

Air Quality Progress

Report to the Board
January 23, 2014

California Environmental Protection Agency

 **Air Resources Board**

Overview

- ▶ Air quality standards
- ▶ Recent high particulate levels
- ▶ Regional progress

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- ▶ Recent high particulate levels
- ▶ Regional progress

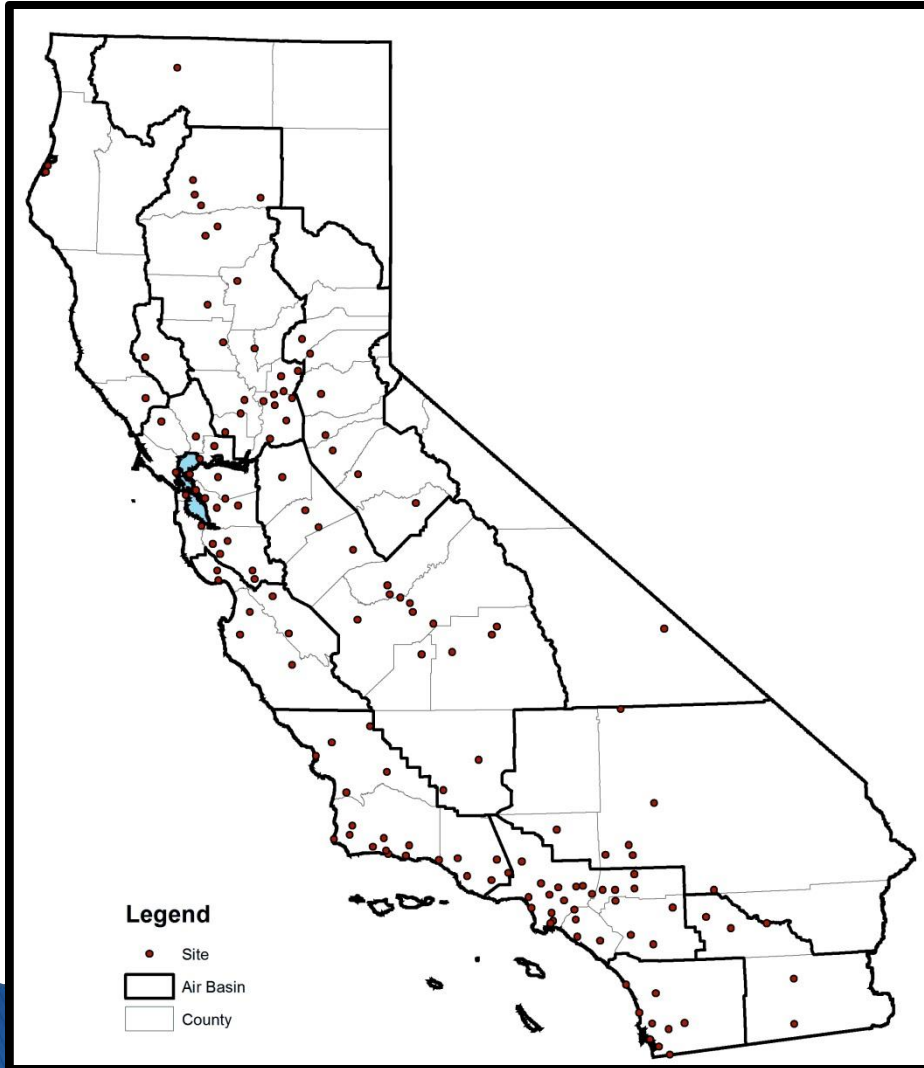
Health Based Air Quality Standards

- ▶ Clean Air Act requires U.S. EPA to set and review air quality standards every five years
- ▶ Standards are based on health science
- ▶ Advancements in understanding health impacts have led to more stringent standards over time
- ▶ Ozone strongly linked to respiratory effects: asthma exacerbation, reduced lung function, and hospitalization
- ▶ PM_{2.5} linked to mortality and hospitalization for cardiovascular diseases

How Is Attainment Determined?

