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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- Regional progress

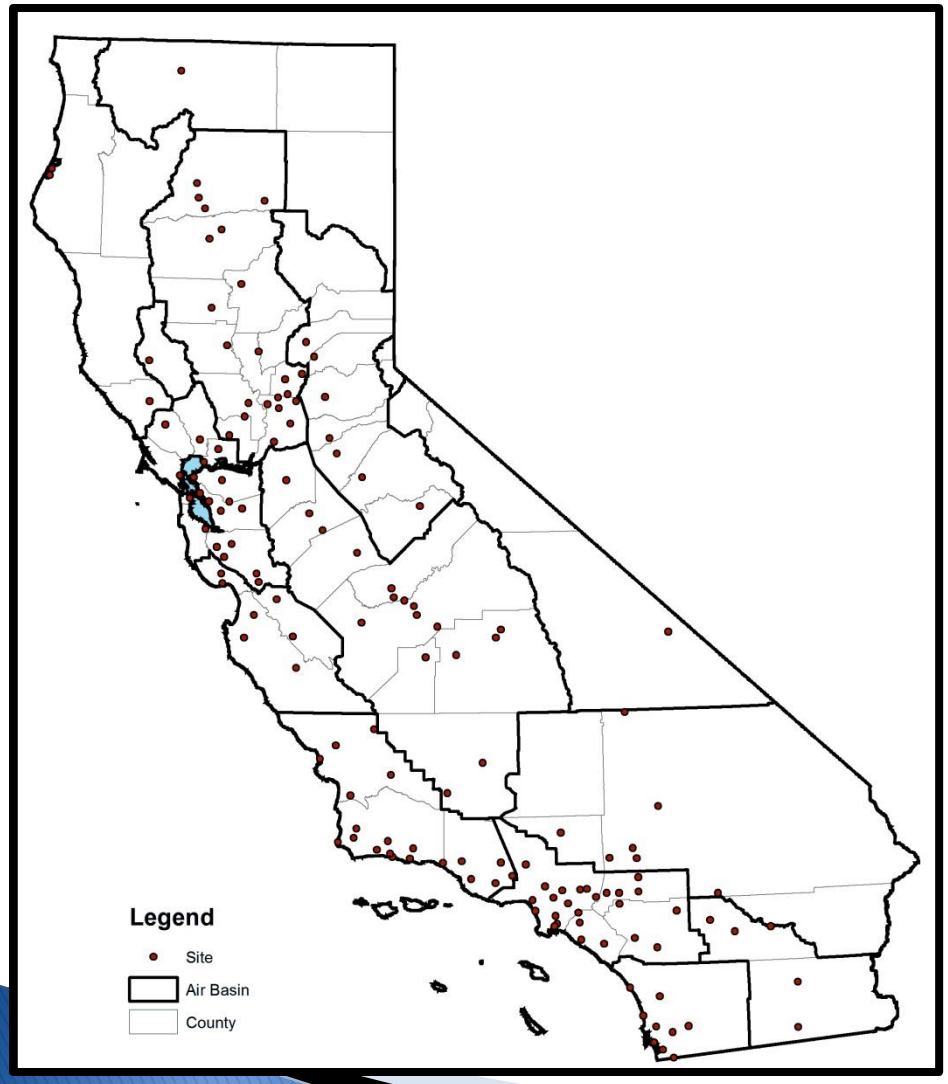
Health Based Air Quality Standards

- 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
- PM2.5 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 μg/m³	(1997) Annual 15 μg/m³	(2006) 24-hour 35 μg/m³	(2012) Annual 12 μg/m³

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 µg/m³	(1997) Annual 15 µg/m³	(2006) 24-Hour 35 µg/m³	(2012) Annual 12 µg/m³
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

