# Spring 2012 Columbus & Palomas Dust Study

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Columbus/Palomas Public Meetings
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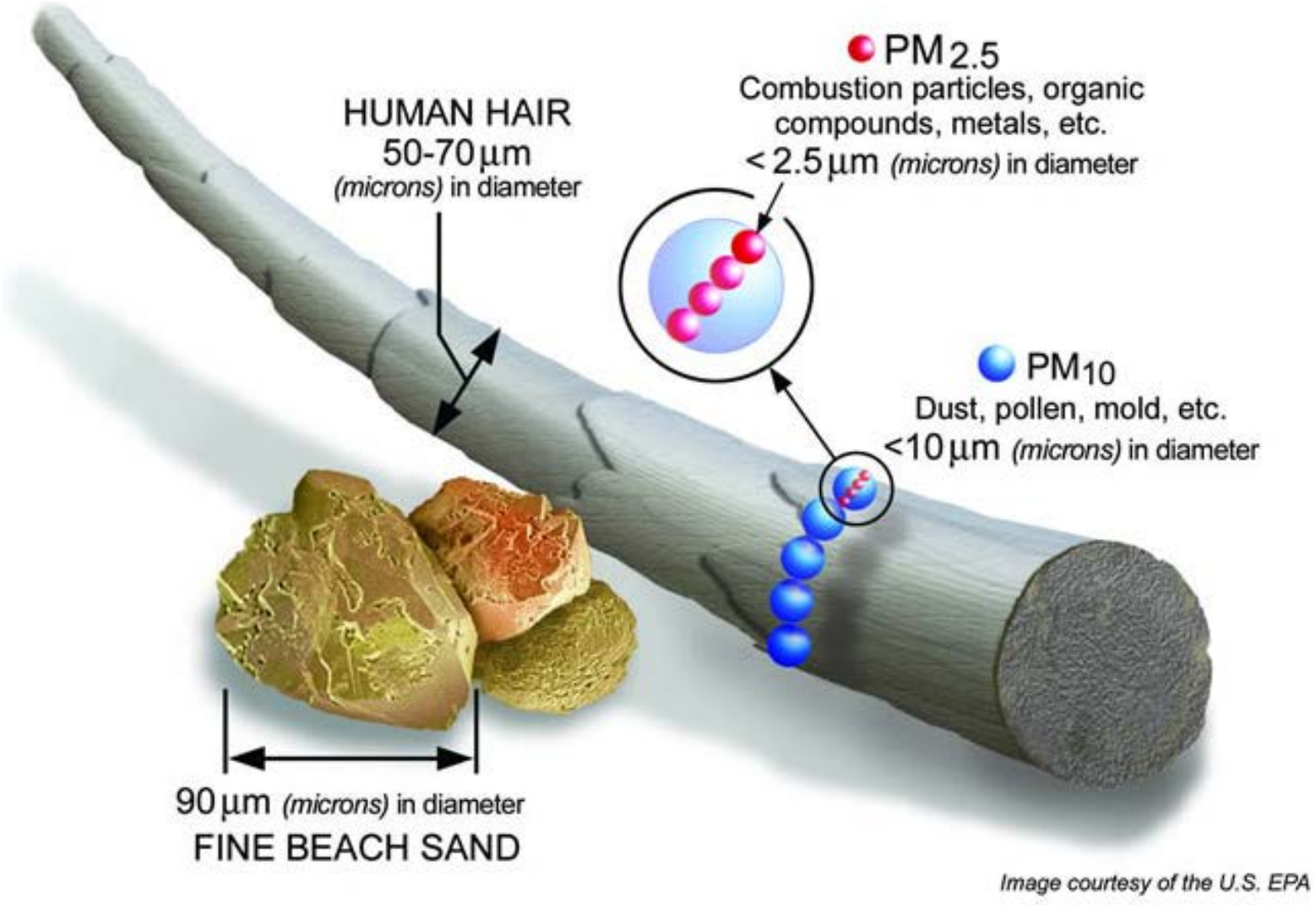
# Motivation

Dust and dust storms are a nuisance, but more importantly, present a significant health hazard to those living in it.

# Project Goals & Objectives

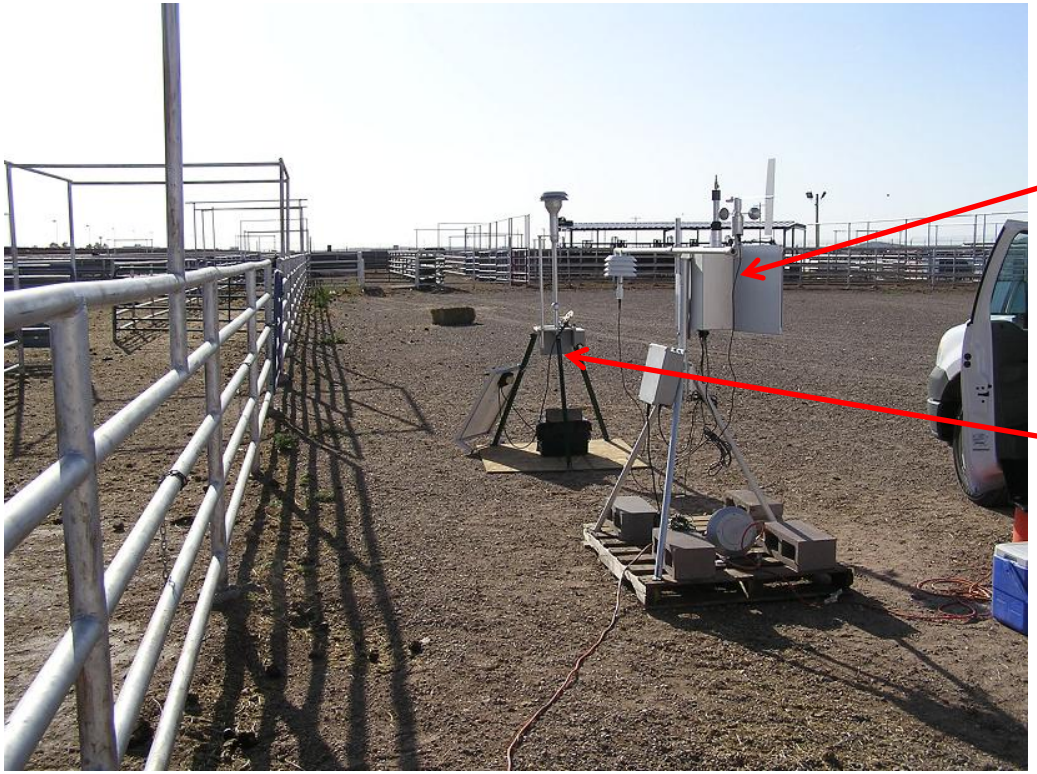
- Collect dust samples from the air to understand typical levels found in the Columbus and Palomas area
  - during low and high winds
- Estimate how dust varied across the towns and around the cattle facility over time