- ▶ Standards allow several exceedances
- ▶ Compliance based on calculated value derived from peak concentrations
- ▶ This is known as the “design value”
- ▶ Design value reflects three-year average to reduce yearly variability
- ▶ Design values for all sites in a region must meet standard

Air Quality Monitoring Network



- ▶ Designed to assess statewide, regional, and local air quality
- ▶ Rigorous data quality procedures
- ▶ Determine regional status regarding standards
- ▶ Multiple pollutants monitored at sites
- ▶ More than 250 sites

Progression of Ozone Standards

Federal Ozone Standards		
➔ CLEANER AIR / MORE PROTECTIVE ➔		
(1979) 1-hour 0.12 ppm	(1997) 8-hour 0.08 ppm	(2008) 8-hour 0.075 ppm

Progression of PM2.5 Standards

Federal PM2.5 Standards			
➔ CLEANER AIR / MORE PROTECTIVE ➔			
(1997) 24-hour 65 $\mu\text{g}/\text{m}^3$	(1997) Annual 15 $\mu\text{g}/\text{m}^3$	(2006) 24-hour 35 $\mu\text{g}/\text{m}^3$	(2012) Annual 12 $\mu\text{g}/\text{m}^3$

Federal Ozone Standards: Air Quality Status

Area	(1979) 1-Hour 0.12 ppm	(1997) 8-Hour 0.08 ppm	(2008) 8-Hour 0.075 ppm
South Coast			
San Joaquin Valley			
Sacramento	✓		
Desert Areas	✓		
San Diego	✓	✓	
Ventura	✓	✓	
Bay Area	✓	✓	✓
Other areas	✓	✓	

✓ = currently meets the standard

Federal PM2.5 Standards:

Air Quality Status

Area	(1997) 24-Hour 65 $\mu\text{g}/\text{m}^3$	(1997) Annual 15 $\mu\text{g}/\text{m}^3$	(2006) 24-Hour 35 $\mu\text{g}/\text{m}^3$	(2012) Annual 12 $\mu\text{g}/\text{m}^3$
South Coast	✓			
San Joaquin Valley	✓			
Imperial County	✓	✓		
Sacramento	✓	✓	✓	✓
Bay Area	✓	✓	✓	✓
Other Areas	✓	✓	✓	✓

✓ = currently meets the standard

- ▶ Air quality standards

- ▶ **Recent high particulate levels**

- ▶ Regional progress

Update on Recent High PM2.5

- ▶ Widespread elevated PM2.5 levels occurred throughout the State this winter
- ▶ Resulted in large number of air advisories
- ▶ Highest values occurred in San Joaquin Valley

Contributing Weather Conditions

- ▶ Very conducive to PM2.5 buildup
- ▶ Cold temperatures and warm afternoons with limited vertical mixing
- ▶ Calm winds and few low pressure systems
- ▶ Drought emergency due to record low rainfall

Implications of Recent High PM2.5

- ▶ Staff is completing review of recent data
- ▶ Expect calculated design values to increase
- ▶ Impacts on attainment status can then be determined

- ▶ Air quality standards
- ▶ Factors that affect air quality

▶ Regional progress

Evaluating Air Quality Progress

- ▶ Many different indicators can be used to assess progress
- ▶ Legal definition of attainment is based on regional monitor with highest design value
- ▶ Changes in spatial extent and frequency of high pollution events highlight other aspects of progress

