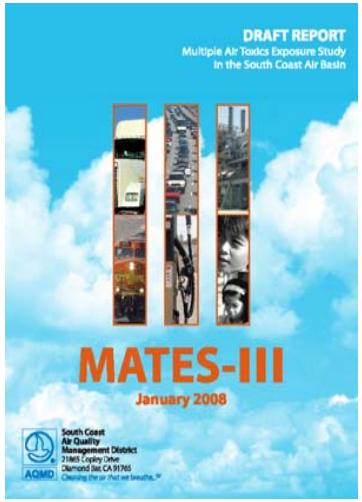
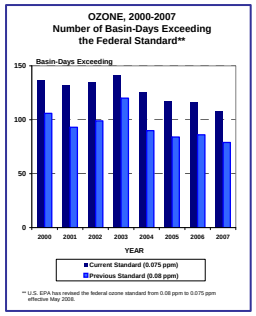
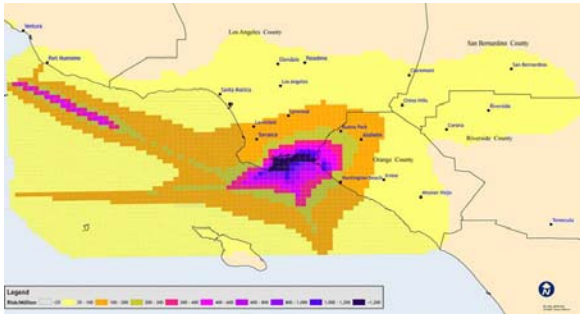
Goods Movement and Air Quality







Clearing the Air
UC Riverside
May 22, 2008

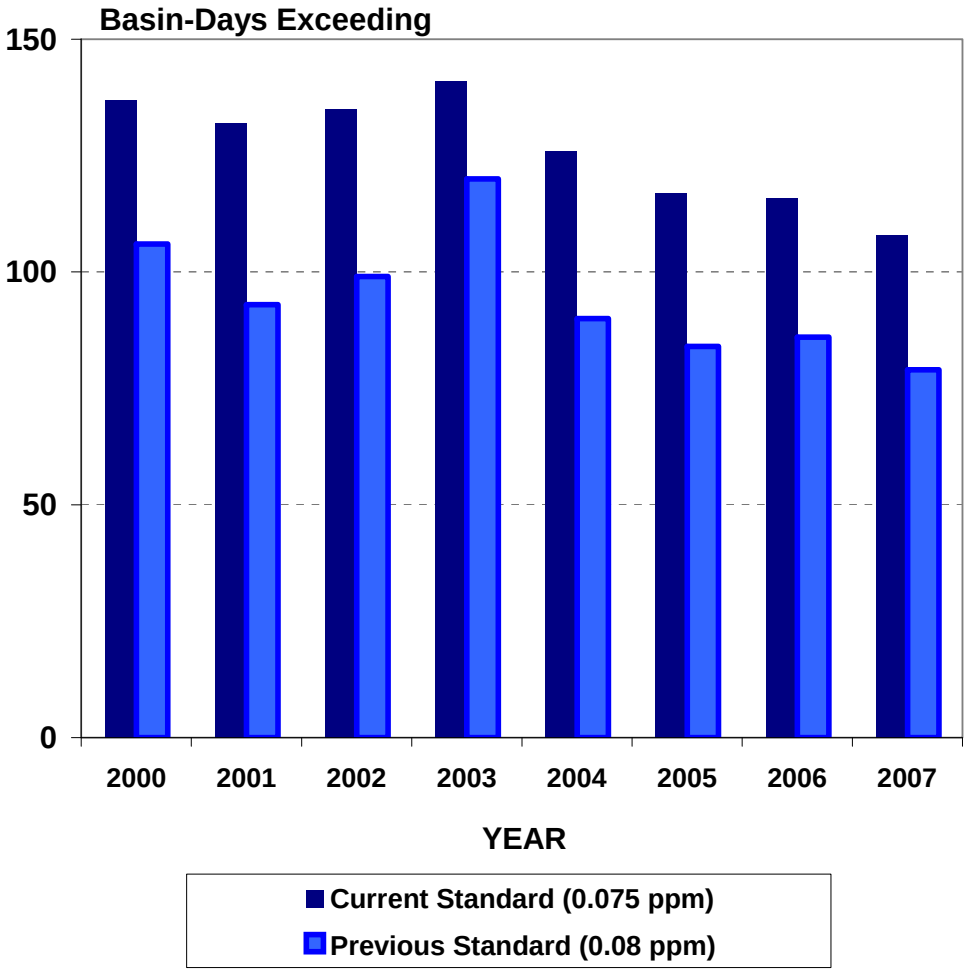
Peter Greenwald
Senior Policy Advisor
South Coast Air Quality Management District

Key Goods Movement Pollutants

- Nitrogen Oxides (particulate & ozone precursor)
- Sulfur Oxides (particulate precursor)
- Diesel Particulates (particulate & toxic)