# Small Dust Particles



# PM10 Methods

- Did not use Federal Reference Method so PM10 values not “official”



MetOne E-BAM

BGI PQ-100 (unfortunately had problems)

# PM10 Methods

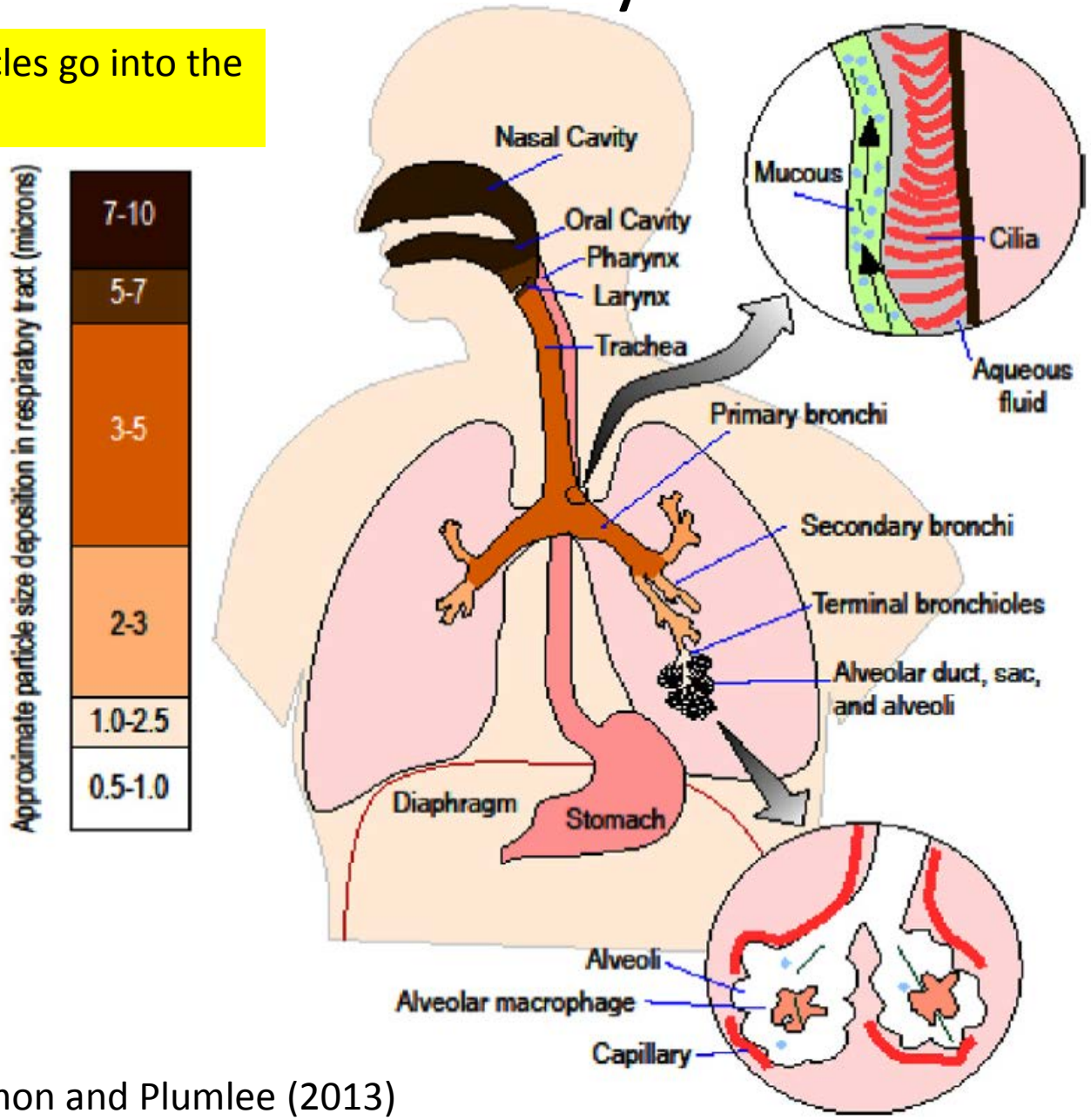
- In Palomas we used MiniVol PM10 with Teflon filters

# Dust Inhalation Pathways

How far do the dust particles go into the lung?

**Upper respiratory tract filters out large particles**

**Lower respiratory tract important for small particles**




Mormon and Plumlee (2013)

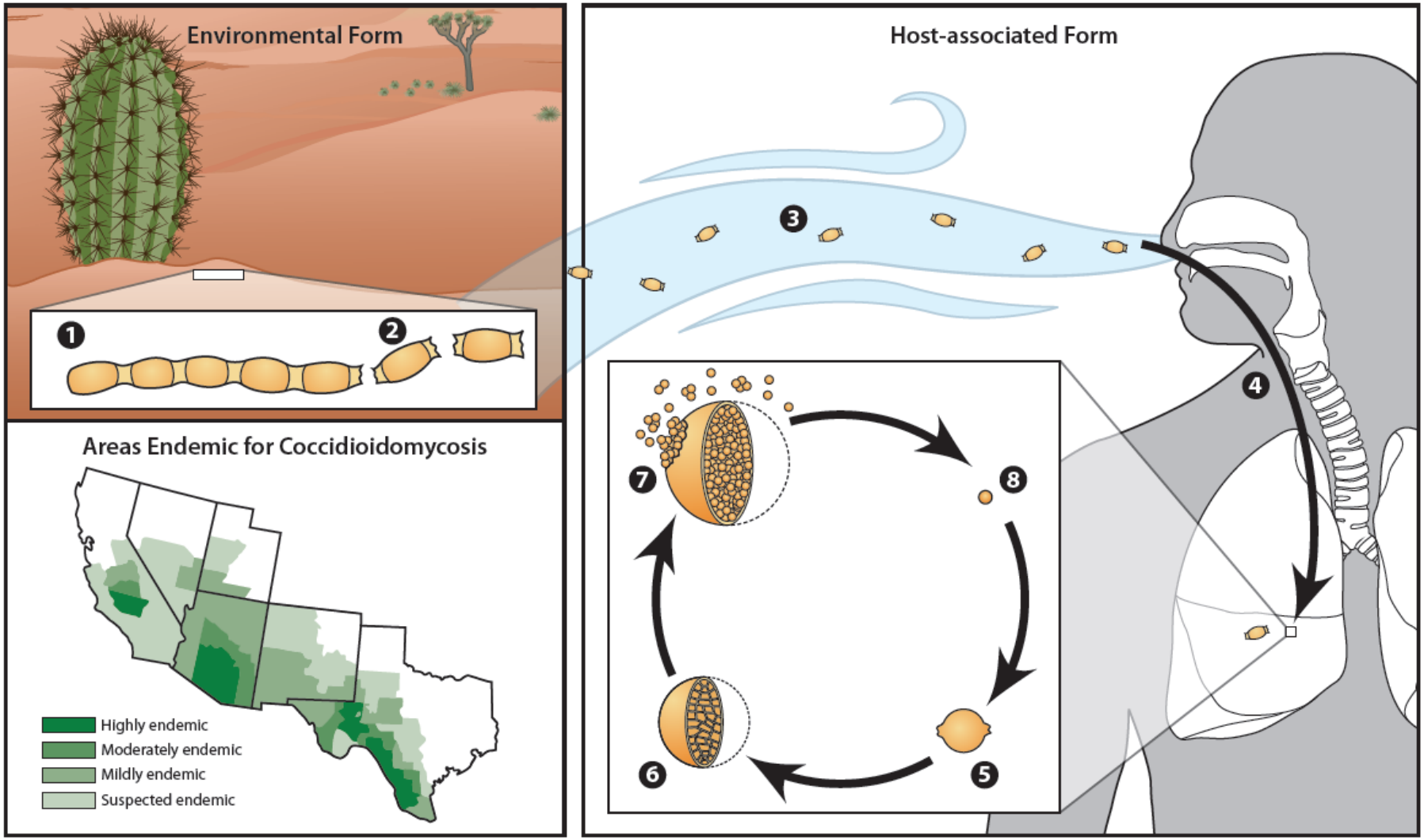
# People Most Sensitive to Air Pollution

