Reducing Uncertainties and Increasing Representativeness in Upstream Western Basins

November 5, 2014

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WESTAR Council

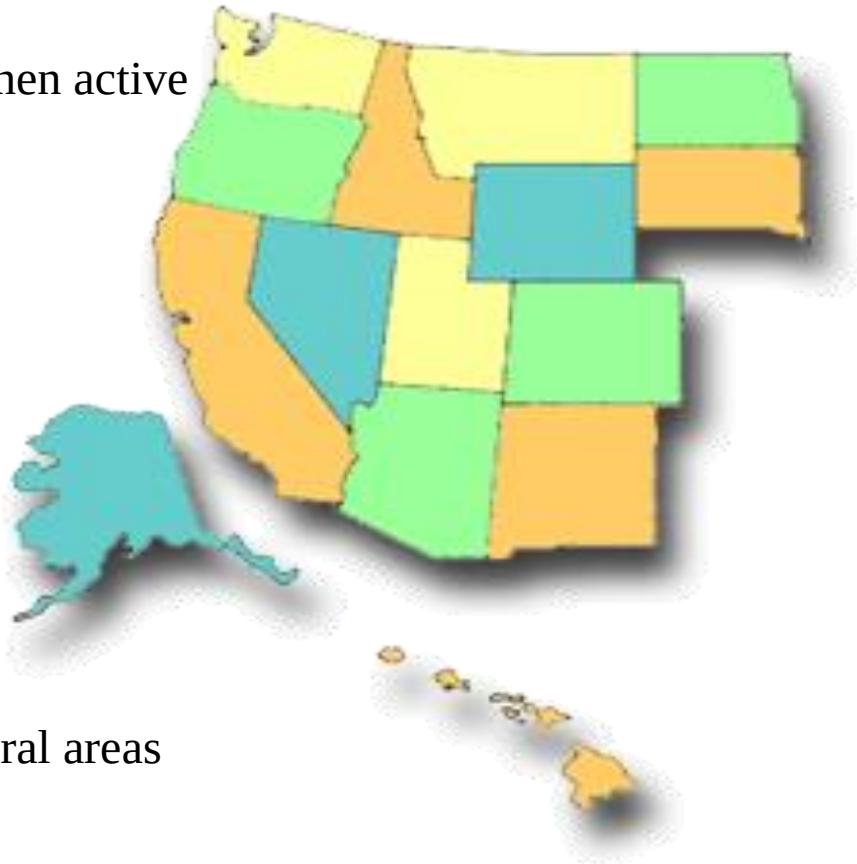
Oil & Gas Emissions Summit Meeting
RTP, NC

WESTERN REGIONAL AIR PARTNERSHIP

WESTAR
Western States Air Resources Council

Western ozone, PM, visibility precursors - key emissions sources

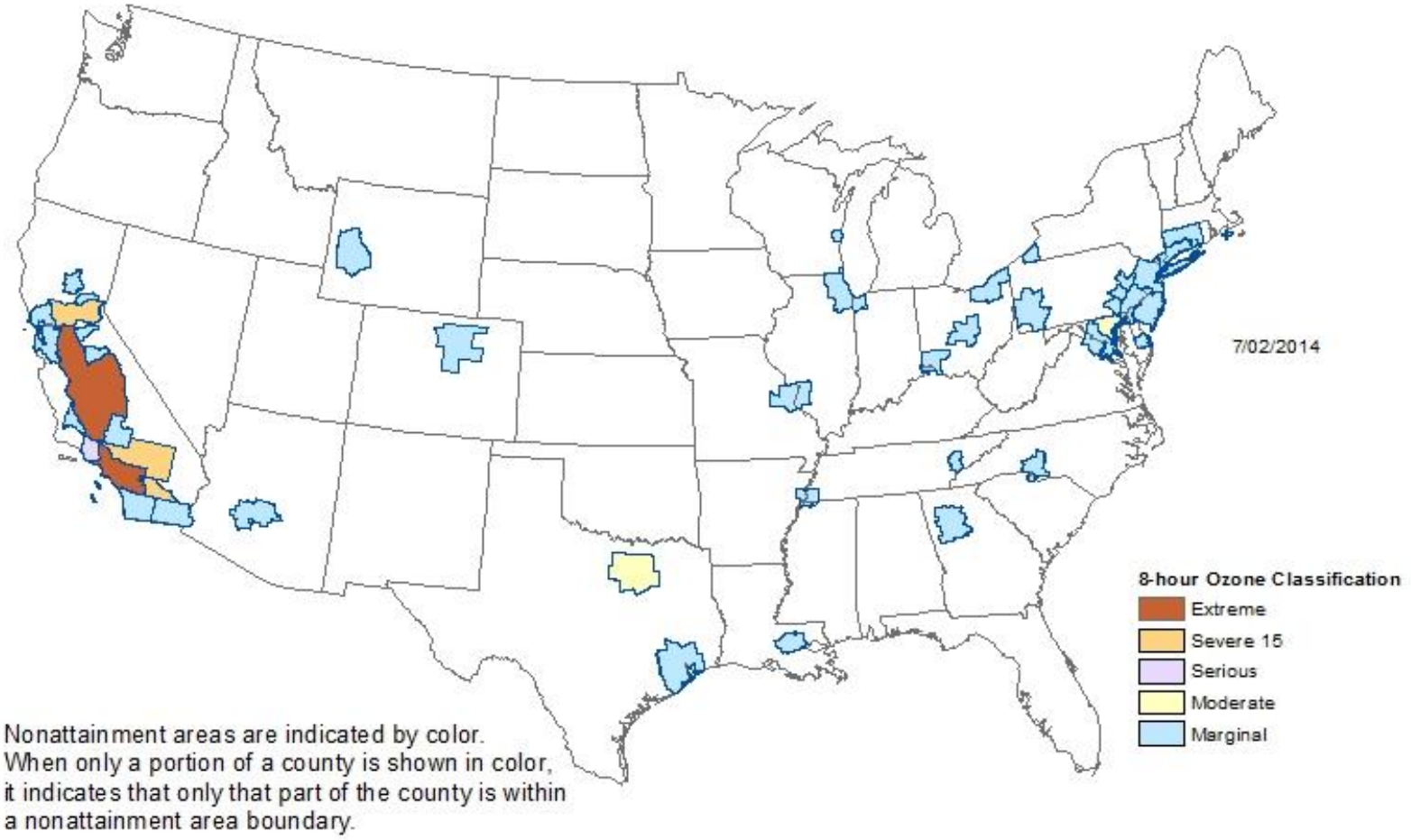
- Power plants decreasing markedly
- Mobile sources controlled and emission rates decreasing markedly through federal rules and state testing programs
- Fire activity and effects are huge
  - Largest air pollution source in the West when active
  - Receiving intensive management / study
- Biogenics (natural plant sources)
- Drought and climate change
  - Pattern changes to geogenic sources
  - Reflected in background and large events
- Oil and gas activity increasing …
- Population growth
  - Concentrated in urban areas
  - More of us living in exurbia, playing in rural areas
  - Living in the Anthropocene…



