




Air Quality Challenges in Region 9: The Importance of Accurate, Reliable Data



**Primary Quality Assurance Organization
Training
Pomona, CA
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USEPA Region 9 Air Division**



- Historical Air Quality Trends
- Current Nonattainment Areas and Health Risk Exposure
- Importance of Accurate, Reliable Data
 - New Nonattainment Designations
 - Clean Data Determinations
 - Targeting Control Strategies
 - Emergencies
 - Litigation
- Conclusions

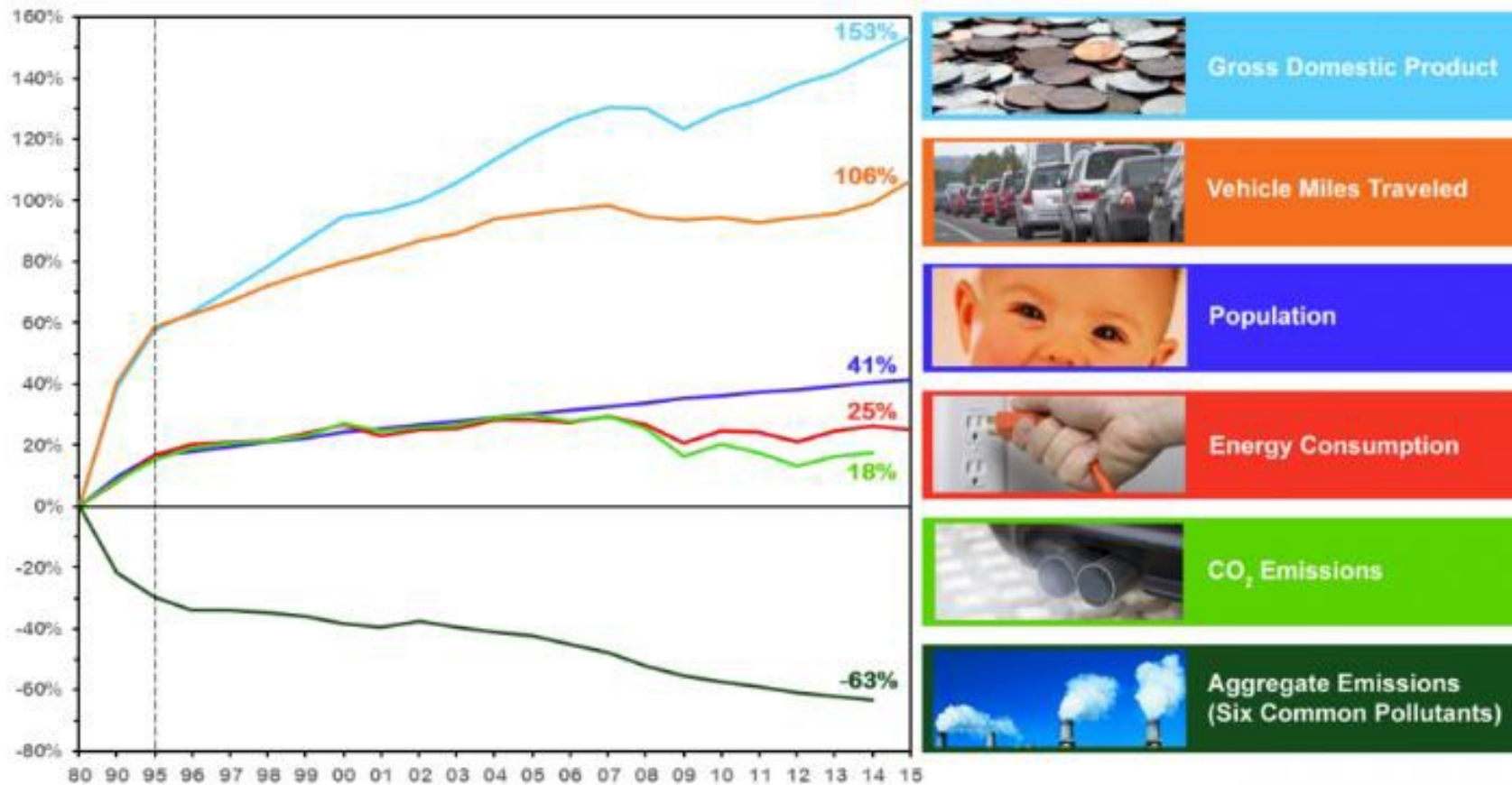


Historical Air Quality Trends

National Historical Air Quality Trends



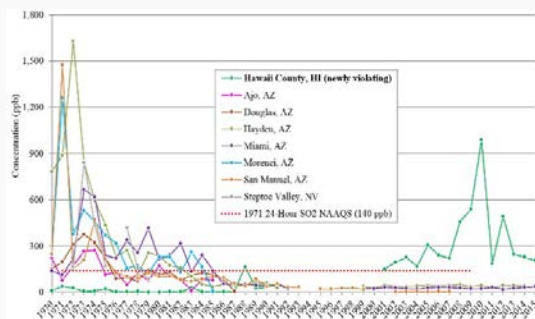
Comparison of Growth Areas and Emissions, 1980-2015



