# Upper Green River Basin Ozone

UGRB Air Quality Citizen Advisory Task Force

February 21, 2012 Meeting

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# Outline

- What we know about ground level ozone
- What we have been doing
- Winter 2012 (January – March)
- What the future holds

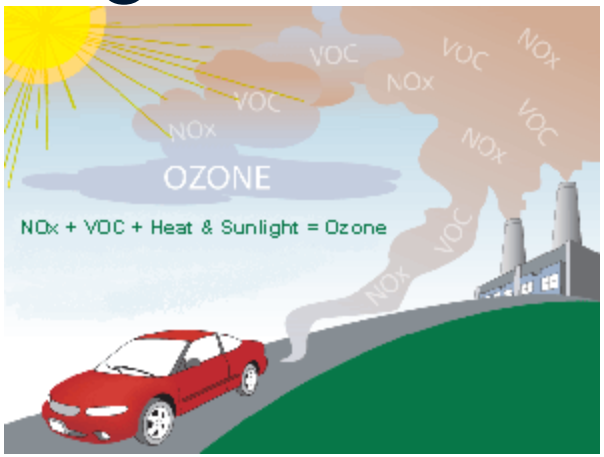
# What we know about ground level ozone

# What is Ground Level Ozone

- A secondary pollutant formed by complex photochemical reactions between nitrogen oxides ($NO_x$) and volatile organic compounds (VOC) in the presence of sunlight
- Ozone affects the lungs and respiratory system
  - Reduce lung function
  - Inflame and damage cells that line the lungs
  - Make the lungs more susceptible to infection
  - Aggravate asthma conditions and other lung diseases
  - Repeated exposure can have permanent effects
- National Ambient Air Quality Standard (NAAQS) Ozone
  - 0.075 ppm (75 ppb)
  - 3-year average of the 4$^{th}$ highest daily 8-hour averaged ozone concentration