Oil & Gas Basins in the Intermountain West

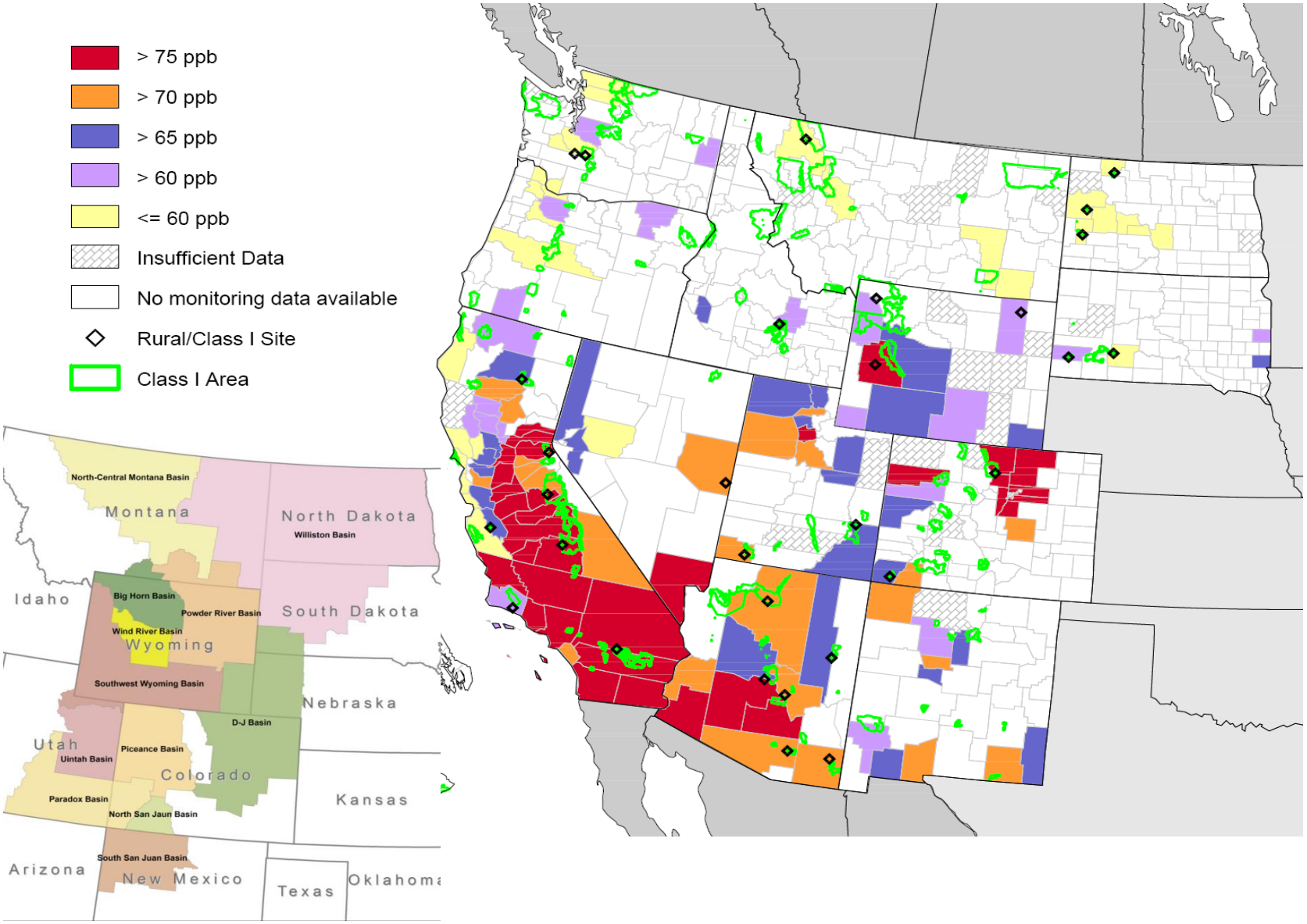
Counties with Monitors Violating Primary 8-Hour Ground-Level Ozone Standard (0.075 ppb)

(Based on 2011-2013 Air Quality Data)