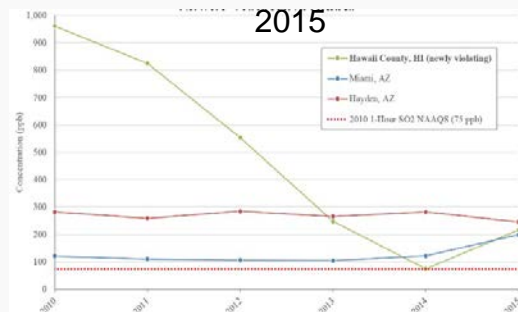
Region 9: Trends 1970-2015



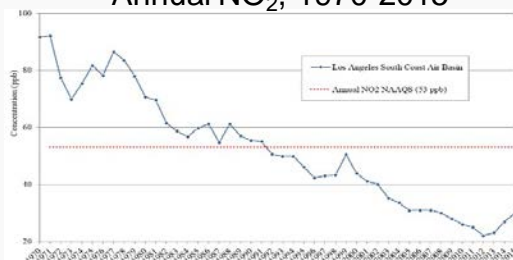
Old NAAQS: 24-Hour SO₂, 1970-2015



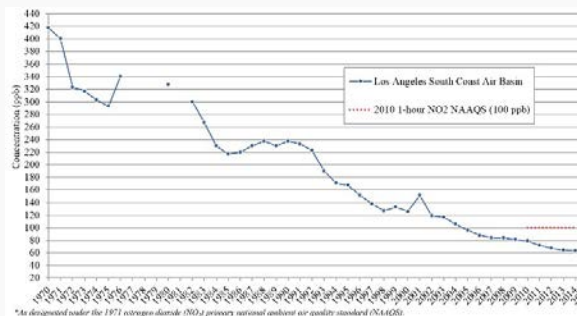
Current NAAQS: 1-Hour SO₂, 2010-2015



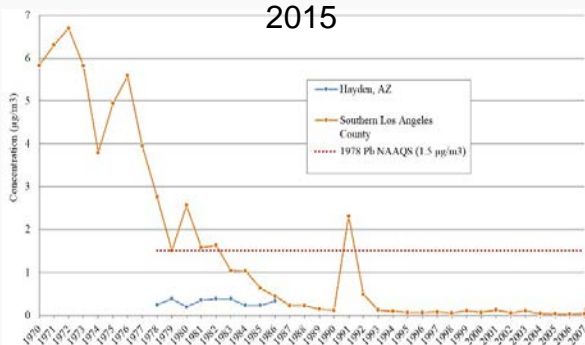
Annual NO₂, 1970-2015



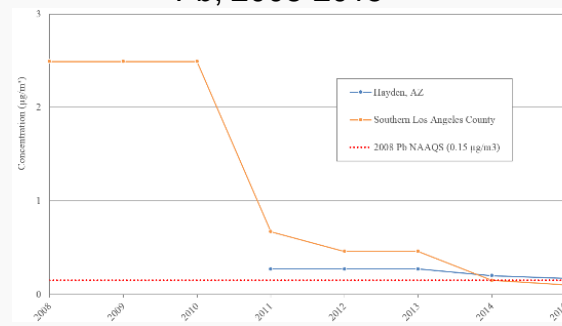
1-Hour NO₂, 1970-2015



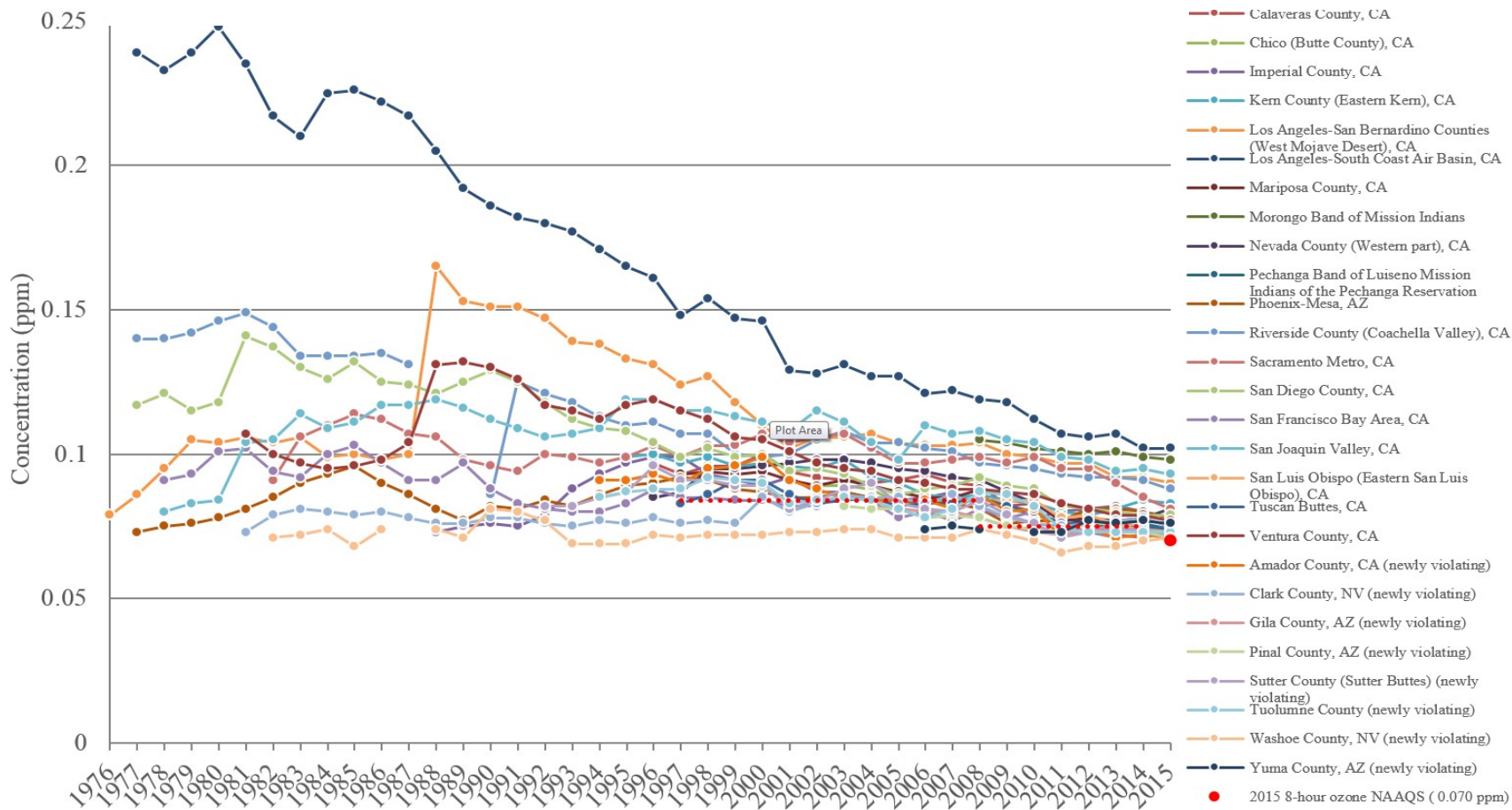
Old NAAQS: 1978 Quarterly Pb, 1970-2015



Current NAAQS: 2008 3-Month Rolling Pb, 2008-2015



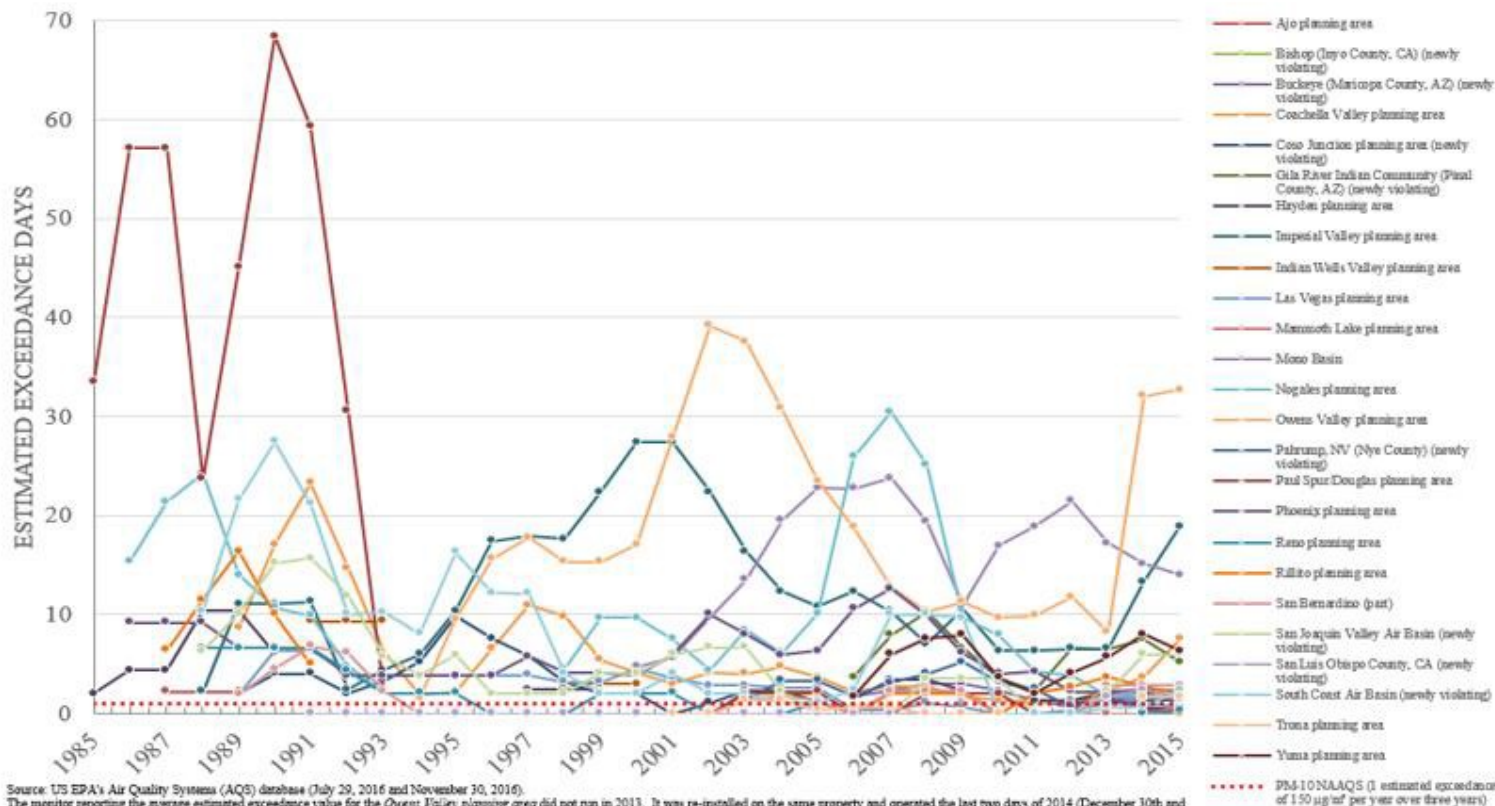
Region 9: 8-Hour OZONE Trends 1976-2015 Existing and Historic Nonattainment Areas



Source: US EPA's Air Quality Systems (AQS) database (July 29, 2016 and December 1, 2016). The 2015 national ambient air quality standard (NAAQS) for 8-hour ozone is 0.070 parts per million (ppm). The design value is a calculation of each year's 4th-highest day's recorded values, averaged over a 3-year period at an air quality monitor. X-axis labels represent the last year of a monitor's 3 year time period. All exceptional event data (e.g., high winds and wildfires) that EPA has concurred on have been excluded from design value calculations. AIR1600079 - 2015 air quality summary.xlsx (December 2, 2016)



Region 9: PM10 Trends 1985-2015 Designated and Violating Areas*



Source: US EPA's Air Quality Systems (AQS) database (July 29, 2016 and November 30, 2016). The monitor reporting the average estimated exceedance value for the Owens Valley planning area did not run in 2013. It was re-installed on the same property and operated the last two days of 2014 (December 30th and 31st). There was a single exceedance on December 31st, which raised the average estimated exceedances to 32.1 and 32.7 over the 2012-2014 and 2013-2015 periods, respectively. Discounting that exceedance would result in fewer estimated exceedances (2 instead of 32.7), but the area still would not meet the PM10 NAAQS for the 2013-2015 period. The 1971 national ambient air quality standard (NAAQS) for coarse particulate matter (PM10) is not to exceed one estimated exceedance day of 150 micrograms per cubic meter (µg/m³) per year on average over a 3-year period. Bismarck City, East Kern, Mono planning area, Payson, AZ, and Sacramento County are not represented due to lack of data, or values are less than what can be displayed. X-axis labels represent the last year of a monitor's 3-year time period. All exceptional event data (e.g., high winds and wildfires) that EPA has concurred on have been excluded from design value calculations. AIR1600079 - 2015 air quality summary.xlsx (December 1, 2016)

