Western Regional Air Study Efforts and Effects of CAA Requirements

February 19, 2015

Tom Moore
WRAP Air Quality Program Manager
WESTAR Council

CENRS Air Quality Research Subcommittee Meeting
Washington, DC

WESTERN REGIONAL AIR PARTNERSHIP

WESTAR
Western States Air Resources Council

Topics

- Overview of the WESTAR/WRAP organization
- Key issues and areas of focus
- Recent projects and studies

Overview of WESTAR/WRAP

www.westar.org

www.wrapair2.org

Overview of WESTAR/WRAP (cont'd)

- Purpose
  - Service organization
  - Assist members in achieving their air quality management goals
- Approach
  - Training
  - Provide a forum for discussion
  - Inform policy-related discussions
  - Provide regional technical support

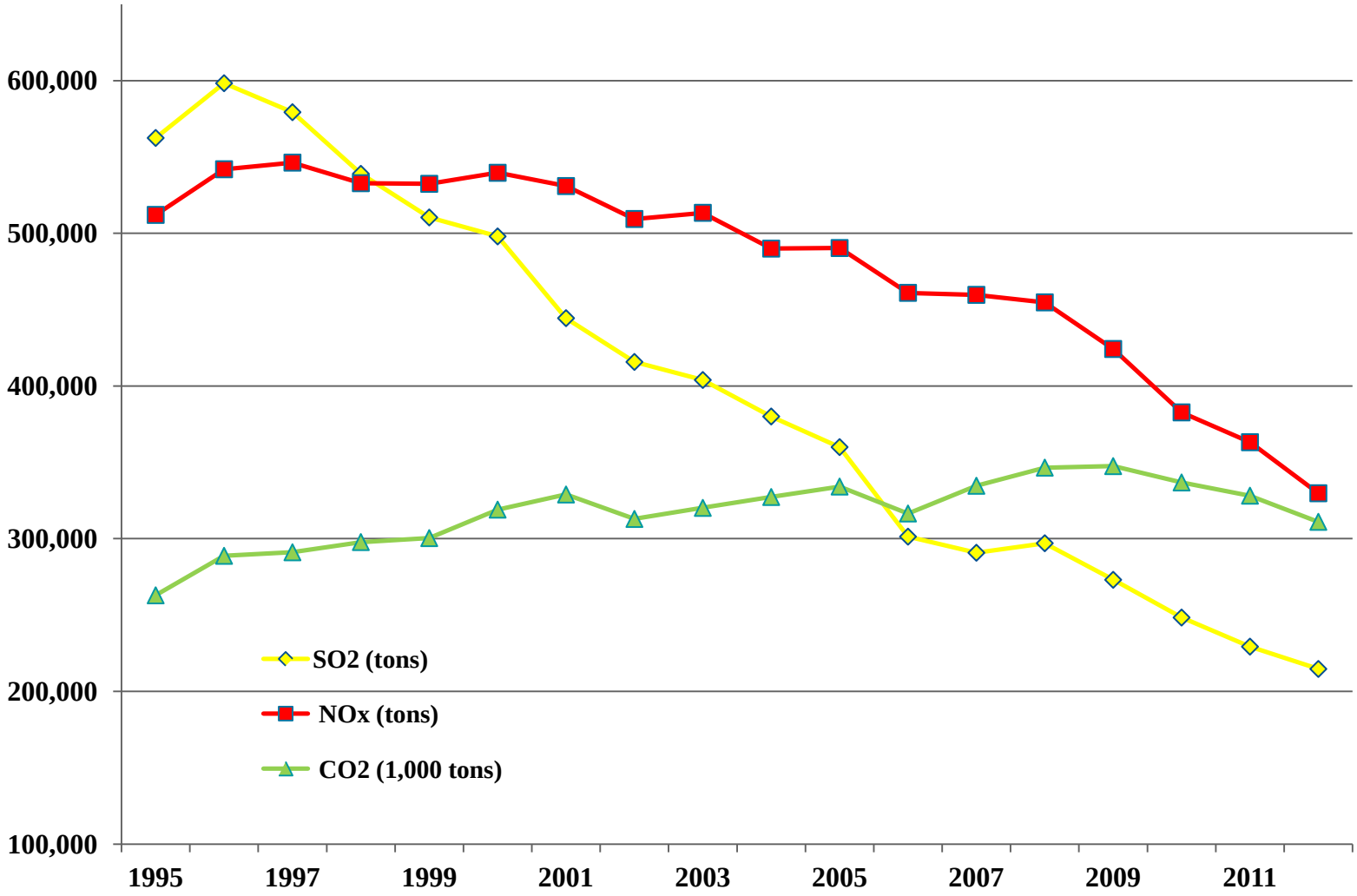
WRAP Key Issues and Areas of Focus

- NAAQS Implementation and Maintenance
  - Data for future infrastructure and transport SIPs
- Exceptional Events
  - Develop technical support data and analysis protocols
- Implementation of Regional Haze SIPs
  - Identify and execute technical work needed for 2018 plans
- Needs of sub-regional groups of states
  - Currently oil and gas, fire
  - Similar efforts in past – dust, BART, other topics

WRAP current projects and priorities

- precursors to Ozone, Particulates, and Regional Haze - key western sources
  - Power plants
  - Mobile sources
  - Fire activity and effects
  - Biogenics (natural) emissions
  - Oil and gas exploration and production
  - All sources studied in comprehensive regional modeling analysis
    - West-wide Jumpstart Air Quality Modeling Study (WestJumpAQMS)

Power Plant Emissions Trends – Western Interconnect



Data Source: EPA Clean Air Markets Division

The Big Picture

Smoke/Fire & the Ozone and PM NAAQS, Regional Haze Rule

Fire

Technical Products for air quality planning & management as required by the Clean Air Act

Future emissions, efforts to avert emissions & health/visibility impacts, & adapt to a changing/varying climate

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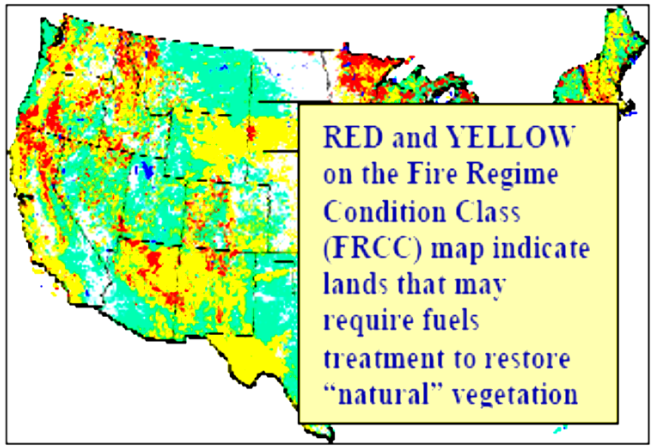
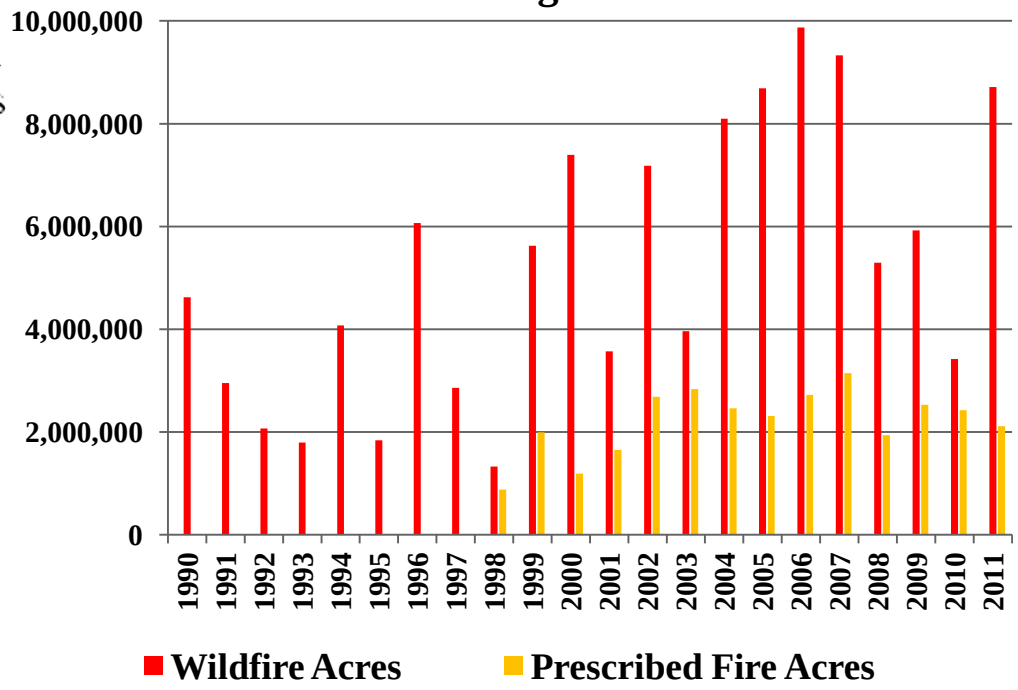
The quantity of forest fuels and composition of vegetation in the wildlands of the Western U. S. motivate the land managers to increase the application of prescribed fire to the landscape (from 650.000 acres in 2002 to a projection of up to 3.6 MM acres in 2018).