- Infants
- Children
- Elderly
- Asthmatics
- People with existing lung and heart disease, COPD, emphysema

# Health Effects of Dust

- A recent study linking dust levels in El Paso with hospital admissions (Grineski et al. 2010)
  - Dust events were significantly associated with children's acute bronchitis admissions
  - Dust and low wind events were associated with increased odds of hospital admissions for asthma and acute bronchitis amongst all ages and children, and the same was true for adults and dust

# Coccidiodomycosis “Valley Fever”






CDC, http://www.cdc.gov/fungal/coccidioidomycosis/causes.html

# Cocci in New Mexico

- Expected that Coccidioidomycosis (Valley Fever) is underreported in New Mexico
  - Misdiagnosed (pneumonia, COPD, bronchitis, asthma, TB, lung cancer)
  - Ineffective treatments (often antibiotics)

Coccidioides endemic zone

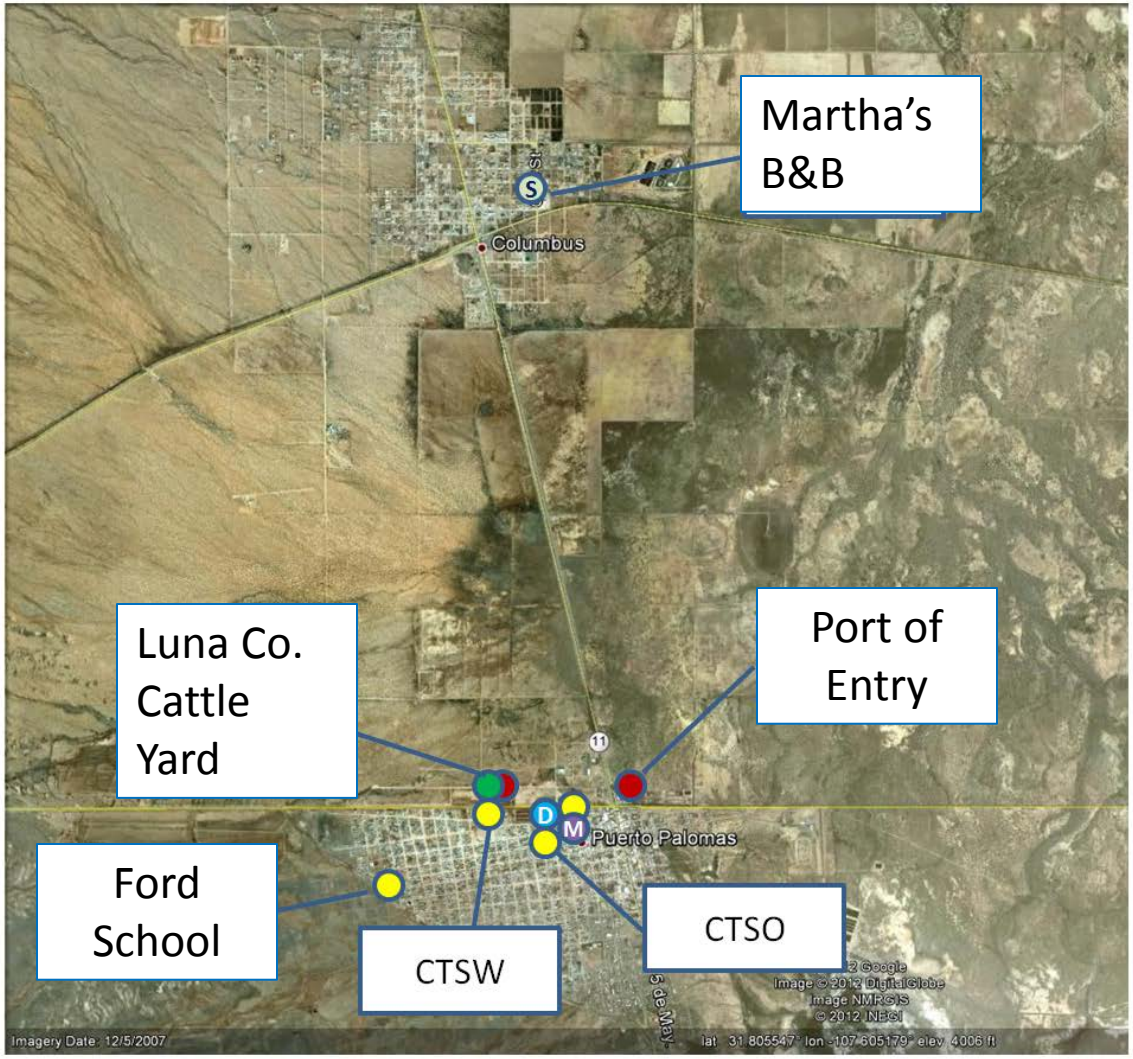

Fisher et al. 2007

- Education and awareness campaign for clinical providers in New Mexico and public
  - Increase testing and diagnosis
  - Increase reporting