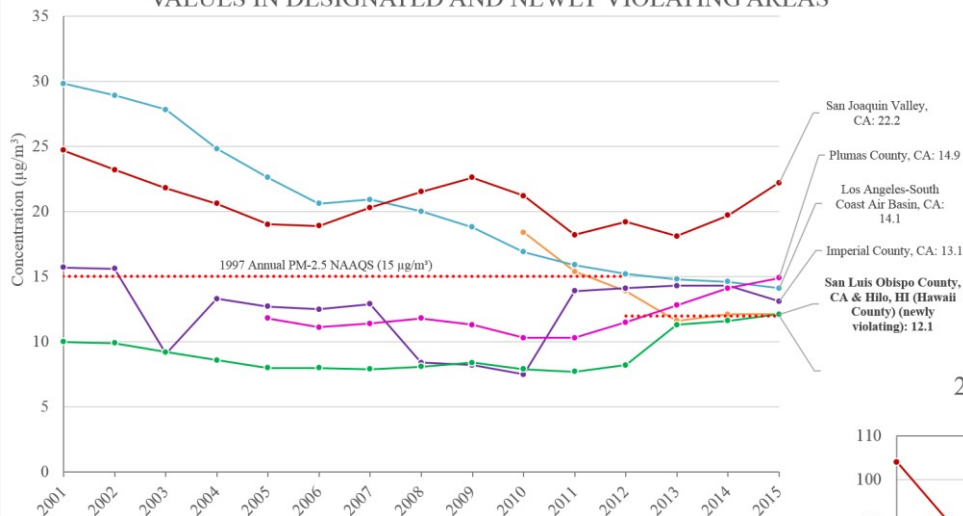


*PM₁₀ chart does not include West Pinal, AZ

Region 9: PM_{2.5} Trends Designated and Violating Areas

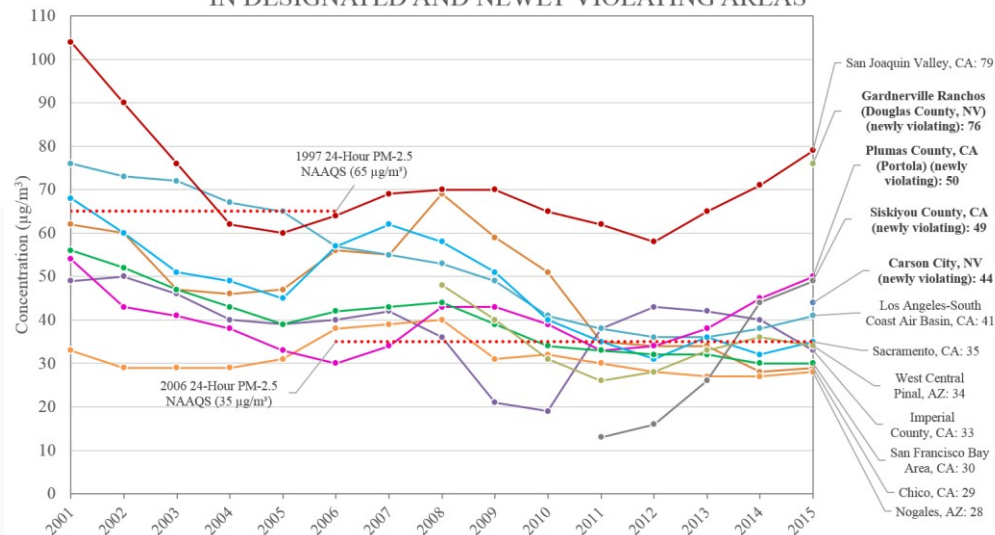


US EPA REGION 9 AIR QUALITY TRENDS, 2001-2015
2012 ANNUAL FINE PARTICULATE MATTER (PM_{2.5}) DESIGN VALUES IN DESIGNATED AND NEWLY VIOLATING AREAS



Source: US EPA's Air Quality Systems (AQS) database (July 29, 2016).
The 2012 national ambient air quality standard (NAAQS) for annual fine particulate matter (annual PM_{2.5}) is 12.0 micrograms per cubic meter (µg/m³). The design value for annual PM_{2.5} is the three-year average of annual mean values at a monitoring site. X-axis values represent the last year of a monitoring site's three-year time period. All exceptional event data (e.g., high winds and wildfires) that EPA has concurred on have been excluded from design value calculations.
AIR1600079 - 2015 air quality summary.xlsx (November 30, 2016)

US EPA REGION 9 AIR QUALITY TRENDS, 2001-2015
24-HOUR FINE PARTICULATE MATTER (PM_{2.5}) DESIGN VALUES IN DESIGNATED AND NEWLY VIOLATING AREAS



Source: US EPA's Air Quality Systems (AQS) database (July 29, 2016).
The 2006 national ambient air quality standard (NAAQS) for 24-hour fine particulate matter (24-hour PM_{2.5}) is 35 micrograms per cubic meter (µg/m³). The design value for 24-hour PM_{2.5} is the three-year average of third-highest daily values. X-axis values represent the last year of a monitoring site's three year time period. All exceptional event data (e.g., high winds and wildfires) that EPA has concurred on have been excluded from design value calculations.
AIR1600079 - 2015 air quality summary.xlsx (November 30, 2016)



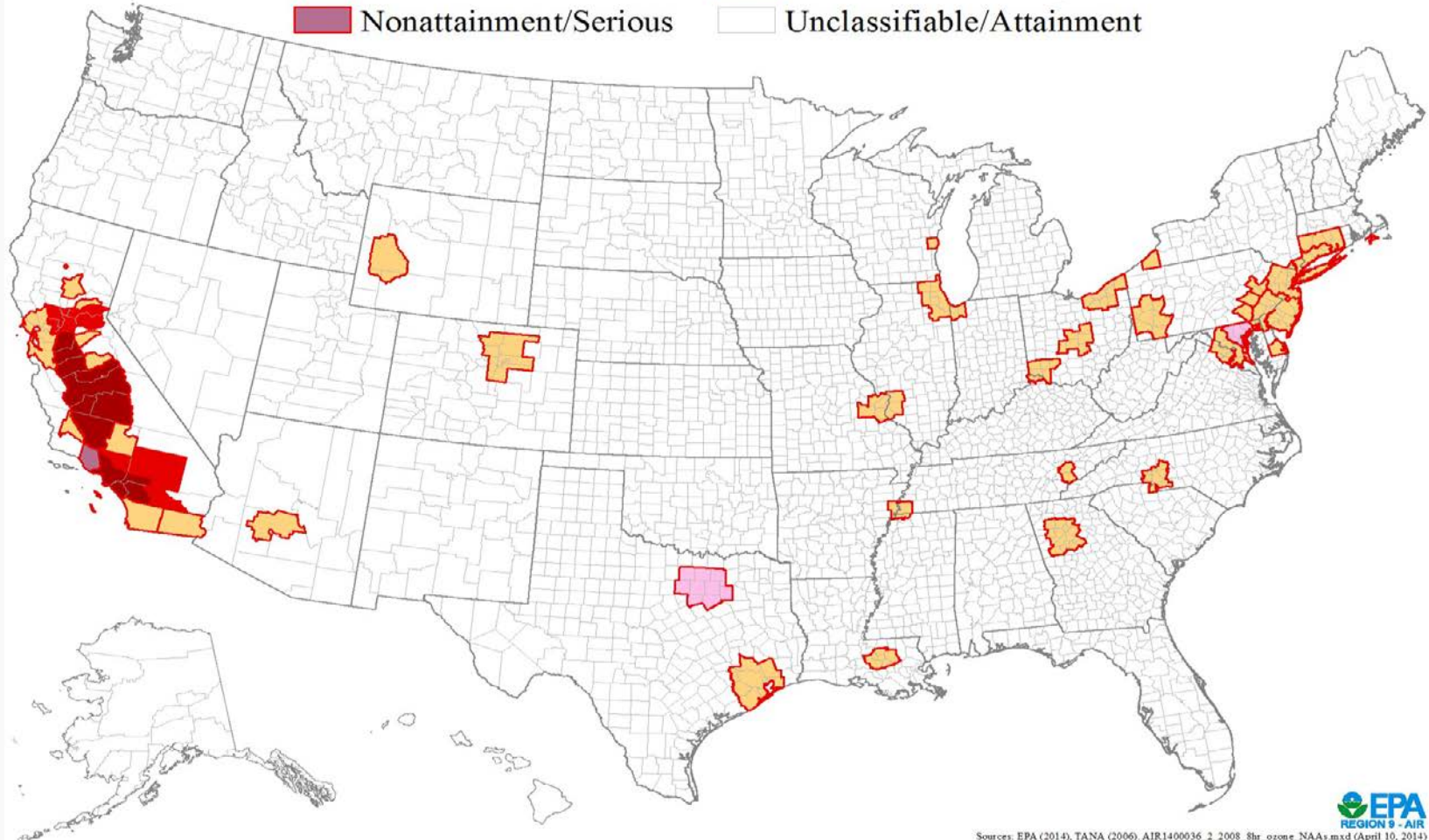
Current Nonattainment Areas and Health Risk Exposure