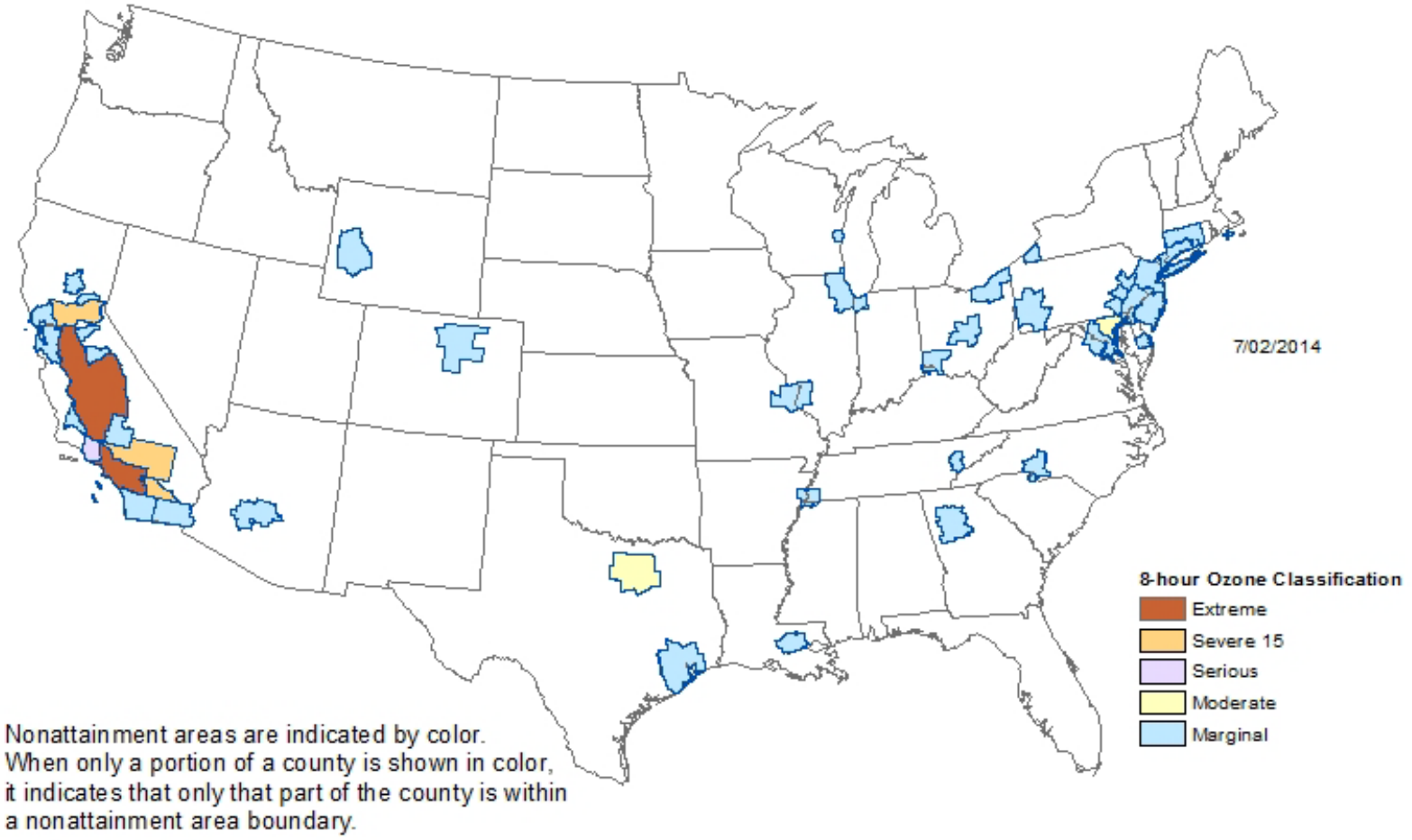


U.S. Wildfire and Prescribed Fires Acres Burned - 1990 through 2011



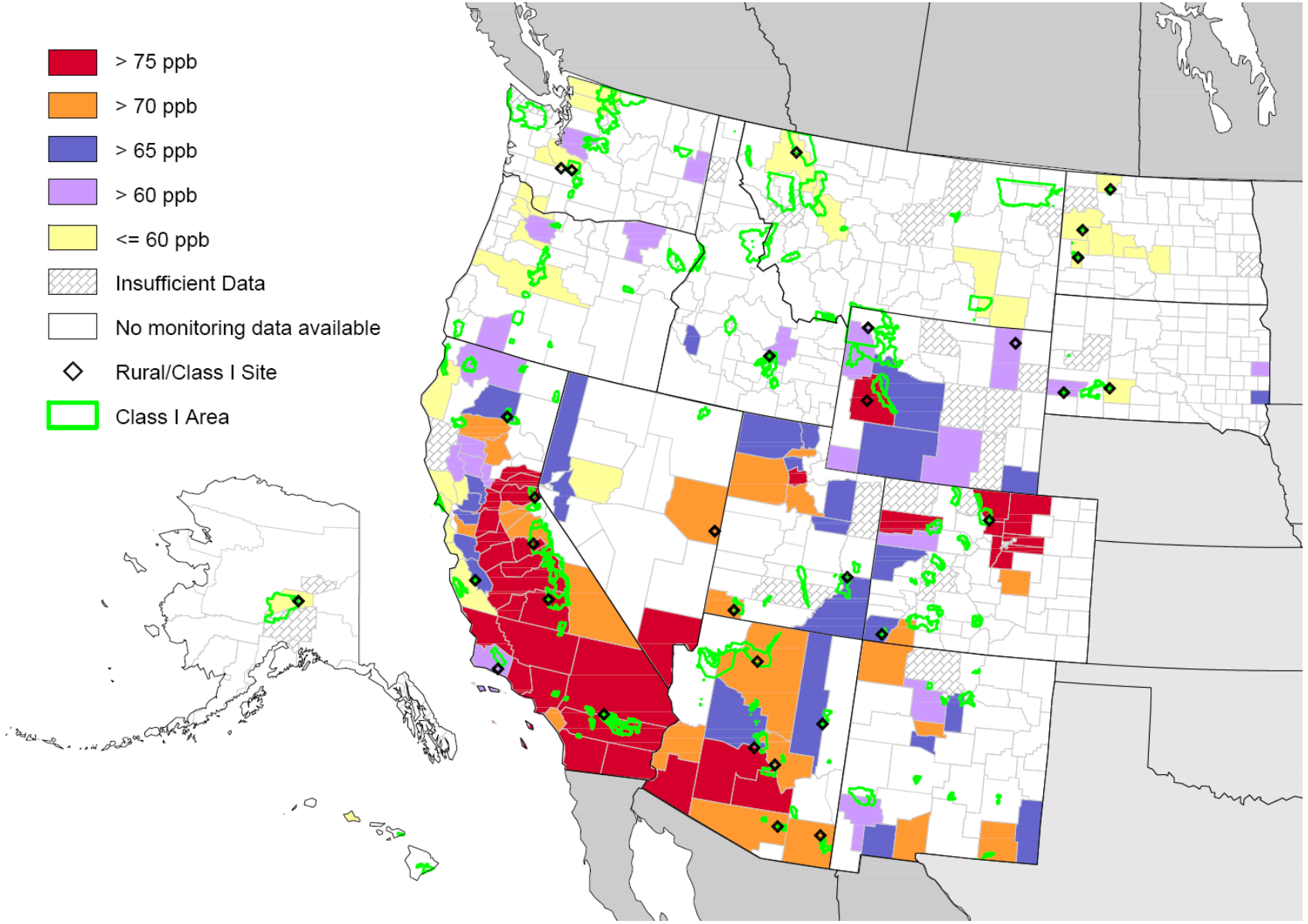
Counties with Monitors Violating Primary 8-Hour Ground-Level Ozone Standard (0.075 ppb)

(Based on 2011-2013 Air Quality Data)



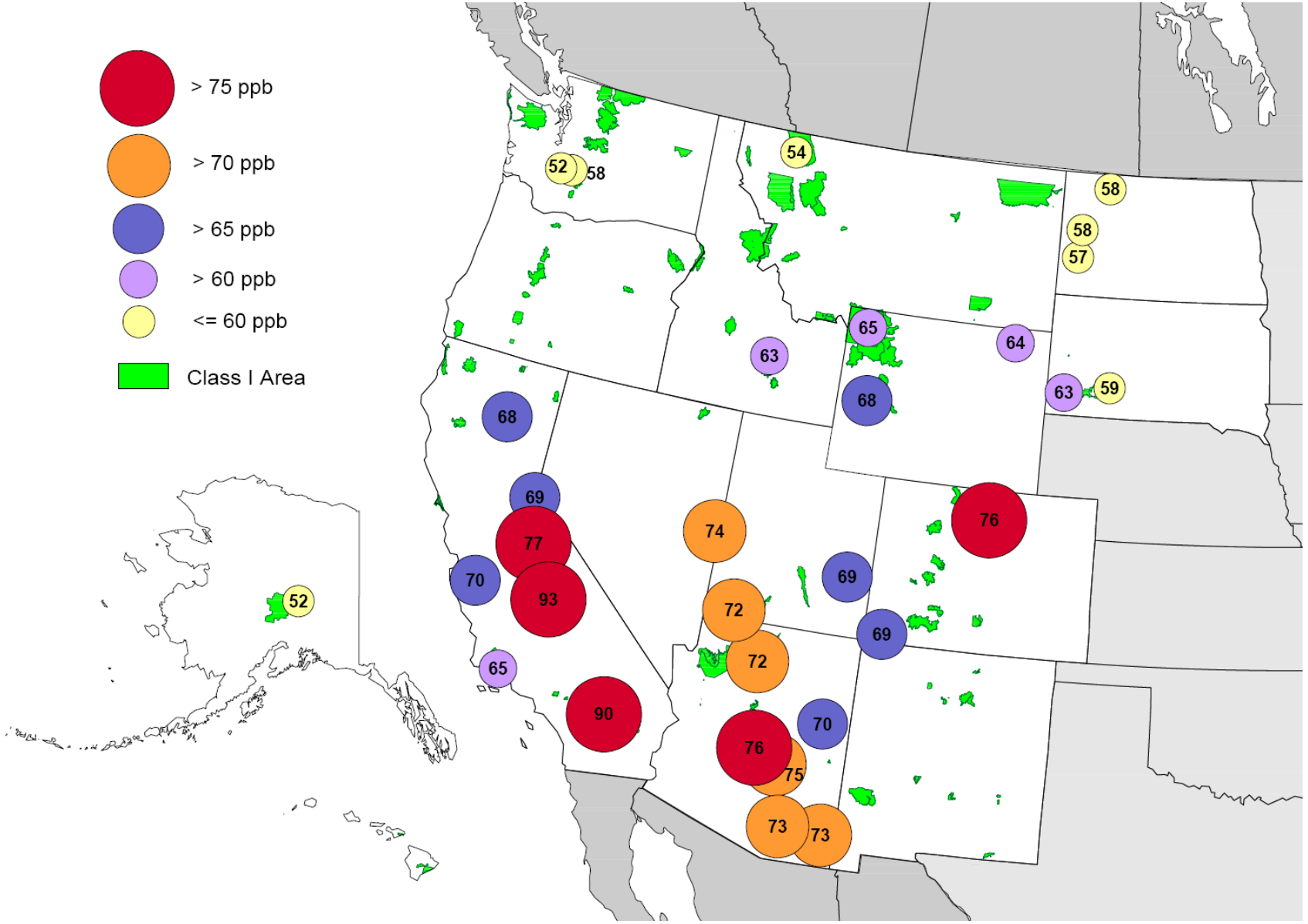
http://www.epa.gov/airquality/greenbook/map8hr_2008.html

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



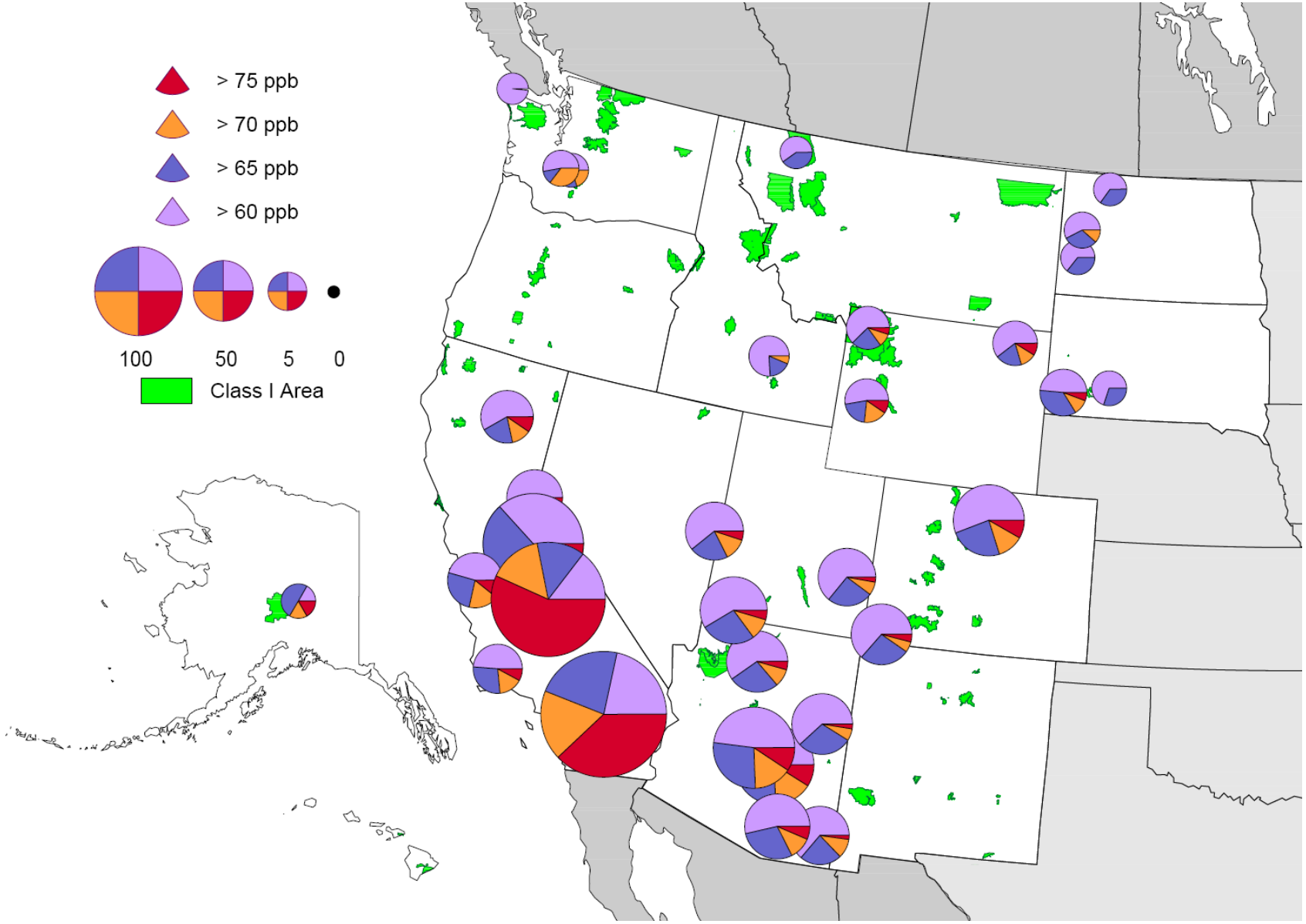
AQS Federal Reference Method data from the monitoring site in each County with the highest Ozone values

3-year Average 4th Highest 8-Hour Ozone value for Rural/Class I Sites 2011-2013



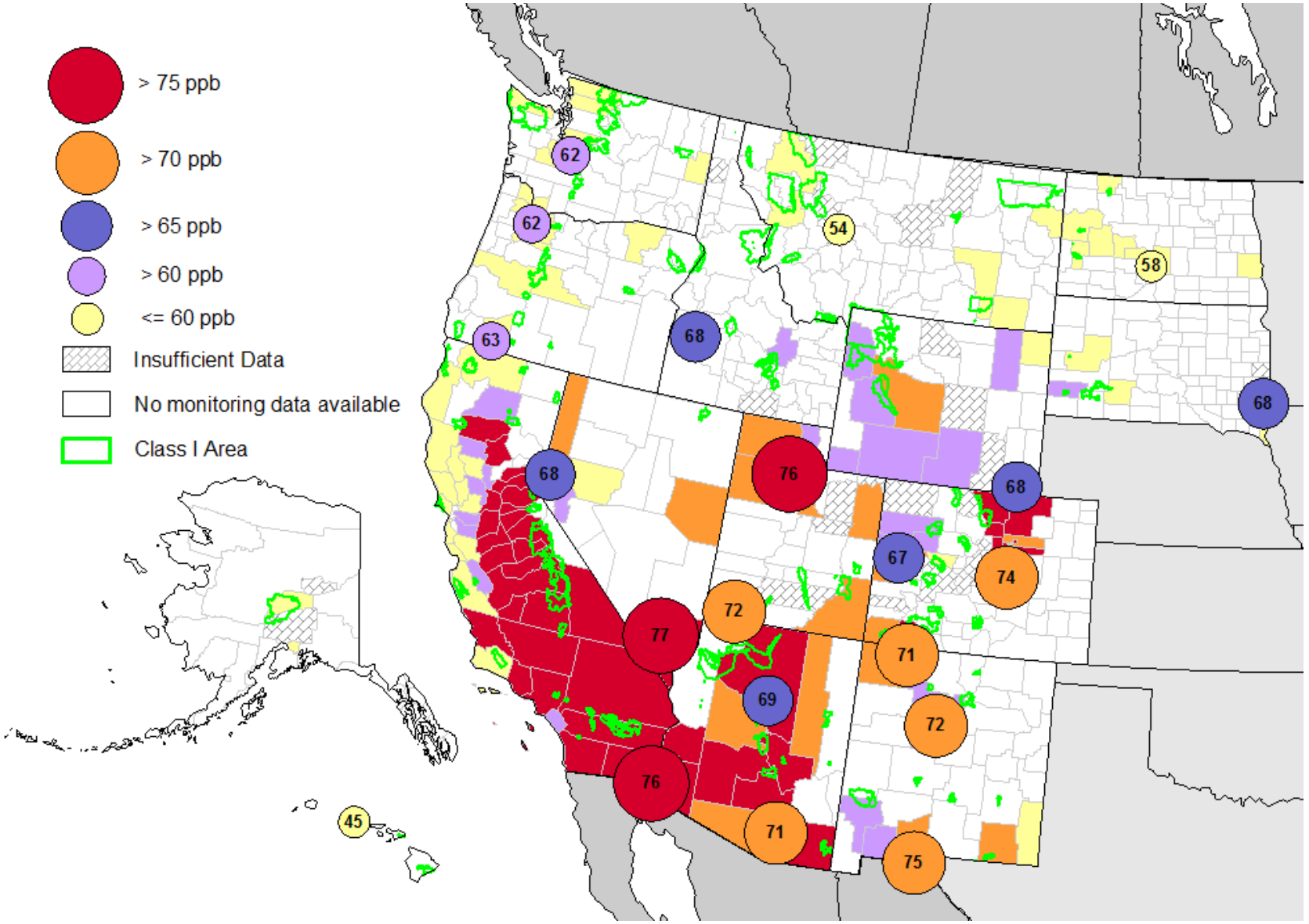
AQS Federal Reference Method data from rural or Class I area monitoring sites

Average Annual Count of Days with 8-Hour Ozone Averages >60 ppb for Rural/Class I Monitoring Sites – 2004 through 2013