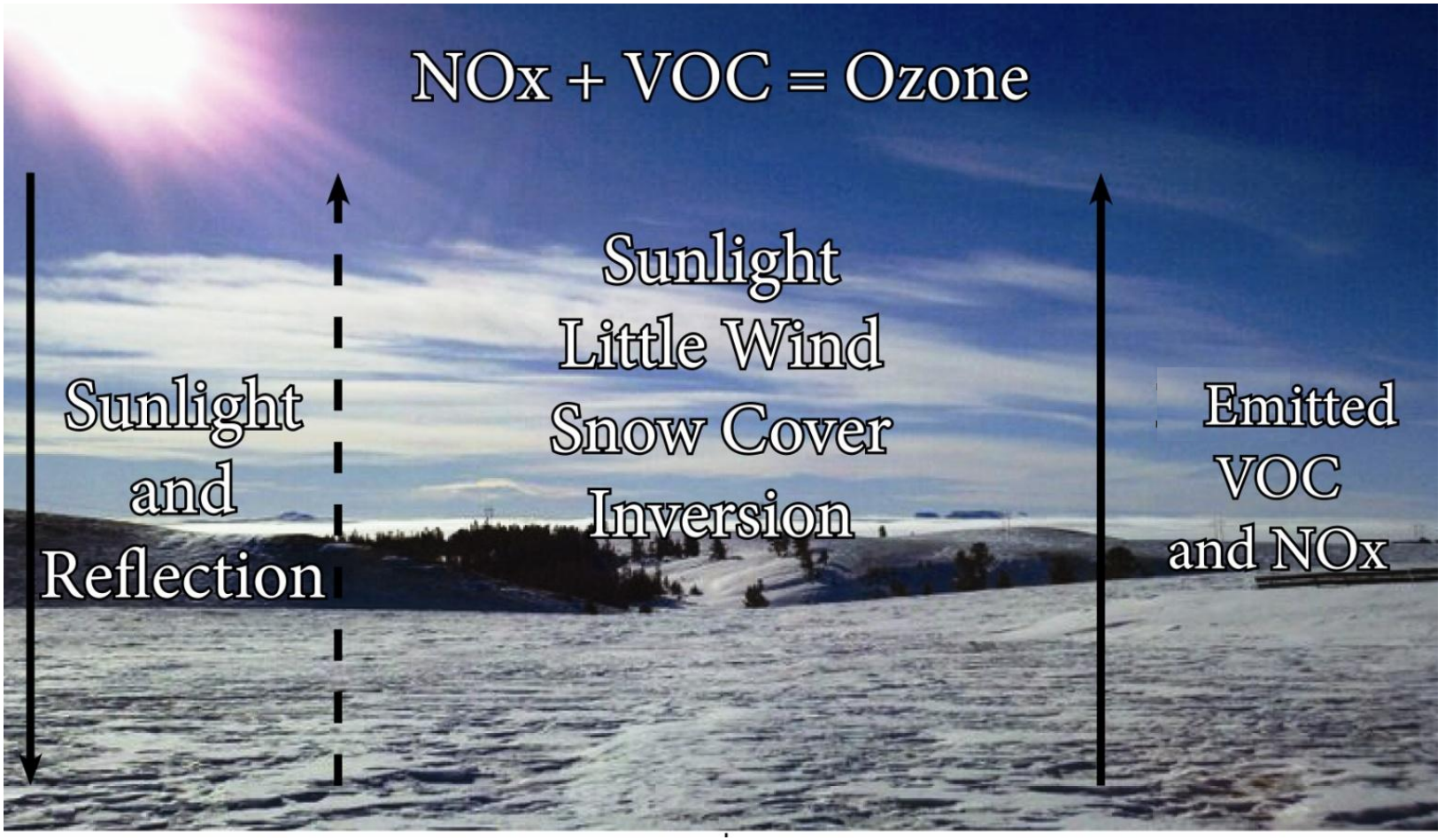
# Ozone: Traditional Thinking

- Sunlight and hot weather cause ground-level ozone to form in the air.
  - Summertime air pollutant
  - Urban areas
  - Rural areas




- Historically, scientists believed ozone could not be formed in low temperatures or areas with low sun angles (i.e., winter)

# Ozone: Wintertime Phenomenon



# Sublette County Ozone & Weather History (2005 – 2011)

- Mid-January – March 2005
  - 8 Elevated 8-Hour $O_3$ Days > 75 ppb
- Mid-January – March 2006
  - 2 Elevated 8-Hour $O_3$ Days > 75 ppb
- Mid-January – March 2007
  - 0 Elevated 8-Hour $O_3$ Days > 75 ppb
  - Meteorological conditions not conducive to formation of elevated ozone levels.
- Mid-January – March 2008
  - 14 Elevated 8-Hour $O_3$ Days > 75 ppb
  - Higher magnitude than previous years
  - Met. conditions conducive to formation of elevated ozone levels.
- Mid-January – March 2009
  - 0 Elevated 8-Hour $O_3$ Days > 75 ppb
  - Limited met. conditions conducive to formation of elevated ozone levels.
- Mid-January – March 2010
  - 0 Elevated 8-Hour $O_3$ Days > 75 ppb
  - Met. conditions not conducive to formation of elevated ozone levels.
- Mid-January – March 2011
  - 13 Elevated 8-Hour $O_3$ Days > 75 ppb
  - Higher magnitude than previous years
  - Met. conditions conducive to formation of elevated ozone levels.

# What we have been doing

# Definition of the Proposed Nonattainment Boundary

- Key Meteorological Issues
  - Local meteorological conditions are the single most important factor contributing to the formation of ozone and the definition of the nonattainment boundary.
  - Trajectory analyses using detailed observation-based wind field data show that local scale transport of ozone and ozone precursors is dominant during periods of elevated ozone.
  - Trajectory analyses using the wind field data show that regional transport of ozone and ozone precursors appears to be insignificant during periods of elevated ozone.