Progress in Major Urban Areas

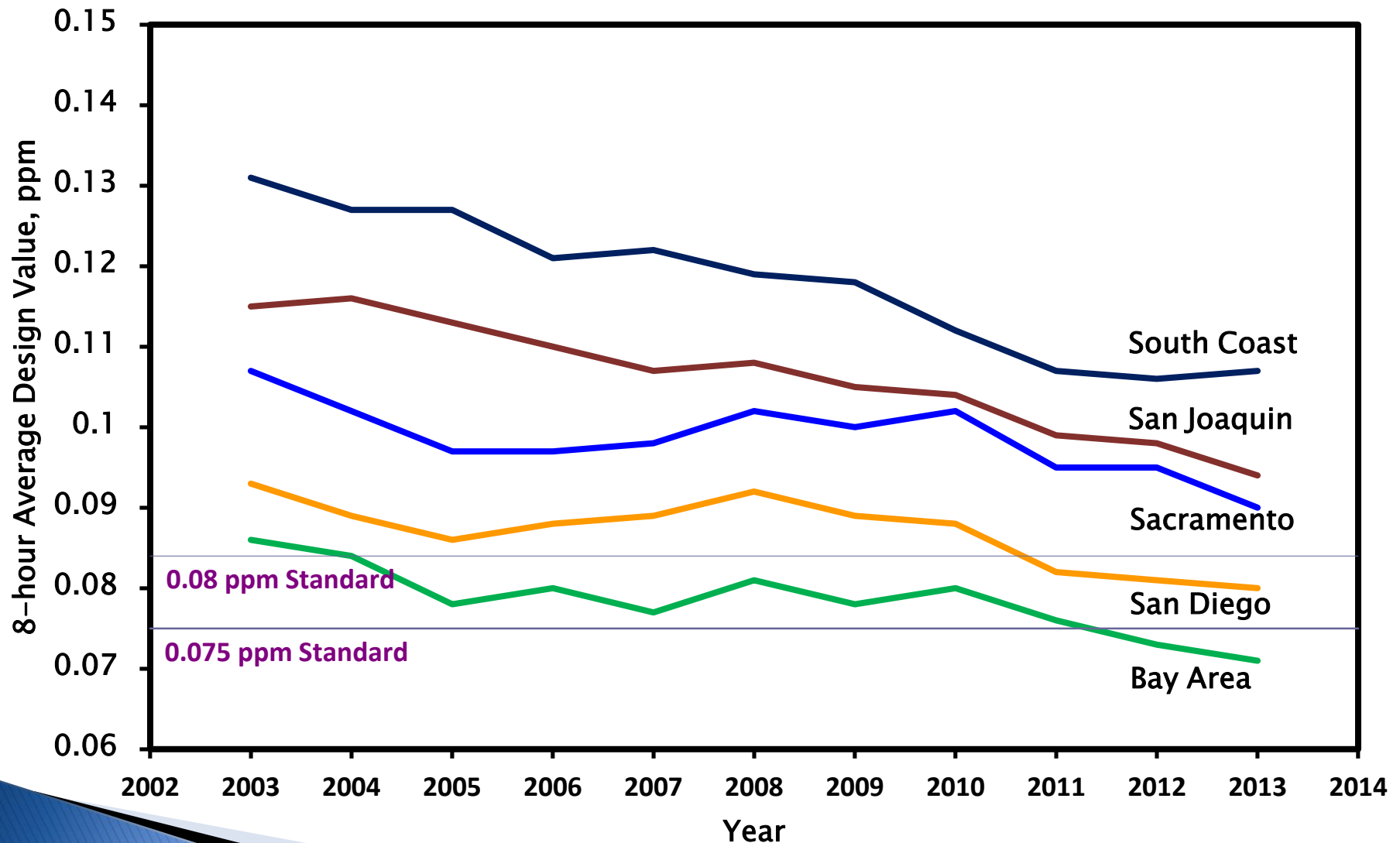
▶ Ozone

- Design values show uniform progress across all areas over last decade
- Even greater progress in reducing number of high ozone days