AQS Federal Reference Method data from rural or Class I area monitoring sites

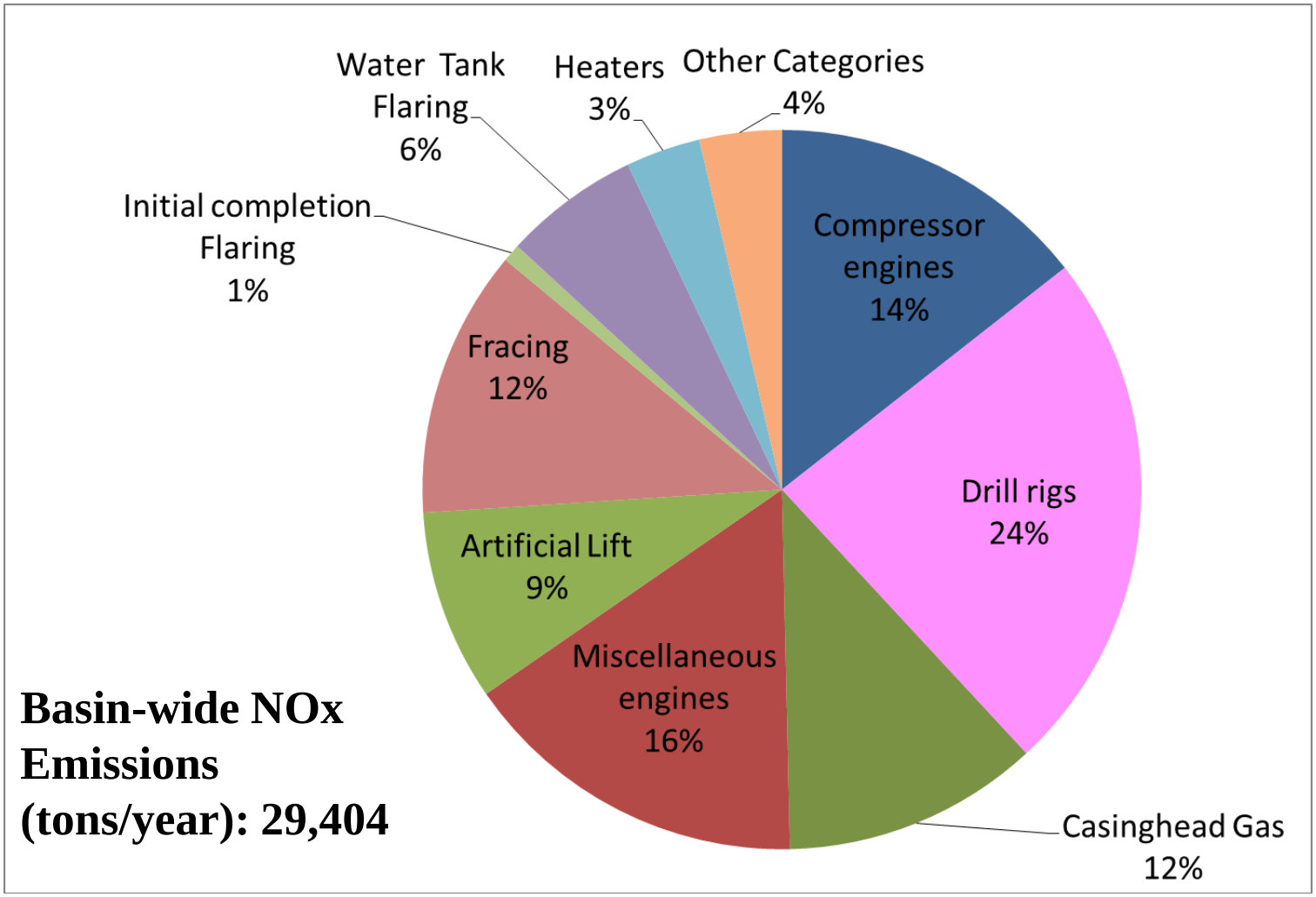
3-year Average 4th Highest 8-Hour Ozone Design Value for Selected Urban Counties currently in Attainment – 2011 through 2013



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

Recent Western Regional Studies and Projects

Example Oil & Gas Study: Williston Basin 2011 Baseline Results NOx Emissions By Source Category



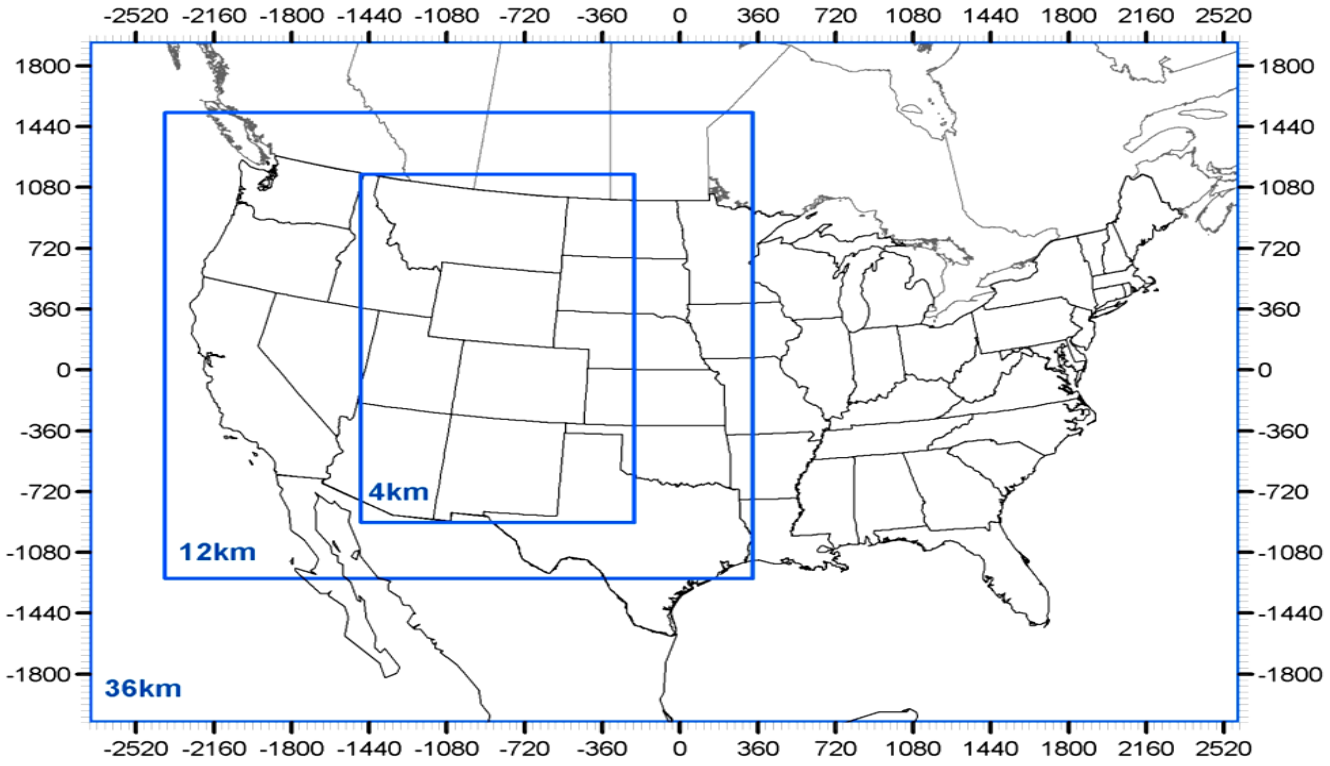
Source: BLM/WRAP Oil and Gas Inventory project

West-Wide Jumpstart Air Quality Modeling Study

- Regional results provide data and context for state and federal planning
  - Uses most current transport and background studies
  - Meteorological and emissions modeling
    - Regionally consistent, High resolution, Comprehensive
  - Photochemical modeling
    - 2008 base case model performance evaluation with Ozone / PM source apportionment
  - Most up-to-date and complete characterization of Western U.S. air quality available

- Study completed September 2013
  - Emissions and Modeling data foundation of 3-State Data Warehouse
  - All materials at: http://www.wrapair2.org/WestJumpAQMS.aspx
  - Advances goal to provide a regional modeling framework

WestJumpAQMS Area



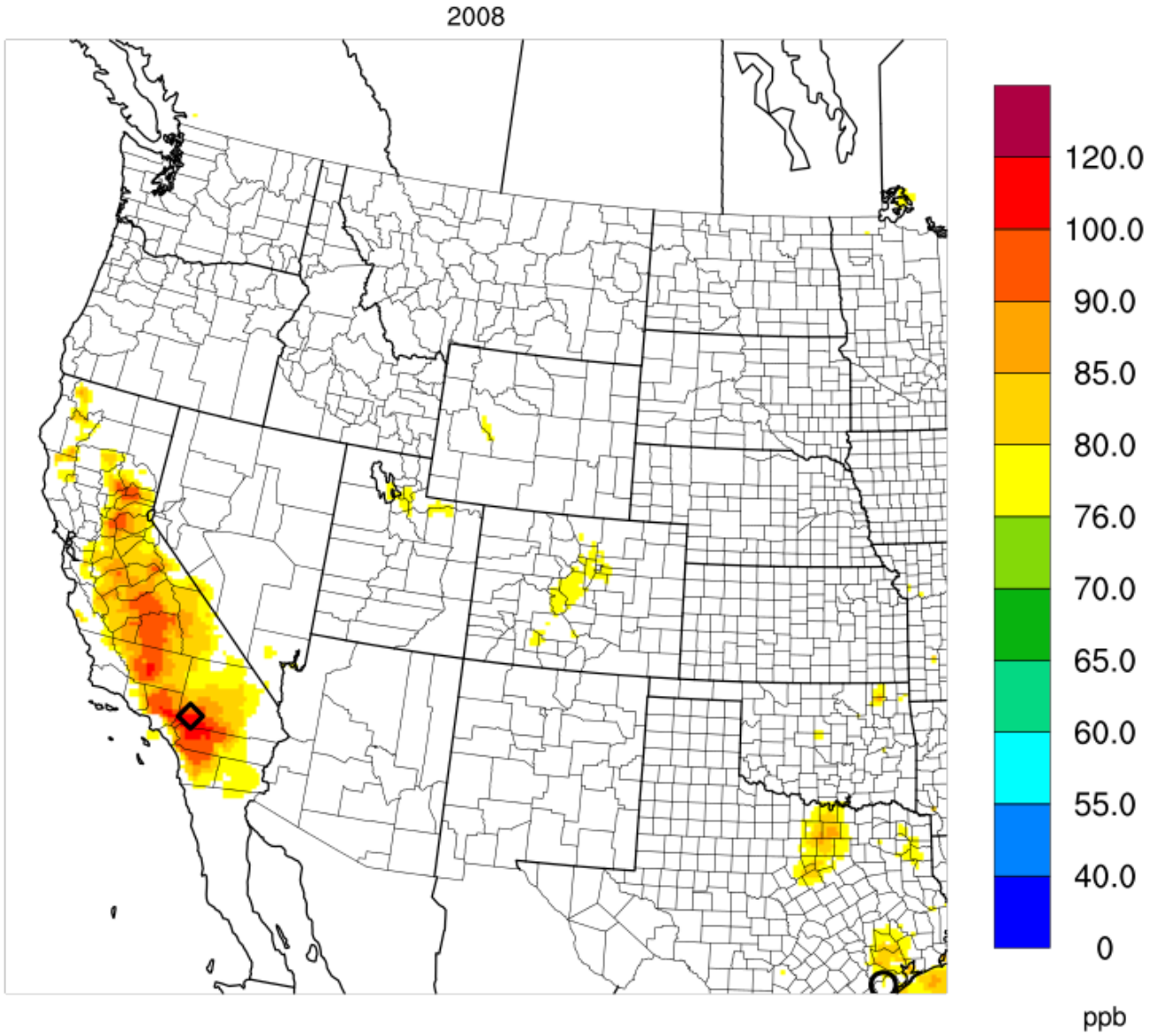
Modeling Domain

36km: 148 x 112 (-2736, -2088) to (2592, 1944)
12km*: 227 x 230 (-2388, -1236) to (336, 1542)
04km*: 317 x 515 (-1480, -904) to (-212, 1156)

* includes buffer cells

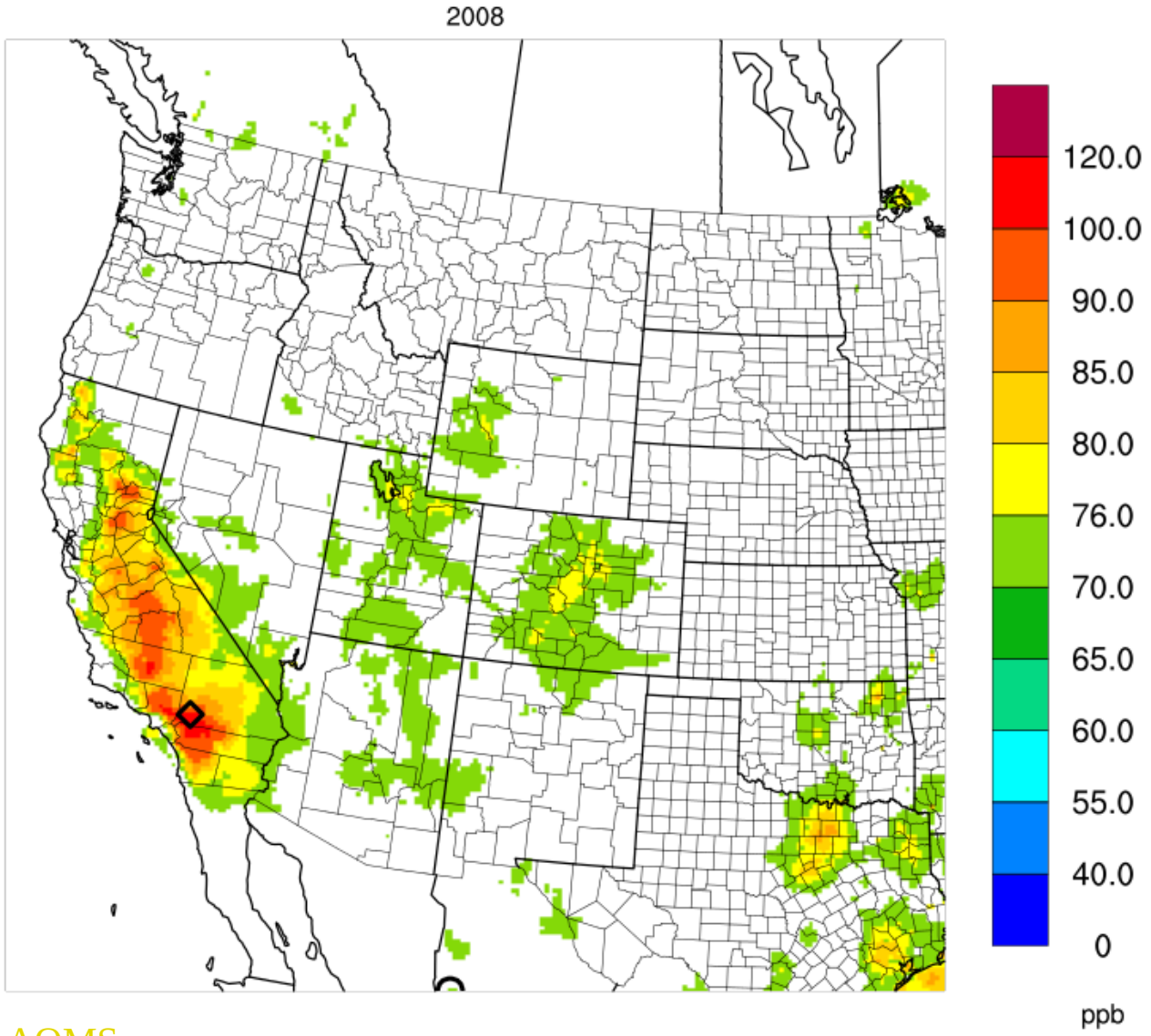
Source: WestJumpAQMS

Ozone Modeled Attainment Test Software – Unmonitored Area Analysis with Design Value (2006-2010) ≥ 76 ppb