# Trajectory Analyses

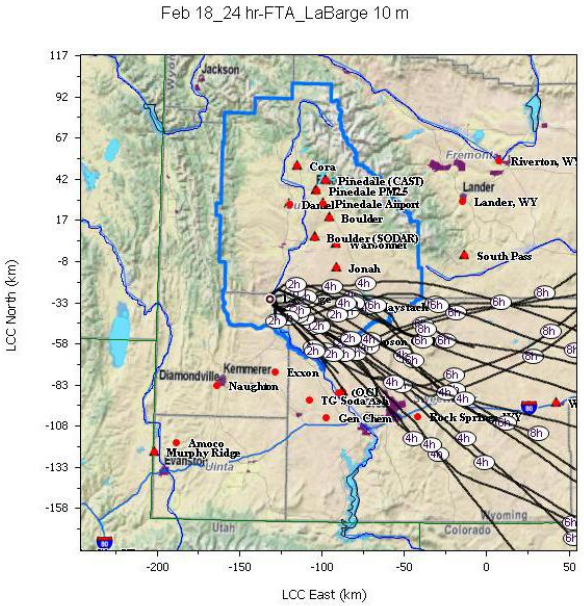



Figure S.7-18. 24-hour forward trajectory analysis at LaBarge, Wyoming on Feb. 18, 2008.

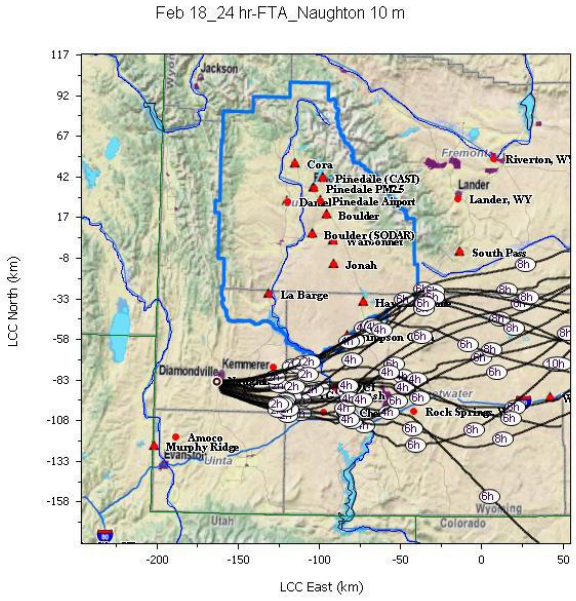



Figure S.7-20. 24-hour forward trajectory analysis at Naughton power plant on Feb. 18, 2008.