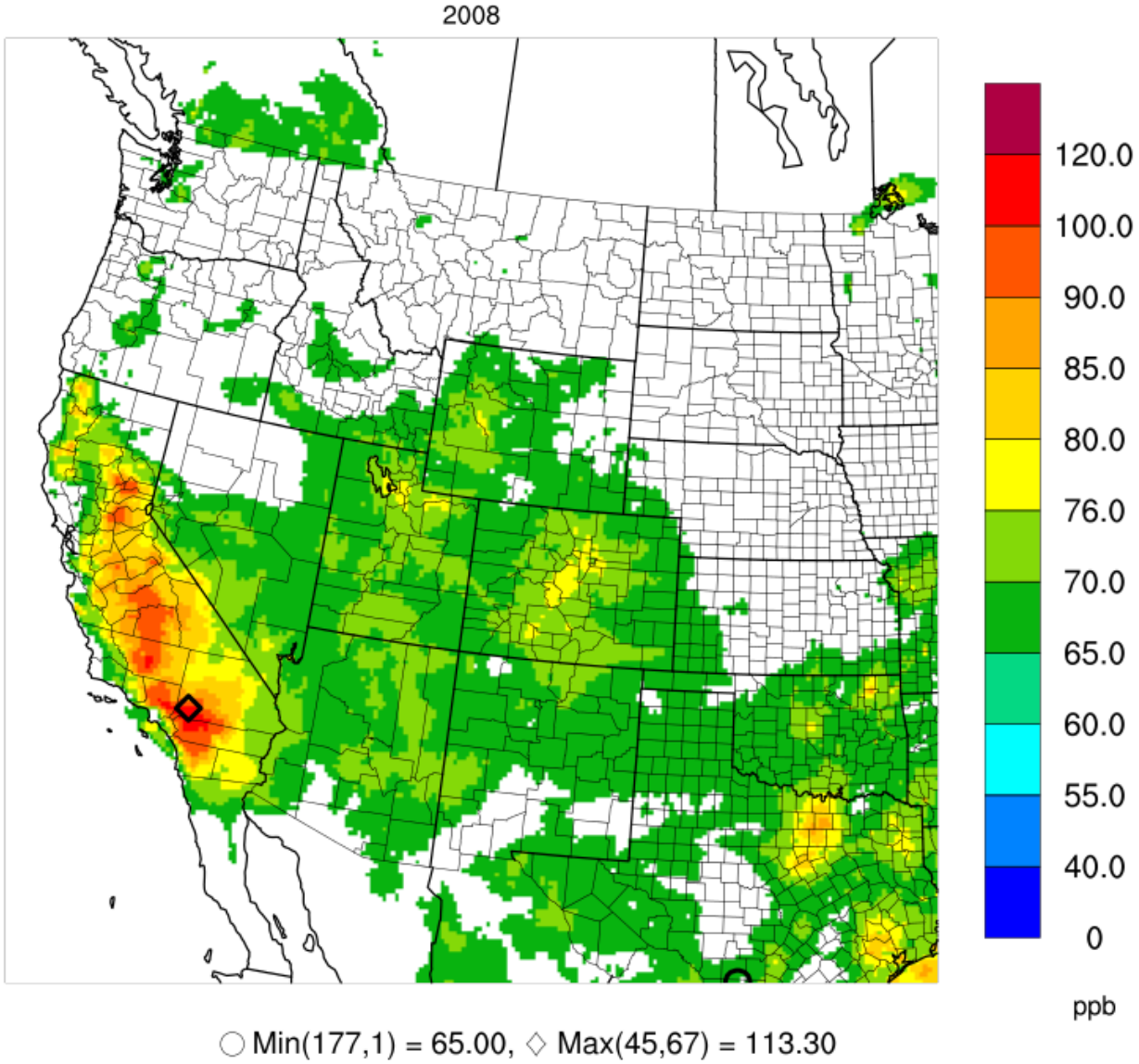
http://www.epa.gov/airquality/greenbook/map8hr_2008.html

3-year Average 4th Highest 8-Hour Ozone value by County 2011-2013



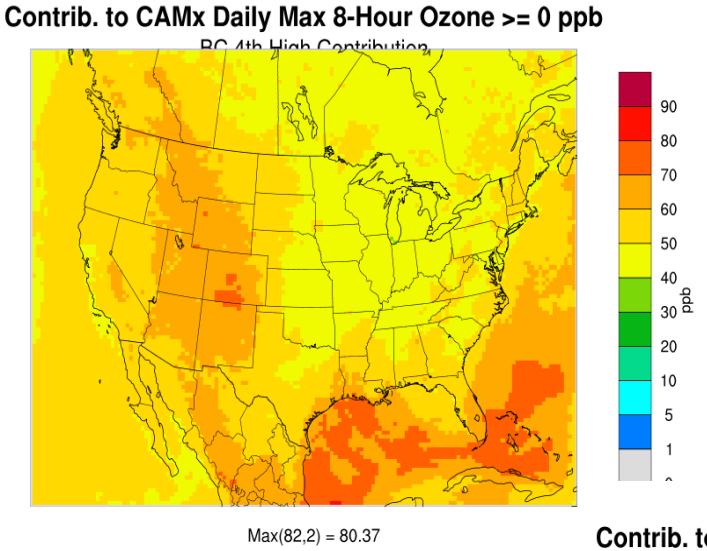
AQS Federal Reference Method data from the monitoring site in each County with the highest Ozone values

Attainment Test Software – Unmonitored Area Analysis with Design Value (2006-2010) ≥ 65 ppb



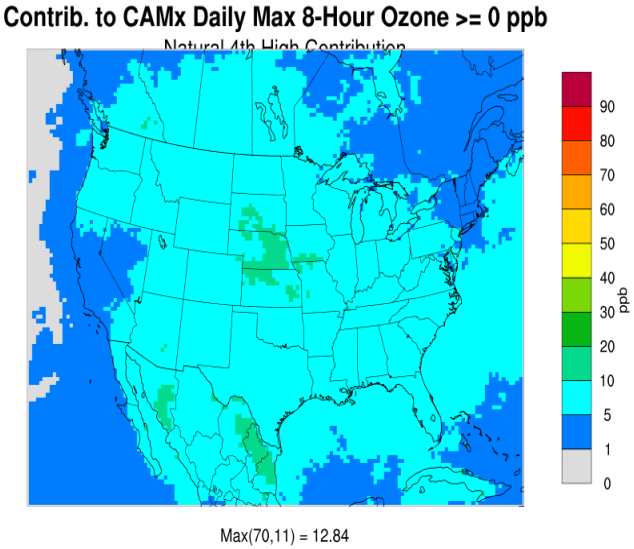
West-wide Jumpstart Air Quality Modeling Study (WestJumpAQMS)