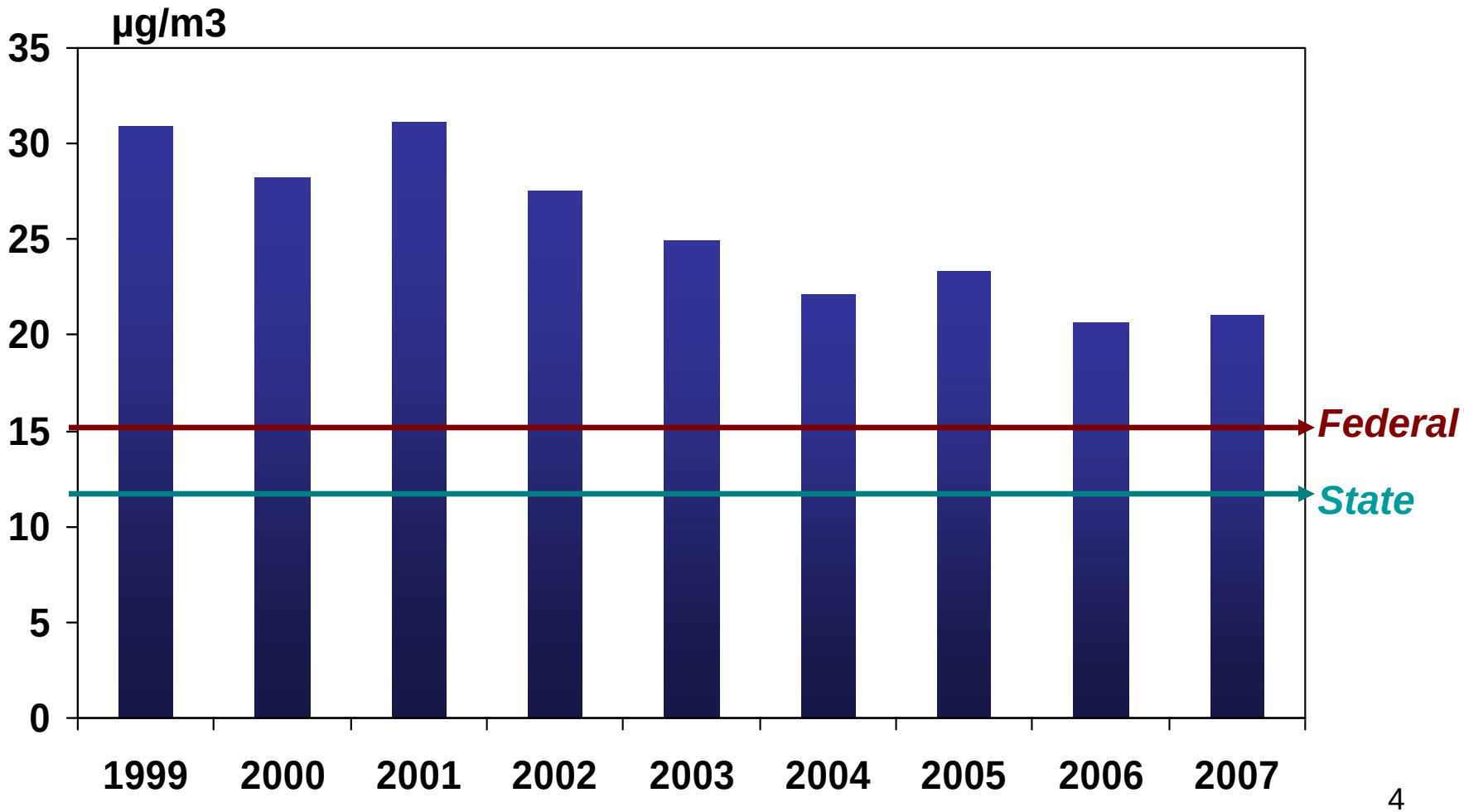
Goods movement sources are primarily diesel

OZONE, 2000-2007
Number of Basin-Days Exceeding the Federal Standard**



** U.S. EPA has revised the federal ozone standard from 0.08 ppm to 0.075 ppm effective May 2008.

PM2.5, 1999-2007
Maximum Annual Average Concentration
(compared to state and federal standards)



Health Impacts of PM 2.5 Particulate Pollution in South Coast Basin

5,400 Premature Deaths *per year**

"Exposures to air pollution can shorten life by about 14 years for people who die prematurely"
— CARB 2007

Other annual health impacts: 980,000 lost work days,
2,400 hospitalizations 140,000 asthma & lower respiratory symptoms

* Source: California Air Resources Board, 2007; 1999-2000 Air Quality Data

USC Children's Health Study

New England Journal of Medicine, Sept 2004

- Lower lung-function growth rate associated with PM_{10}, $PM_{2.5}$, NO_2 and acid vapor
- "By age 18, lungs of many children growing up in smoggy areas are underdeveloped and will likely never recover"
- Pollutants of harm "derive from vehicle-related emissions and combustion of fossil fuels"

"When we began the study 10 years ago, we had no idea we would find effects on the lung this serious."

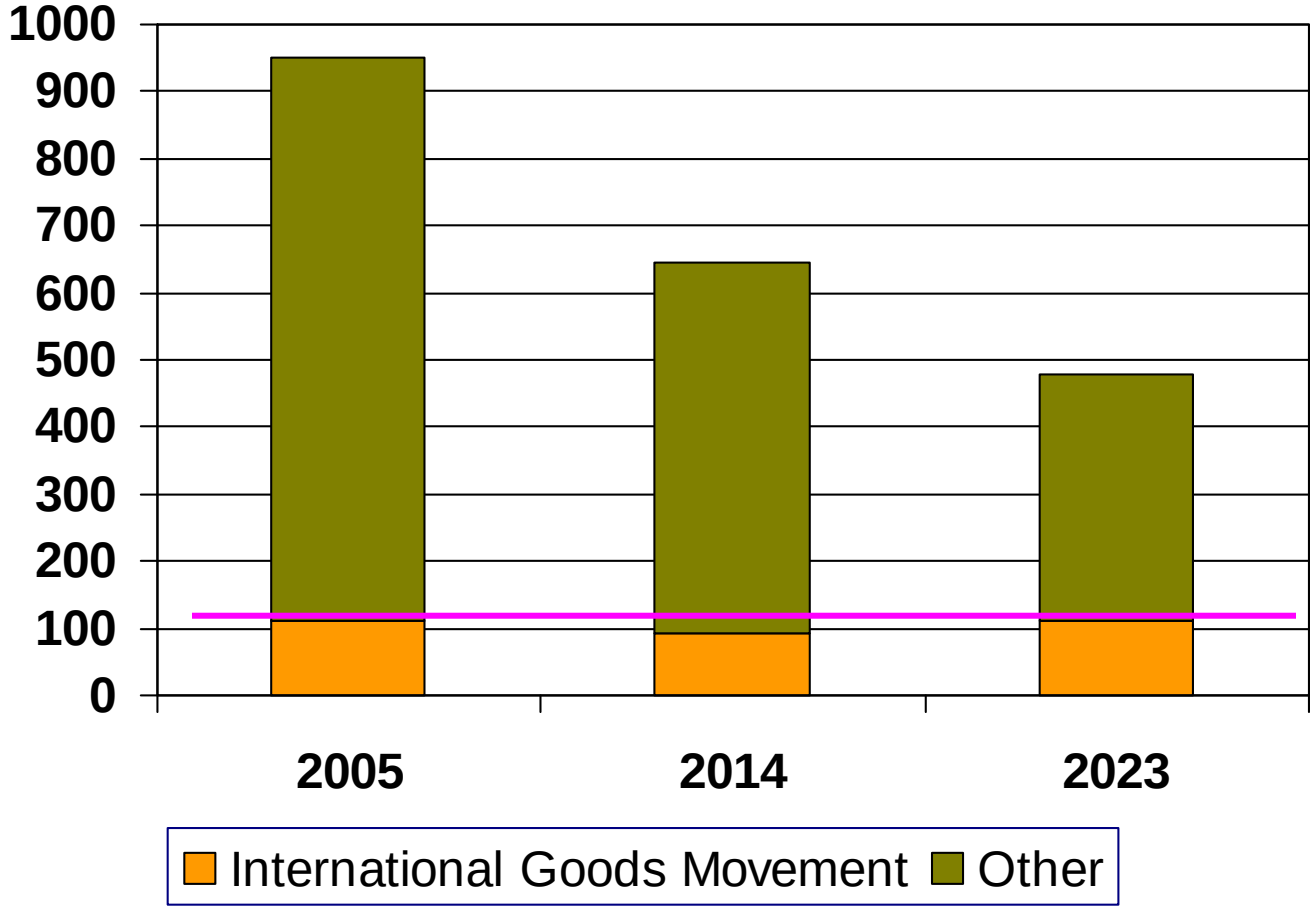
— John Peters, M.D., study senior author