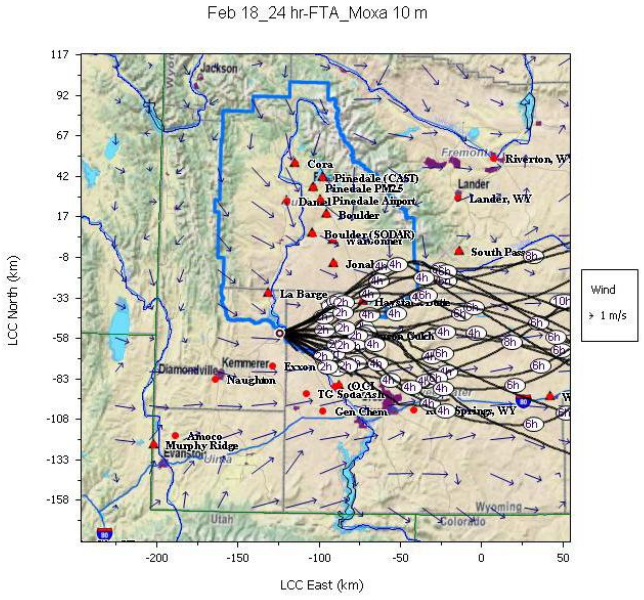
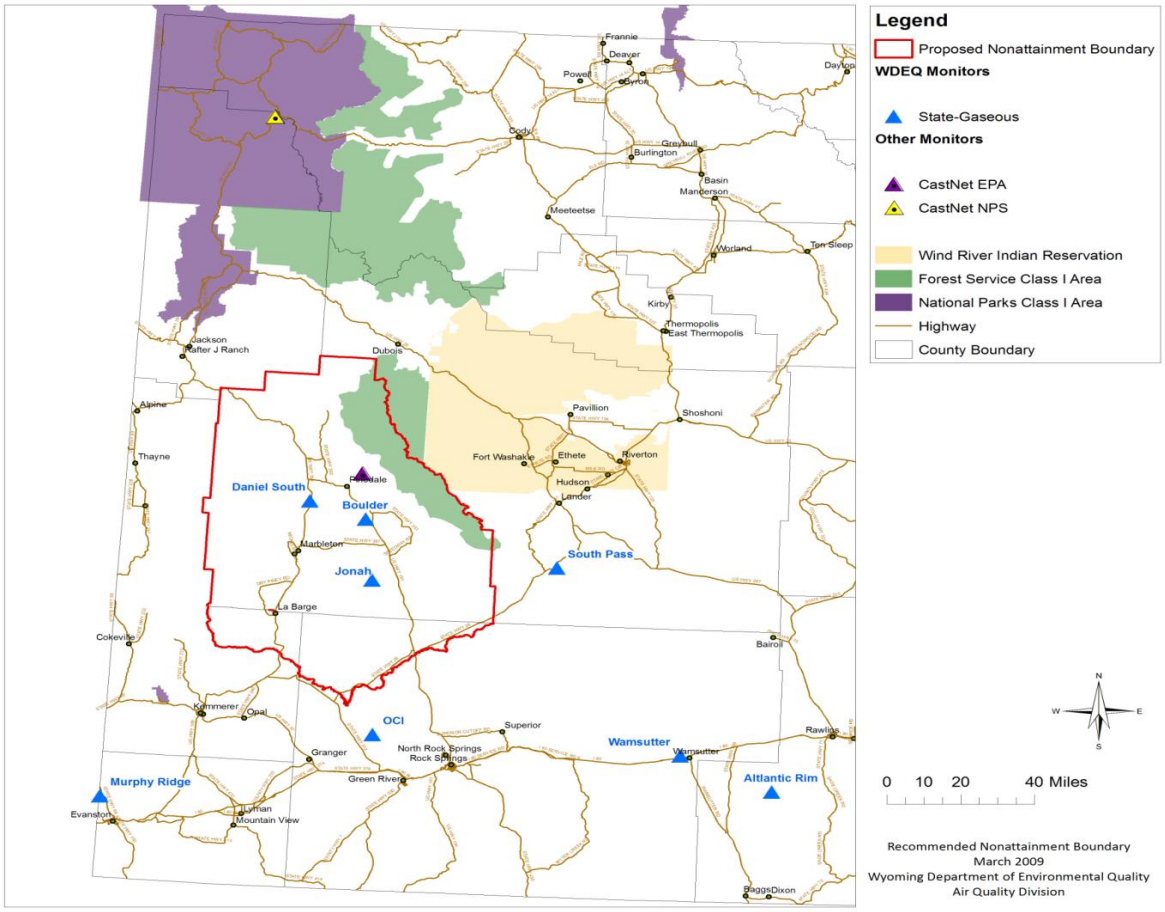



Figure S.7-19. 24-hour forward trajectory analysis in the Moxa Arch area on Feb. 18, 2008.

# Proposed Ozone Nonattainment Area




- Sublette County and Portions of Lincoln and Sweetwater Counties
- March 2009 Ozone NAA Recommendation
  - March 2009 Technical Support Document
  - May & August 2009 Additional Tech. Support Documentation
- 120 Day Letter – December 9, 2011
- Final Designation – anticipated May 31, 2012