Source Category Maximum Modeled Contribution to 4th Highest Daily Maximum 8-hour Ozone for 2008

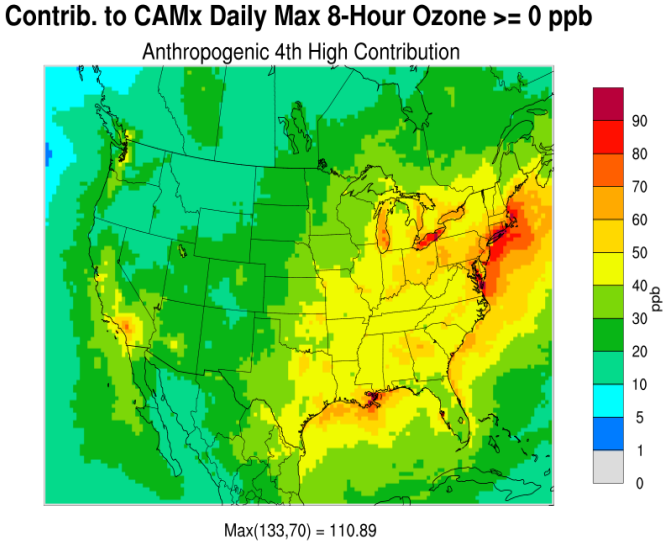


Boundary Conditions

Natural



Anthropogenic



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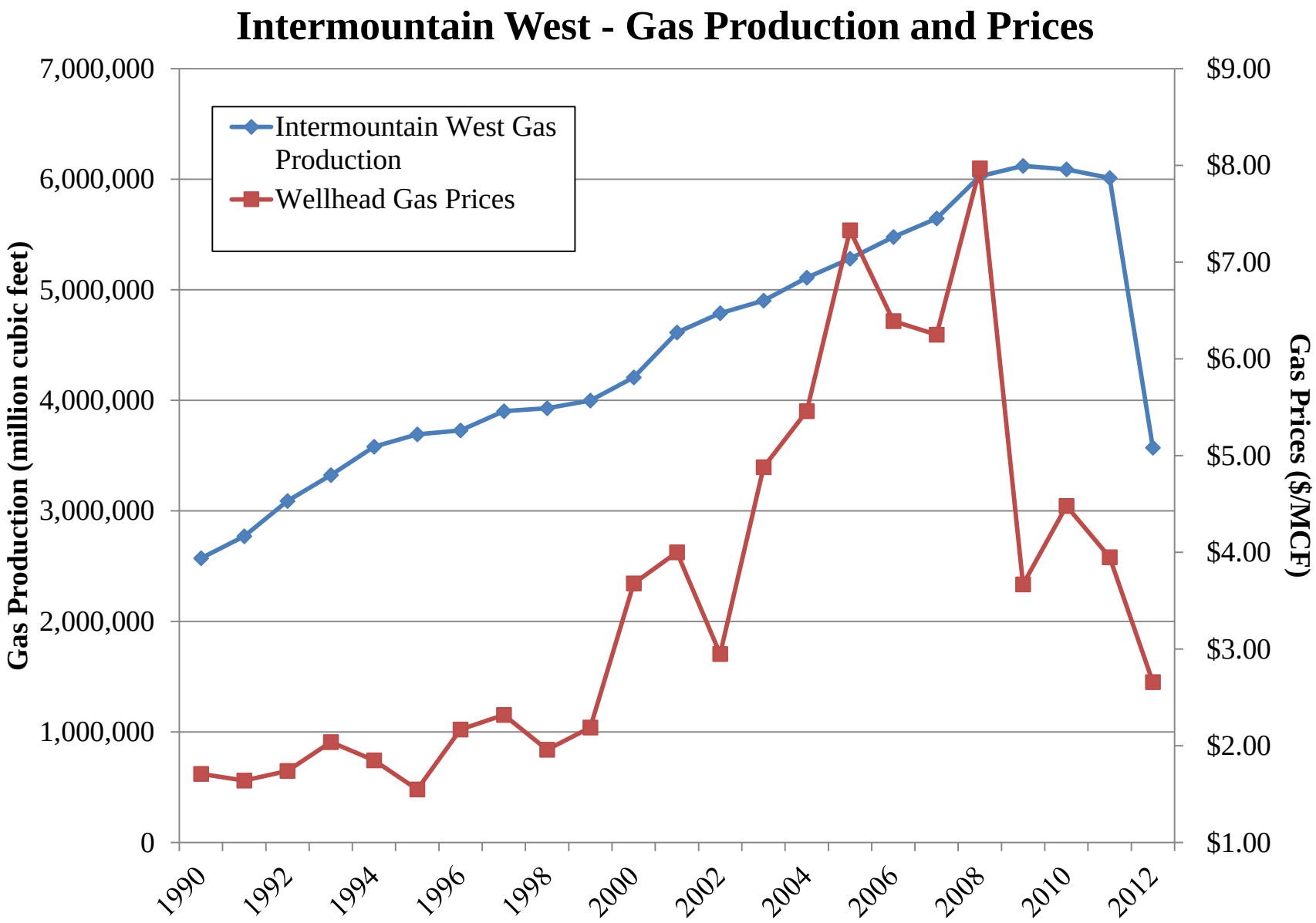

Intermountain West - Gas Production and Prices
Intermountain West Gas Production
Wellhead Gas Prices
Gas Production (million cubic feet)
Gas Prices ($/MCF)
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
$9.00
$8.00
$7.00
$6.00
$5.00
$4.00
$3.00
$2.00
$1.00
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012

Drilling companies flood BLM with proposals to burn, vent gas

Published: Tuesday, November 4, 2014

- Oil and gas companies are seeking a major increase in permits to vent or burn natural gas from wells on federal lands without paying royalties, according to data obtained by Greenwire.