# Health, Safety, and Air Quality

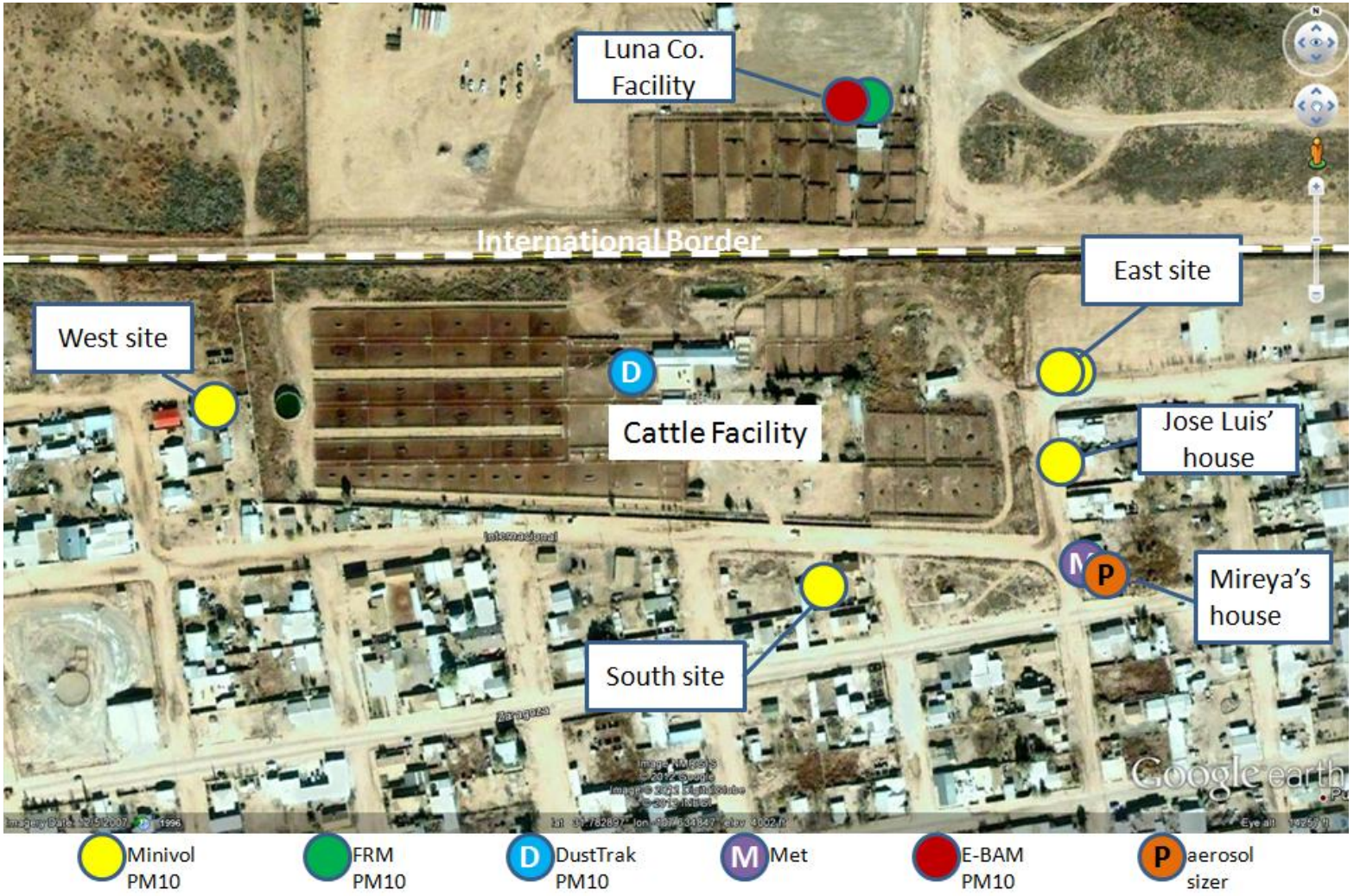
- Major Impacts to
  - Human health
  - Travel safety
  - Worker down time
- 2011 and 2012 had above average number of dust storms in southern NM and west TX
- March 18, 2012 storm was worst since 2003
  - More than 10x EPA standard for 24-hour $PM_{10}$ in Dona Ana County