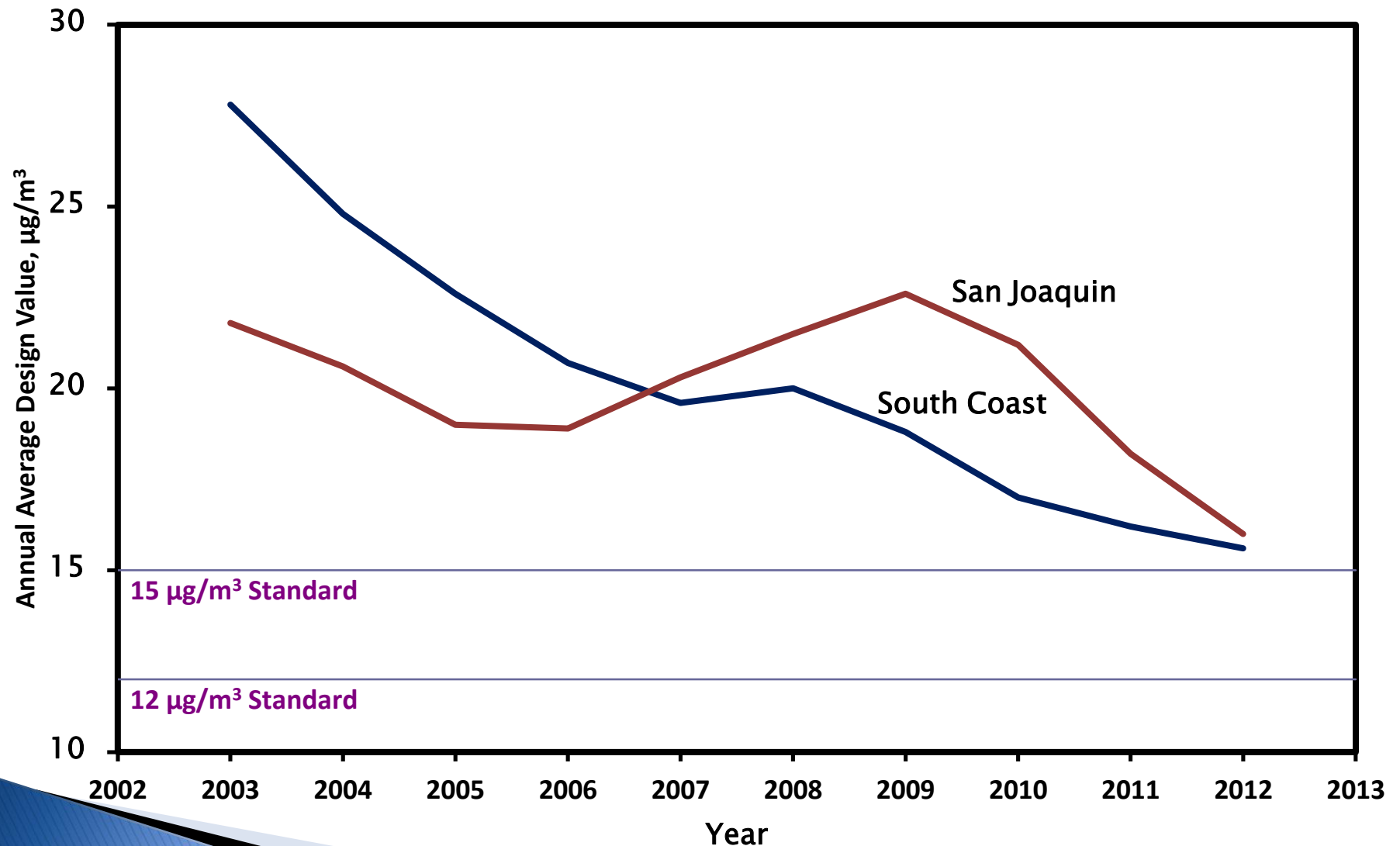
▶ PM2.5

- Progress is variable, but both annual and 24-hour concentrations have declined
- Few sites now exceed the $15\mu\text{g}/\text{m}^3$ annual average standard

Ozone 8-Hour Design Value Trends



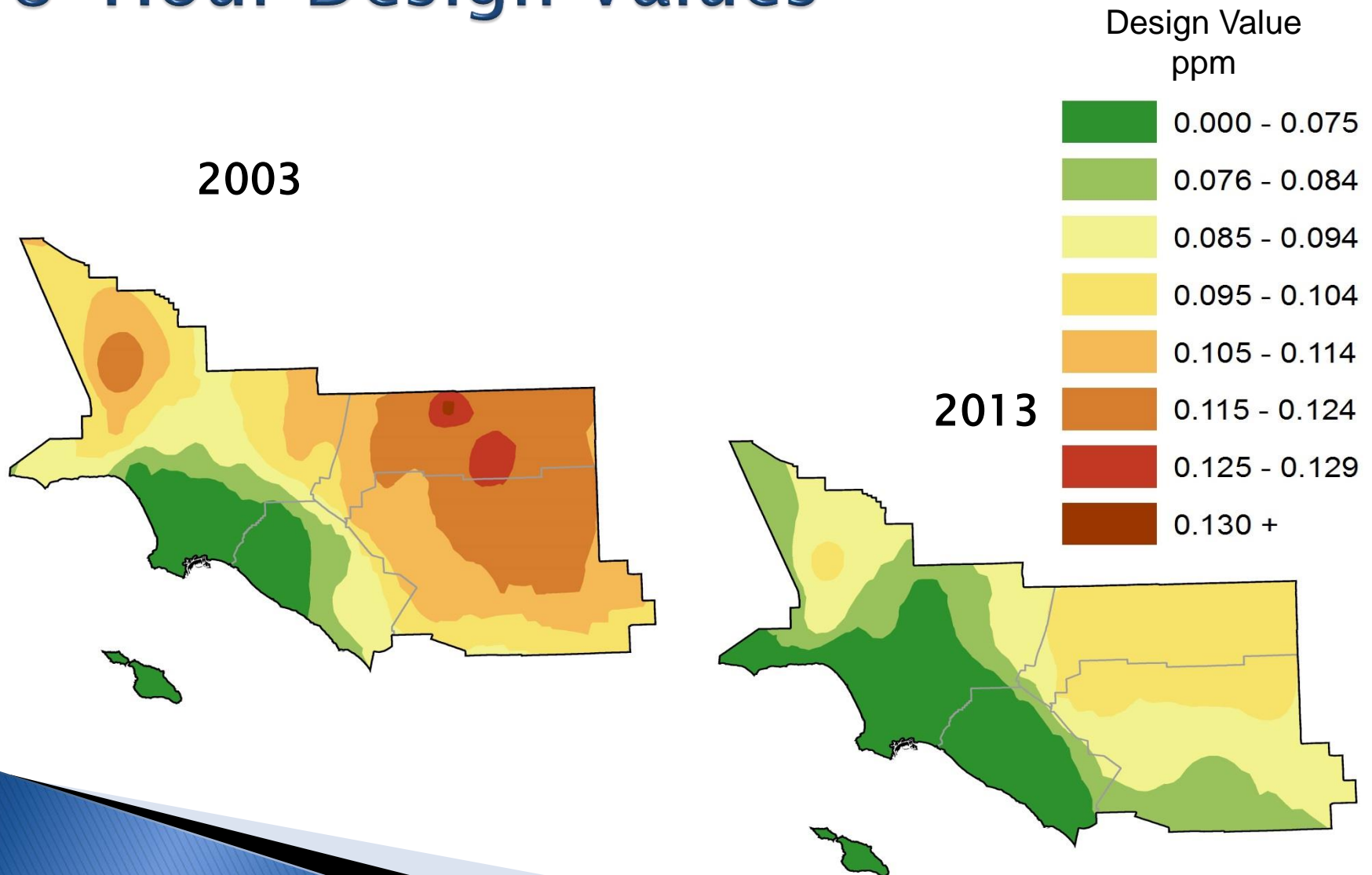
PM2.5 Annual Average Design Value Trends