2008 8-Hour OZONE Current Nonattainment Areas



2008 8-HOUR OZONE NONATTAINMENT AREAS

- Nonattainment/Extreme
- Nonattainment/Severe
- Nonattainment/Serious
- Nonattainment/Moderate
- Nonattainment/Marginal
- Unclassifiable/Attainment

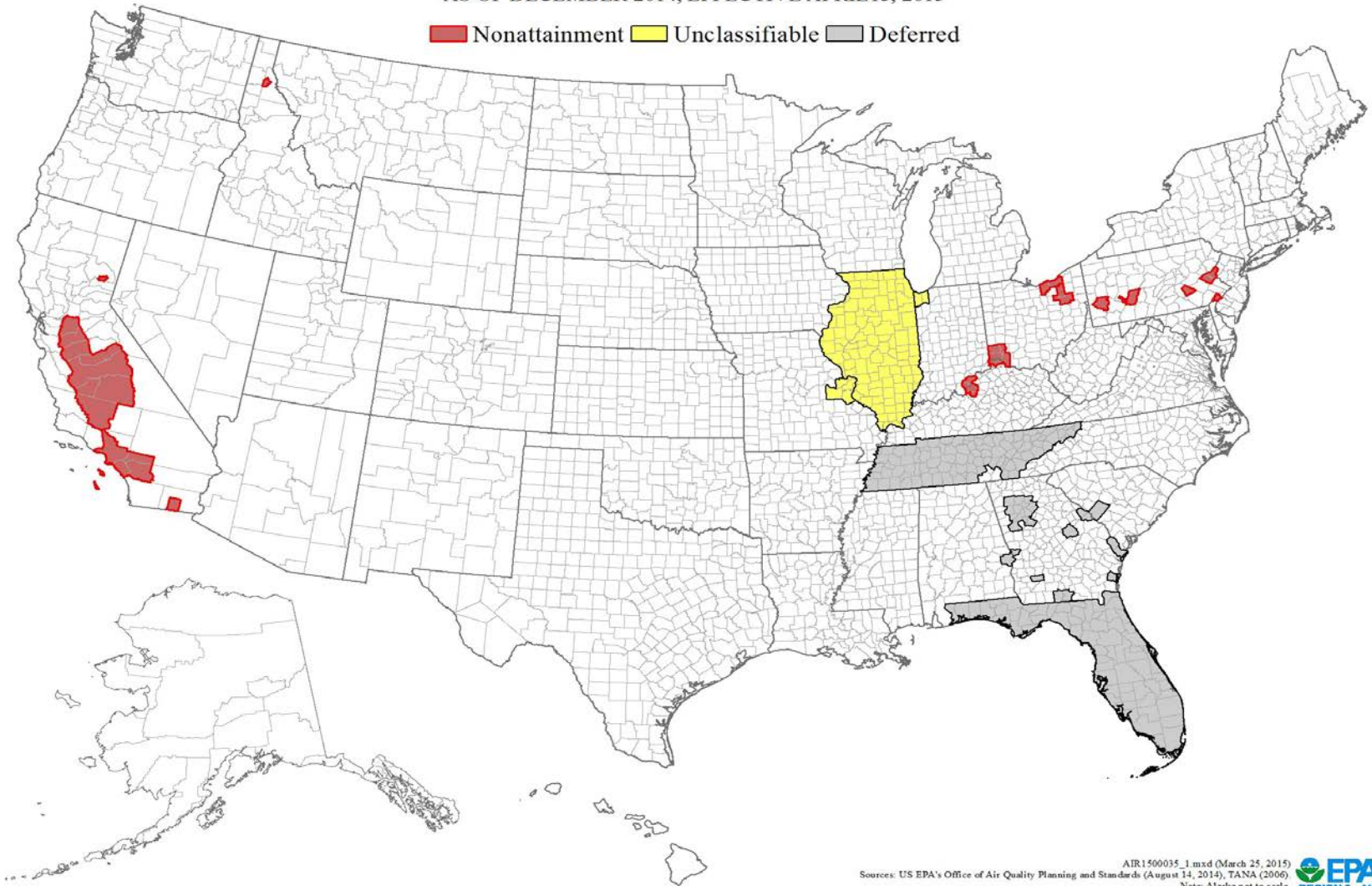


2012 PM_{2.5} Current Nonattainment Areas

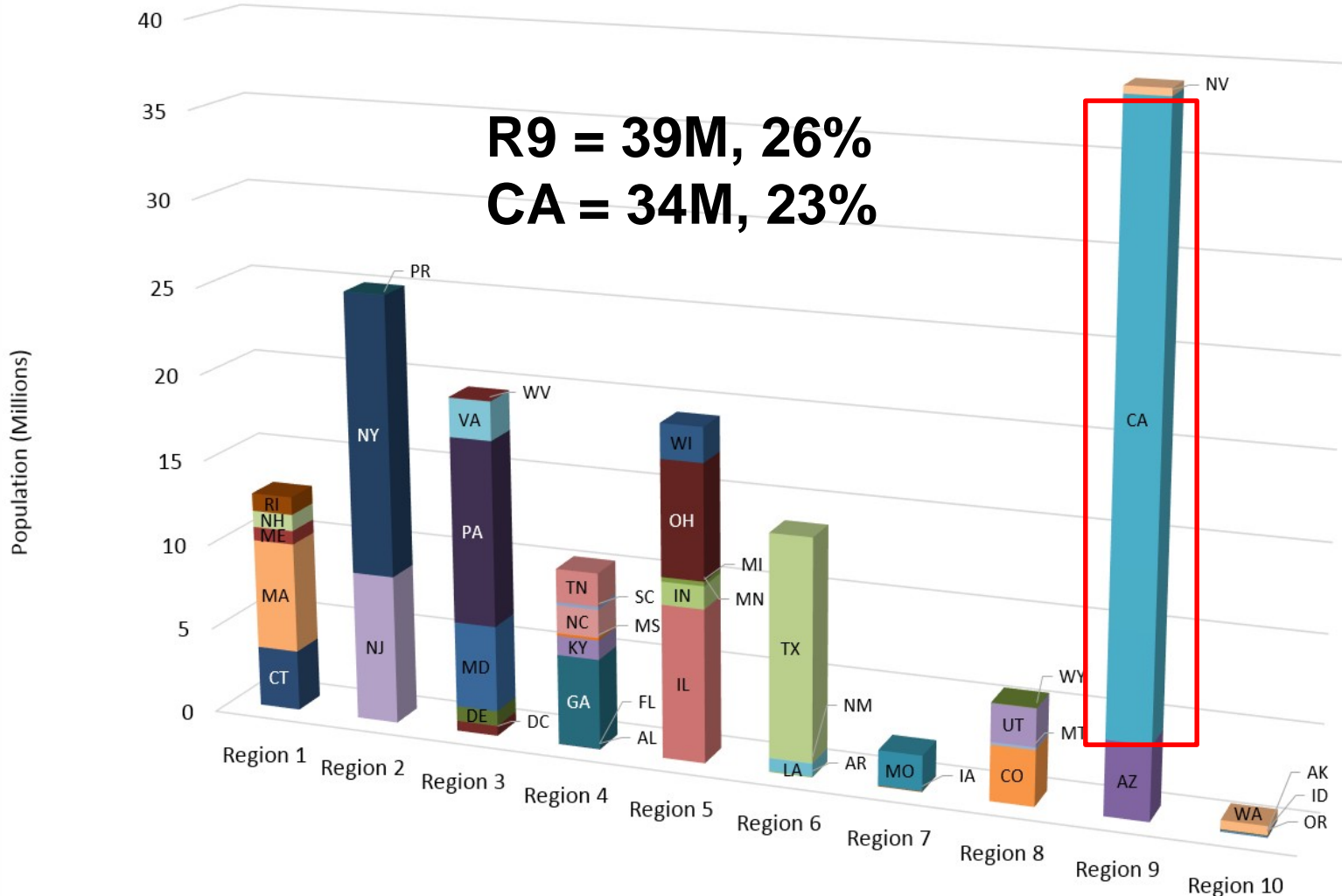


2012 ANNUAL PM_{2.5} NAAQS DESIGNATIONS AS OF DECEMBER 2014, EFFECTIVE APRIL 15, 2015

■ Nonattainment ■ Unclassifiable ■ Deferred



Population in Nonattainment Areas

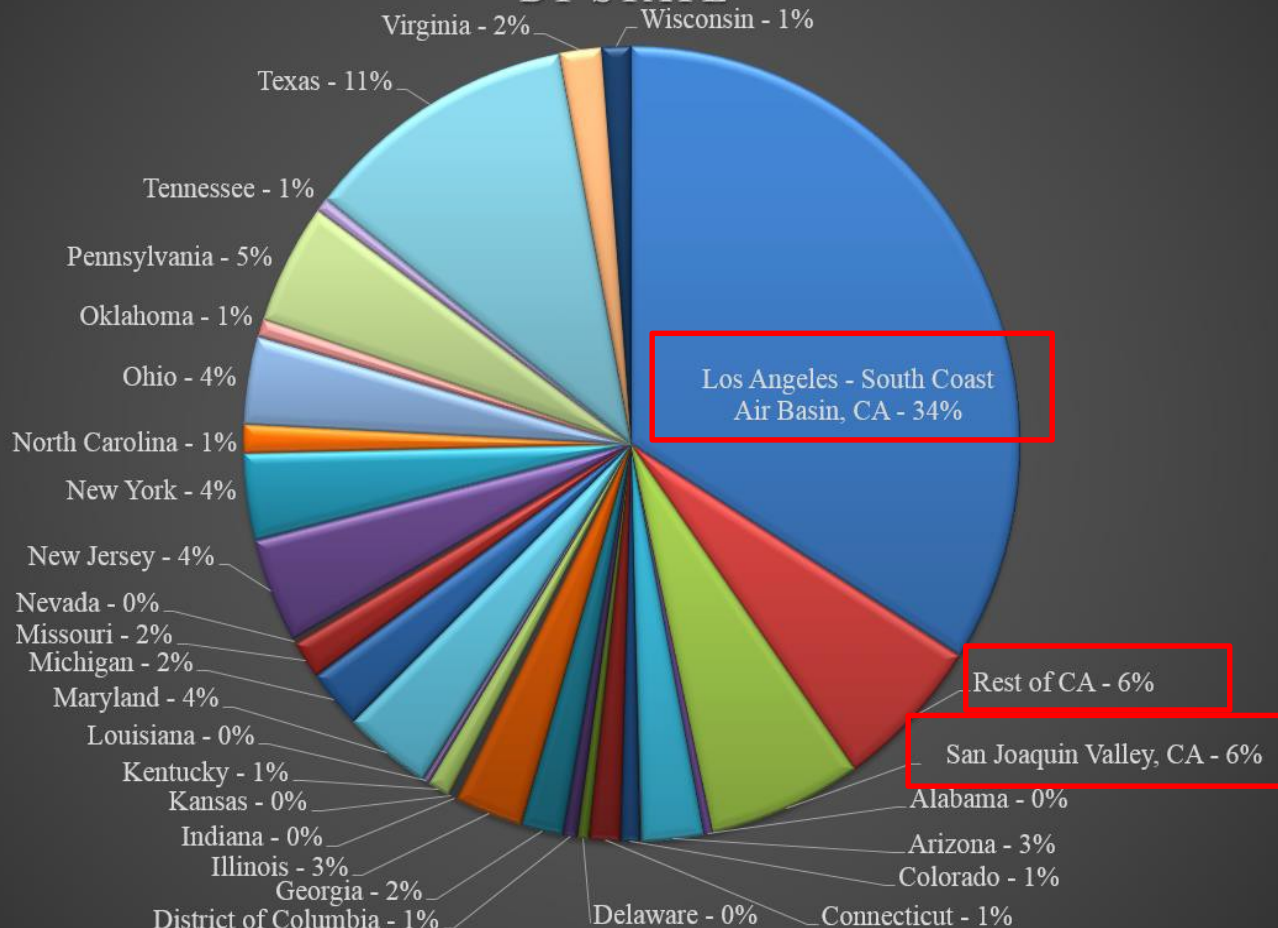


Sources: American Community Survey 2006-2010 File Geodatabase for Block Groups, U.S. EPA Office of Environmental Information (OEI) - Office of Information Analysis and Access (OIAA) (2011), U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards (OAQPS) (2015). Columns consist of summaries of populations of 2010 U.S. Census block groups which have centroids inside