Nitrogen Oxides

Regional Baseline Emissions and Federal 8-Hour Ozone Carrying Capacity

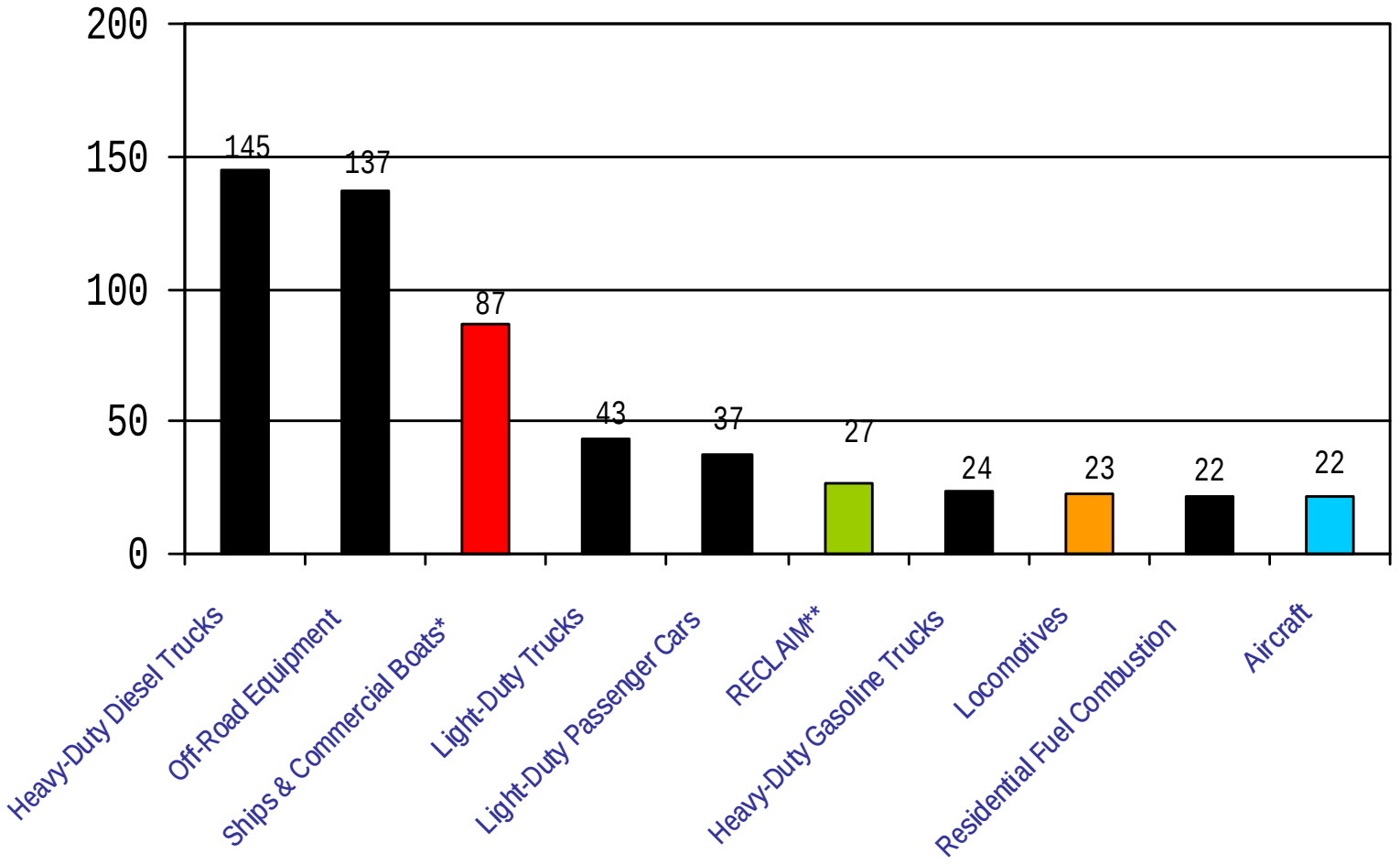
Including benefits of all regulatory agency rules adopted to date

(tons per day)



Carrying Capacity - 114 ***2023 Int'l Goods Movement - 111*** ***2023 "Black Box" - 220***

