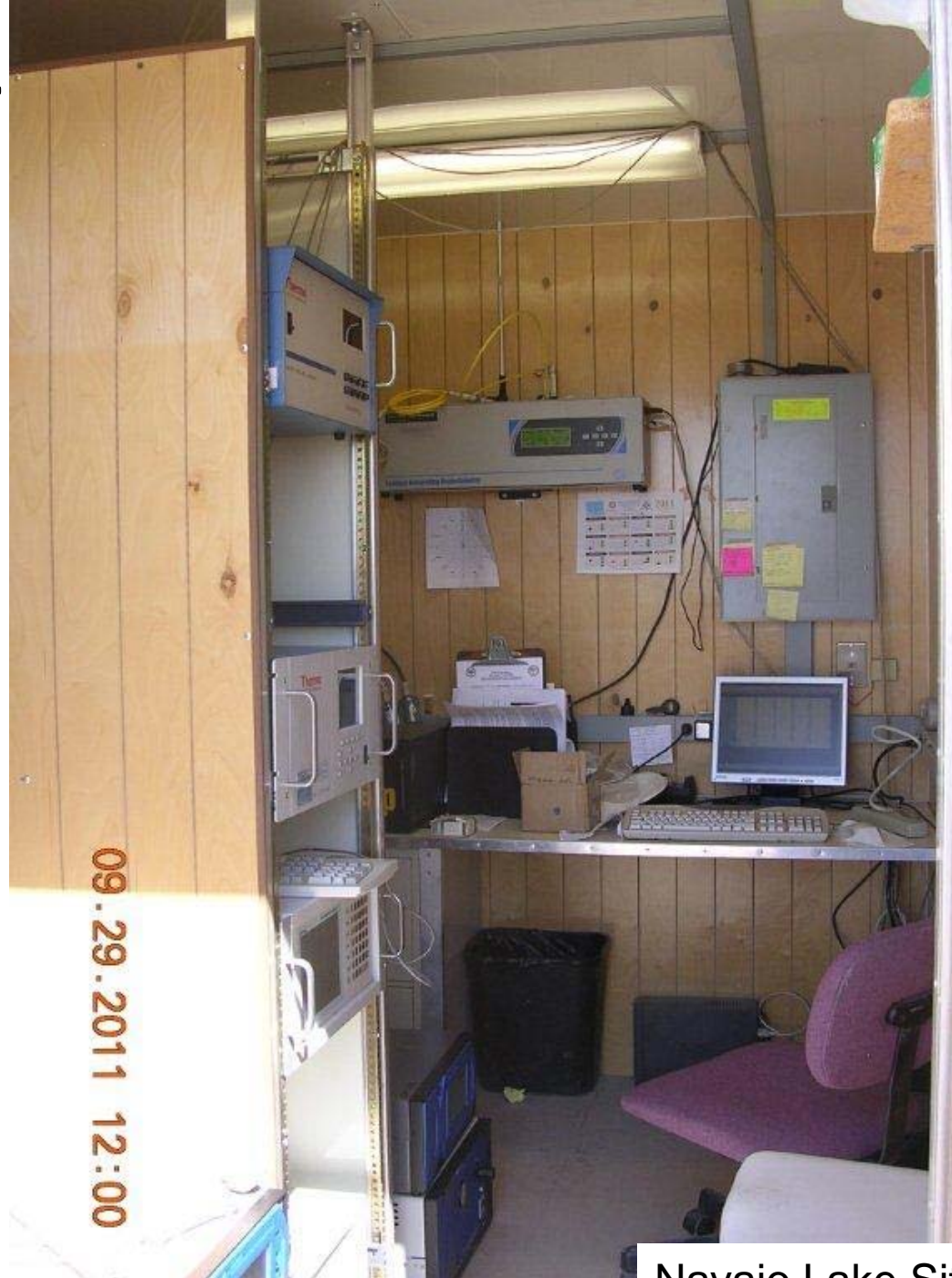


# 8-hour Ozone Trends

Four Corners Area; 3-year running design values



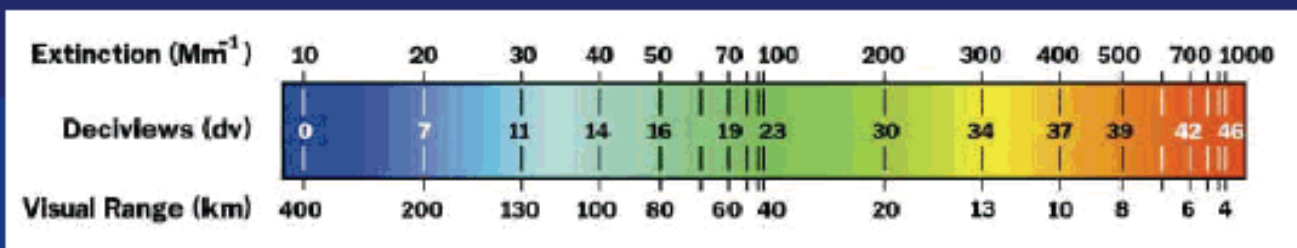
# Nephelometer (visibility)



11/9/2011

Navajo Lake Site, NM

# Visibility/Haze Metric Scale



# Ammonia



# Mercury



Navajo Lake Site, NM  
Monitor type: Reactive  
Gaseous Mercury  
Study duration: 2 Years;  
Completed

11/9/2011



Navajo Lake Site, NM  
Monitor type: Wet Deposition  
Mercury  
Study duration: Ongoing

# Rad Net Monitor

Navajo Lake  
Time frame: Ongoing





# Four Corners Task Force Field Trips to monitoring locations in SW Colorado



Hike to Molas High Mountain Lake





# Cont.

Aug 2007, Shamrock Visibility Monitor and IMPROVE site



Aug 2006, Mesa Verde Mercury deposition monitor



# Los Alamos National Labs (LANL) research on next generation pollution/greenhouse gas monitoring technologies



11/09/2011

Live netcam of monitor:  
<http://206.123.216.45:81/>



# Contact information

New Mexico Environment Department – Air Quality  
Bureau (NMED-AQB) website:

<http://www.nmenv.state.nm.us/aqb/>

NMED-AQB Monitoring website:

<http://air.nmenv.state.nm.us/>

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