- The data suggest a growing amount of taxpayer-owned natural gas is literally going up in flames as companies focus development in oil plays, particularly in New Mexico and North Dakota.

- Over the past three years, industry applications to vent or flare gas -- rather than capture it, send it to market and pay federal royalties -- have risen nearly threefold, according to the data from the Bureau of Land Management.

- In the past decade, those applications have risen nearly 2,400 percent.

be found below in this section and in sections V and IX of this preamble.

TABLE 3—SUMMARY OF 40 CFR PART 60, SUBPART OOOO EMISSION STANDARDS

Affected facility	Pollutant	Standard	Compliance dates
Hydraulically fractured wildcat and delineation wells.	VOC	Route flowback emissions to completion combustion device.	October 15, 2012.
Hydraulically fractured low pressure wells, non-wildcat and non-delineation wells.	VOC	Route flowback emissions to completion combustion device.	October 15, 2012.
All other hydraulically fractured gas wells	VOC	Route flowback emissions to completion combustion device.	Prior to January 1, 2015.
All other hydraulically fractured gas wells	VOC	Use REC and route flowback emissions to completion combustion device.	On or after January 1, 2015.
Centrifugal compressors with wet seals	VOC	Reduce emissions by 95 percent	October 15, 2012.
Reciprocating compressors	VOC	Change rod packing after 26,000 hours or after 36 months.	October 15, 2012.
Continuous bleed natural gas-driven pneumatic controllers at natural gas processing plants.	VOC	Natural gas bleed rate of zero	October 15, 2012.
Continuous bleed natural gas-driven pneumatic controllers with a bleed rate greater than 6 scfh between wellhead and natural gas processing plant or oil pipeline.	VOC	Natural gas bleed rate less than 6 scfh	October 15, 2013.
Storage vessels with VOC emissions equal to or greater than 6 tpy.	VOC	Reduce emissions by 95 percent	October 15, 2013.
Equipment leaks at onshore natural gas processing plants.	VOC	LDAR program	October 15, 2012.
Sweetening units at onshore natural gas processing plants.	SO_2	Reduce SO_2 emissions based on sulfur feed rate and sulfur content of acid gas.	October 15, 2012.

Future combined emissions reduction strategy for methane, criteria pollutants, HAPs will need to combine regulations with best practices to address existing 1,000,000+ wells

Drill Rig NO_2 Study Concepts

- **Drill Rig 1-hour NO_2 Collaborative Study**
- Collaborative effort between BLM, EPA, States, other FLMs and the Oil and Gas Industry to better predict 1-hour NO_2 impacts from drill rigs through a field study.
- WESTAR/WRAP coordinating project
  - Funding by BLM and API
  - Substantial operational field support by ConocoPhillips and Anadarko
  - Important in-kind contributions by States and EPA

Monitoring

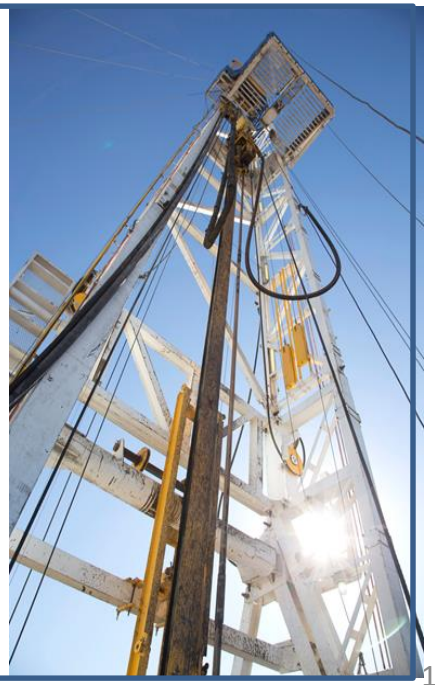
- NO_2 concentrations at multiple locations near operating drill rigs with ambient arrays
- Meteorological conditions (up/downwind stations)

Measuring

- Drill rig emissions (continuous generator and boiler stack testing with CEMS)

Modeling

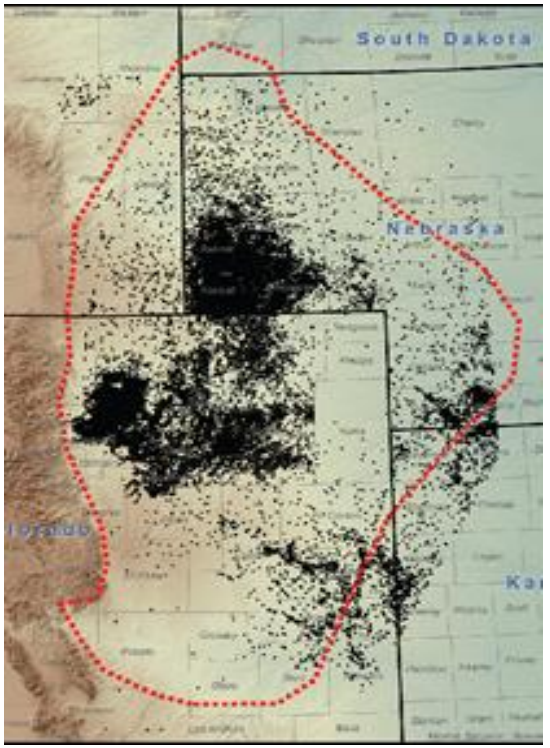
- Model using data from monitoring and measurements