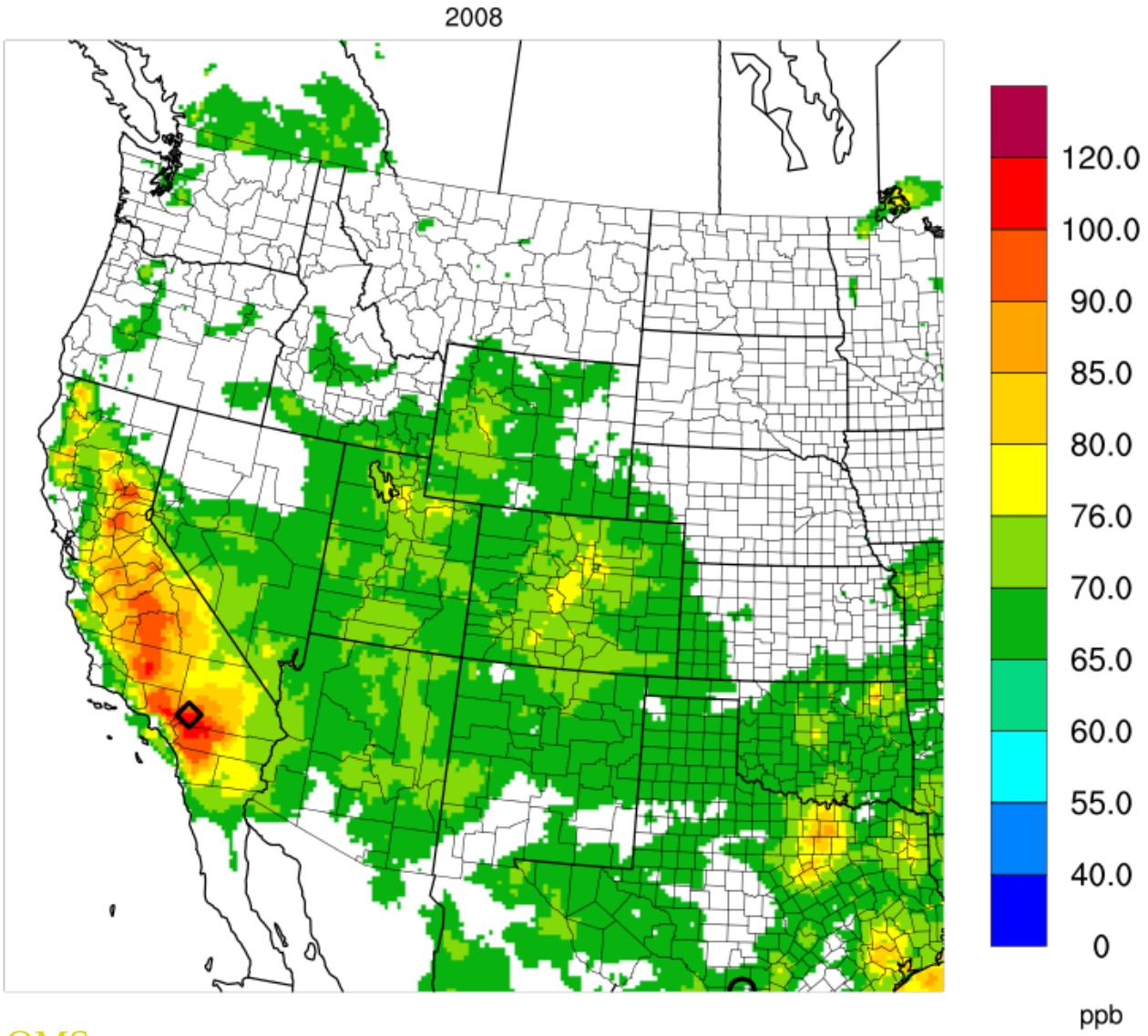
Source: WestJumpAQMS

Ozone Modeled Attainment Test Software – Unmonitored Area Analysis with Design Value (2006-2010) ≥ 70 ppb



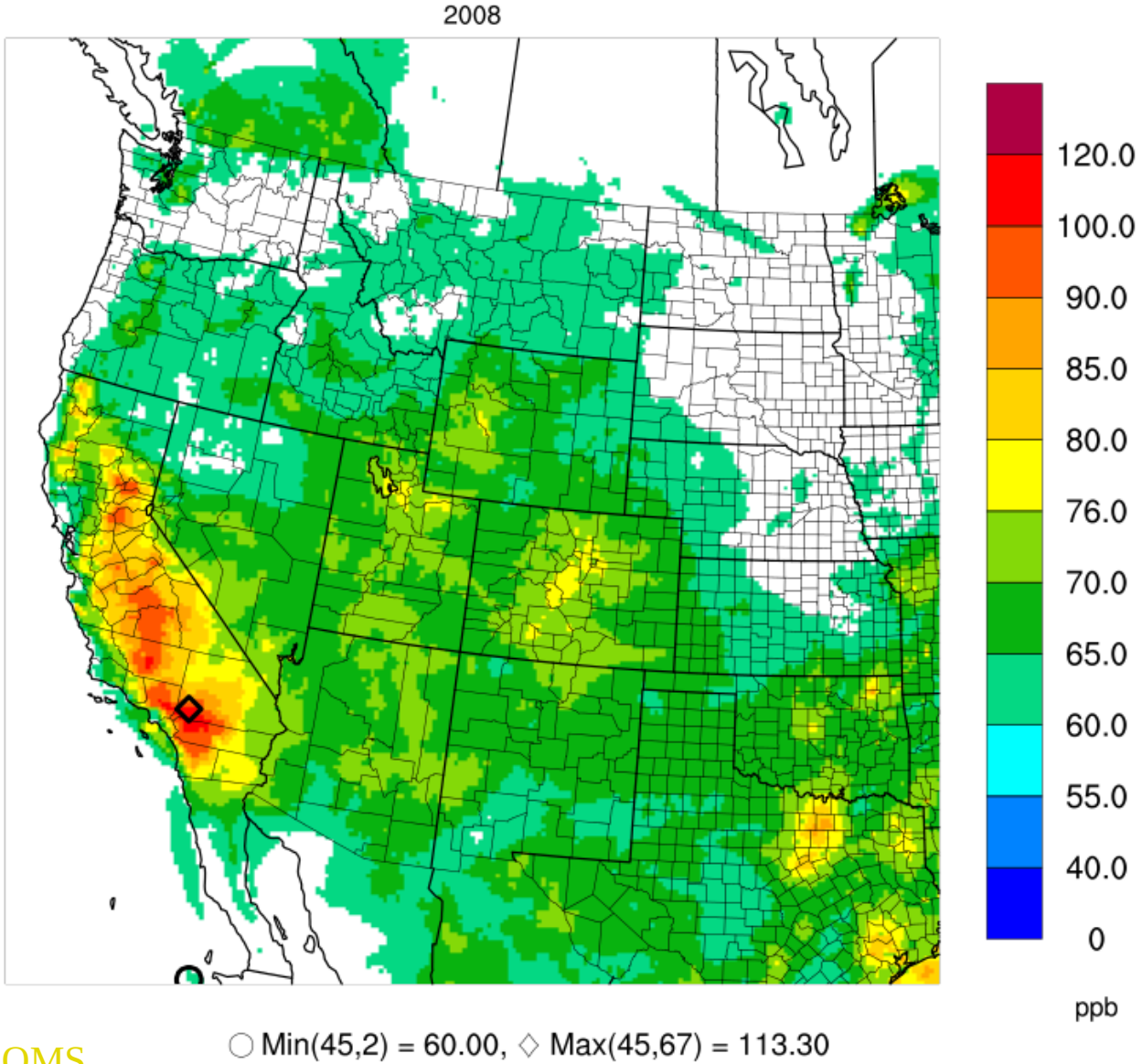
Source: WestJumpAQMS

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



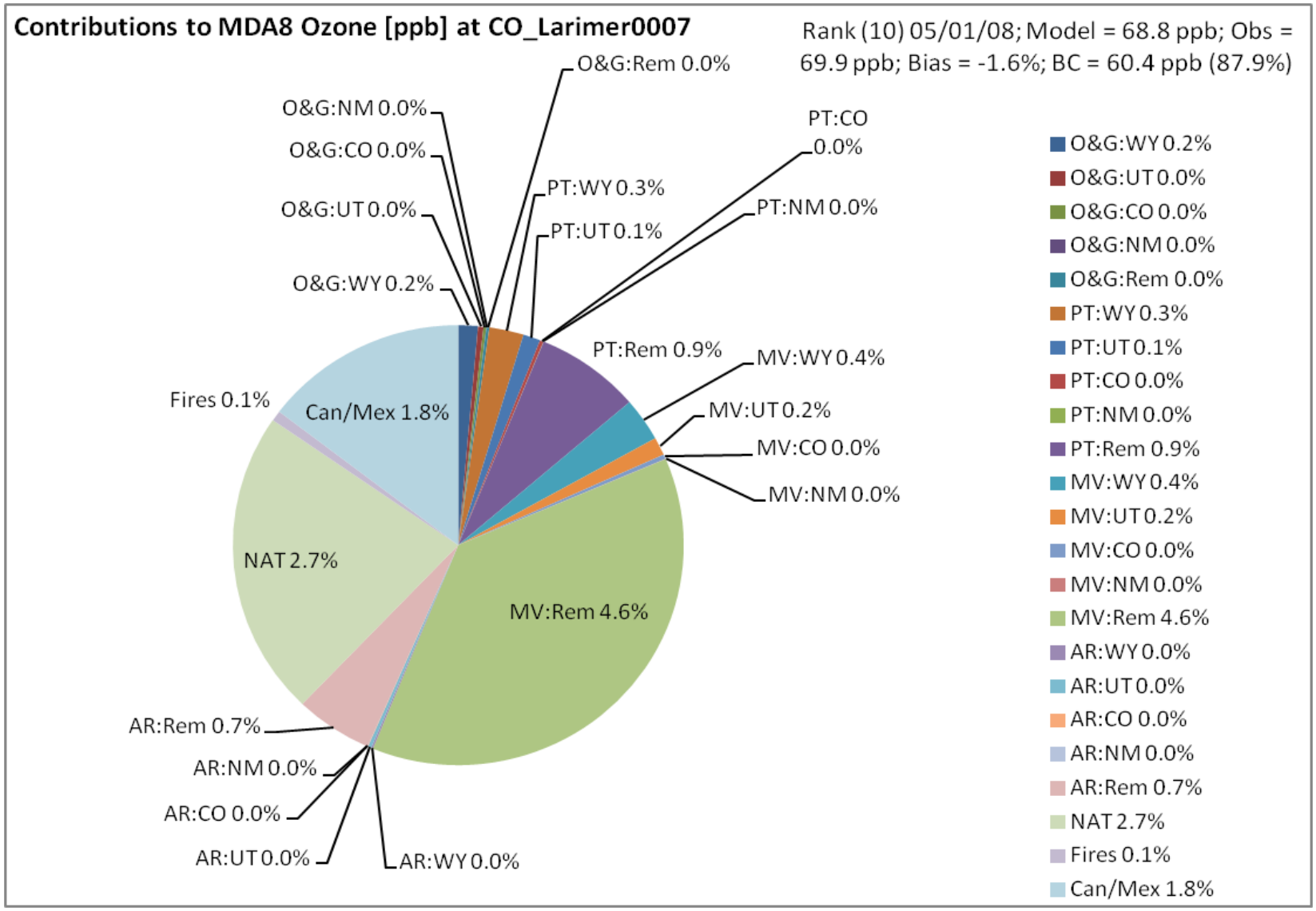
Source: WestJumpAQMS

Ozone Modeled Attainment Test Software – Unmonitored Area Analysis with Design Value (2006-2010) ≥ 60 ppb



Source: WestJumpAQMS

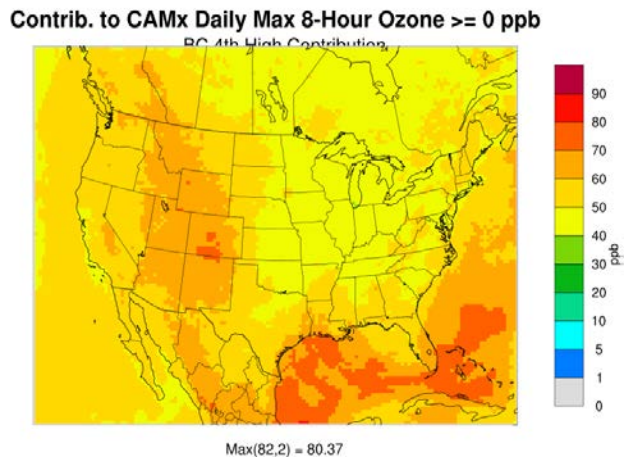
Contributions to Ozone at Rocky Mountain National Park