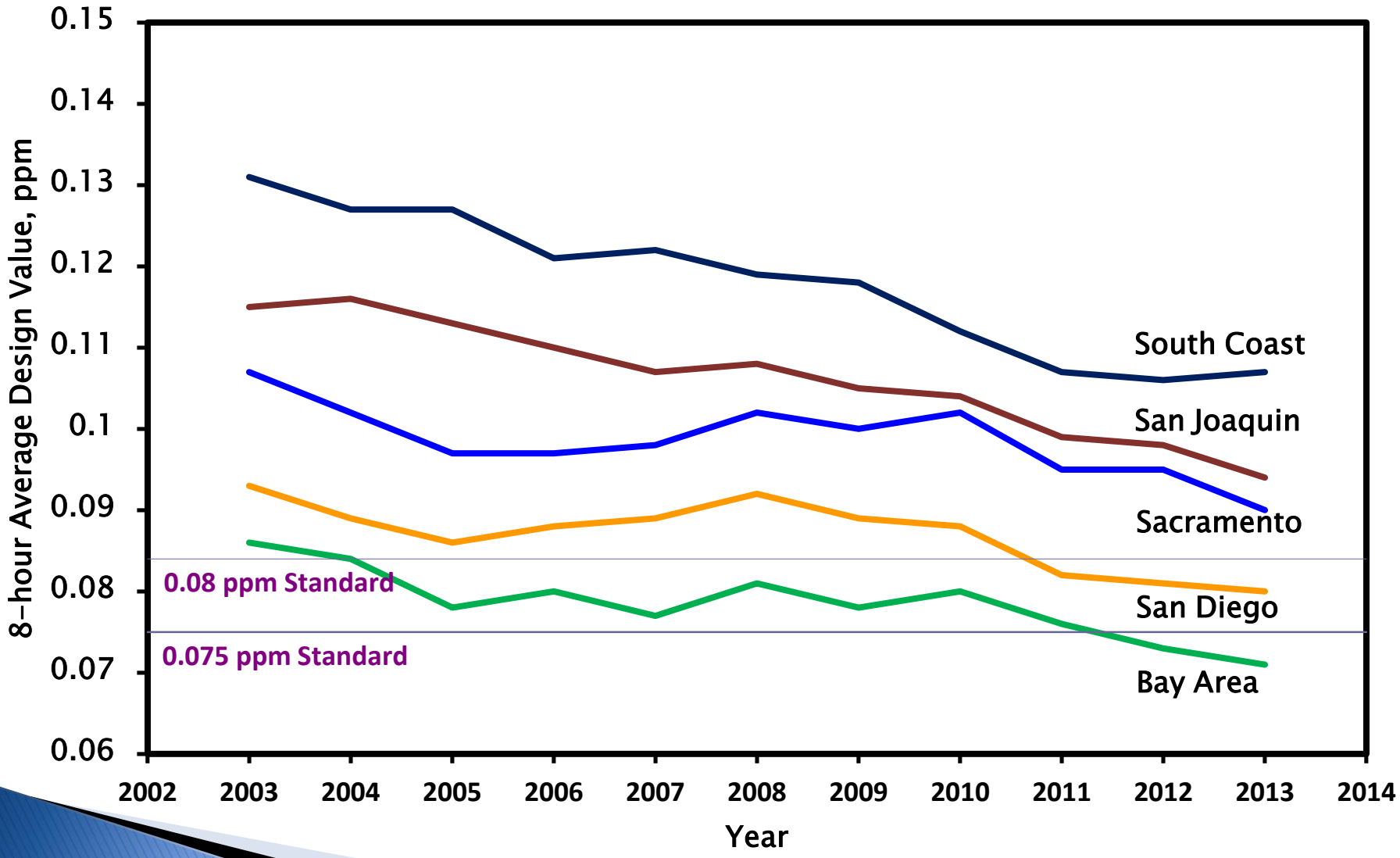
- Many different indicators can be used to assess progress
- Legal definition of attainment is based on regional monitor with highest design value
- Changes in spatial extent and frequency of high pollution events highlight other aspects of progress