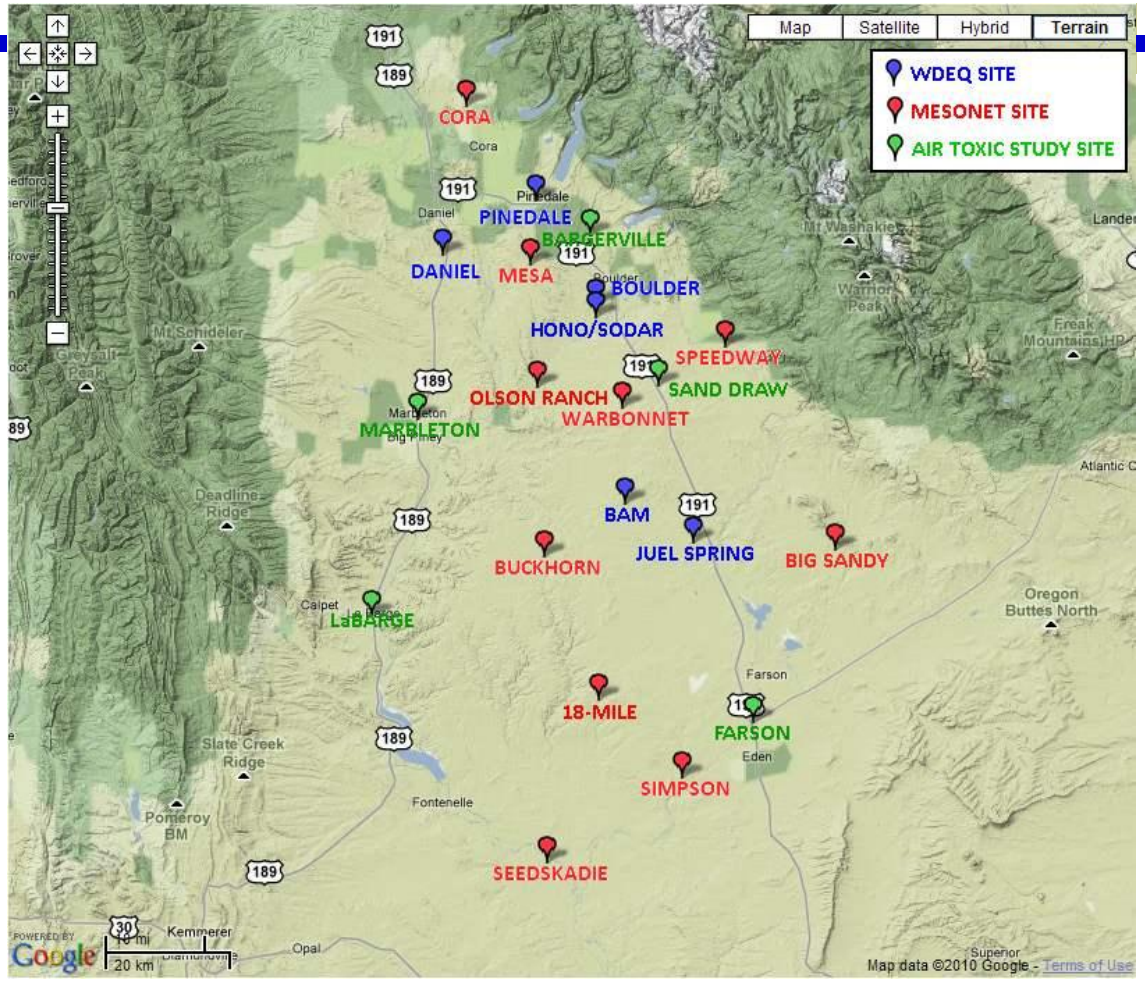
Regardless of the Federal process, we have been taking action

# Accomplished & Underway

- WDEQ Collaboration & Research
  - Collect the appropriate scientific data via collaboration and research
    - Amount of VOCs and $NO_x$ produced and monitored
    - Where and when the VOCs and $NO_x$ are produced
    - Weather data unique to the Upper Green River Basin
  - Use scientific data and develop models to reproduce actual ozone formation, in order to design focused reduction strategies.

