MATES V
Emissions Inventory and Modeling Methods and Results

Sang-Mi Lee
Program Supervisor

Jo Kay Ghosh
Health Effects Officer

MATES V Technical Advisory Group Meeting

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Emissions Inventory Methods and Results

Sang-Mi Lee

Program Supervisor

MATES V Modeling Platform

Chemical Transport Model	CAMx RTRAC v6.50
Modeling Period	May 1, 2018 – April 30, 2019, the same as the measurement period
Modeling Domain	South Coast Air Basin and majority of Coachella Valley in 2 km spatial resolution
Emissions	Based on the 2016 AQMP inventory with updates

Emissions Inventory Development

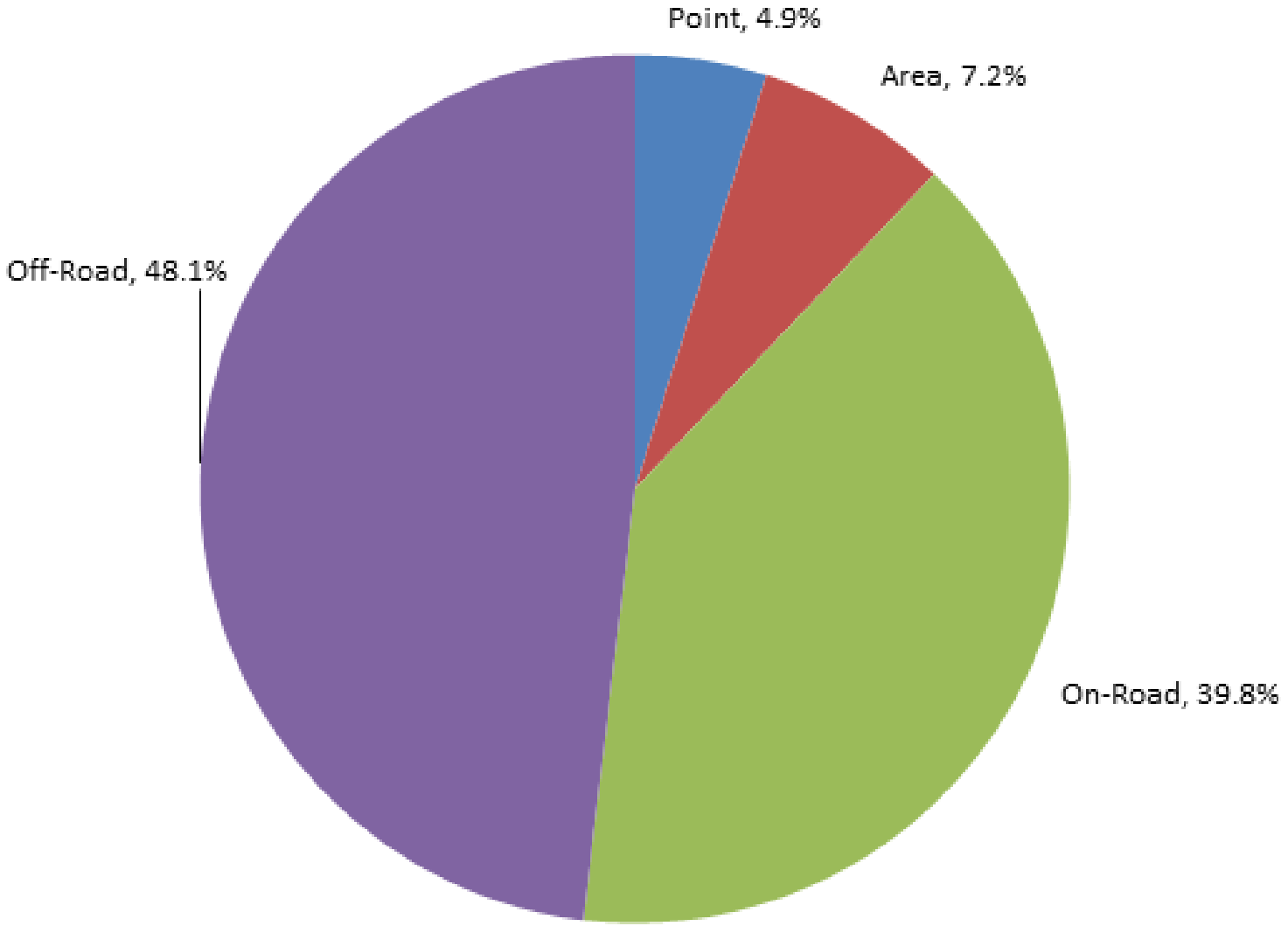
Developing Emissions Inventory for MATES V