nonattainment area boundaries. Populations inside revoked 1-hour ozone nonattainment areas and populations inside nonattainment areas of former air quality standards are included.

Population-Weighted Exposure – Ozone



POPULATION-WEIGHTED INCREMENTAL EXPOSURE TO 8-HOUR OZONE ABOVE THE NATIONAL STANDARD BY STATE



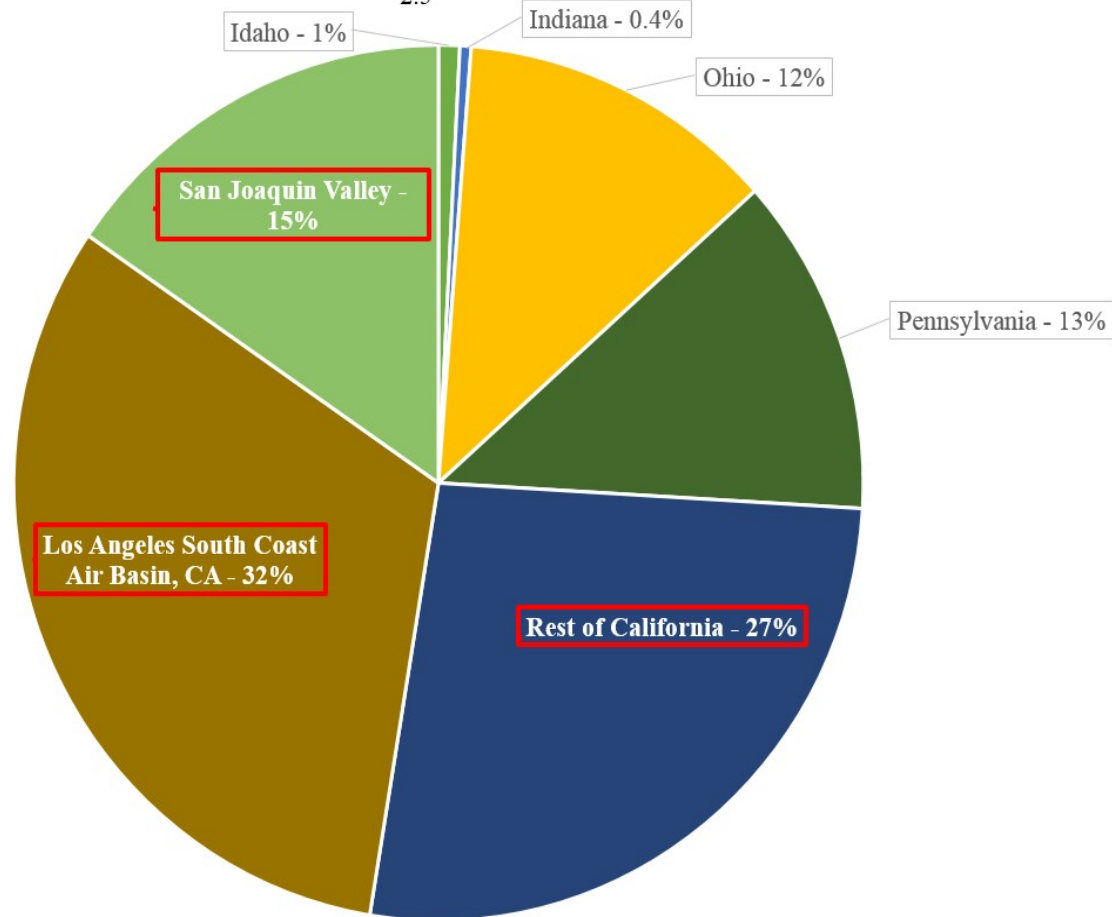
Note: States attaining the 0.075 ppm national 8-hour ozone standard are not represented here.

Sources: US EPA's Air Quality System (AQS) database (2013), 2013 US Census Population Estimates (2014).

Population-Weighted Exposure – PM_{2.5}



POPULATION-WEIGHTED INCREMENTAL EXPOSURE ABOVE THE 12 $\mu\text{g}/\text{m}^3$ 2012 ANNUAL PM_{2.5} STANDARD BY STATE



Note: States attaining the 2012 annual PM_{2.5} standard of 12 $\mu\text{g}/\text{m}^3$ are not represented here.

Sources: US Census American Community Survey (2011), US EPA's Air Quality System (AQS) database (August 14, 2014).