# Dust and Weather Stations

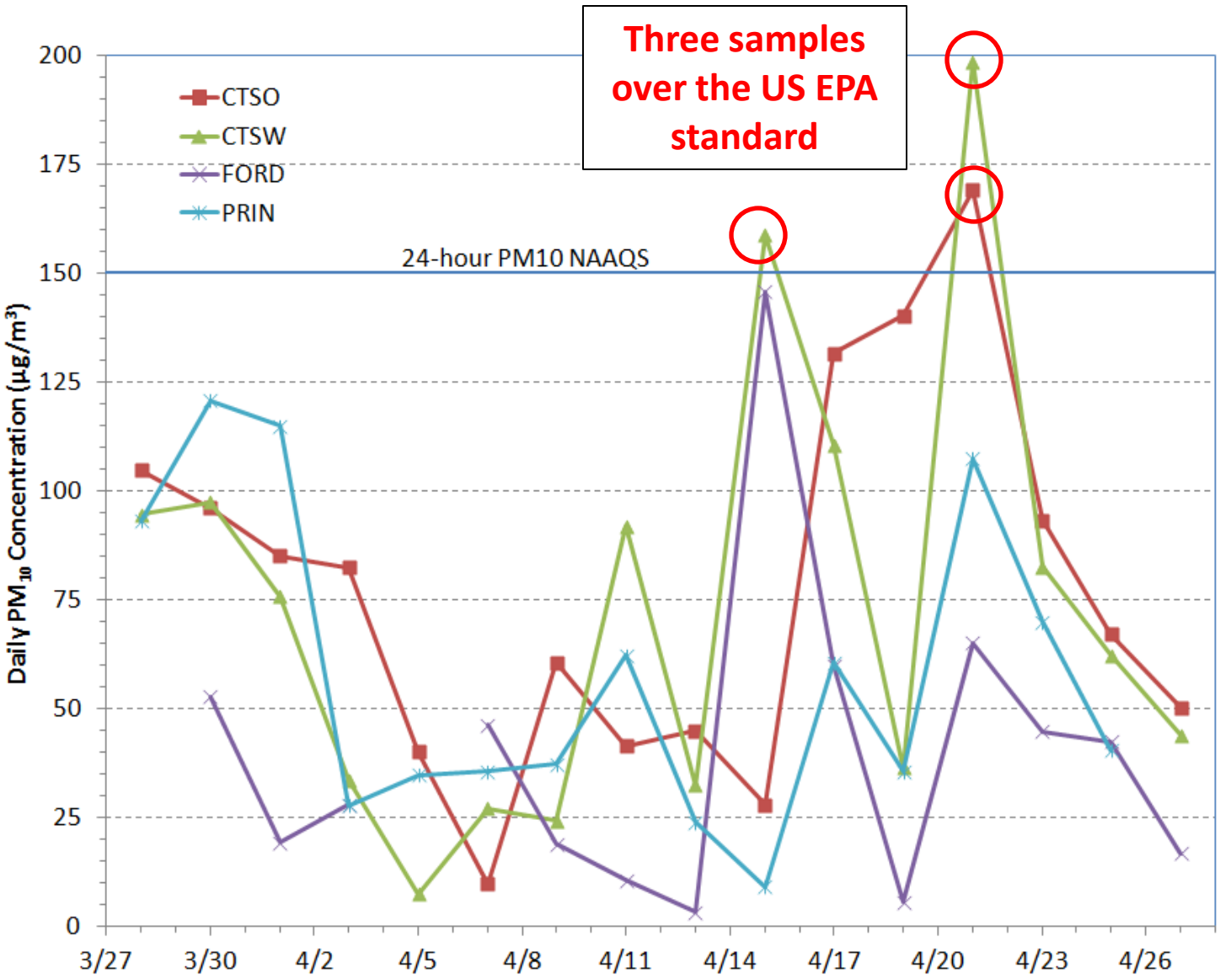



- Minivol $PM_{10}$
- FRM $PM_{10}$
- DustTrak $PM_{10}$
- Met
- E-BAM $PM_{10}$
- Satellite site (met + sizer)