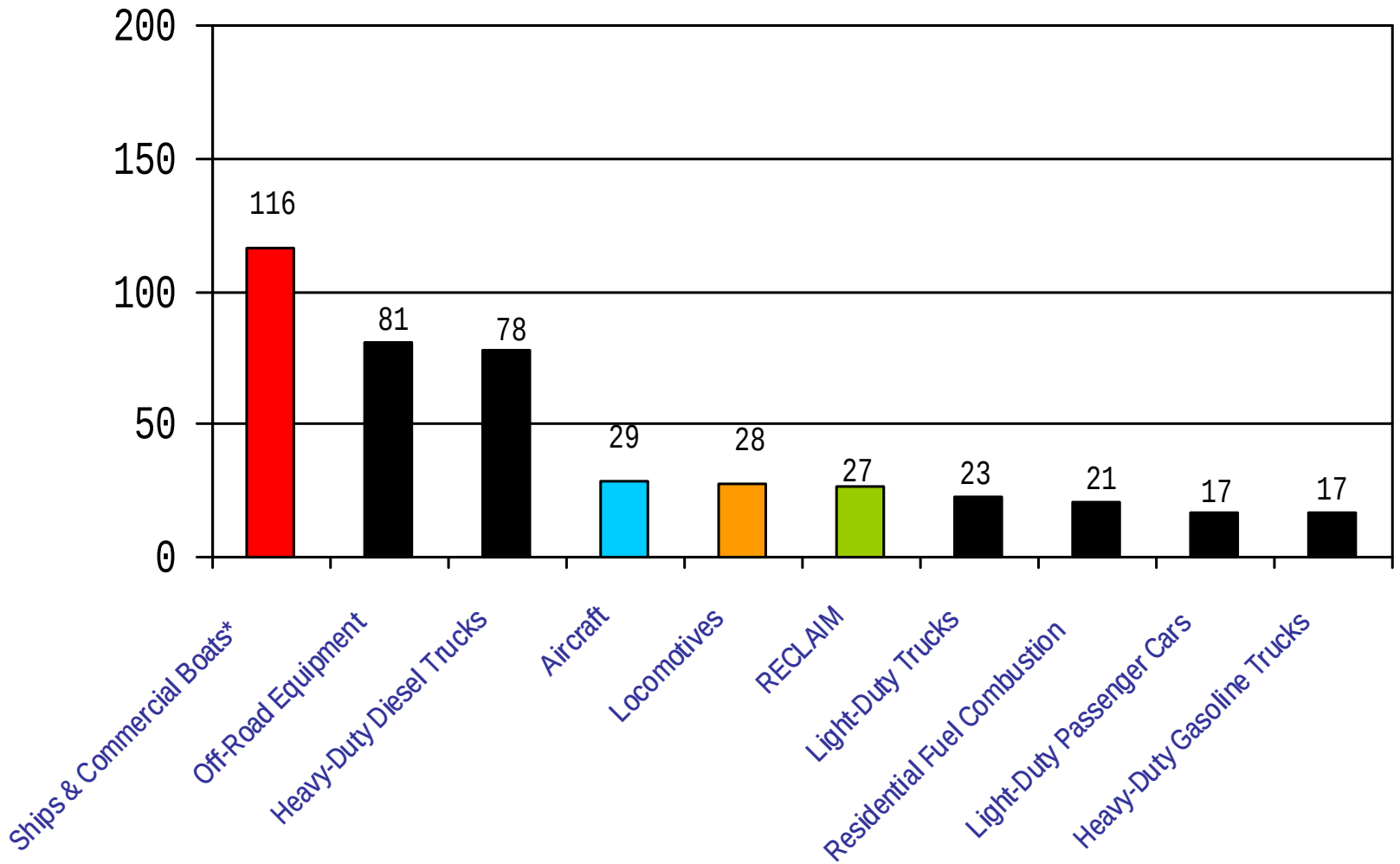
2014 NOx Top Ten Source Categories



* Oceangoing vessels = 72
**RECLAIM: 320 largest stationary sources, including all refineries and power plants

Source: 2007 South Coast Air Quality Management Plan

2023 NOx Top Ten Source Categories



* Oceangoing vessels = 103

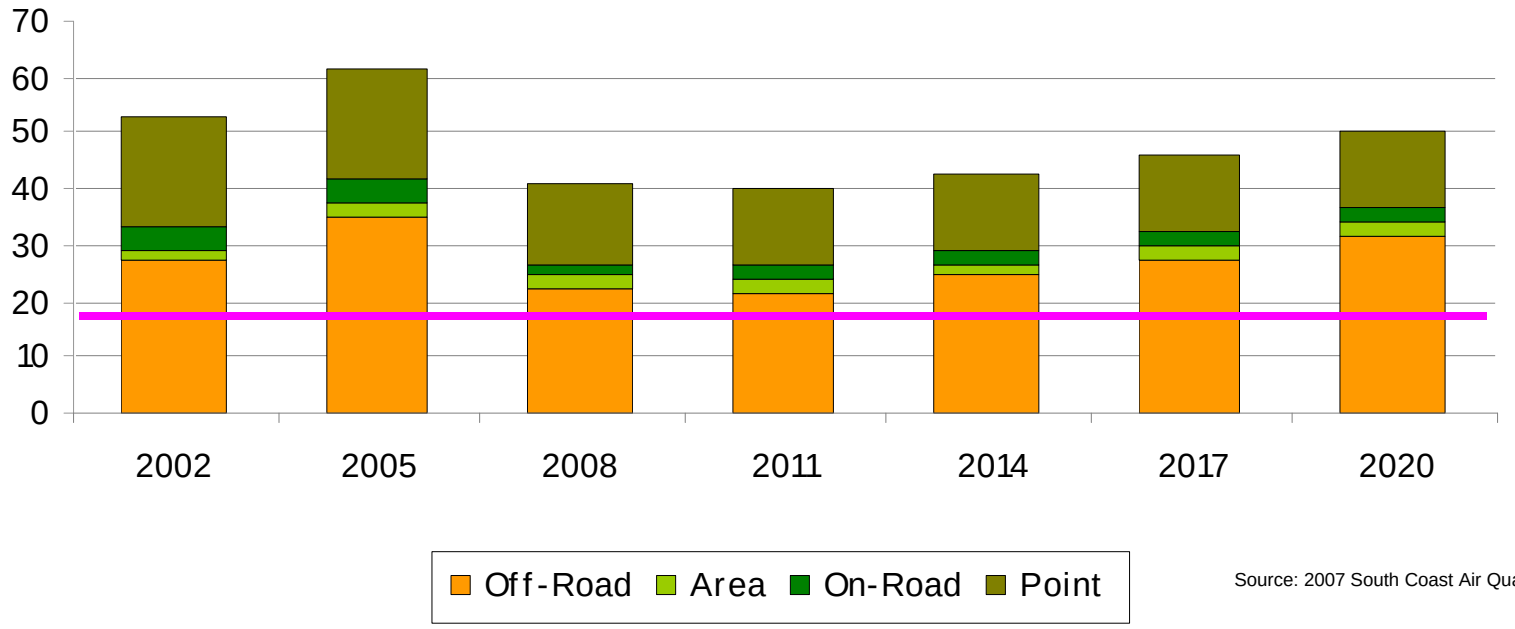
Source: 2007 South Coast Air Quality Management Plan

Sulfur Oxides

Regional Baseline Emissions from 2007 Air Quality Management Plan and Federal "Annual" PM 2.5 Standard Carrying Capacity

With benefit of CARB marine auxiliary engine rule invalidated by court

(tons per day)