South Coast Air Basin: Progress Towards Ozone Standards

- ▶ South Coast making continuing progress towards 2023 attainment
- ▶ Frequency of exposures improving, with 21% fewer exceedance days since 2003
- ▶ Coastal portion meets both 8-hour ozone standards
- ▶ Significant reductions in NO_x and VOCs still needed to achieve 2023 attainment as well as more stringent 2032 deadline

Basinwide Reductions in Ozone 8-Hour Design Values



South Coast Air Basin

Progress Towards PM_{2.5} Standards

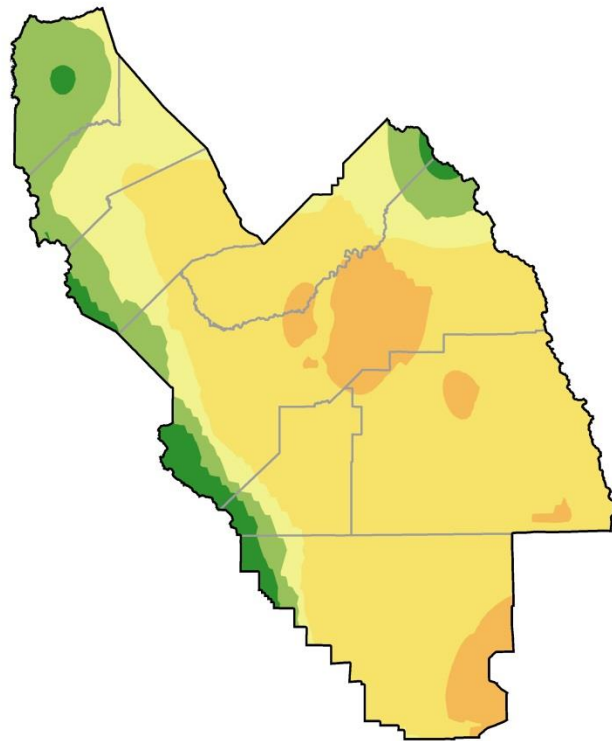
- ▶ Since 2002, annual average design value has decreased almost one-half to 15.6 $\mu\text{g}/\text{m}^3$
- ▶ As of 2012, only one site now exceeds the 15 $\mu\text{g}/\text{m}^3$ annual and 35 $\mu\text{g}/\text{m}^3$ 24-hour standards
- ▶ Still evaluating 2013 data
- ▶ Area has 2014 attainment date for both standards