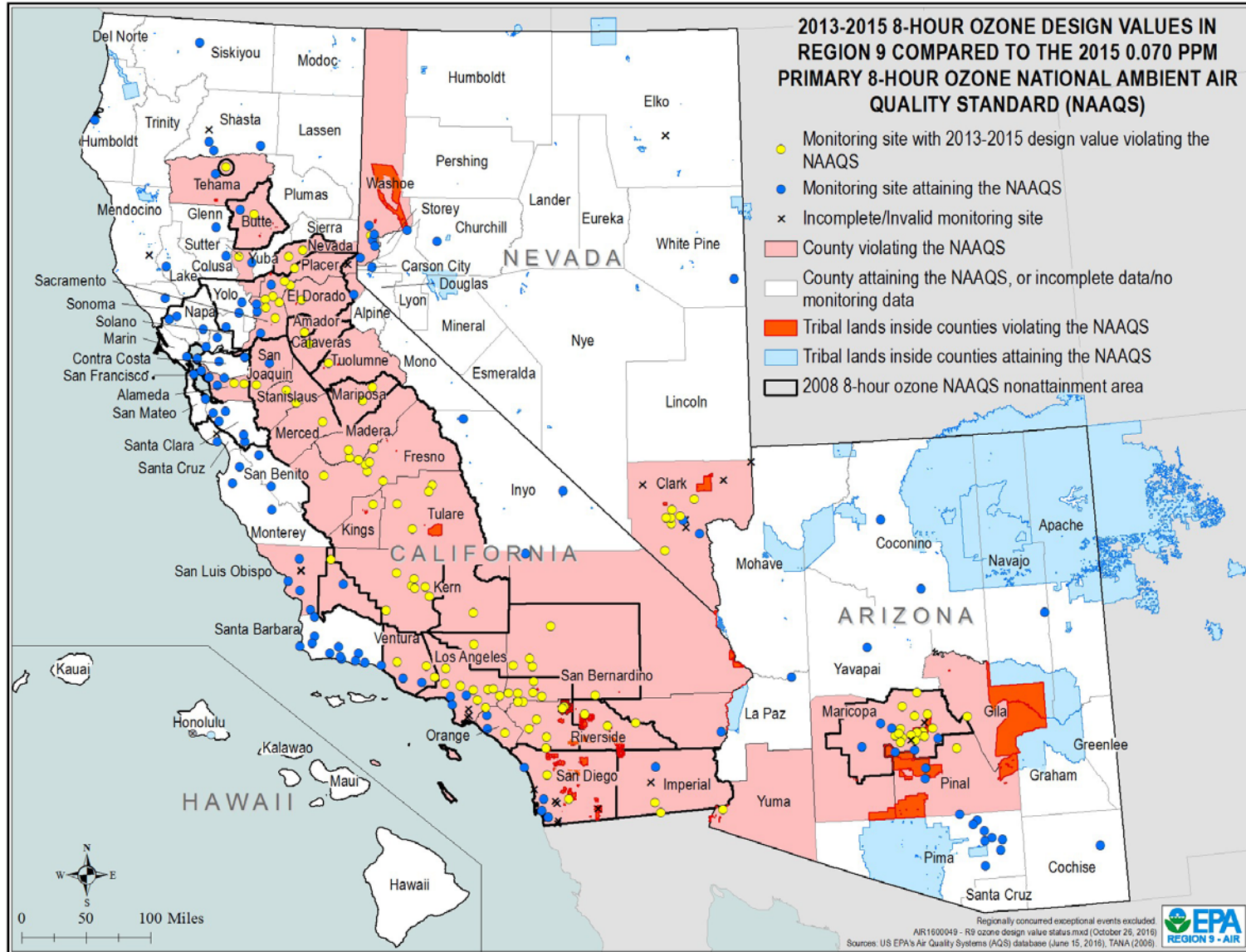
Importance of Accurate, Reliable Data



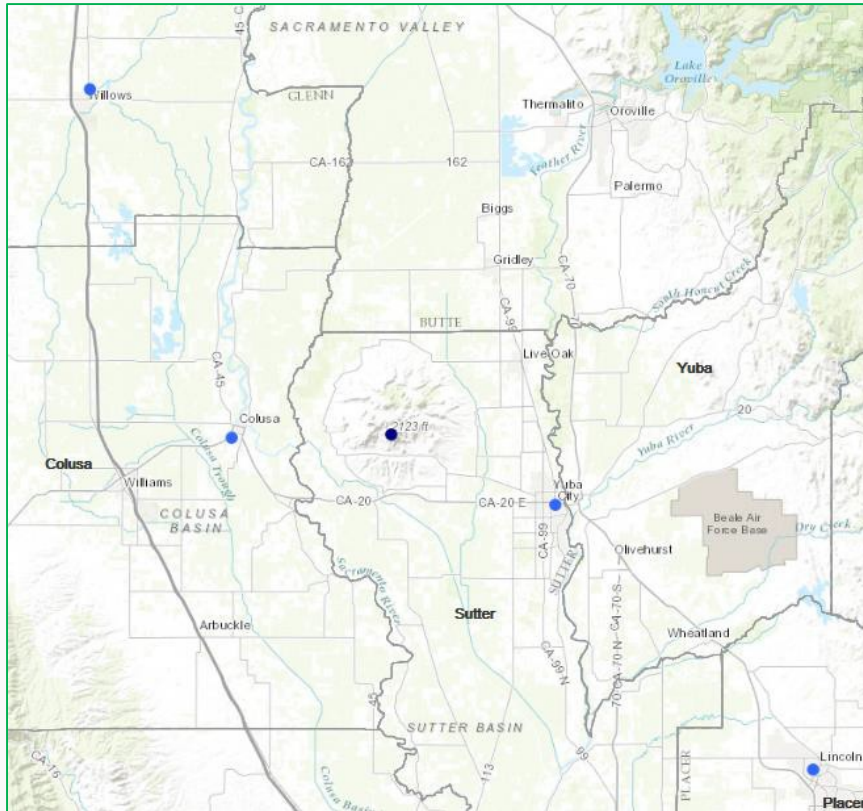
Importance of Accurate, Reliable Data: Attainment Designations

- Used as the basis for air quality planning
- Designations typically start with monitoring data
 - An area with a violating monitor is designated nonattainment, and includes nearby areas that cause or contribute to the violation.
- EPA considers five factors when determining the size of a nonattainment area:
 1. Air Quality
 2. Emissions
 3. Geography/Topography
 4. Meteorology
 5. Jurisdiction

2013-2015 OZONE Design Values in Region 9



Example: Sutter Buttes, California



Air Quality

- Navy blue dot in the middle of the map indicates violating monitor. All other dots indicate attaining monitors.

Other Factors

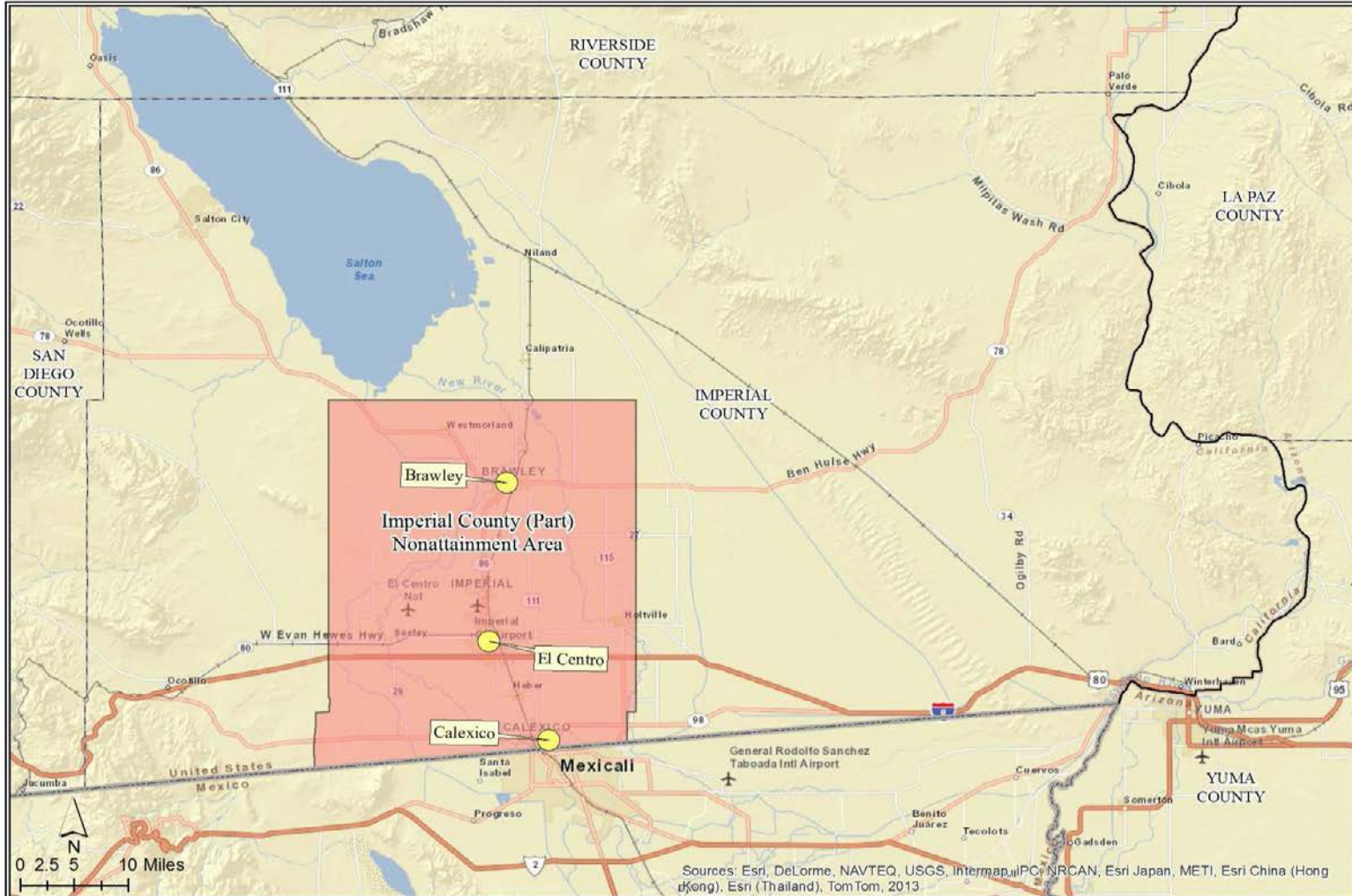
- Mountain top area
- No sources
- Elevated area contained within Sutter County (does not cross jurisdictions)