Source: 2007 South Coast Air Quality Management Plan

Year 2015 PM2.5 Carrying Capacity - 19

Year 2014 Marine Vessels - 22

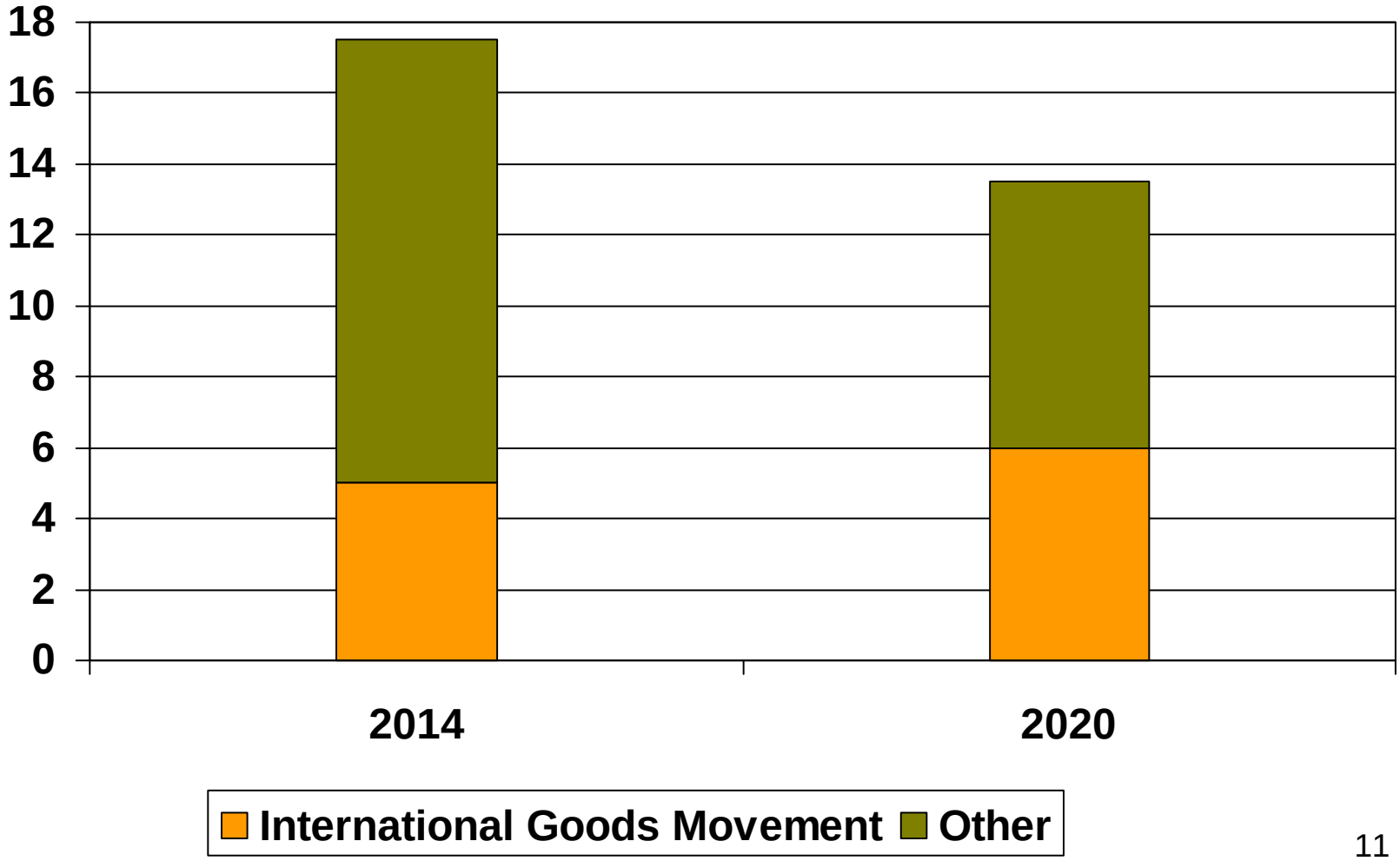
Diesel Particulates

Regional Baseline Emissions

Including benefits of all regulatory agency rules adopted to date

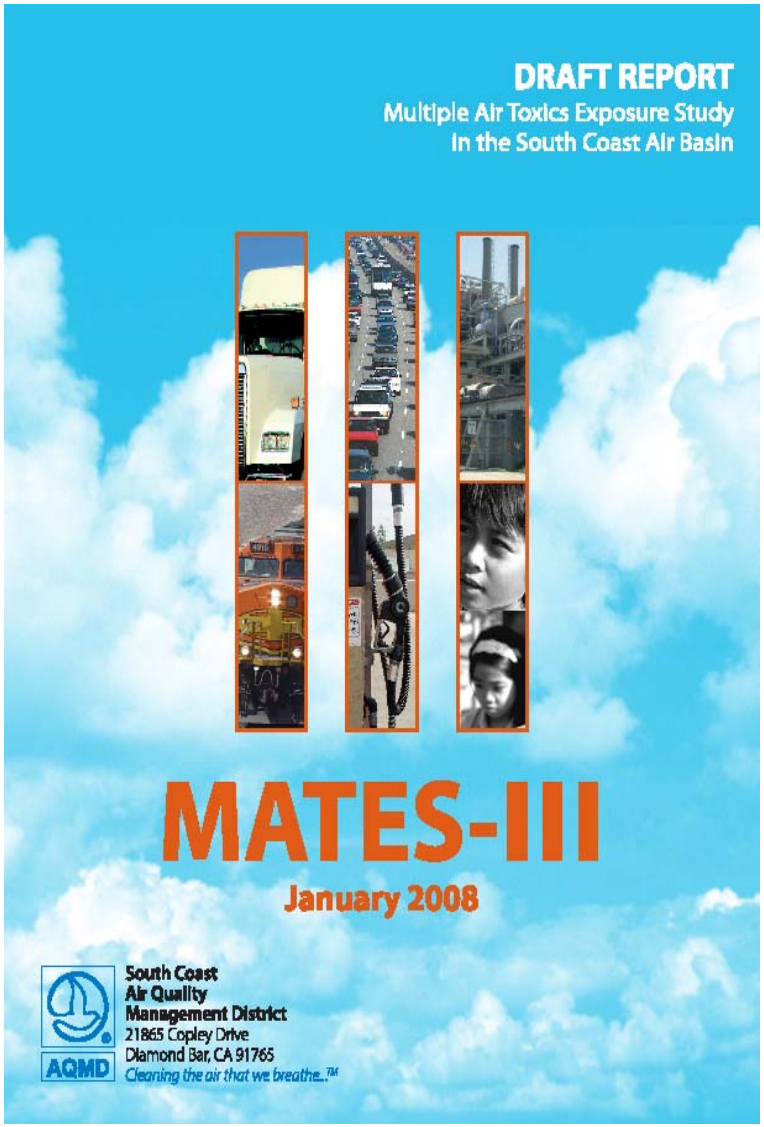
With benefit of CARB marine auxiliary engine rule invalidated by court