Progress in Major Urban Areas

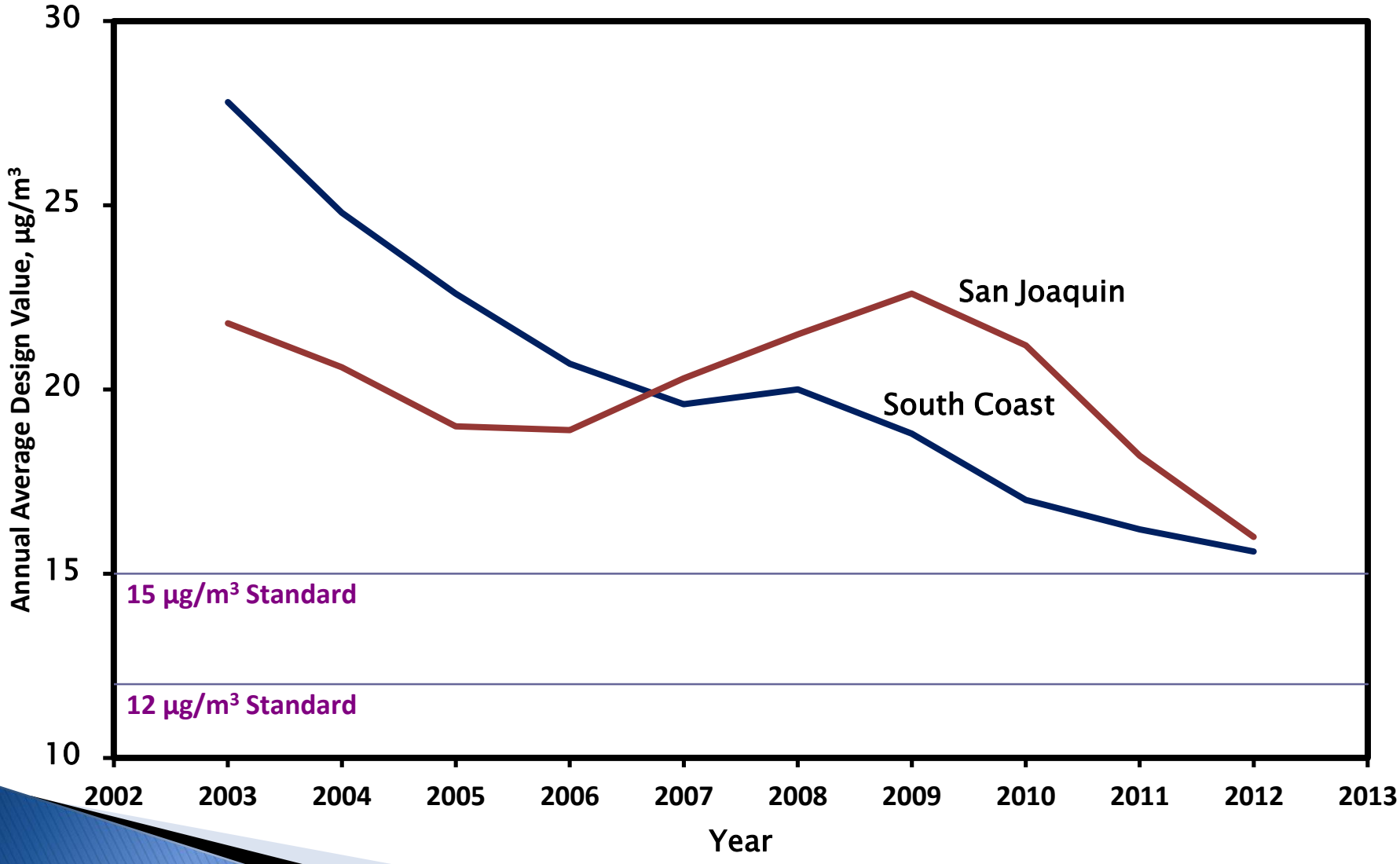
- Ozone
  - Design values show uniform progress across all areas over last decade
  - Even greater progress in reducing number of high ozone days

- PM2.5
  - Progress is variable, but both annual and 24-hour concentrations have declined
  - Few sites now exceed the 15$\mu g/m^3$ annual average standard