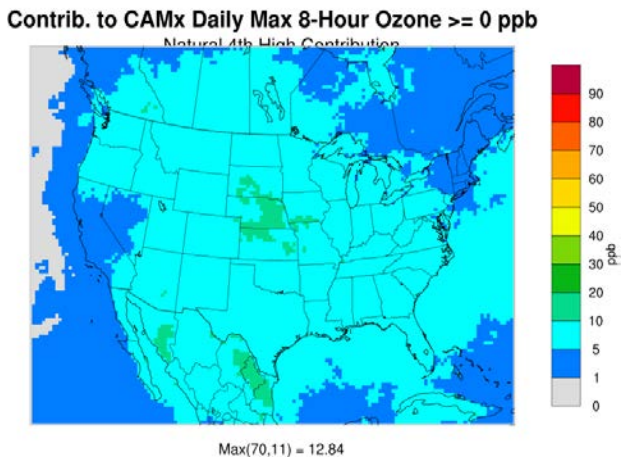
Source: WestJumpAQMS

“Other Sources” Max Contrib. 4th High DMAX8 Ozone

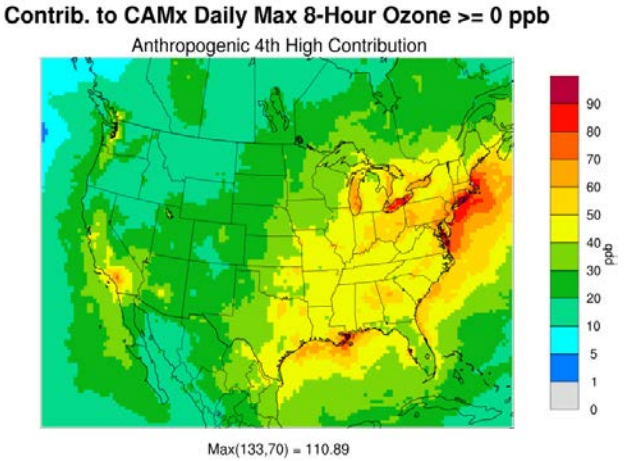
Boundary Conditions

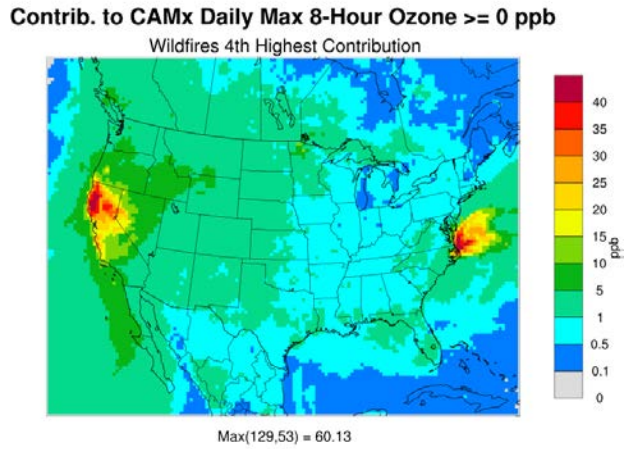


Natural

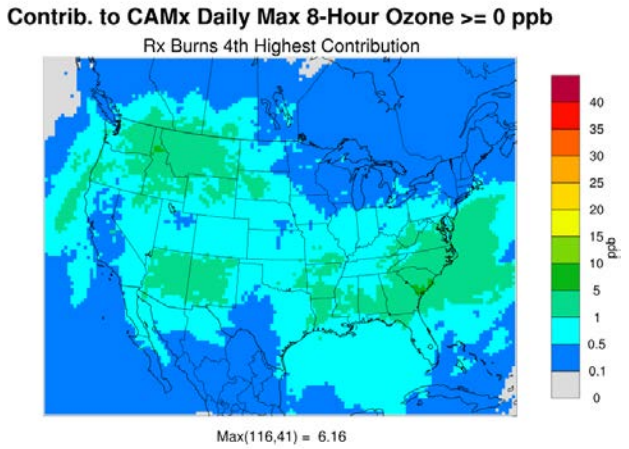


Anthropogenic

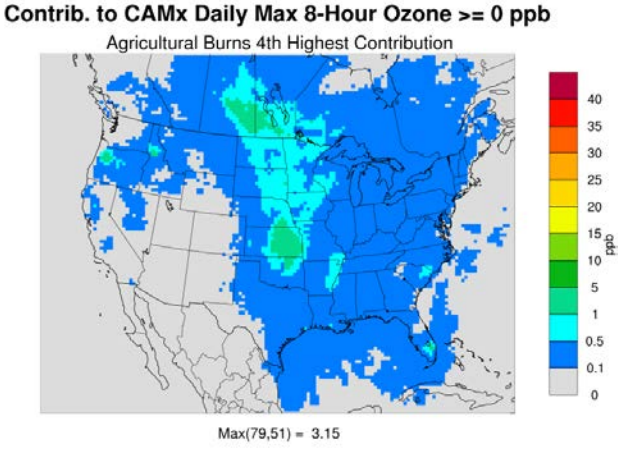




Wildfire

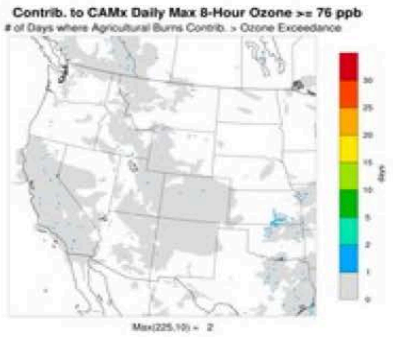
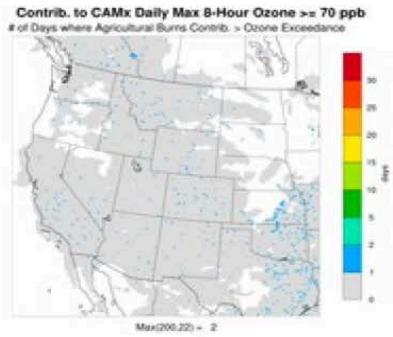
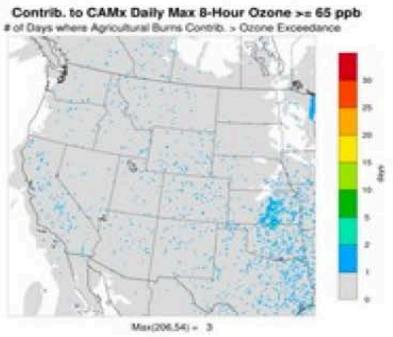
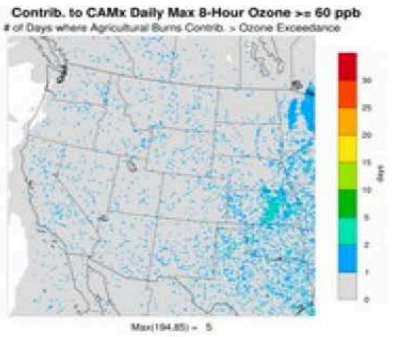
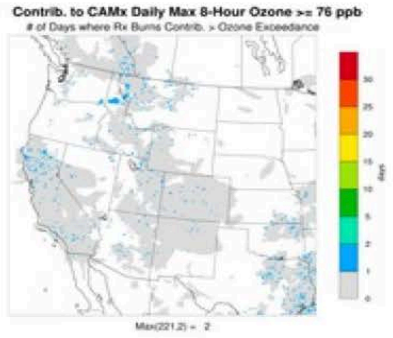
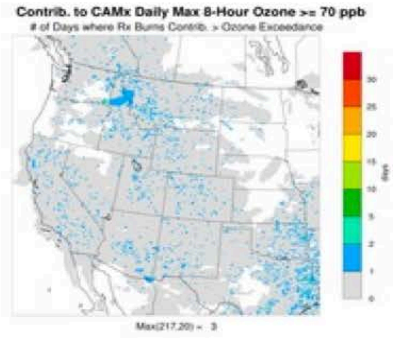
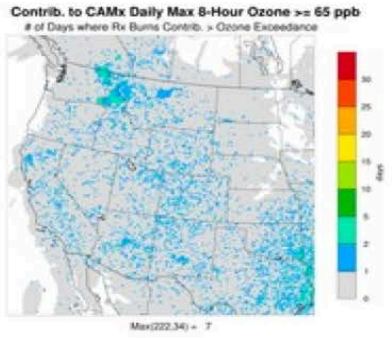
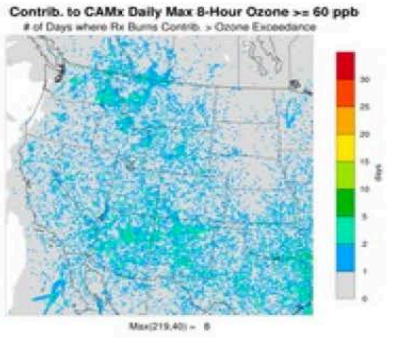
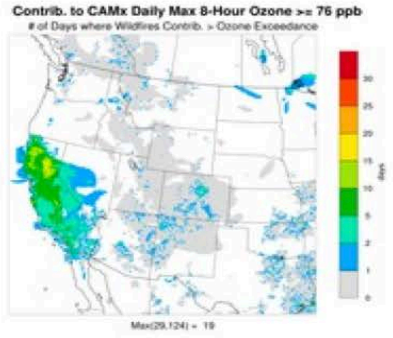
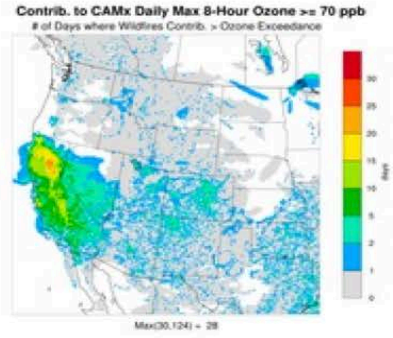
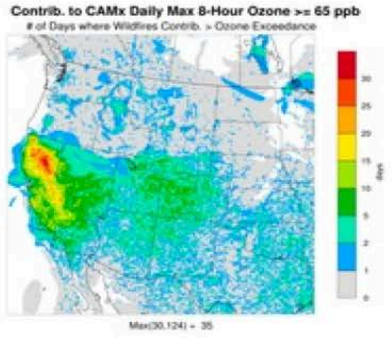
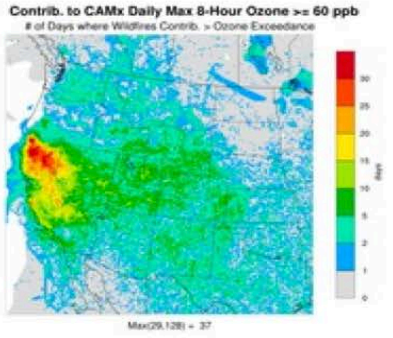


Prescribed Fire



Agricultural Fire

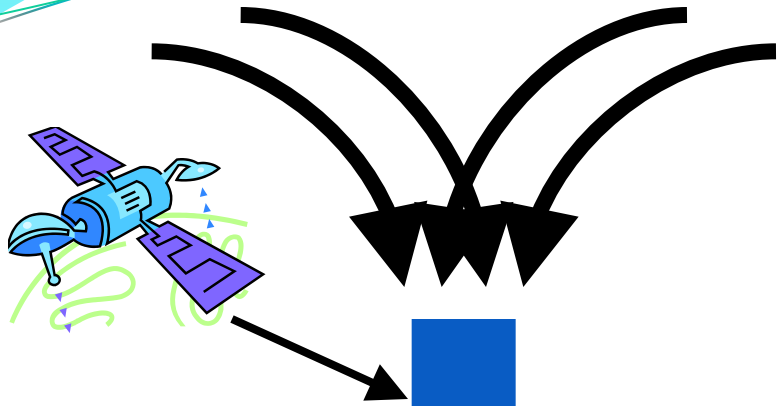
WestJumpAQMS (http://www.wrapair2.org/WestJumpAQMS.aspx)

Fire Type	Daily Maximum 8-Hour Ozone Threshold			
	76 (ppb)	70 (ppb)	65 (ppb)	60 (ppb)
Agricultural				
Prescribed				
Wildfire				

Track activity and emissions

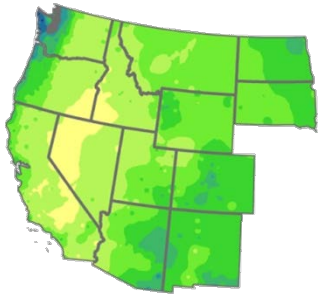
Determine source impact / contribution

Fire Activity Data (acres/day)