(tons per day)



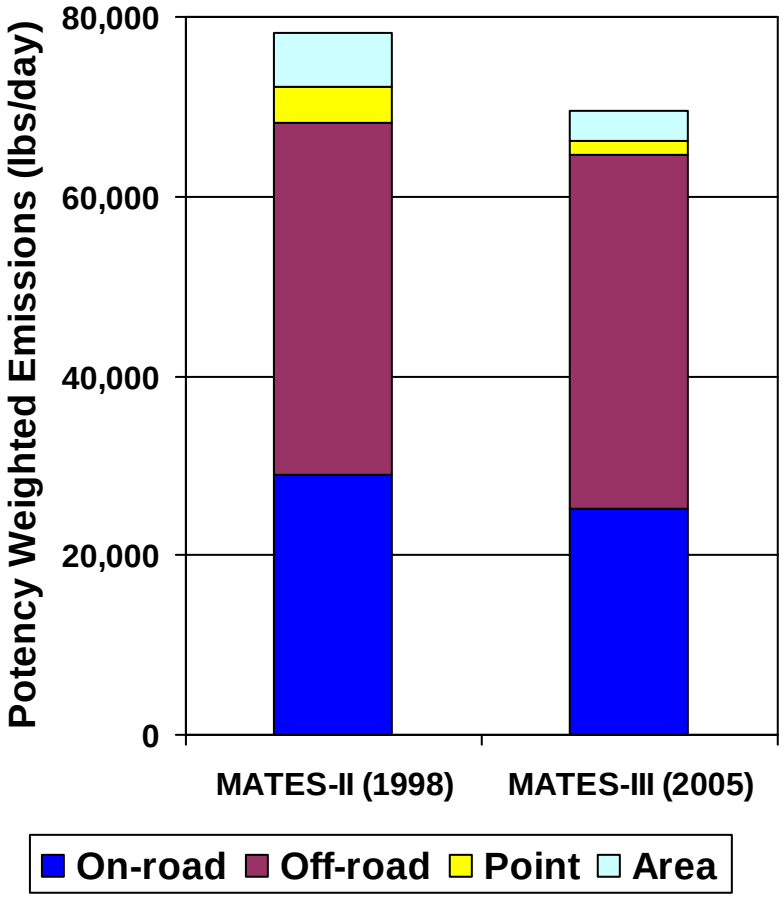
Multiple Air Toxics Exposure Study (MATES III)

- Components:
  - Monitoring of Toxics
  - Emissions Inventory
  - Cancer Risk Modeling
- Improved methodologies over MATES II (1998)



Regionwide Potency-Weighted Emissions Inventory

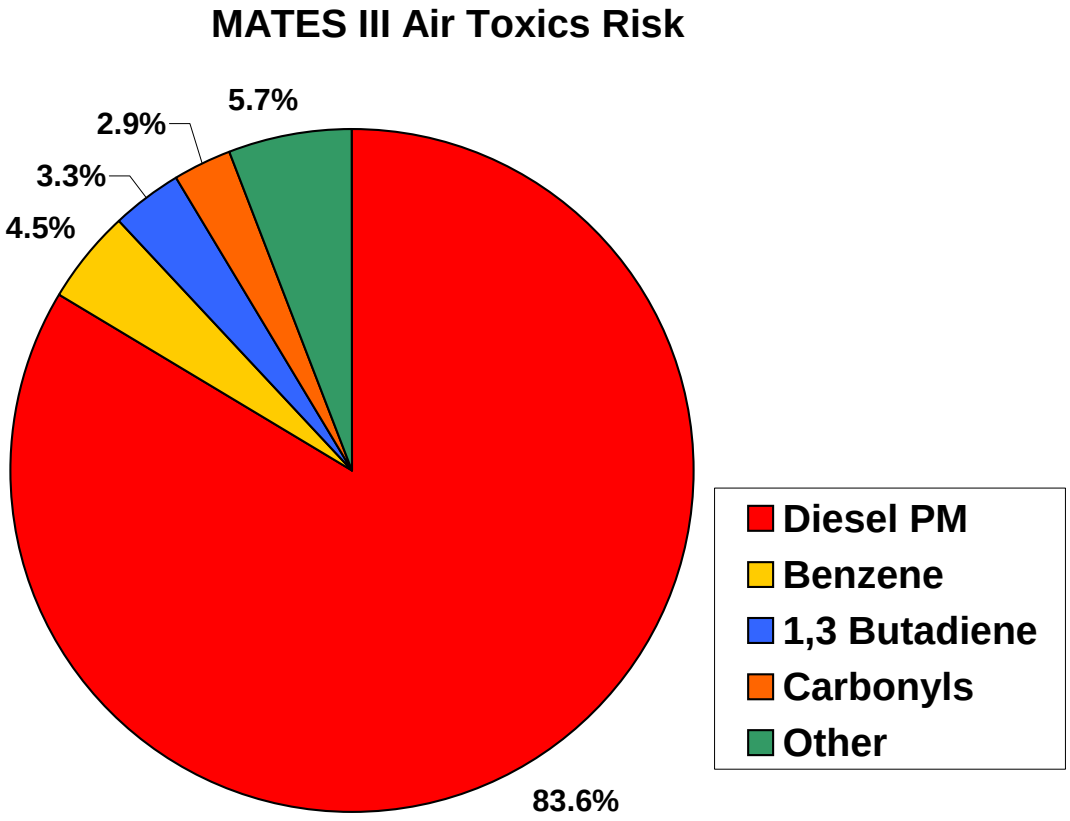
(MATES-II vs. MATES-III)



Source Category	Percent Change
On-road	13% decrease
Off-road	1% increase
Point	65% decrease
Area	43% decrease