Ozone 8-Hour Design Value Trends



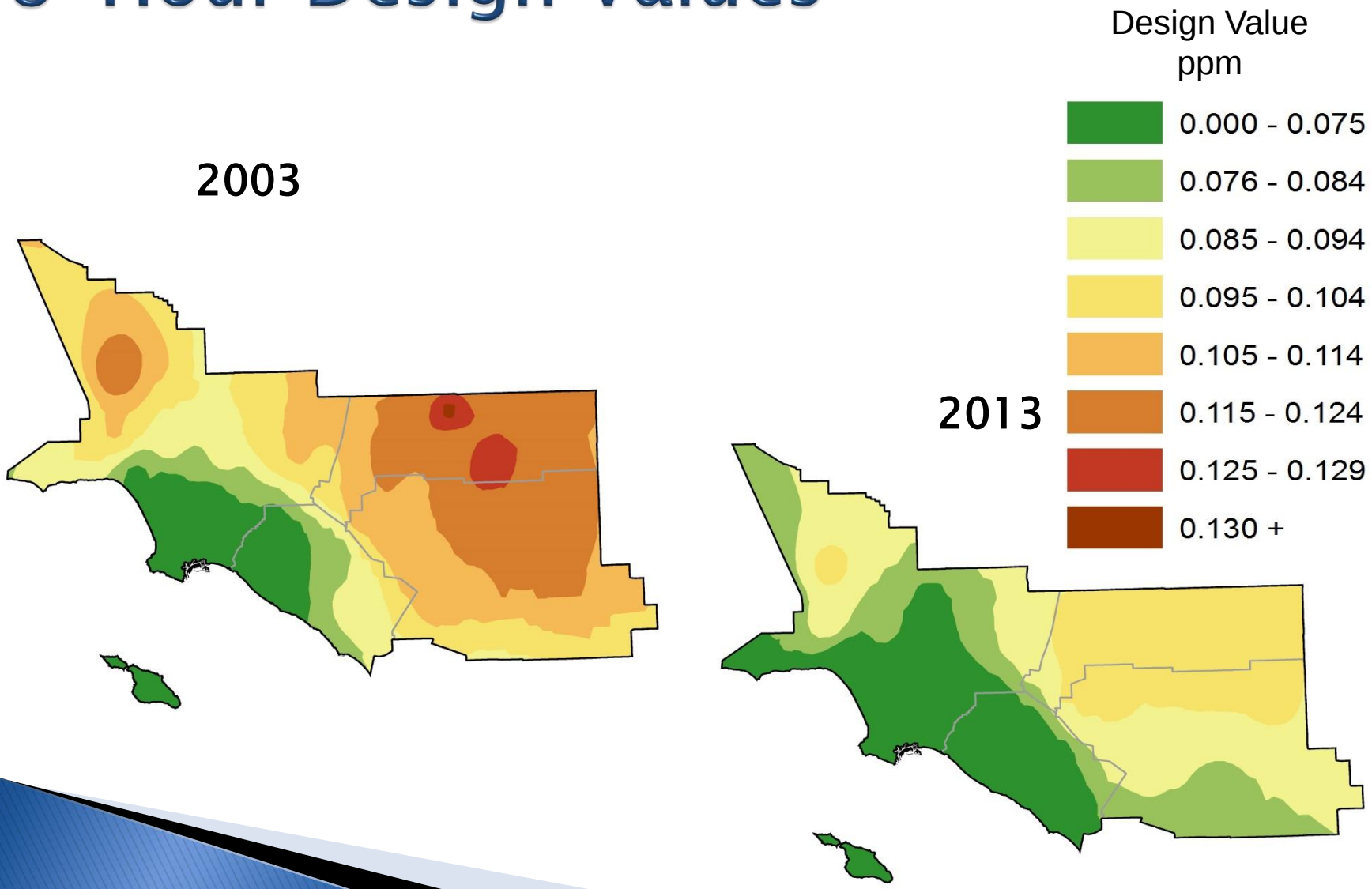
PM2.5 Annual Average Design Value Trends



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 NOx 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 PM2.5 Standards