Loading

Moisture

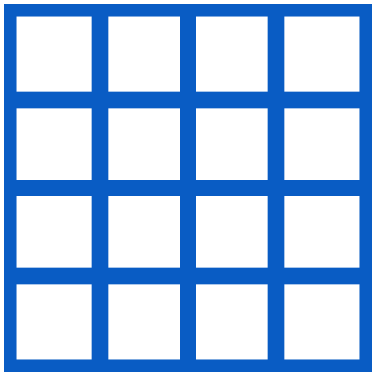


Emissions Model

SFEF

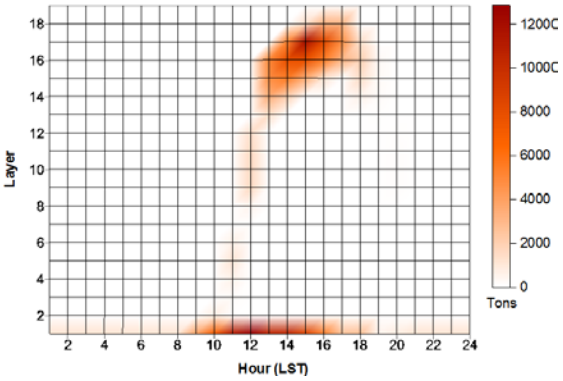
DEASCO$_3$ & PMDETAIL

distribute emissions

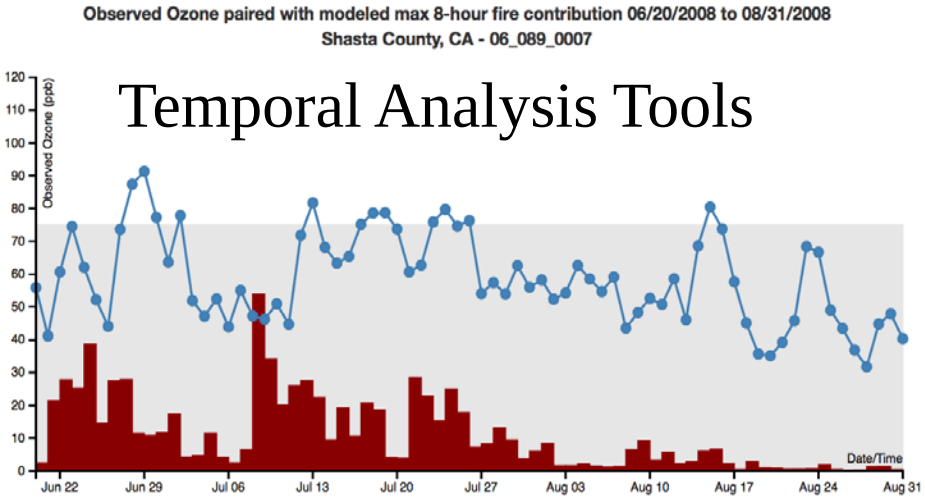


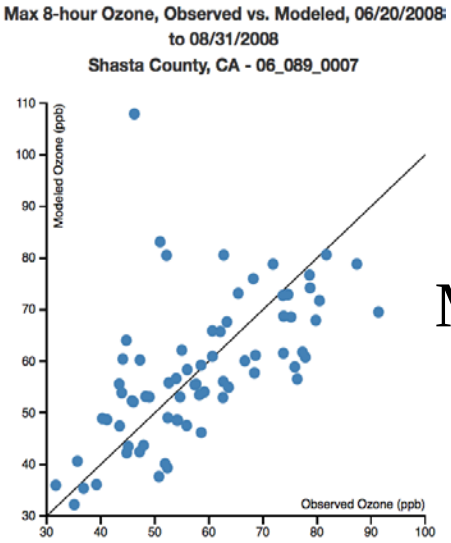
Chemical Profiles

loft emissions

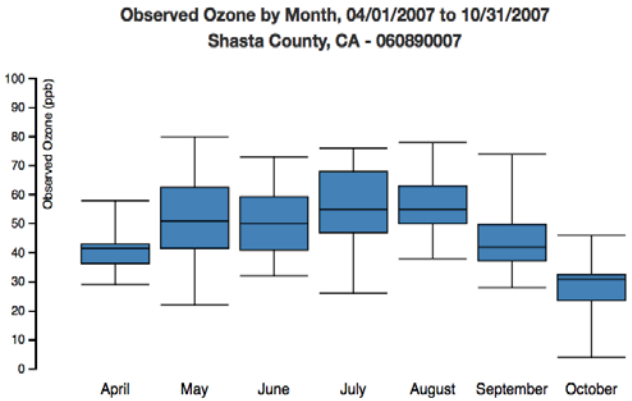


Temporal Analysis Tools



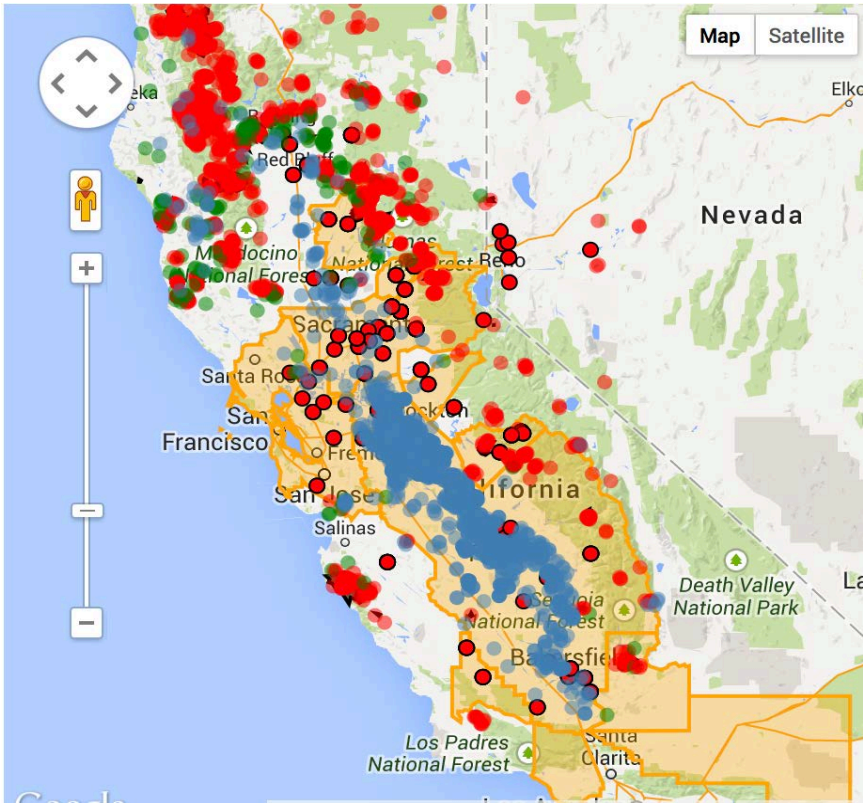


Model Evaluation



Inter-annual Observational Analysis

Fire Contributions to AQ Impacts

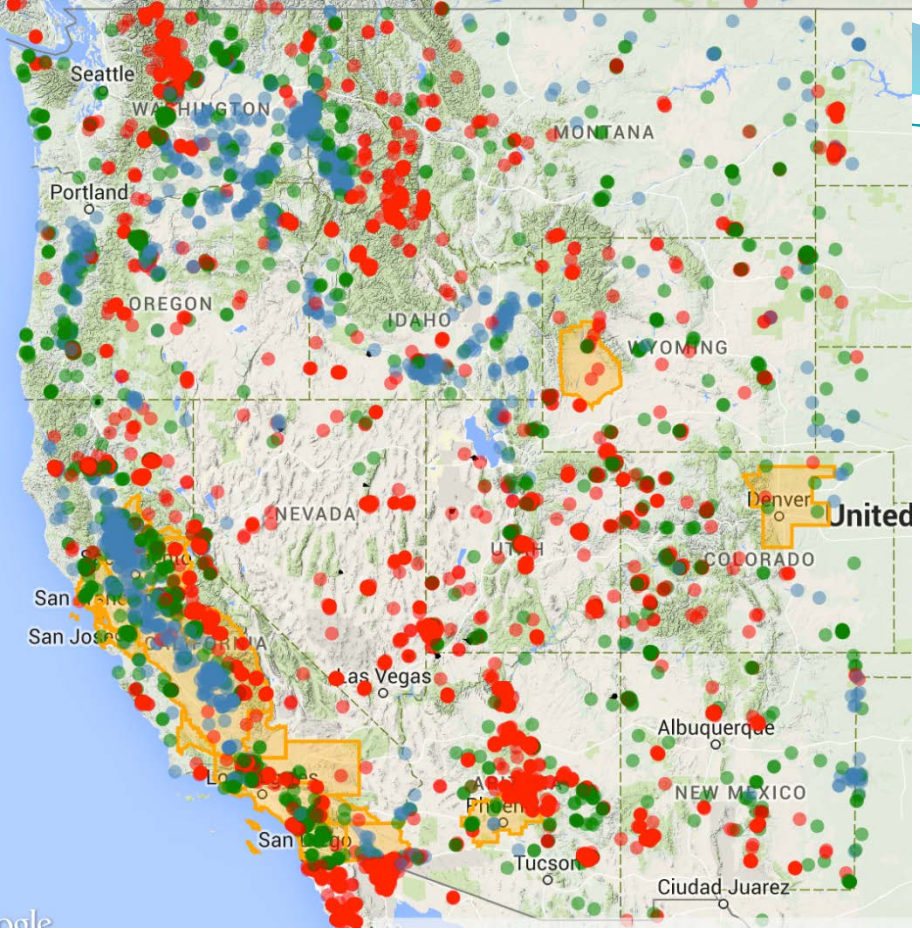


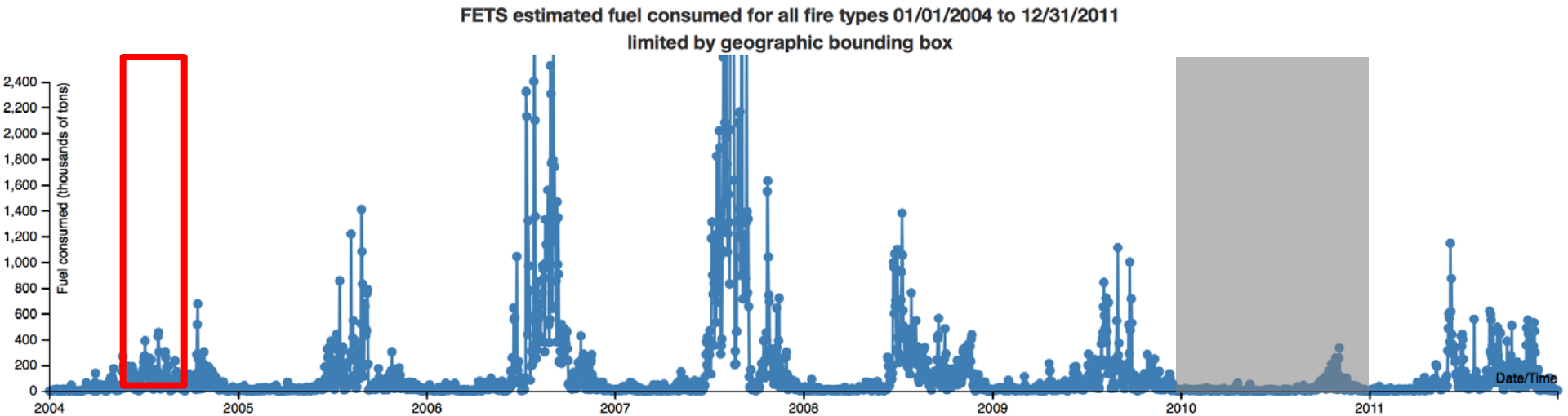
Source: [WRAP Fire Tools]