# 2010 Monitoring Sites

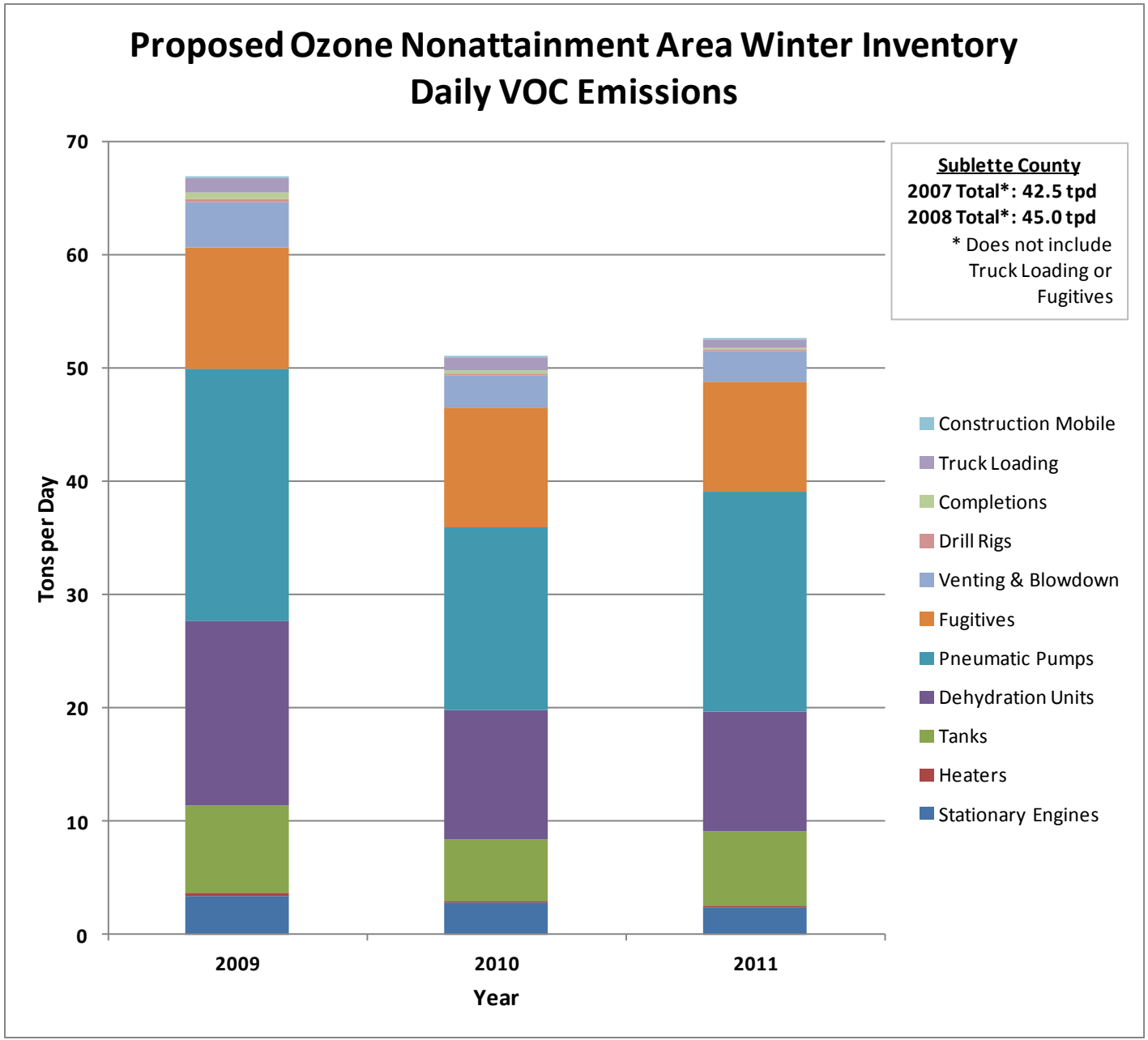
- Ambient monitoring sites
  - Permanent Sites: Juel Springs, Boulder, Pinedale, Daniel South
  - Temporary Site: BAM Trailer
  - HONO/SODAR (adjacent to Boulder)
- Mesonet sites
  - Winds, temperature and ozone
- Sublette County Human Health Risk Study
  - Ozone and Winds