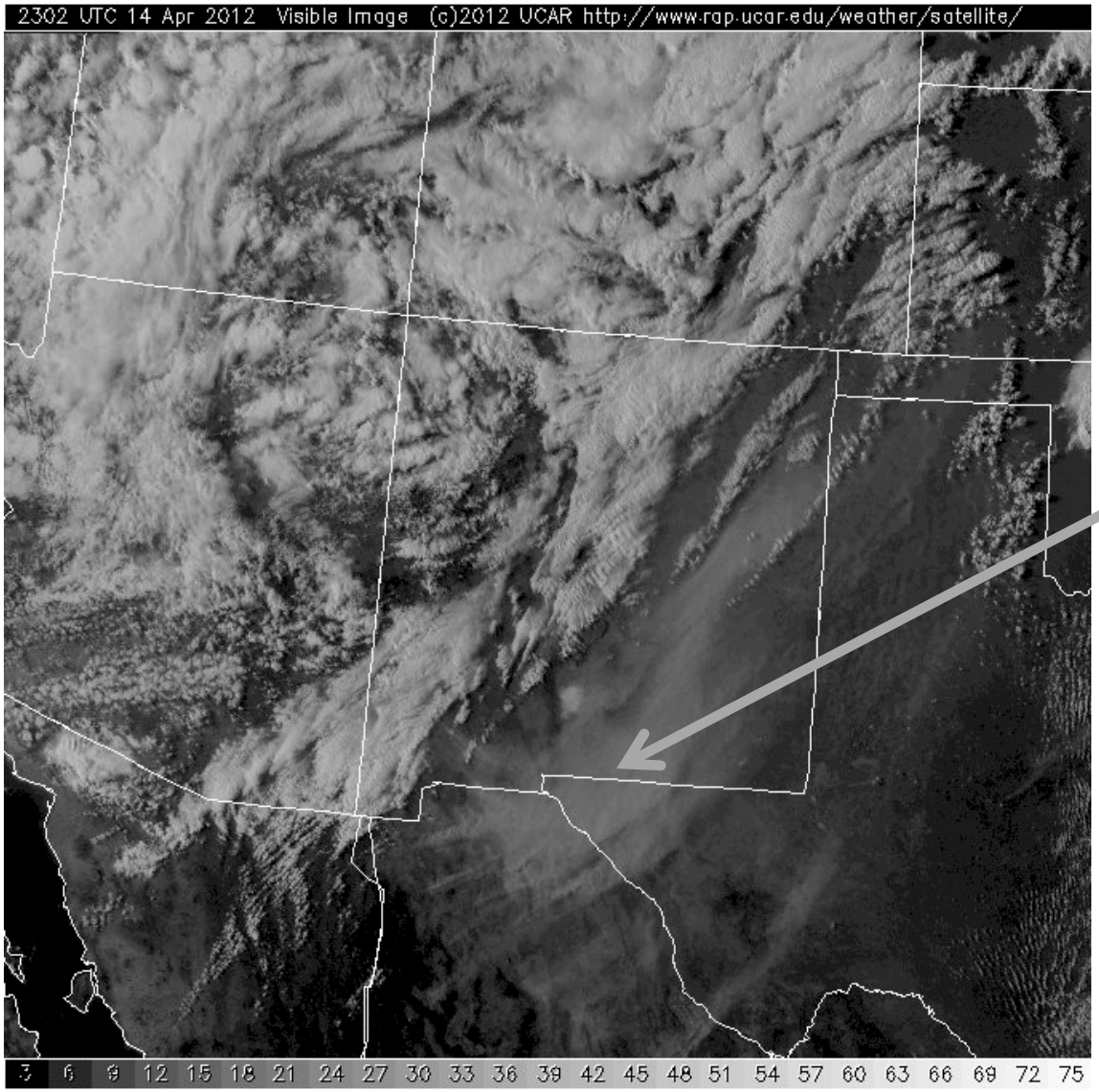
# Dust Collection Locations



# Palomas PM10



# April 14, 2012 Storm



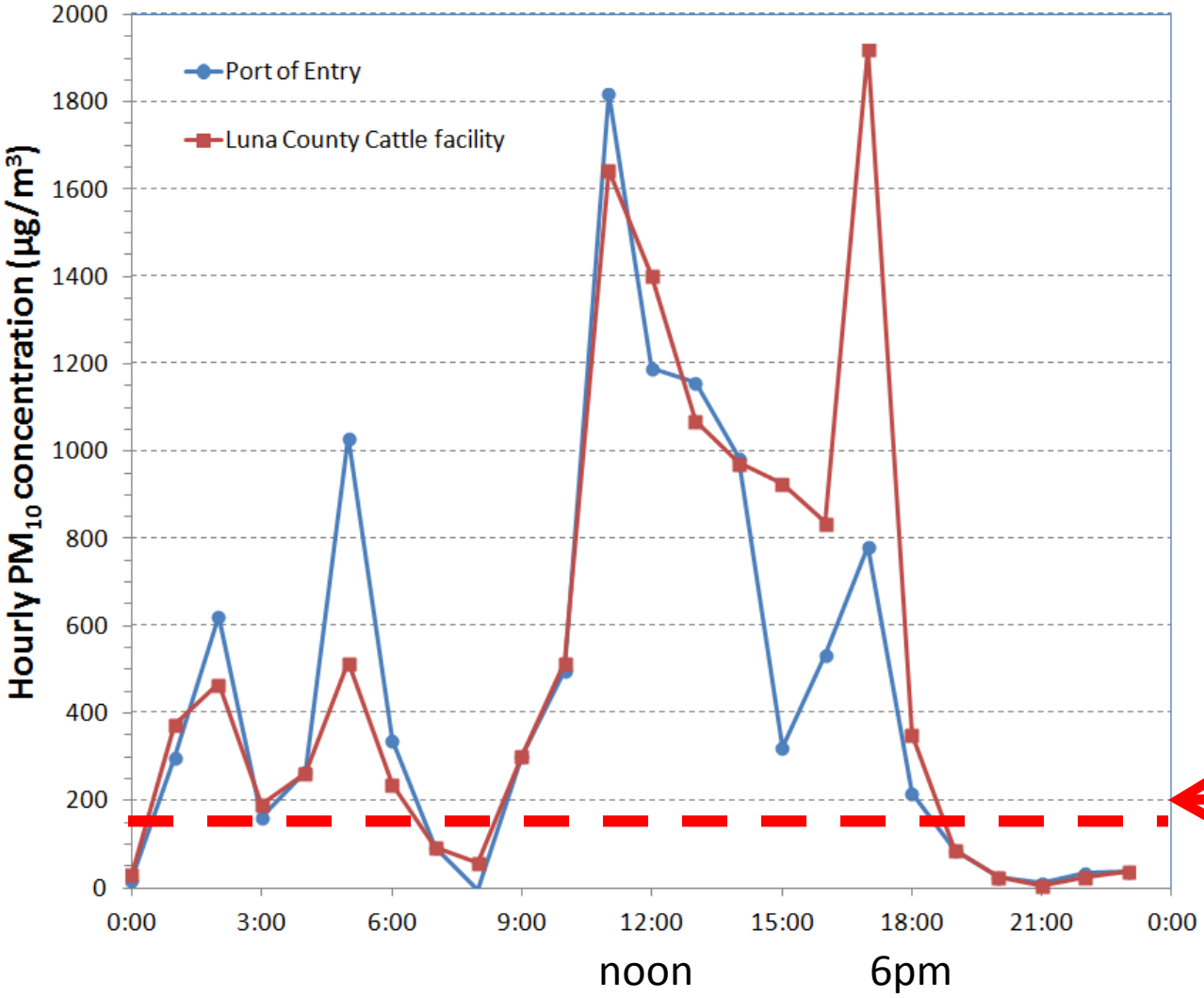

Satellite image of the afternoon of the 14th

**Gray area is dust generated by the high winds**

**PM10 was 340% of standard at Luna County cattle yard**

**301% of standard at Columbus Port of Entry**

# April 14, 2012 Storm



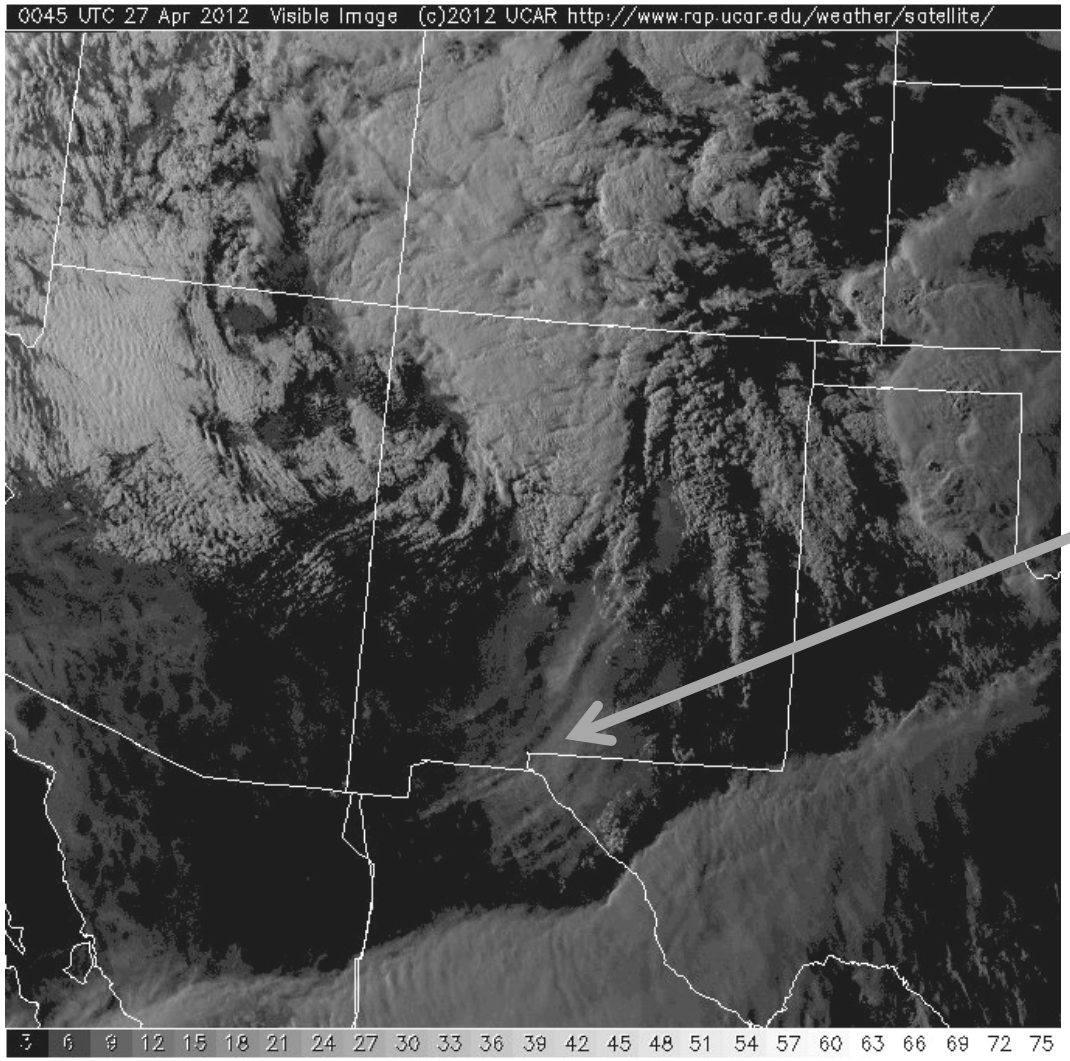

**PM10 measurements in Luna County**

Red = County cattle yard (24-hr average 515 ug/$m^3$)

Blue = US Port of Entry (451 ug/$m^3$)