Importance of Accurate, Reliable Data: Clean Data Determination

- A specific regulatory action that determines that a nonattainment area is “clean” (i.e. data are below the NAAQS).
- Relies on most recent 3-year design value
 - Must be a valid design value
 - Completeness and QA/QC requirements must be met
- Also relies on preliminary data from most recent year
 - Data must continue to be below the NAAQS
- Reduces regulatory requirements for the area
 - Suspends some planning requirements
 - Could have influence on local control strategies

Imperial County Clean Data Determination for 2015 PM_{2.5} Standard



**24-HOUR PM_{2.5} MONITORING SITES AND NONATTAINMENT AREAS
IMPERIAL COUNTY, CALIFORNIA**

● Active PM_{2.5} Site ■ 2006 NAAQS 24-Hour PM_{2.5} Nonattainment Area



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013



June 6, 2013
AIR1300042_Imperial_PM2.5.mxd
Additional Sources: EPA (2013), Eri (2013), TANA (2006)
EPA REGION 9 - AIR



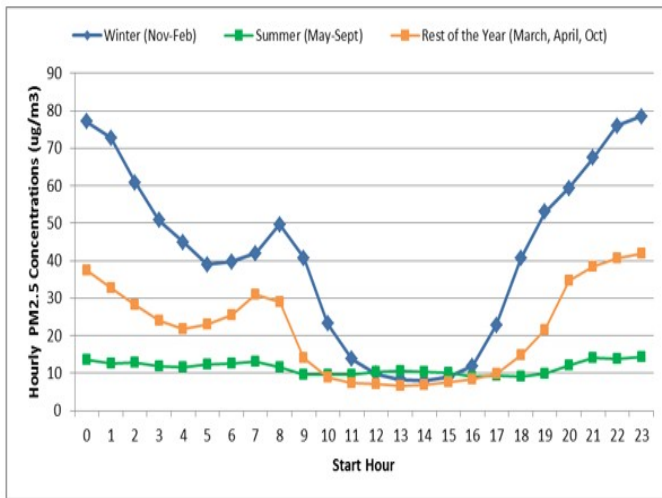
Importance of Accurate, Reliable Data: Targeting Control Strategies

- **PM2.5 Portola Wood Smoke**
- **PM10 Owens Lake Dust**
- **Ozone South Coast Vehicle Emissions**

PM2.5: Portola Woodsmoke

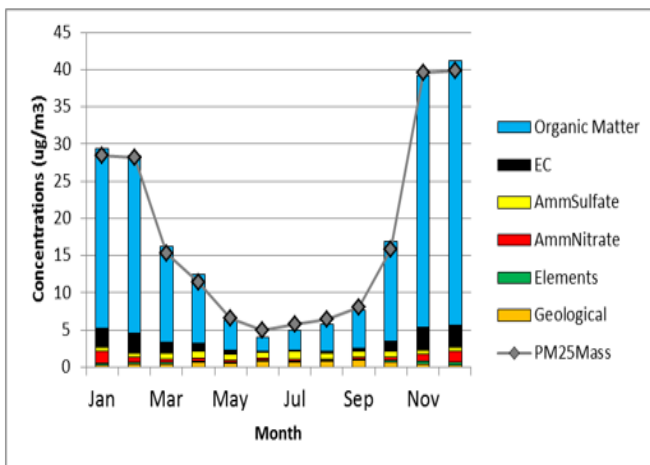


Figure 12. Diurnal Patterns in PM_{2.5} Concentrations at Portola (2010-2012)



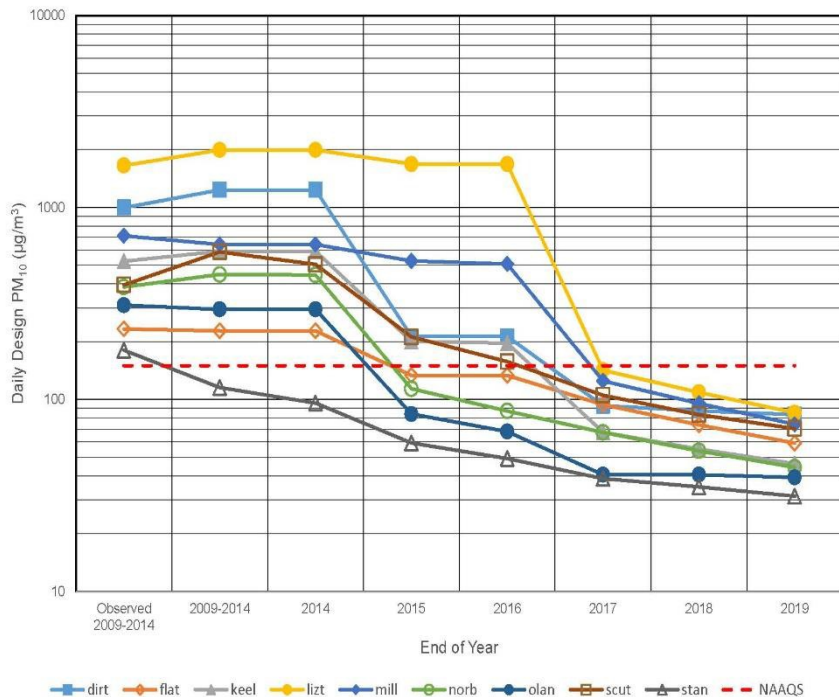
- Classified nonattainment for PM_{2.5} annual NAAQS in Dec 2015
- NSAQMD received a \$2.48M Targeted Air Shed grant from EPA
- 105 stoves changed out in first year of program (April-Dec 2016)
- Passed a comprehensive city ordinance regulating stove use

Figure 8. Portola 2013-2014 Monthly Average PM_{2.5} Composition



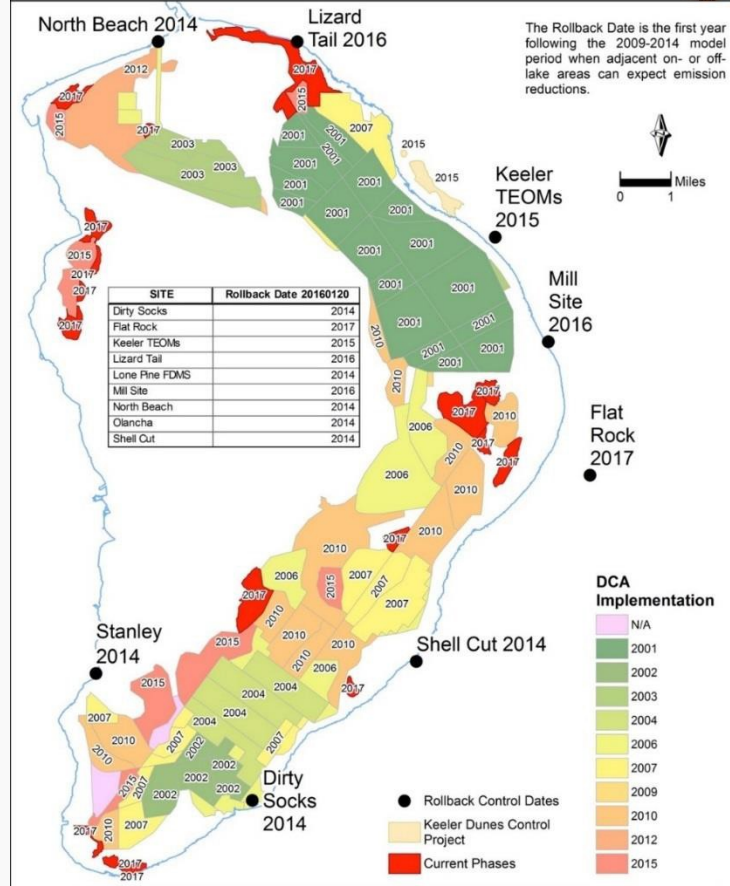
33% reduction in number of days exceeding 24-hr PM_{2.5} standard for Nov-Dec 2016 compared to Nov-Dec 2015