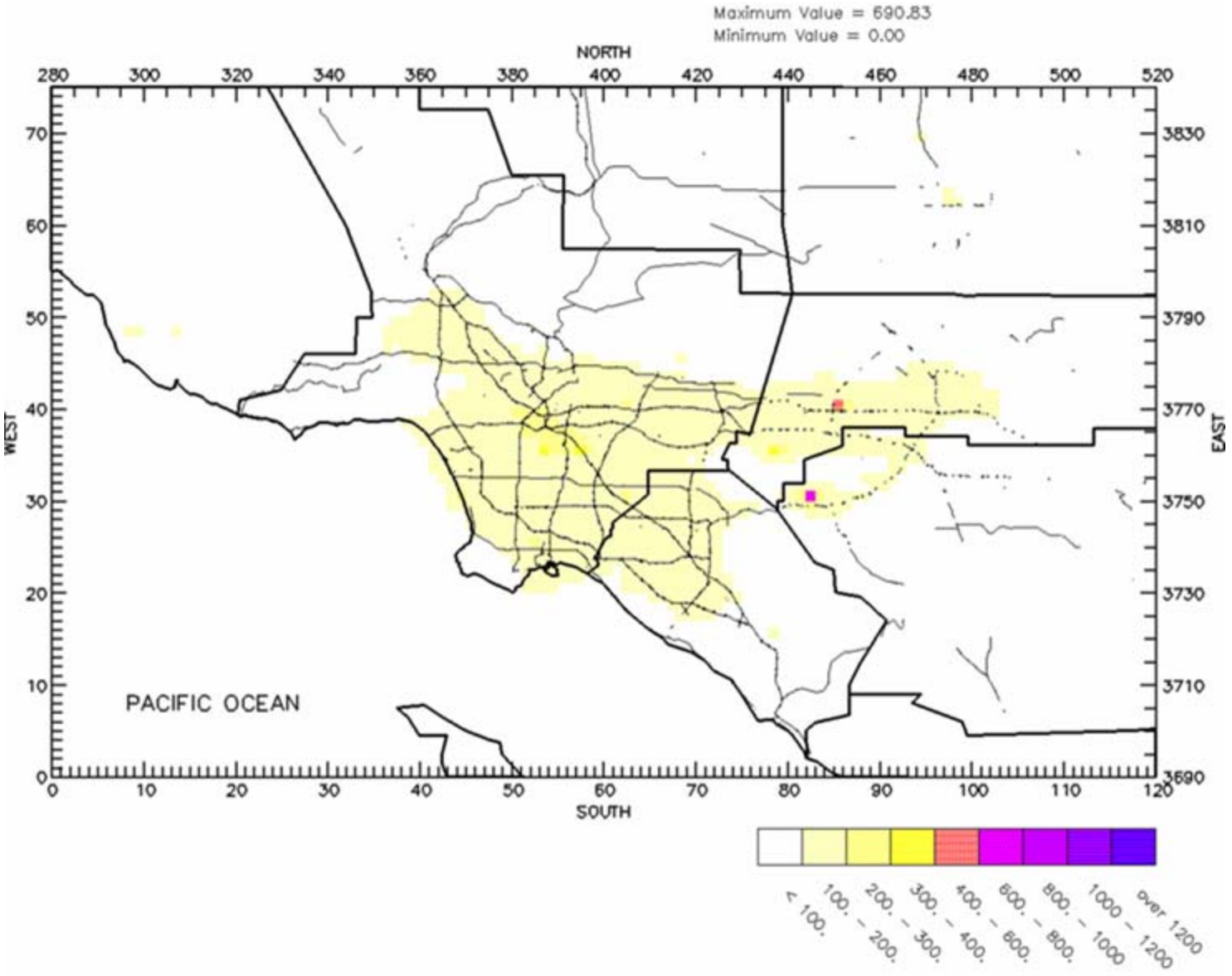
MATES III Risk Contribution

(From Monitor Data)