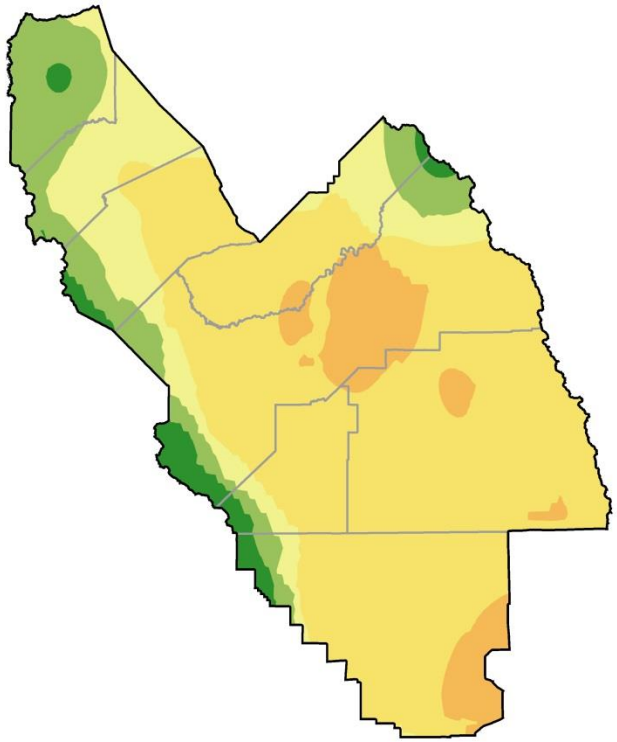
- Since 2002, annual average design value has decreased almost one-half to 15.6 $\mu g/m^3$
- As of 2012, only one site now exceeds the 15 $\mu g/m^3$ annual and 35 $\mu g/m^3$ 24-hour standards
- Still evaluating 2013 data
- Area has 2014 attainment date for both standards

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 NOx still needed to achieve 2023 attainment as well as more stringent 2032 deadline

Basinwide Reductions in Ozone 8-Hour Design Values

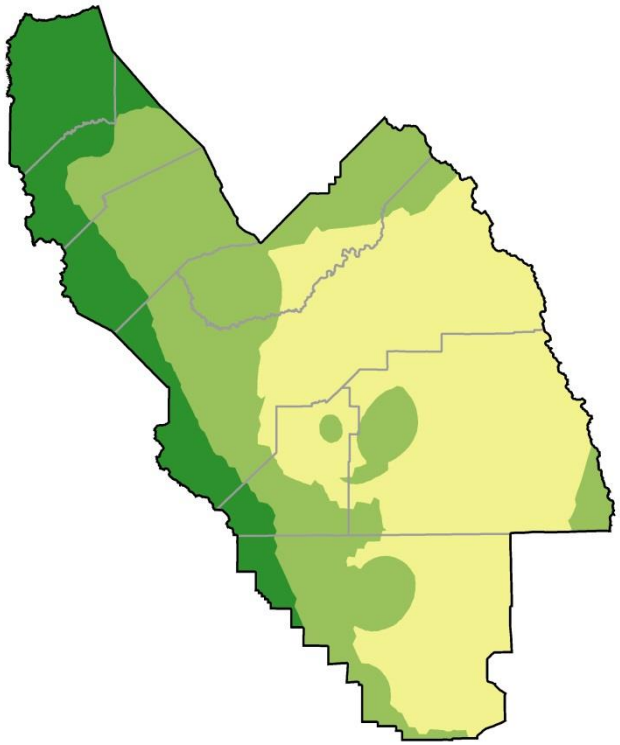
2003



Design Value
ppm

0.000 - 0.075
0.076 - 0.084
0.085 - 0.094
0.095 - 0.104
0.105 - 0.114
0.115 - 0.124
0.125 - 0.129
0.130 +

2013



San Joaquin Valley Air Basin: Progress Towards PM2.5 Standards

- Since 2002, annual average design value has decreased almost one-third to 16 $\mu g/m^3$
- 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 NOx, VOC and PM2.5 controls is providing continuing benefits for ozone and PM2.5
- Significant further emission reductions will be needed to meet ozone standards