GBUAPCD Owens Lake Control Strategy



Great Basin Unified Air Pollution Control District

Dust Control Dates



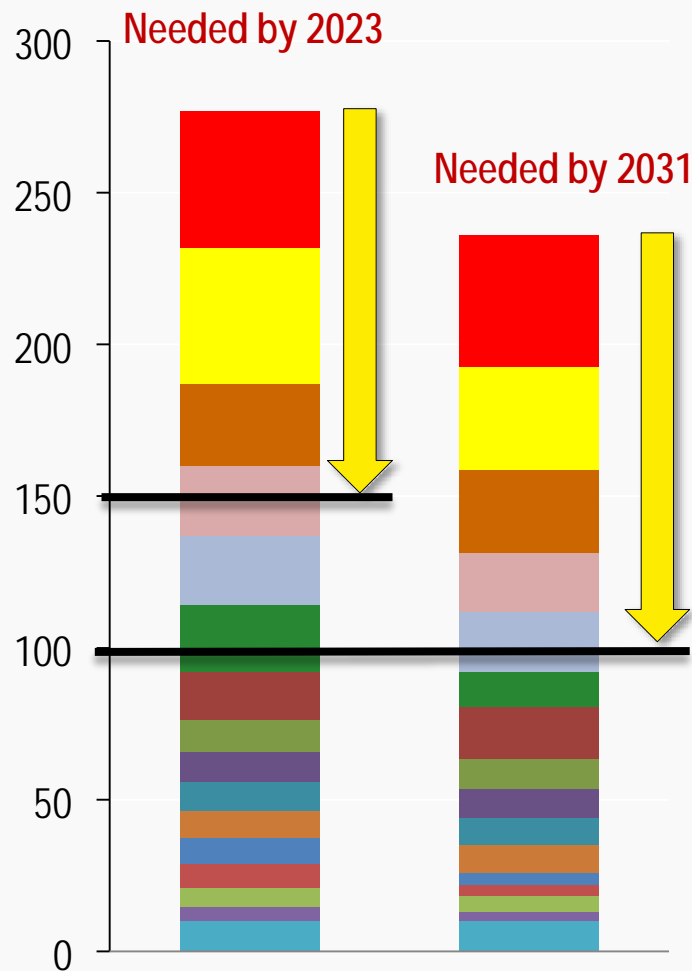
2/12/2016 2:43:01 PM

Rollback control dates 20160201.mxd

South Coast & Ozone NAAQS



- Heavy-Duty Diesel Trucks
- Off-Road Mobile Equipment
- RECLAIM
- Ocean Going Vessels
- Locomotives
- Cars/Light-Duty Trucks/SUVs
- Aircraft
- Commercial Harbor Craft
- Manufacturing and Industrial
- Residential Fuel Combustion
- Service and Commercial
- Buses
- Medium-Duty Trucks
- Recreational Boats
- Heavy-Duty Gas Trucks
- Other





Importance of Accurate, Reliable Data: **Wildfire Response**

2016 CA Wildfire Season

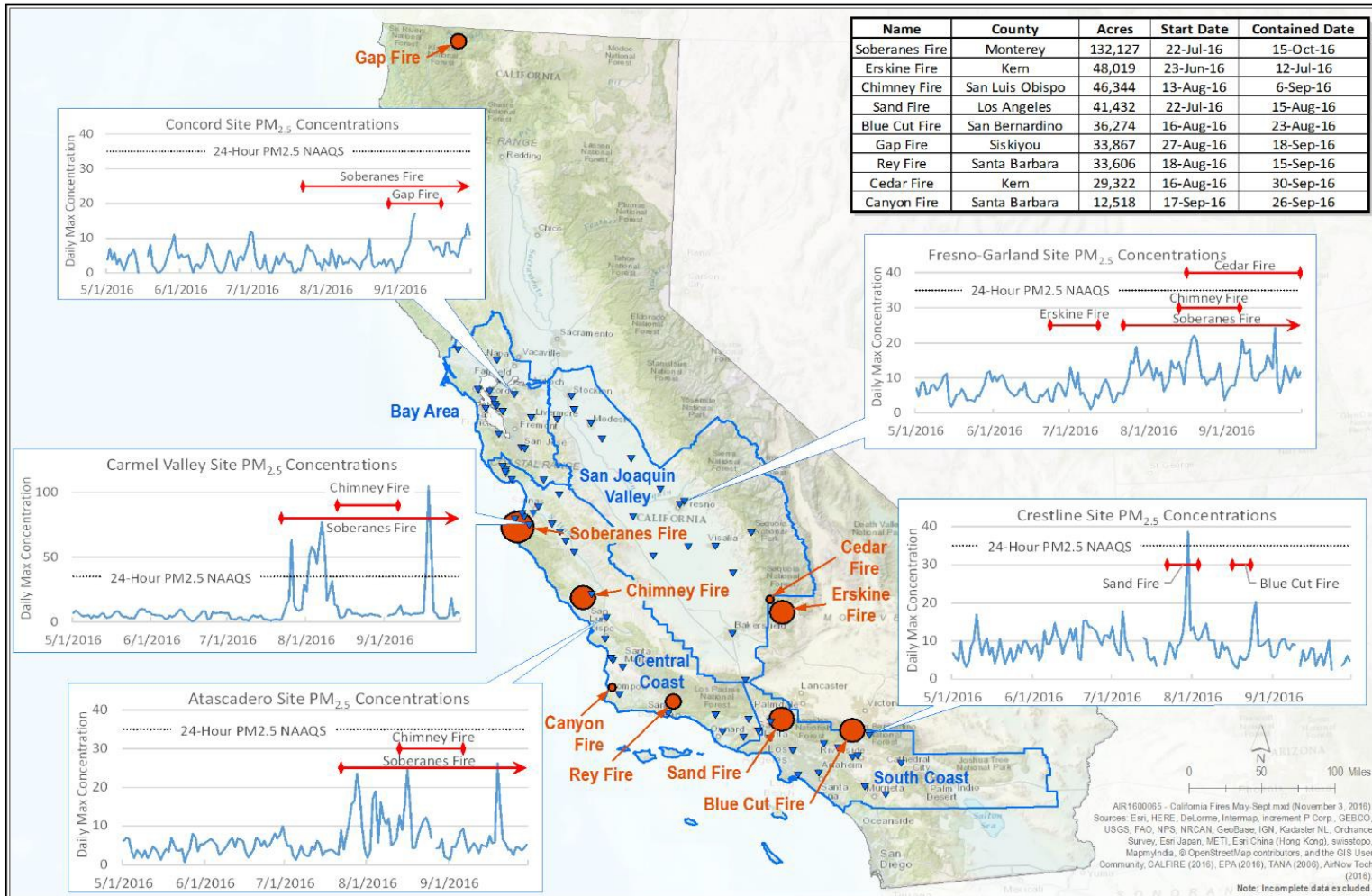


- During the 2016 fire season, 6,883 fires were documented and 563,411 total acres burned in California (as of Oct 29, 2016).
- Nine fires burned over 10,000 acres, including: Soberanes (132,127 acres), Erksine (48,019 acres), Chimney (46,344 acres), and Sand (41,432 acres).
- Based on preliminary 2016 data, several R9 air districts showed elevated PM_{2.5} concentrations during the May – Sept timeframe.
- The 2016 CA fire season is average in total acreage and below average in number of fires when compared to the last 15 years.



Chimney Fire. Photo Credit: CalFire

2016 CA Wildfire Season



Name	County	Acres	Start Date	Contained Date
Soberanes Fire	Monterey	132,127	22-Jul-16	15-Oct-16
Erskine Fire	Kern	48,019	23-Jun-16	12-Jul-16
Chimney Fire	San Luis Obispo	46,344	13-Aug-16	6-Sep-16
Sand Fire	Los Angeles	41,432	22-Jul-16	15-Aug-16
Blue Cut Fire	San Bernardino	36,274	16-Aug-16	23-Aug-16
Gap Fire	Siskiyou	33,867	27-Aug-16	18-Sep-16
Rey Fire	Santa Barbara	33,606	18-Aug-16	15-Sep-16
Cedar Fire	Kern	29,322	16-Aug-16	30-Sep-16
Canyon Fire	Santa Barbara	12,518	17-Sep-16	26-Sep-16

**CALIFORNIA WILDFIRES GREATER THAN 10,000 ACRES AND SELECTED 24-HOUR PM_{2.5} MONITORING SITE TRENDS
MAY 1 - SEPTEMBER 30, 2016**

- ▼ PM_{2.5} monitoring site
- Wildfire ≤ 30,000 acres
- 30,001 - 35,000 acres
- 35,001 - 50,000 acres
- >50,000 acres
- Focal area

AIR16000095 - California Fires May-Sept.mxd (November 3, 2016)
 Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, MapboxIndia, © OpenStreetMap contributors, and the GIS User Community, CALFIRE (2016), EPA (2016), TANA (2006), AirNow Tech (2016).
 Note: Incomplete data excluded.





Importance of Accurate, Reliable Data: Litigation

- EPA regularly faces both legal and technical challenges to the use of data for regulatory purposes
- Comments on regulatory actions or annual monitoring network plans, for example:
 - Approval of QAPPs
 - Questioning QA/QC measures
 - Maximum concentration locations/Network design



CONCLUSIONS

- Reliable, accurate data are foundation of the air quality management program
- California monitoring network is unparalleled
- Fundamental to key policy decisions to clean air



THANK YOU

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