**US EPA air quality standard**

# April 26, 2012 Storm



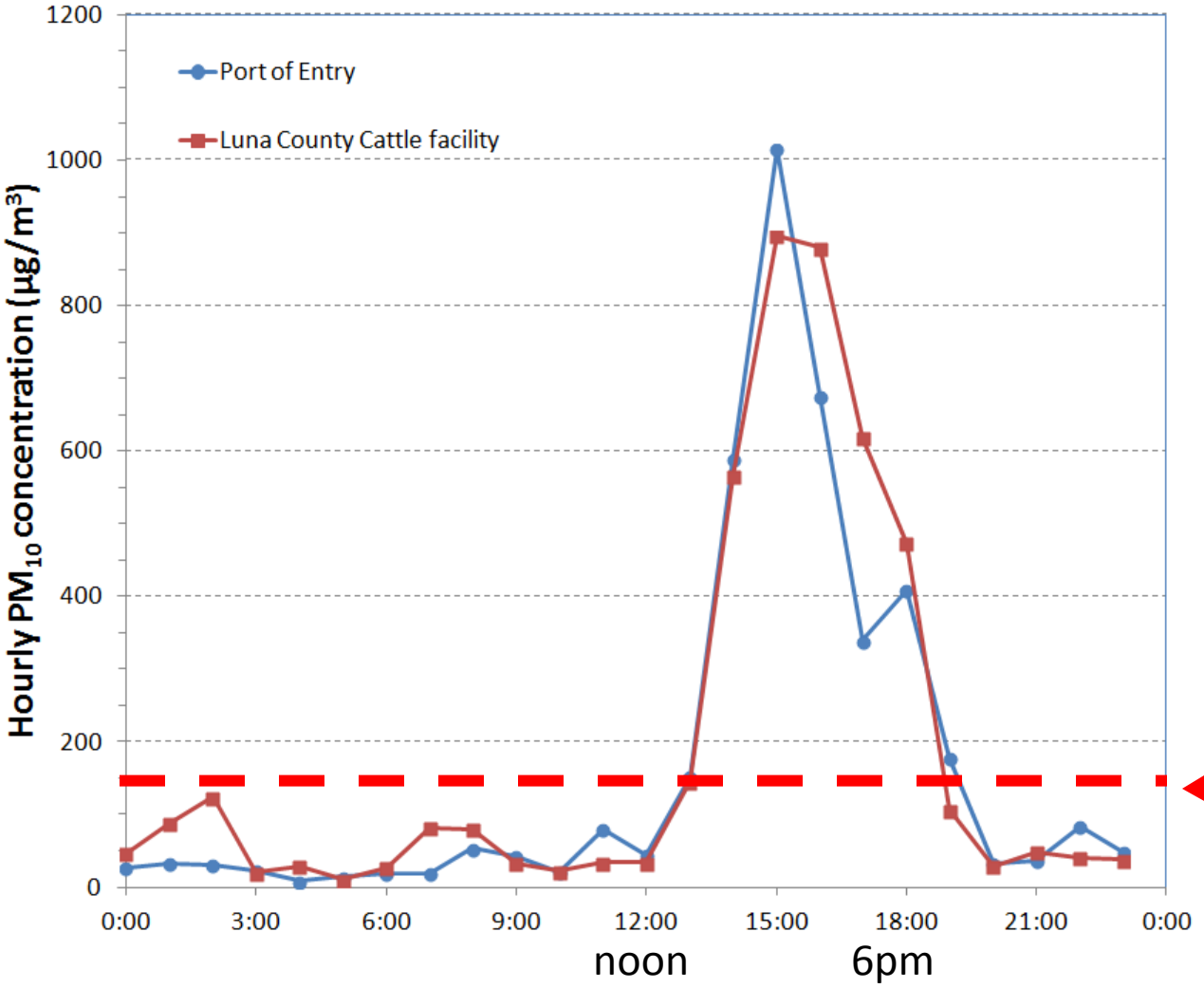

Satellite image of the afternoon of the 14th

**Gray area is dust generated by the high winds**

**PM10 was 124% of standard at Luna County cattle yard**

**110% of standard at Columbus Port of Entry**

# April 26, 2012 Storm




**PM10 measurements in Luna County**

Red = County cattle yard (24-hr average 186 ug/$m^3$)

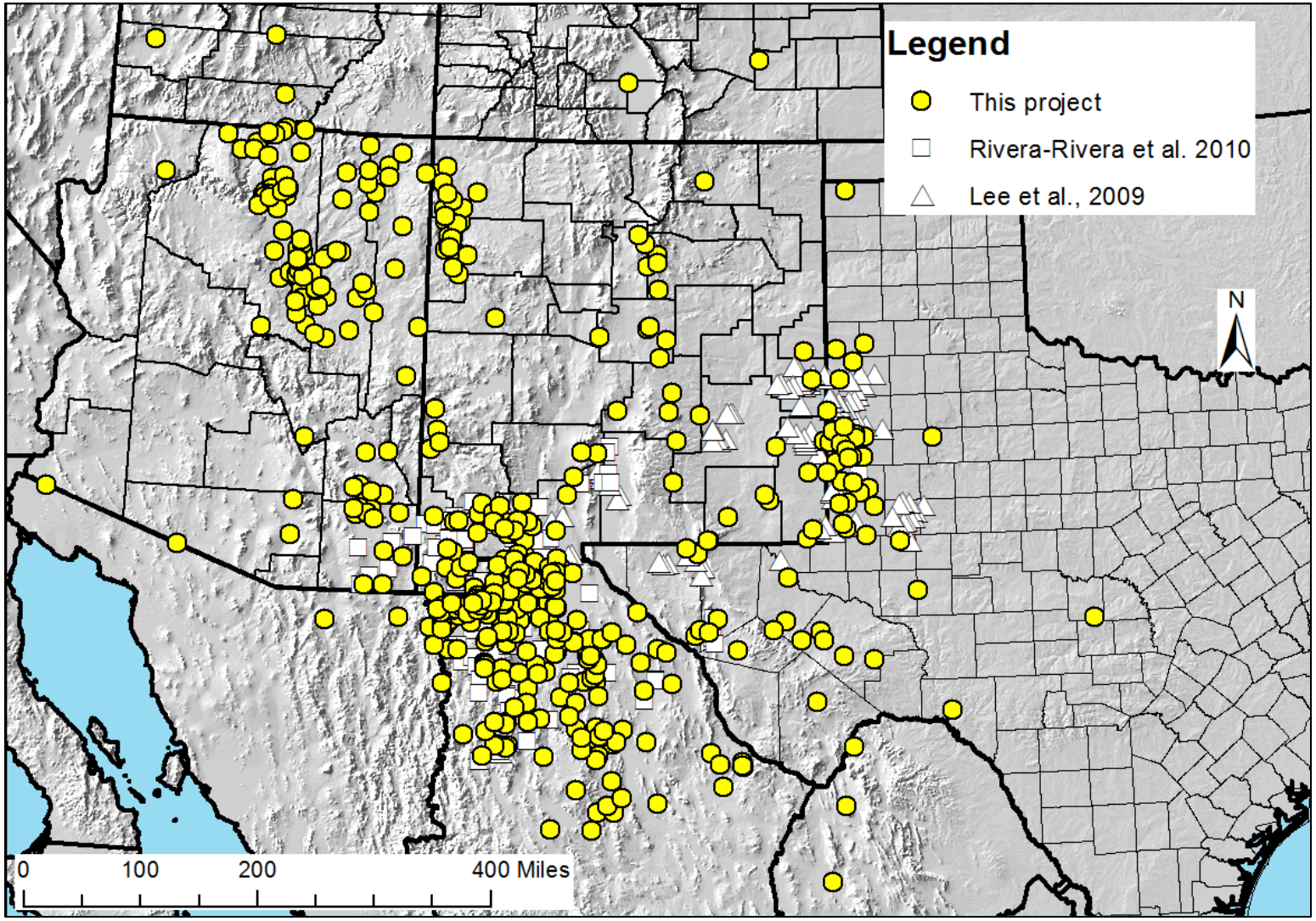
Blue = US Port of Entry (165 ug/$m^3$)