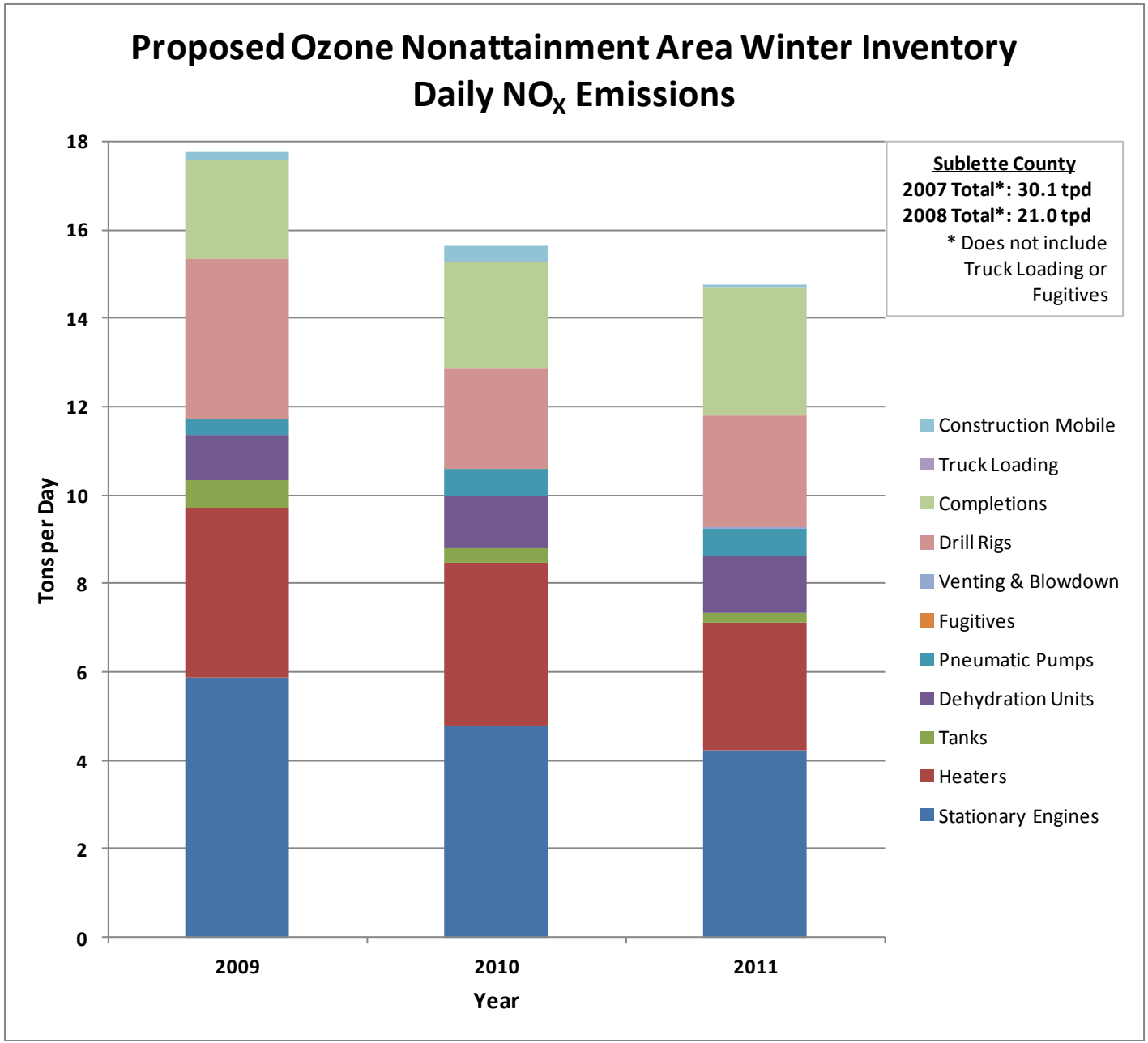
# Accomplished & Underway

- WDEQ & Industry Efforts
  - Policies to reduce and bank precursor emissions
  - Voluntary emissions reductions
  - Consultation with EPA regarding early reductions
  - Contingency Plans
  - Technology transfer
  - Outreach