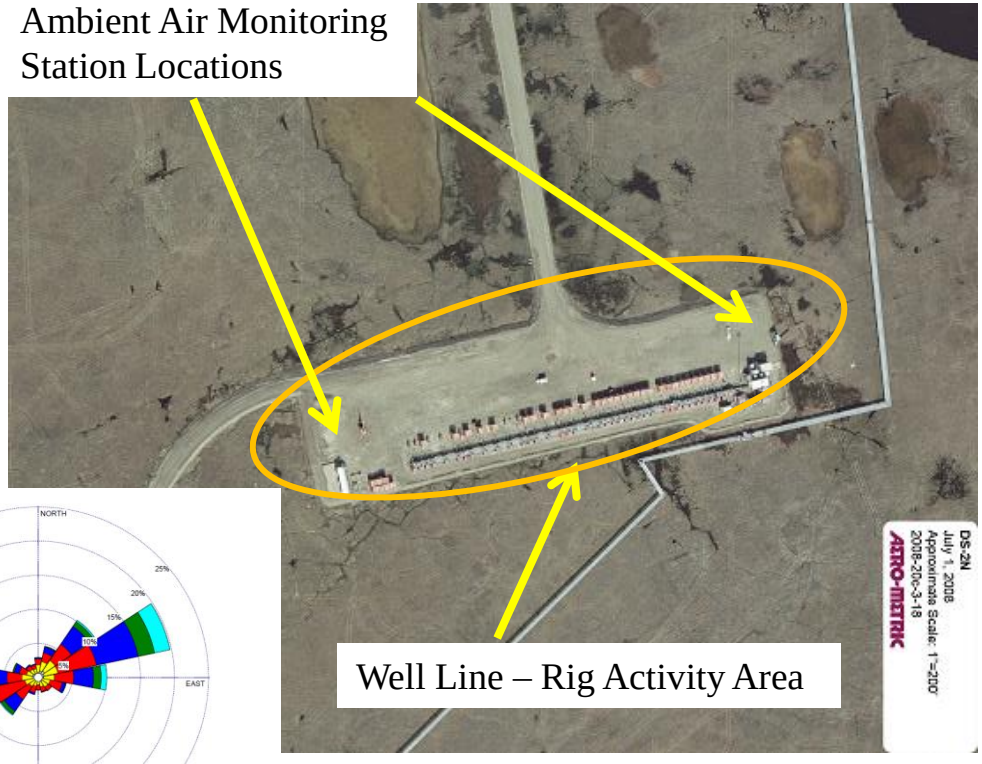


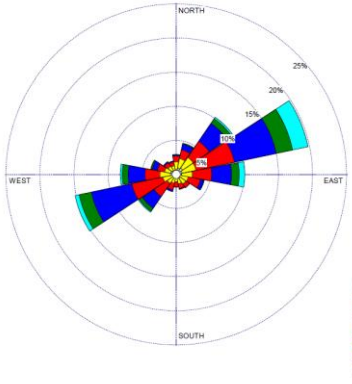
Study Areas

- **Denver-Julesburg (D-J) Basin**
  Niobrara Oil Shale

  2 Anadarko drill pads, Oct.-Nov. 2014





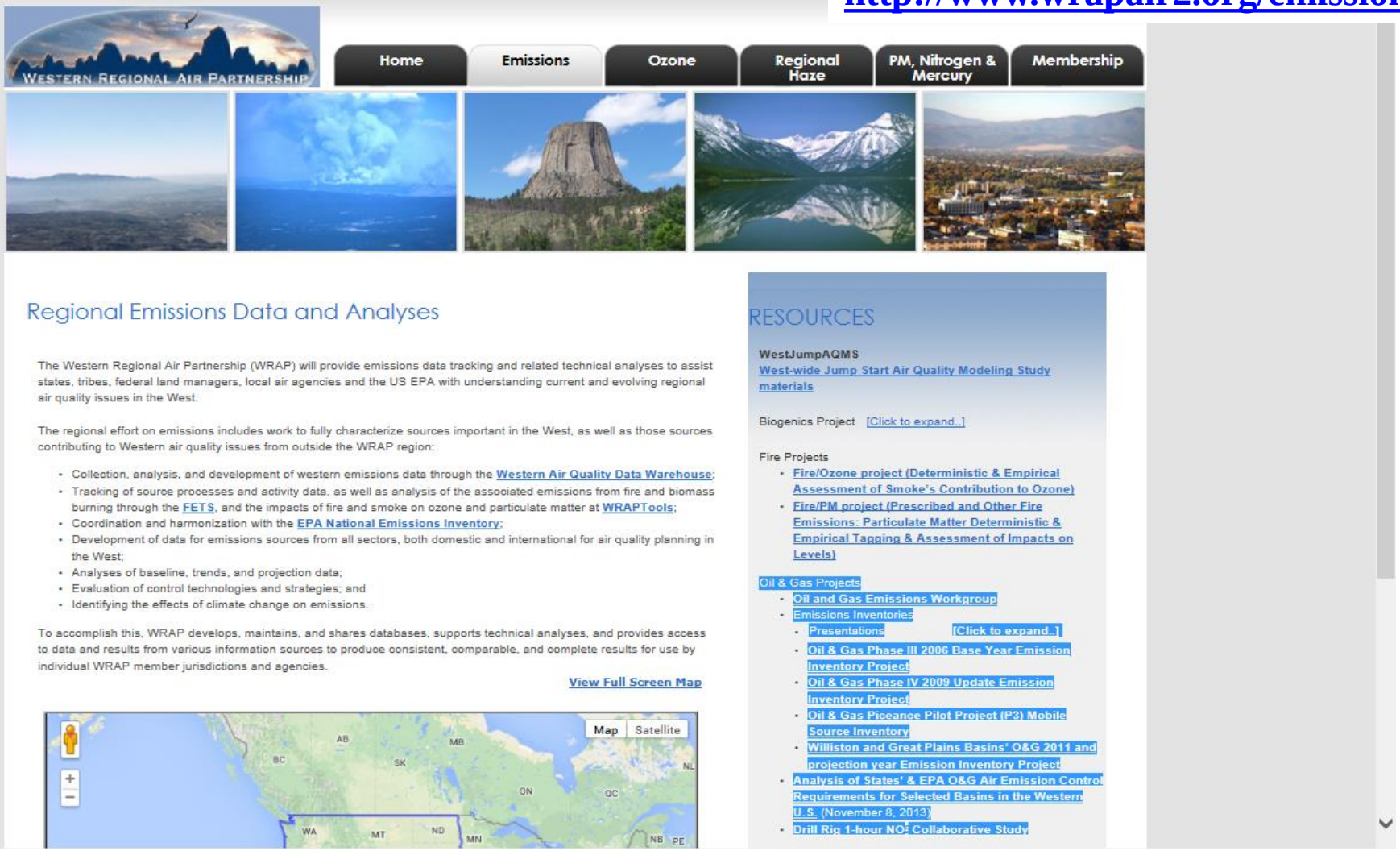


- **Alaska North Slope**
  Kuparuk Oil Field

  Work being funded separately by ConocoPhillips

  Aug.-Dec. 2014

http://www.wrapair2.org/emissions.aspx