San Joaquin Valley Air Basin: Progress Towards Ozone Standards

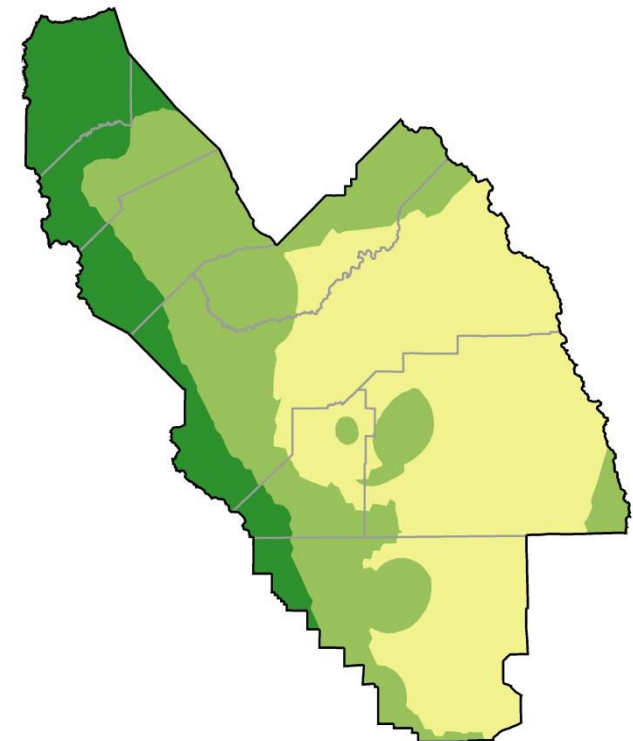
- ▶ San Joaquin Valley shows continued progress towards 2023 attainment
- ▶ Frequency of exposure improving, with 35% fewer exceedance days since 2003
- ▶ Portions of the Valley meet both 8-hour ozone standards
- ▶ Further reductions in NO_x still needed to achieve 2023 attainment as well as more stringent 2032 deadline

Basinwide Reductions in Ozone 8-Hour Design Values

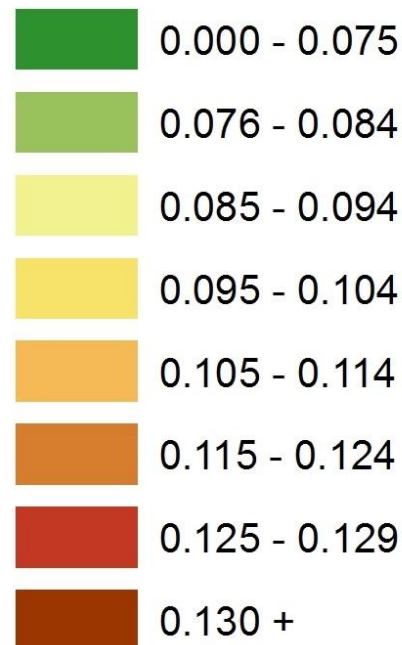
2003



2013



Design Value
ppm



San Joaquin Valley Air Basin: Progress Towards PM_{2.5} Standards

- ▶ Since 2002, annual average design value has decreased almost one-third to 16 $\mu\text{g}/\text{m}^3$
- ▶ Portions of the central and southern Valley remain above the standard
- ▶ Area has 2014 attainment date for annual standard and 2019 attainment date for 24-hour standard

Sacramento Metro Area

- ▶ Classified Severe with 2027 attainment deadline for 0.075 ppm 8-hour ozone standard
- ▶ Over last three years averaged 35 days above the 0.075 ppm 8-hour standard
- ▶ Only one site remains above the 0.08 ppm 8-hour ozone standard
- ▶ Sacramento meets all other federal standards for ozone and particulate matter

San Diego Area

- ▶ Classified Marginal for the 0.075 ppm 8-hour ozone standard with near-term attainment deadline
- ▶ Only one site still above this standard
- ▶ San Diego meets all other federal standards for ozone and particulate matter
- ▶ Still violates state standards

San Francisco Bay Area

- ▶ Meets all federal standards for ozone and particulate matter
- ▶ Still has violations of state standards

Summary

- ▶ Air quality continues to improve statewide
- ▶ Over 68% of Californians live in communities that meet federal standards
- ▶ Even within remaining communities, levels and numbers of exceedance days are declining
- ▶ Our multi-pollutant strategy of NO_x, VOC and PM_{2.5} controls is providing continuing benefits for ozone and PM_{2.5}
- ▶ Significant further emission reductions will be needed to meet ozone standards