2004

6/21 – 9/21
Limited by bounding box

Source: WRAP Fire Tools

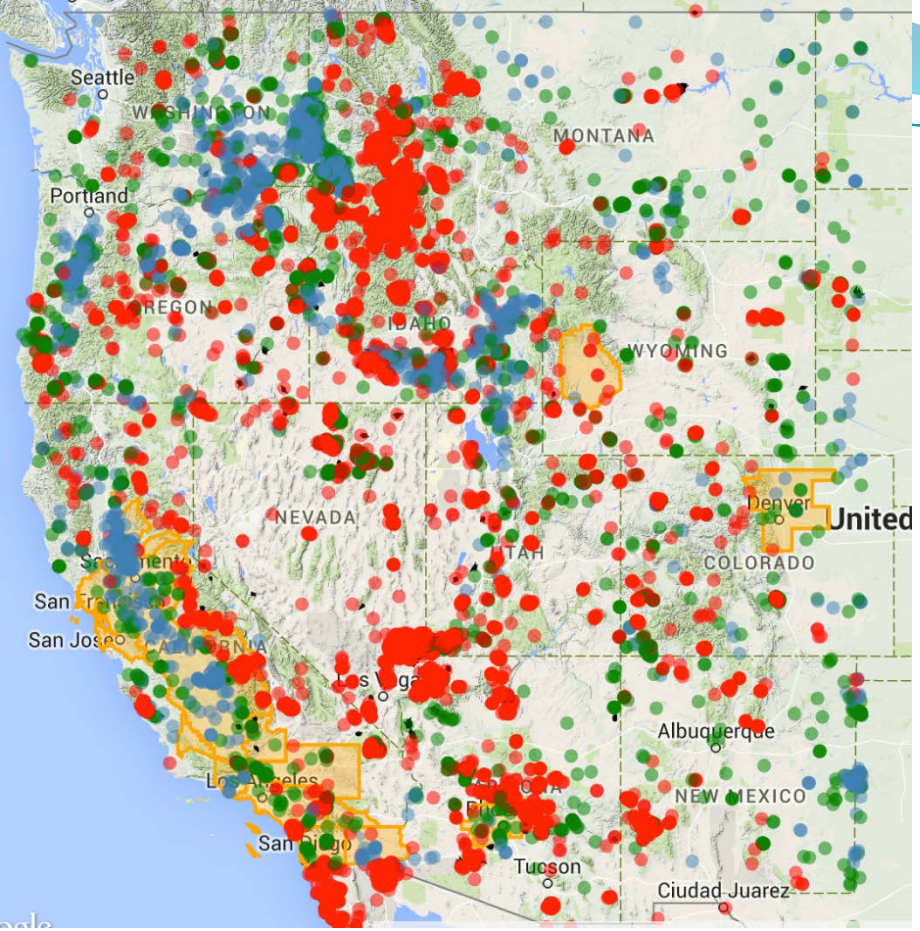




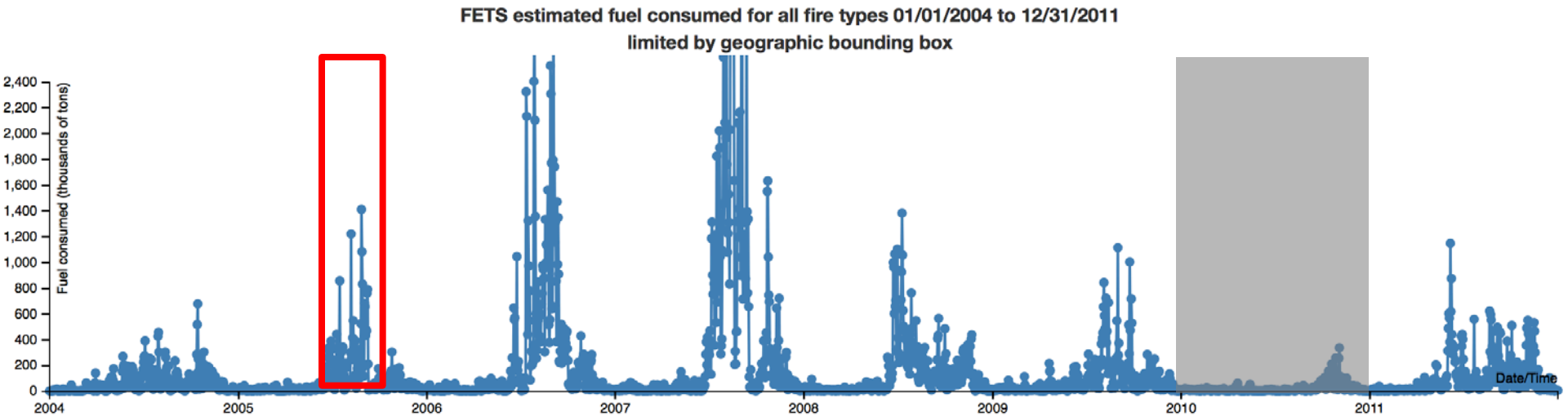
2005

6/21 – 9/21
Limited by bounding box

Source: WRAP Fire Tools



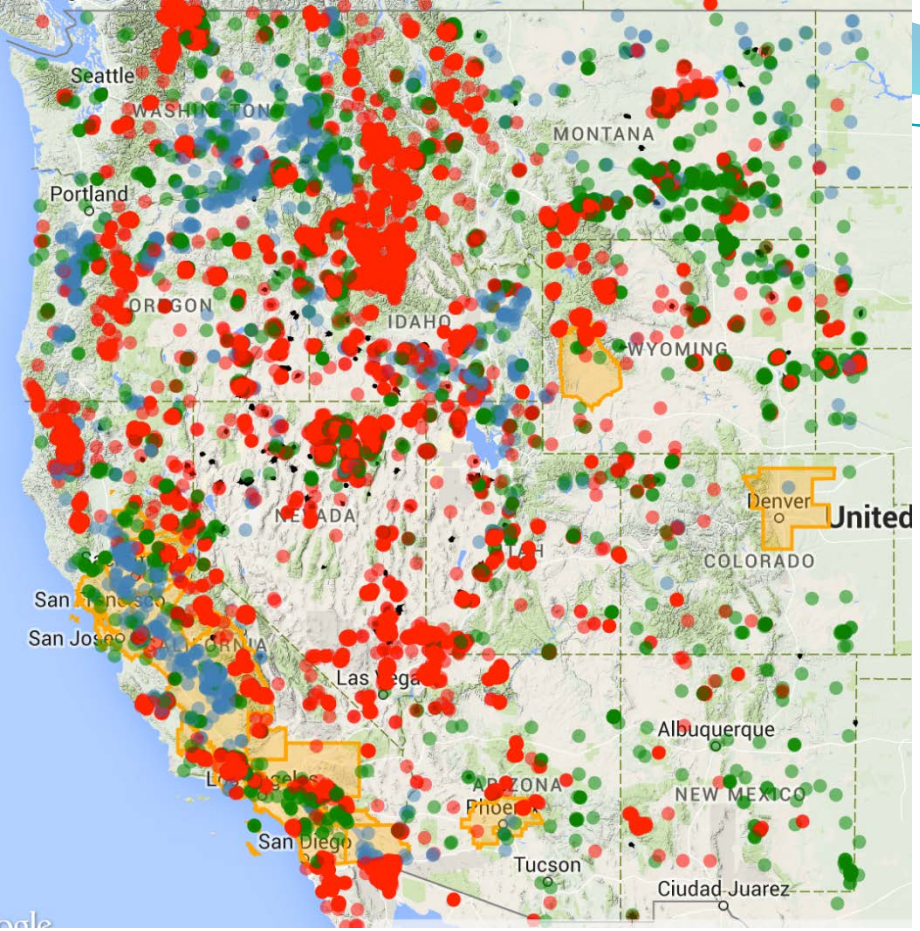
Agriculture
Prescribed
Wildfires



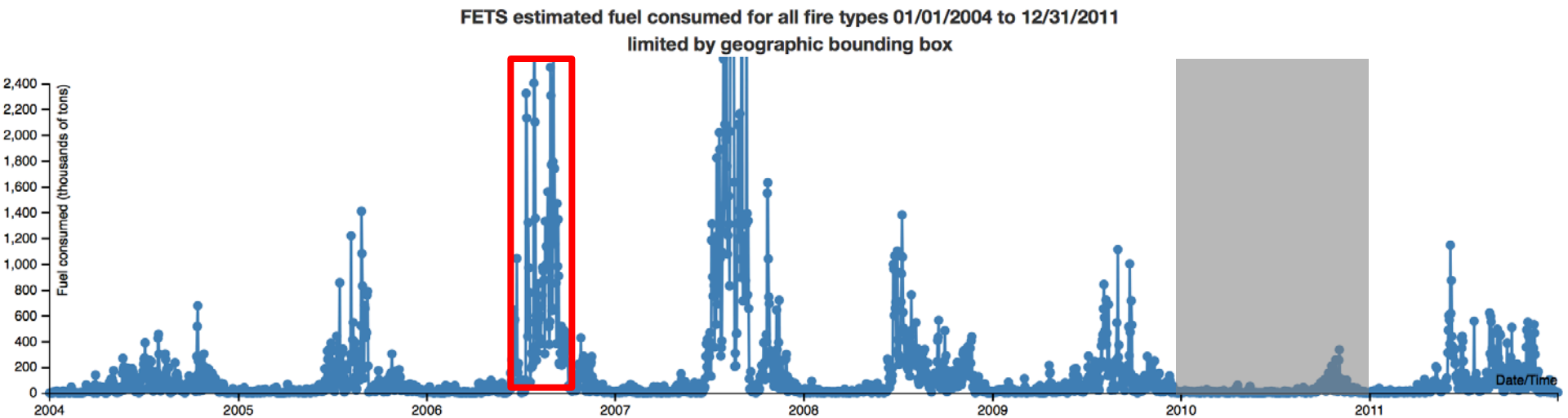
2006

6/21 – 9/21
Limited by bounding box

Source: WRAP Fire Tools



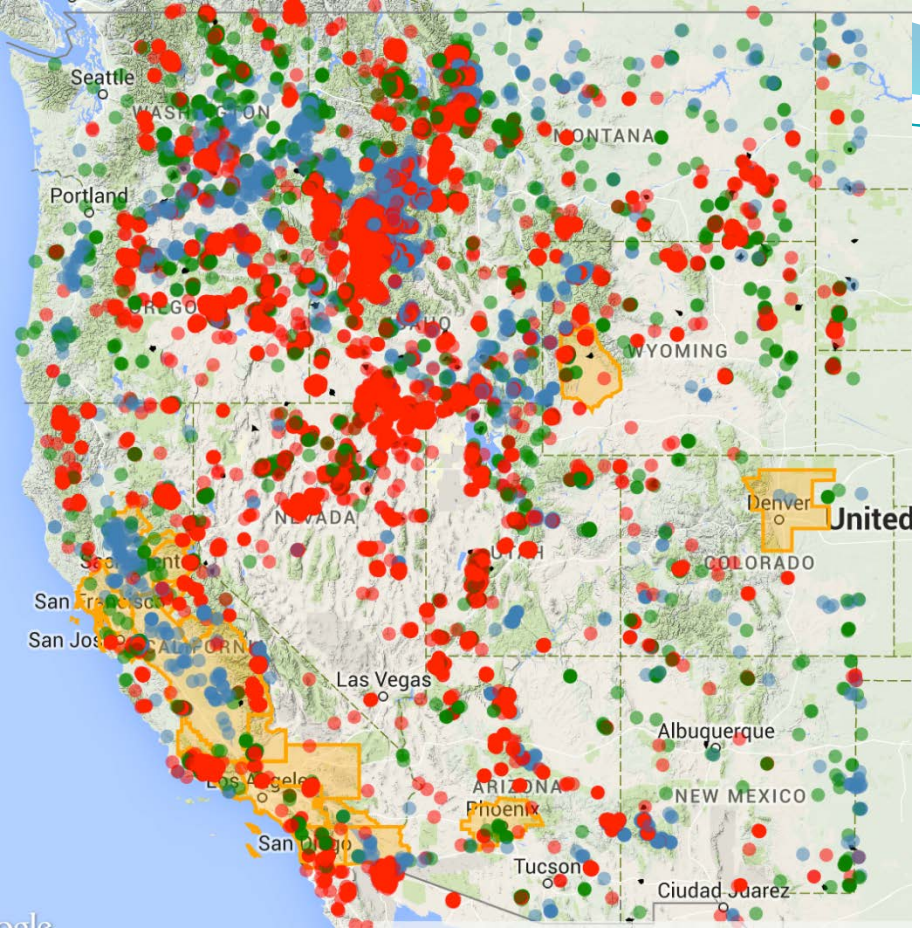
Agriculture
Prescribed
Wildfires



2007

6/21 – 9/21
Limited by bounding box

Source: WRAP Fire Tools



Agriculture
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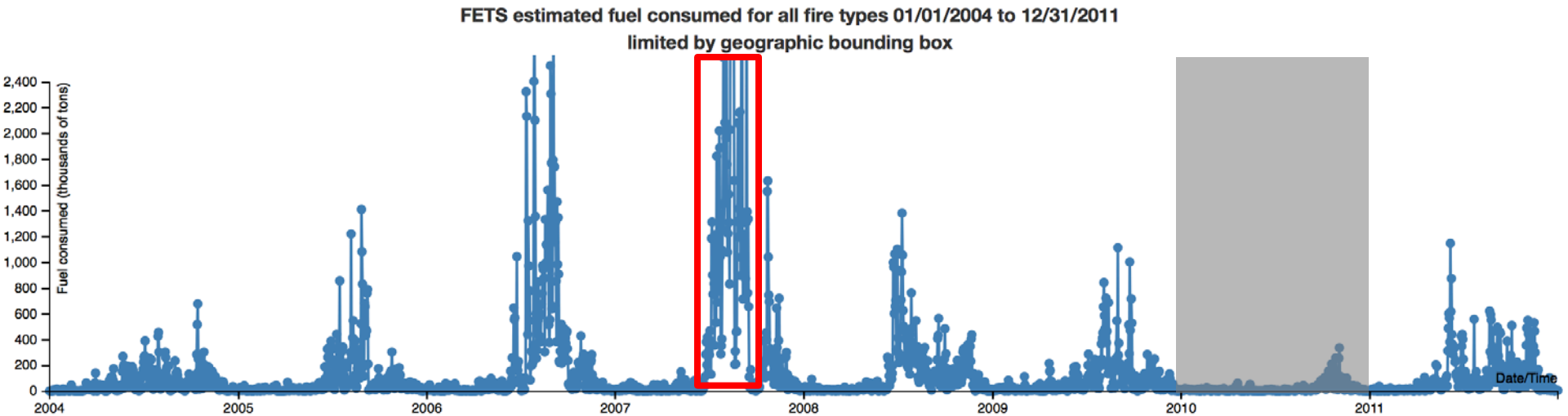
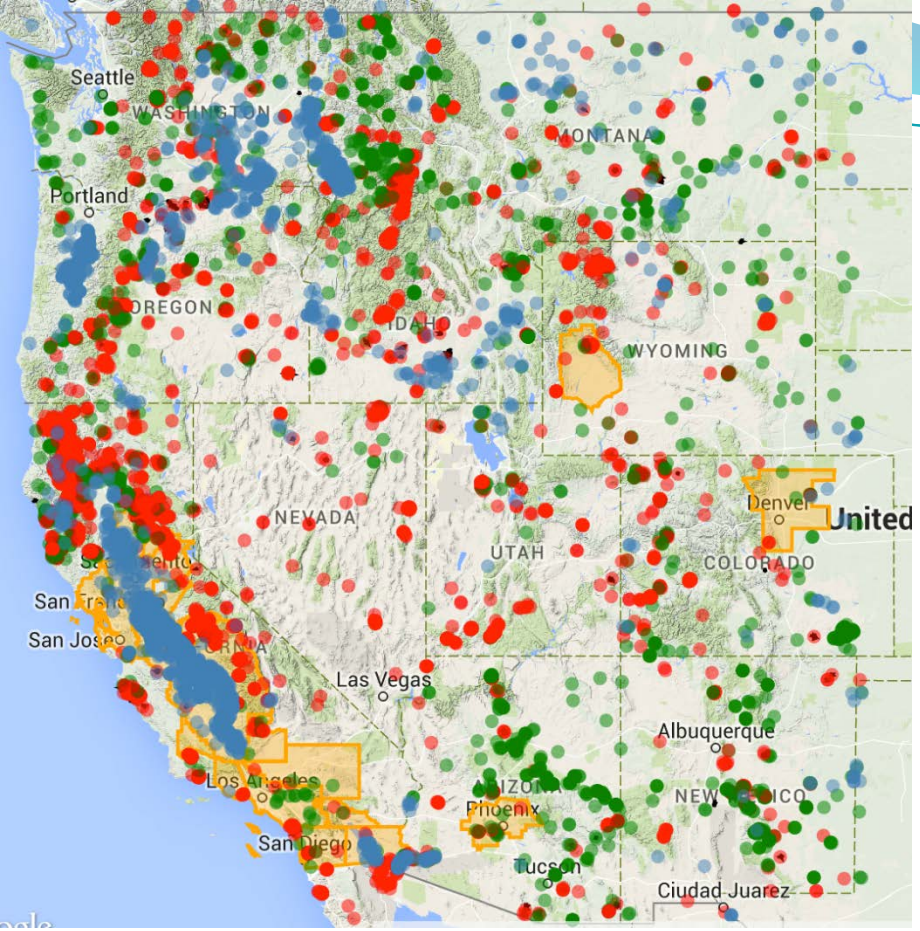