Williston and Great Plains Basins' O&G 2011 and projection year Emission Inventory Project

Analysis of States' and EPA Oil & Gas Air Emissions Control Requirements for Selected Basins in the Western United States - (November 2013 Update)

Eastern Utah Energy Development Area

2006 Oil and Gas Production

BLM proposed leasing for oil shale development

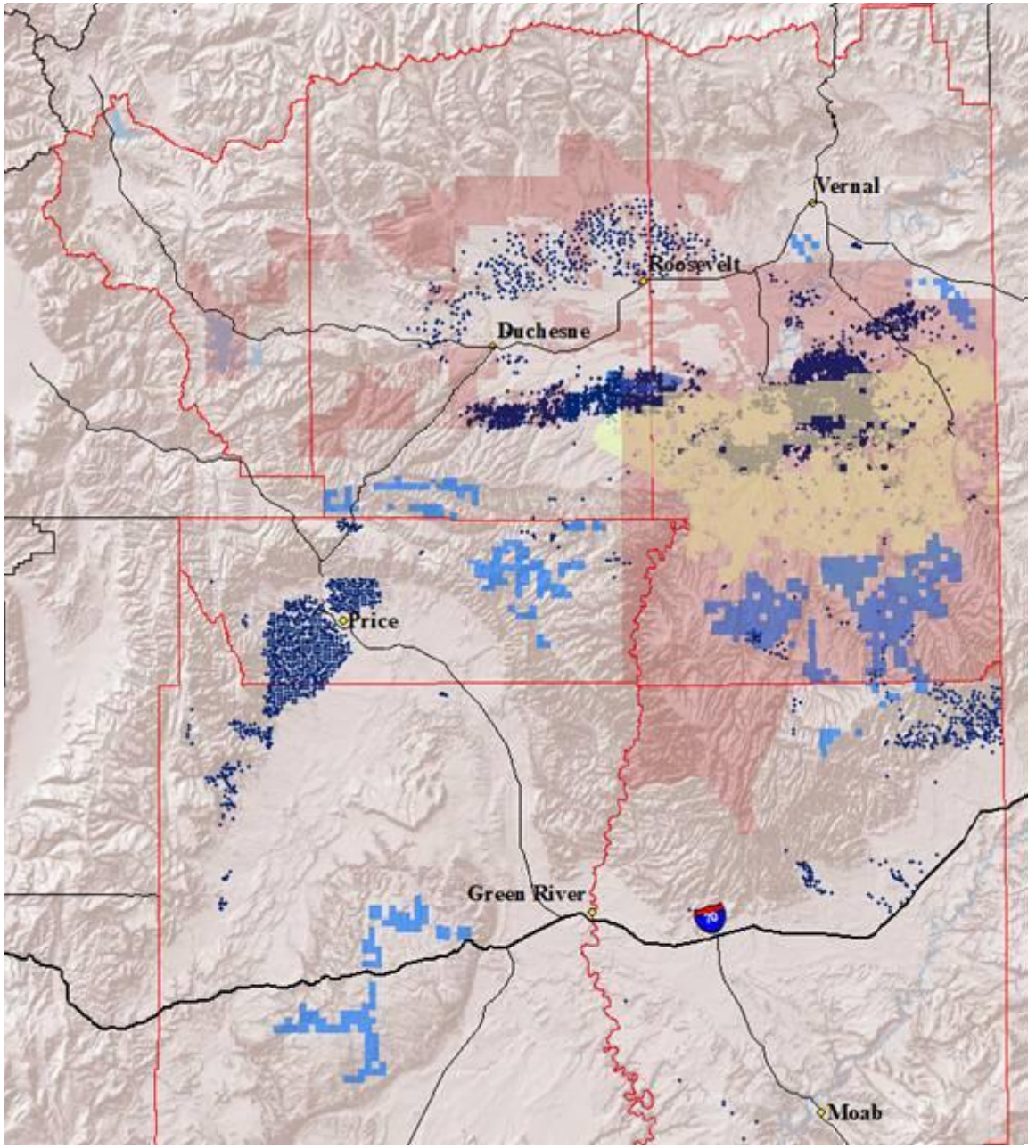
BLM proposed leasing for tar sands development