# Emissions of Volatile Organics



# Emissions of Nitrogen Oxides

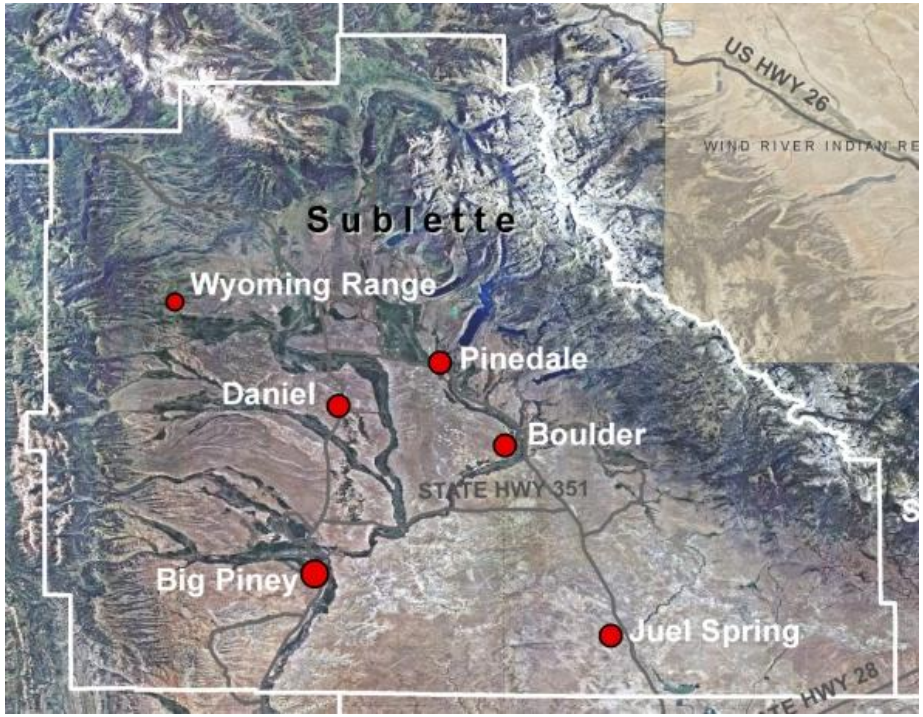


# Winter 2012
## January - March

# Winter 2012

- Winter Ozone Forecasting
  - Daily weather forecasts (January 3 – March 30)
    - Winter Ozone Updates (current and next day)
    - Ozone Action Days (issued 24-hours in advance)
- Ozone Contingency Plans
  - Short-term emission reduction actions implemented with 24-hour advance notice
  - Implement on Ozone Action Days (0 days as of February 20)
- Pinedale Compliance Staff
  - Ongoing inspections
  - Field presence on Ozone Action Days

# Ambient Monitoring




- Long Term AQD Stations
  - Ozone and other criteria pollutants; Meteorology
  - Use to determine compliance with National Ambient Air Quality Standards (NAAQS)
  - www.wyvisnet.com
  - Preliminary Ozone Data
    - January 1 – February 20, 2012
    - 8-hour daily max
      0 days > 75 ppb (NAAQS)
    - 1-hour daily max
      7 days > 60 ppb < 70 ppb
      3 days > 70 ppb < 75 ppb

# What the future holds

# Ozone Nonattainment Planning

- Classification Rule – Proposed Feb. 7, 2012
  - "Percent-above-the-standard" approach
  - Marginal – Ozone 76 up to 86 ppb – attainment date 3 years
- Classification Rule Final – Spring/Summer 2012
- Implementation Rule Proposal – Spring/Summer 2012
  - EPA intends to propose a rule that is simple and straight forward
- Implementation Rule Final – End of 2012

# Other Ozone-Related Actions

- Ozone Monitoring Rule – Proposed July 2009
  - Minimum monitoring requirements
  - Ozone monitoring seasons
- Ozone Advance – Draft Released Feb. 9, 2012
  - Option created by EPA to allow states to take credit for early reductions of ozone forming pollutants
  - Early reductions will be counted towards overall goal of reducing emissions in nonattainment area
- Next Ozone National Ambient Air Quality (NAAQS) Review (already underway)
  - Proposal – October 2013, Final – July 2014

# Nonattainment – What this means for citizens

- Establishes clear timelines for getting back into attainment
  - Marginal – 2015
- Increased federal oversight for a long time
- Nonattainment New Source Review will apply for major sources
- Transport demonstration

# Obstacles & Opportunities

- Obstacles
  - Weather
  - EPA tool box focuses on power plants and mobile sources
  - No established models
  - Pace of development
  - High background ozone levels everywhere in the West
- Opportunities
  - Time to bring ozone under control through marginal classification
  - Energy companies are motivated to assist in solving the problem
  - Ozone Advance
  - EPA is now working on a similar winter time problem in Utah

# Key Webpages

- Daily Winter Ozone Updates
  - http://winterozone.org
  - 1-888-996-9337
  - Email Service winterozone@ewyoming.gov
- Information on the health effects of ozone
  - http://www.health.wyo.gov
- Current information on monitored ozone
  - http://www.wyvisnet.com