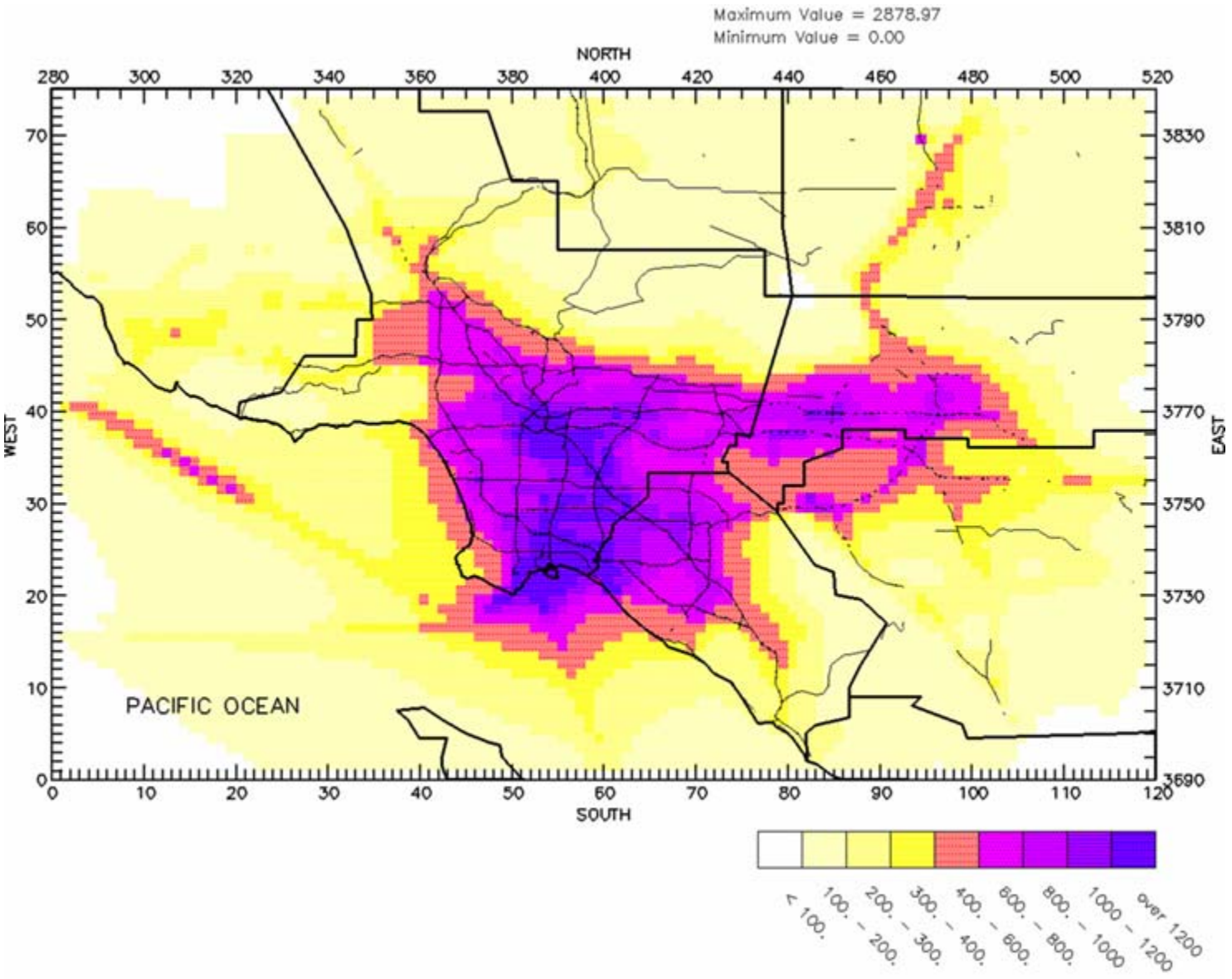


Basinwide Risk: 1194 per million
Based on Average at Fixed Monitoring sites

MATES-III Modeled Risk Without Diesel



MATES-III Modeled Risk From All Sources



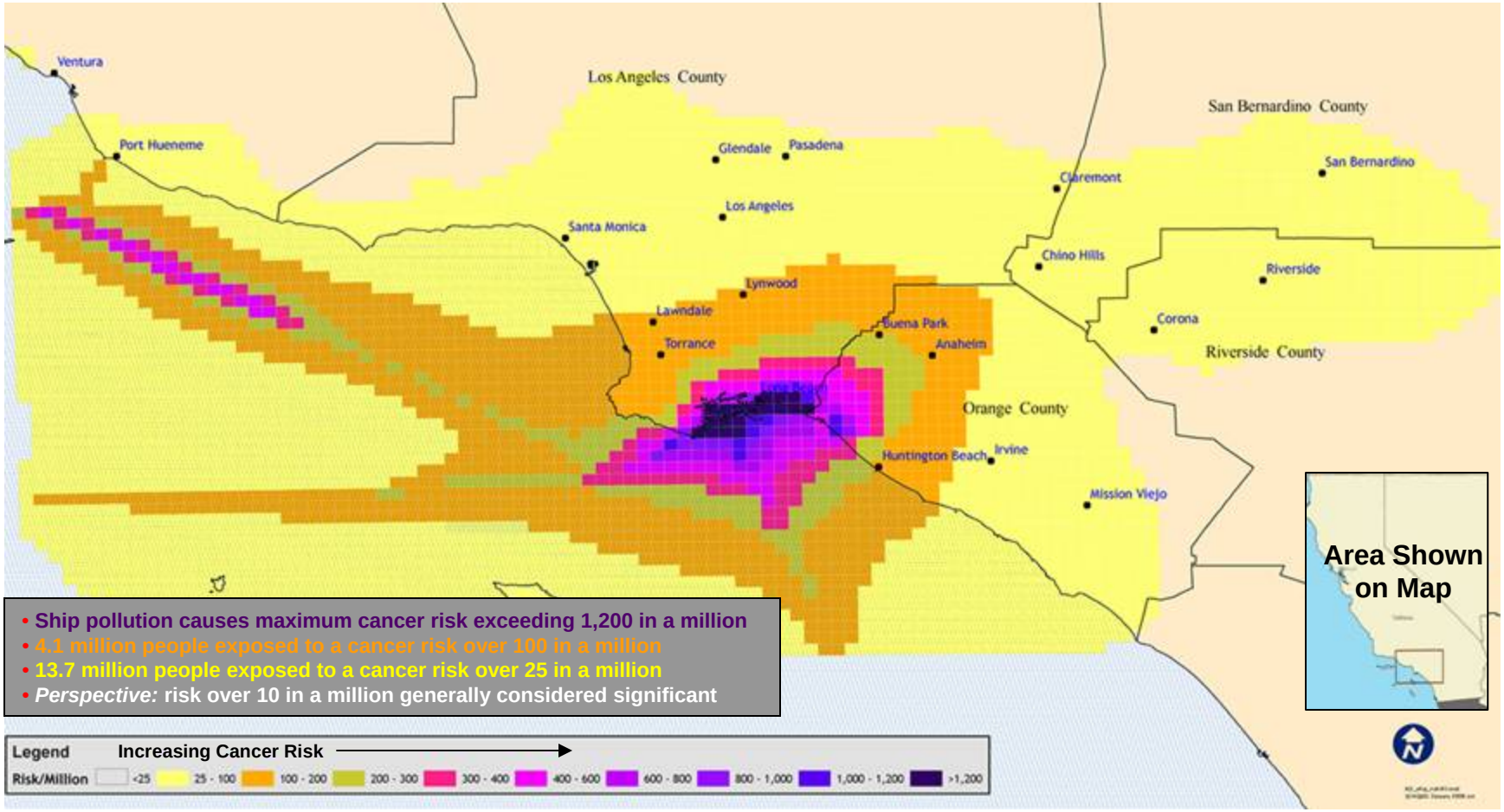
MATES II & III Risk Comparison

- Region-wide modeled population-weighted risk:
  - 810 in a million
  - 17% below MATES II
- Variables between MATES II & III
  - Emission inventory updates
  - Meteorology
  - Modeling methodology
  - Uncertainties of analysis
- District continuing to analyze to better define trend
- Also: Local risks trends may differ (e.g. ports)

Perspective:
SCAQMD Rule Risk Limits for Stationary Sources

- 25 in a million for existing sources
- 10 in a million for new sources

Cancer Risk From Oceangoing Vessel Emissions



Source: SCAQMD MATES III Study (2008)

CARB Railyard Health Risk Assessments

- BNSF San Bernardino Railyard:
  - Maximum individual cancer risk (MICR) in a residential area:

    2,030 per million

Preliminary Draft

Figure II-4: Estimated Regional Cancer Risk (Chances per Million People) from the BNSF San Bernardino Railyard

Control Measures

Being Implemented or Considered by Ports & Regulatory Agencies

- Ocean Going Vessels
  - Low-Sulfur Fuels
  - Shore Power
  - NOx Controls
- Cargo Handling Equipment
  - Replacement & Retrofit
  - Alt fuels
- Trucks
  - Replacement/Retrofit,
  - Alt fuels & electrification
- Rail
  - Multi-Engine, Hybrids, Aftertreatment & Electrification

Federal Help Is Important

- Litigation over state & local marine & rail rules
- EPA Locomotive Rule
  - 85 - 90% control not until model year 2015 and for *new* locomotives only
- EPA Marine Vessel Rule
  - No control of foreign flags emitting 90% of emissions

II

110TH CONGRESS
1ST SESSION

S. 1499

To amend the Clean Air Act to reduce air pollution from marine vessels.

IN THE SENATE OF THE UNITED STATES

MAY 24, 2007

Mrs. BOXER (for herself and Mrs. FEINSTEIN) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

Take Away Messages:

- The health impacts are severe
- Technological solutions are available
- All levels of government must act