"Indian Country" – Regulatory authority controlled by the Tribes and EPA

Oil Shale Leasing

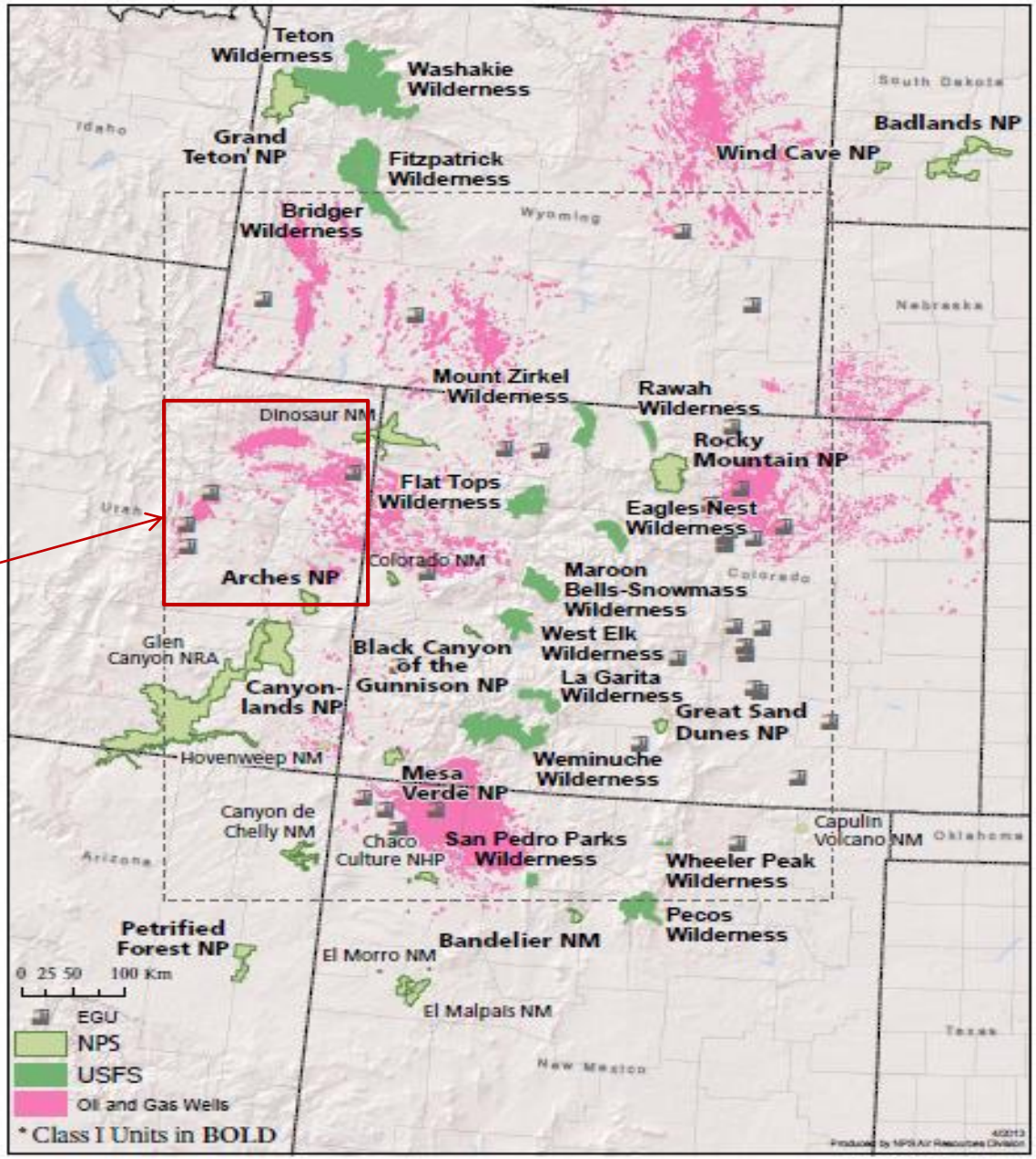
Tar Sands Leasing

"Indian Country"



Intermountain Region Parks and Class I areas

Eastern Utah Energy Development Area



O&G Survey and Preliminary 2014 Emissions (1 of 2)

- O&G Operator Surveys: Piceance, Uinta, South San Juan Basins
  - WRAP Phase III survey for 2006 out-of-date
    - Significant changes in industry practices since then
  - WDEQ has O&G inventory for whole state
    - No survey needed as O&G inventory judged complete
  - Denver-Julesburg survey under separate study (RPSEA)
- Perform outreach to Operators to make sure surveys are responded to (Airstar)
- Acquire 2014 O&G "permitted" O&G data from states and EPA (tribes)
  - Colorado 2014 APEN data
  - Utah mainly tribal data obtained from EPA
  - Wyoming has complete O&G inventory

O&G Survey and Preliminary 2014 Emissions (2 of 2)

- Project "unpermitted" O&G emissions to 2014
  - For Colorado, New Mexico (SSJ) and Utah
  - Start with 3SAQS 2011 O&G emissions
  - Assume new 2014 survey data will not be available
- Format preliminary CO-UT-WY-NM 2014 O&G for SMOKE
- Deliverables:
  - Plan for developing preliminary 2014 O&G emissions for 3 States
  - Basin-aggregated survey data on activity, equipment, processes, gas composition, etc.
  - Preliminary 2014 O&G emissions for 3SAQS formatted for SMOKE
  - Memo on development of preliminary 2014 O&G emissions
  - Memo on how to implement new NEPA future year Project O&G emissions with 3SAQS O&G emission inventories
    - Also discusses design of on-line tool that compares Project O&G emissions with 3SAQS future year O&G emission inventories
- Schedule: Oct 2014 – Jun 2015

Thanks –

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Western Regional Air Partnership | www.wrapair2.org