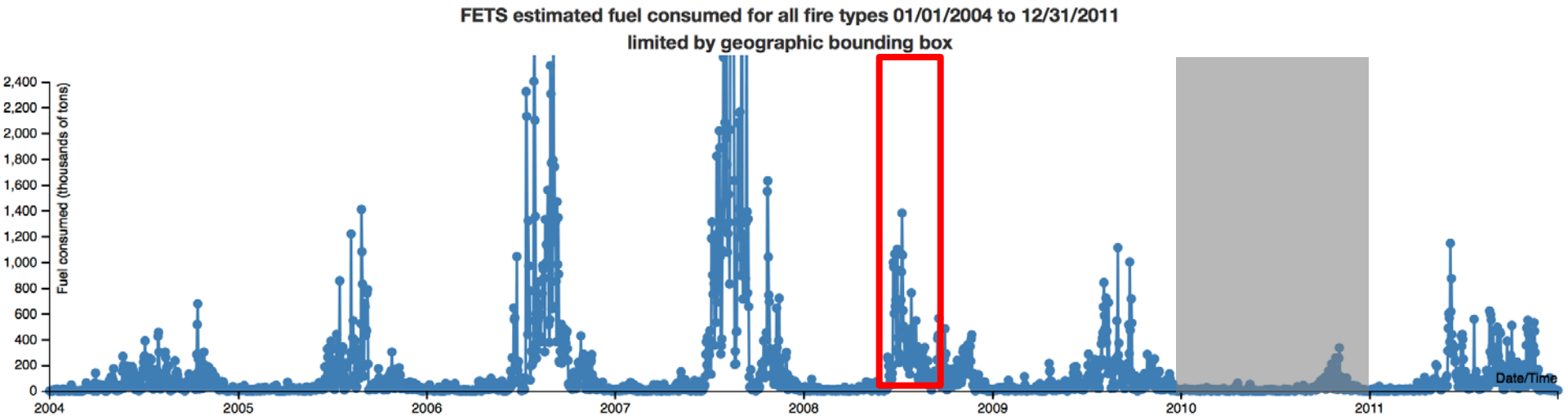
2008

6/21 – 9/21
Limited by bounding box

Source: WRAP Fire Tools



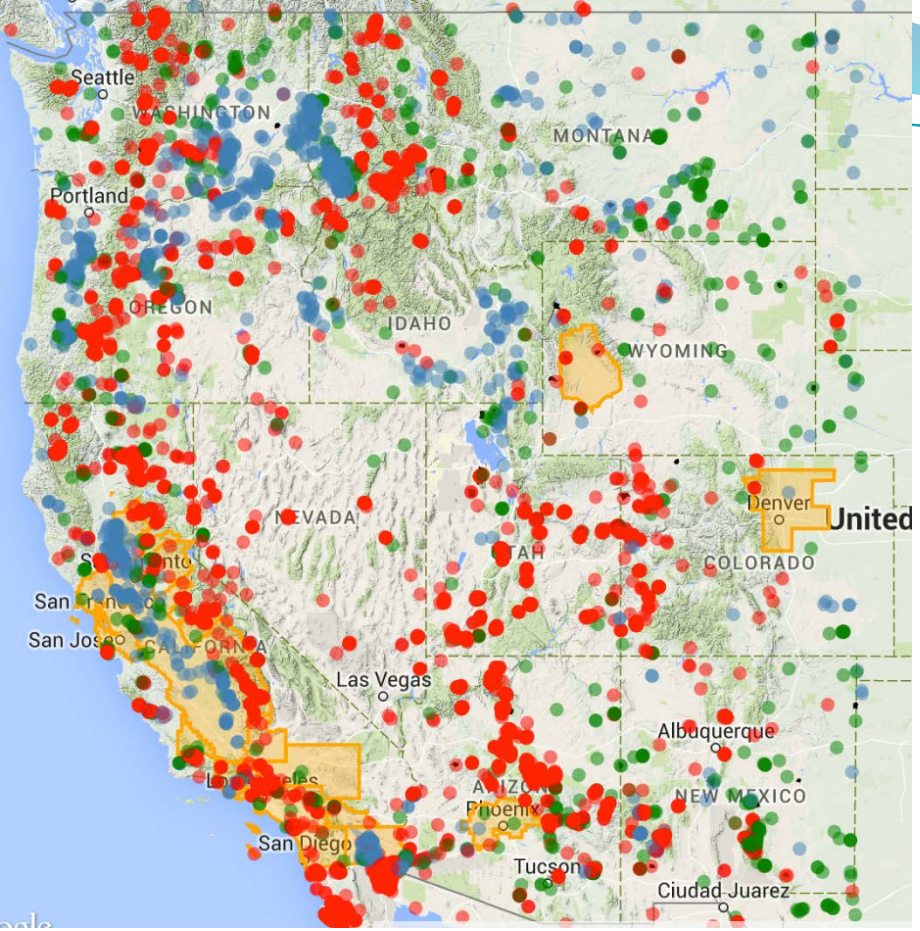
Agriculture
Prescribed
Wildfires



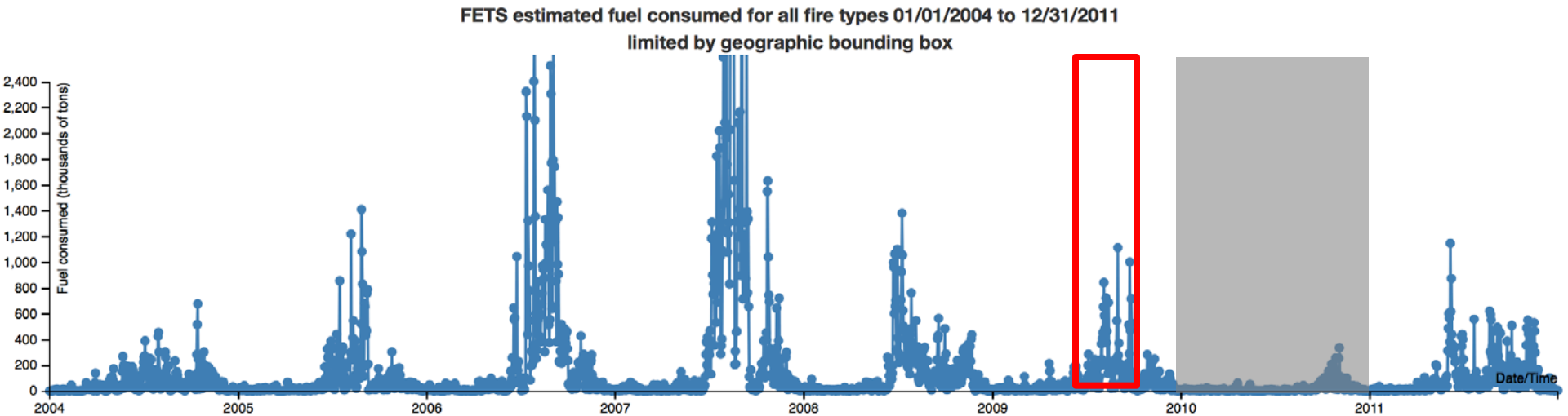
2009

6/21 – 9/21
Limited by bounding box

Source: WRAP Fire Tools



Agriculture
Prescribed
Wildfires

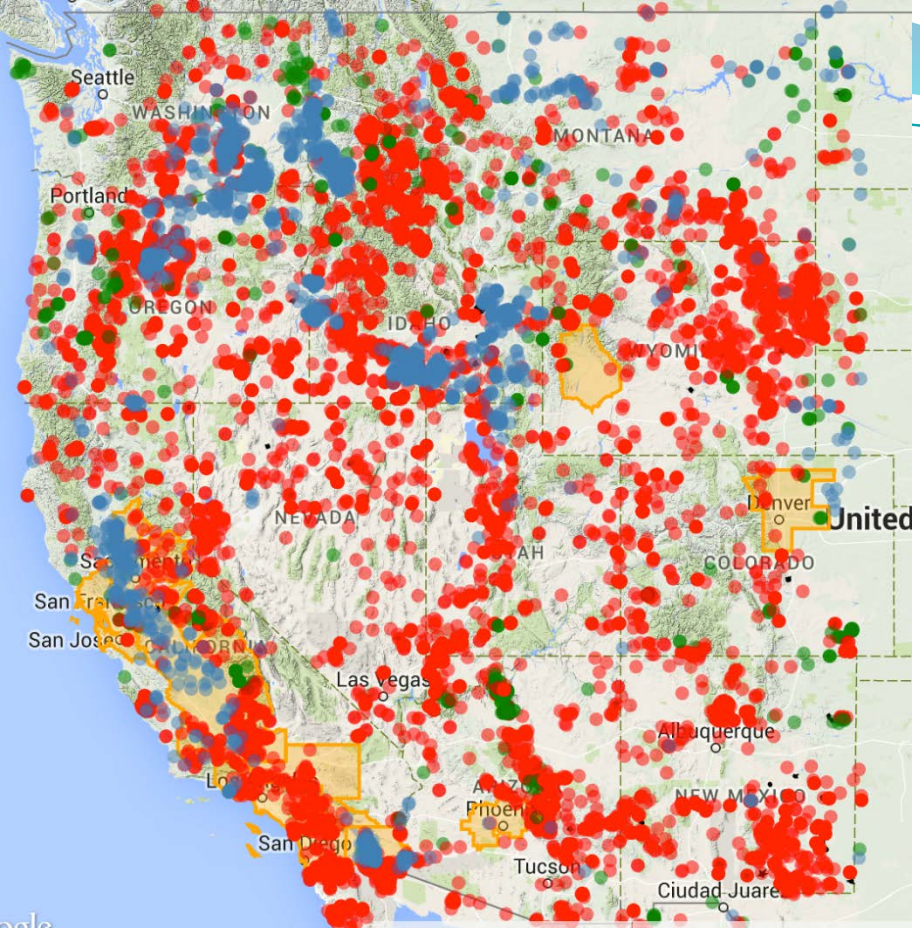


2011

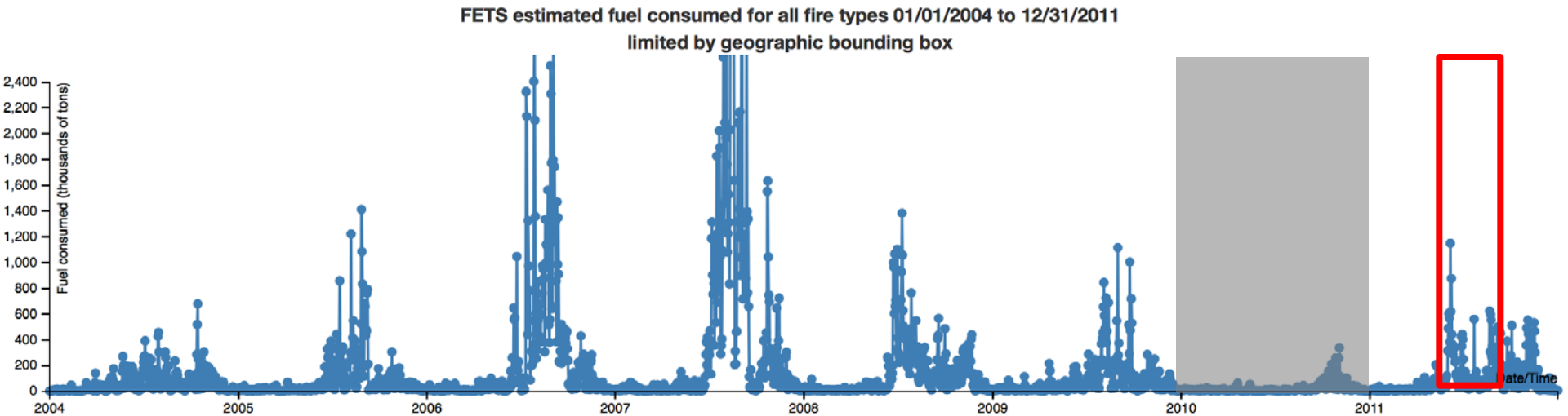
6/21 – 9/21
Limited by bounding box

*Obtained additional small wildfire data for this inventory

Source: WRAP Fire Tools



Agriculture
Prescribed
Wildfires



DEASCO$_3$ Home Analysis Maps Area Impacts Datasets Help Public Admin tmoore Comments

Analyses / Exceptional Events Support

Exceptional Events Support

Source: WRAP Fire Tools

The following case studies are related to the Exceptional Events Support analysis type. To begin click on one of the case studies to review it, or select **Start a New Analysis** to begin creating your own study.

The purpose of this analysis tool is to assist with understanding whether fire might have contributed to an ozone exceedance; and assist with knowing what kind of information might be helpful to a state for preparing an Exceptional Event demonstration package(s) for air quality excursions affected by fire and smoke. The effects of wildland fire on ozone are complex, and meeting the exceptional events requirement is difficult for most if not all fire occurrences. This is, in part, because wildland fires occur at the same time of high ozone caused by anthropogenic emissions. Thus, separating the contribution of wildland fire from anthropogenic emissions is challenging: the but-for test. Yet, EPA requires this for their concurrence. Using the combination of observed ozone and CMAX model output, this tool examines selected cases—planned, unplanned, and combinations of the two—fires contribution to ozone impacts.

Exceptional Events Support Overview

A State Exceptional Event demonstration package must provide evidence that:

A. The event affects air quality, is not reasonably controllable or preventable, and is an event caused by human activity that is unlikely to recur at a particular location or a natural event;
B. There is a clear causal relationship between the measurement under consideration and the event that is claimed to have affected the air quality in the area;
C. The event is associated with a measured concentration in excess of normal historical fluctuations, including background; and
D. There would have been no exceedance or violation but for the event.

States are responsible for demonstrating to EPA that unplanned fires or certain planned fires were responsible for an exceedance of the ozone standard at a particular monitoring site or group of sites. In attempting to make this demonstration, a state may request certain information from land managers. This might include: the smoke emissions; particulate monitoring particular to the fire or photographs; the timing of the burn along with how it was distributed through the day in terms of combustion and smoldering; and to what extent smoke management regulations were complied with

Review a Related Analysis

Title	Sections
Biscuit Wildfire	10
Chatfield, CO July 2004-2007	16
Chatfield, CO July 2008	12
Evans Road Wildfire (Pocosin NWR) / Peat burning	12
Fall burning in southern Louisiana, 2008	9
Flint Hills	8
McNally Wildfire	6
Missionary Ridge & Hayman Wildfires	7
Northern California Wildfires, 2008	17

edit list

These are the current analyses associated with Exceptional Events Support. To review an

Regional Haze: Reasonable Progress Reports + July 2018 SIP

- WRAP produced a comprehensive, regionally-consistent technical report – completed Summer 2013
  - Regional, state, and Class I area reports http://www.wrapair2.org/reghaze.aspx
  - Monitoring and emissions data analyses as required by Regional Haze Rule
  - Western states will use as a common basis in preparing individual SIP revisions – adding status of state actions to implement controls
  - Progress report SIP revisions are due in the 2013-16 timeframe

- Regional Haze Planning
  - WRAP providing western 2008, 2011, and associated projections (as well as eventually 2014) emissions data
  - Modeling platform leveraged from WestJumpAQMS
  - States will use to evaluate changes in monitored visibility

- Regional technical support for July 2018 SIPs in WRAP Work Plan

Western Air Quality Data Warehouse

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3-State Air Quality Study

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The Western Air Quality Data Warehouse provides air quality data and analysis tools to support regulatory, research, and academic applications. Available datasets include emissions inventories, meteorological data, monitoring data, and air quality modeling platforms. Available modeling platforms support consistent photochemical grid modeling for National Environmental Policy Act projects and other modeling studies.

GET DATA

Access a wide variety of monitored, modeled, emissions, and met data.

USER FORUMS

DOCUMENT NEEDS REVIEW !

3SAQS WRF 2011 Meteorological Model Performance Evaluation

DOCUMENT NEEDS REVIEW !

CAMx Photochemical Grid Model Draft Model Performance Evaluation

DRAFT DOCUMENT AVAILABLE

3SAQS WRF

DATA & METADATA

- Data
- Studies
- Documents
- Literature

PROJECTS & PLANNING

- Projects
- Meetings
- News

TOOLS & RESOURCES

- Image Browser

Upcoming Meetings and Workshops

San Joaquin Valley Unified Air Pollution Control District – *Transboundary Ozone Pollution Conference* – March 31-April 2, Tenaya Lodge, Yosemite National Park

EPA *Emission Inventory Conference* – April 13-16, San Diego (western U.S. focus)

WRAP-EPA *Modeling Air Quality from the Global to Local Scale* Workshop – May 11-15, Boulder, CO

Thanks –

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Western Regional Air Partnership | www.wrapair2.org