**US EPA air quality standard**

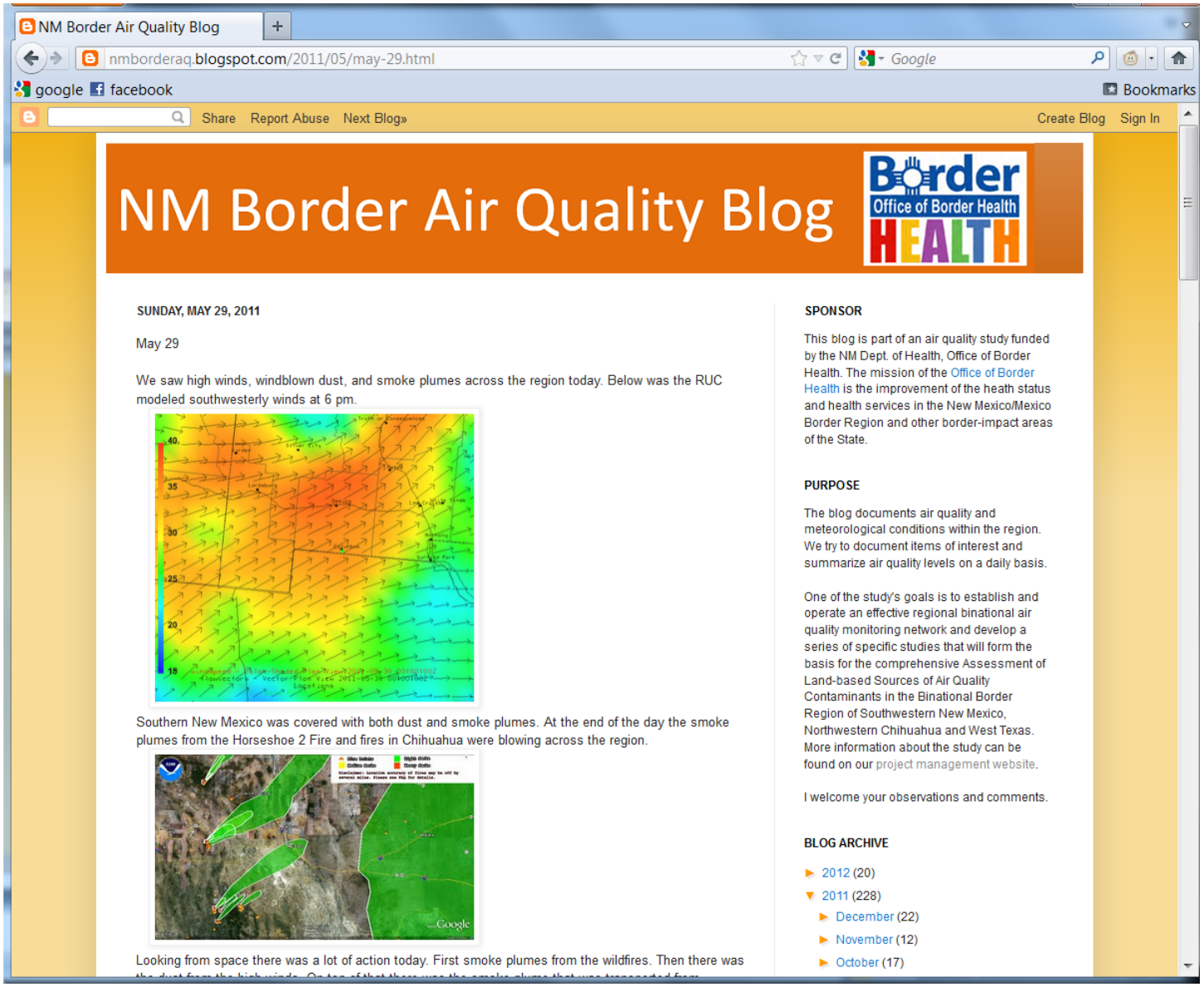
# Next Steps

- Establish routine monitoring in Palomas
- Continue to map dust sources over Northwestern Chihuahua and Southwest New Mexico using satellite
- Evaluate and test dust mitigation options for the region
- Education

# Mapping Wind Blown Dust Sources



# Education blog: nmborderaq.blogspot.com



# Recommendations

- Unpaved road mitigation
  - Pave main roads first
  - Prioritize based on traffic counts
  - Estimate cost & longevity of alternative controls
- Soil stabilization
  - Revisit previous land-use inventory
  - Address larger undeveloped lots first
- Wind Breaks
  - Around schools

# Recommendations

- Continue monitoring in Columbus
- Expand weather and air quality network
  - Start with collecting weather data
    - Started with station in Columbus
    - Work on collecting weather data in Palomas
  - Opportunity to expand CoCoRaHS
    - Daily measurements of rain
    - 300+ observers across NM
    - Ready for volunteers in Mexico
    - Developing training materials in Spanish

# What should you do?

- During dust storms
  - Limit time outside of house
  - Avoid strenuous work outside
  - Keep children inside
  - Keep windows closed
  - Remember pull aside and stay alive when driving
  - Minimize indoor pollutants during this time
- Plant native plants around where people live
- Avoid disturbing vegetation

# Driving in a Dust Storm: What you should do to be safe!

# Pull Aside and Stay Alive!

If you encounter extremely low visibility in a dust storm:

1. ***PULL OFF*** the road as far as safely possible
2. ***LIGHTS OFF*** (Turn OFF your headlights)
2. ***FOOT OFF*** (Place the car in Park or engage the parking brake and take your foot ***OFF*** the brake pedal)

http://www.pullasidestayalive.org/

*Image Source: KVOA News Channel 4*

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