- Point sources
  - Reported emissions from 2018 Annual Emissions Reporting program
- On-road mobile sources
  - Vehicle activity data is consistent with 2016 AQMP; Vehicle emissions rate is based on EMFAC 2017
- Ocean Going Vessels
  - Updated OGV emissions based on CARB 2018 SIP update
- Area and other Off-Road mobile sources
  - 2016 AQMP emissions inventory projected to 2018
- Air Toxics
  - Speciated from Total Organic Gases and PM emissions

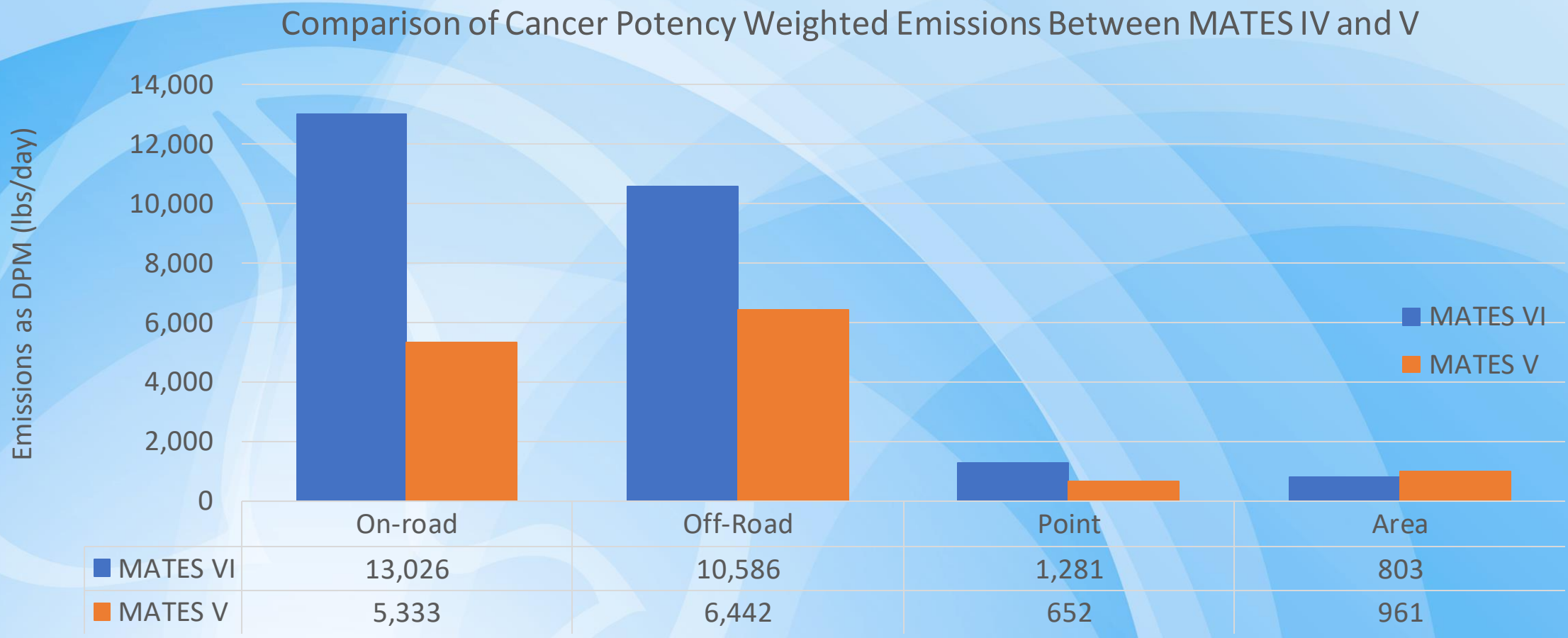
Top 5 Pollutants Contributing to Cancer Potency Weighted Emissions

Toxic	Contribution (%)
Diesel particulate	72.52
Benzene	7.36
1,3-butadiene	7.00
Hexavalent chromium	2.92
Formaldehyde	2.48

Cancer Potency Weighted Emissions by Major Source Category



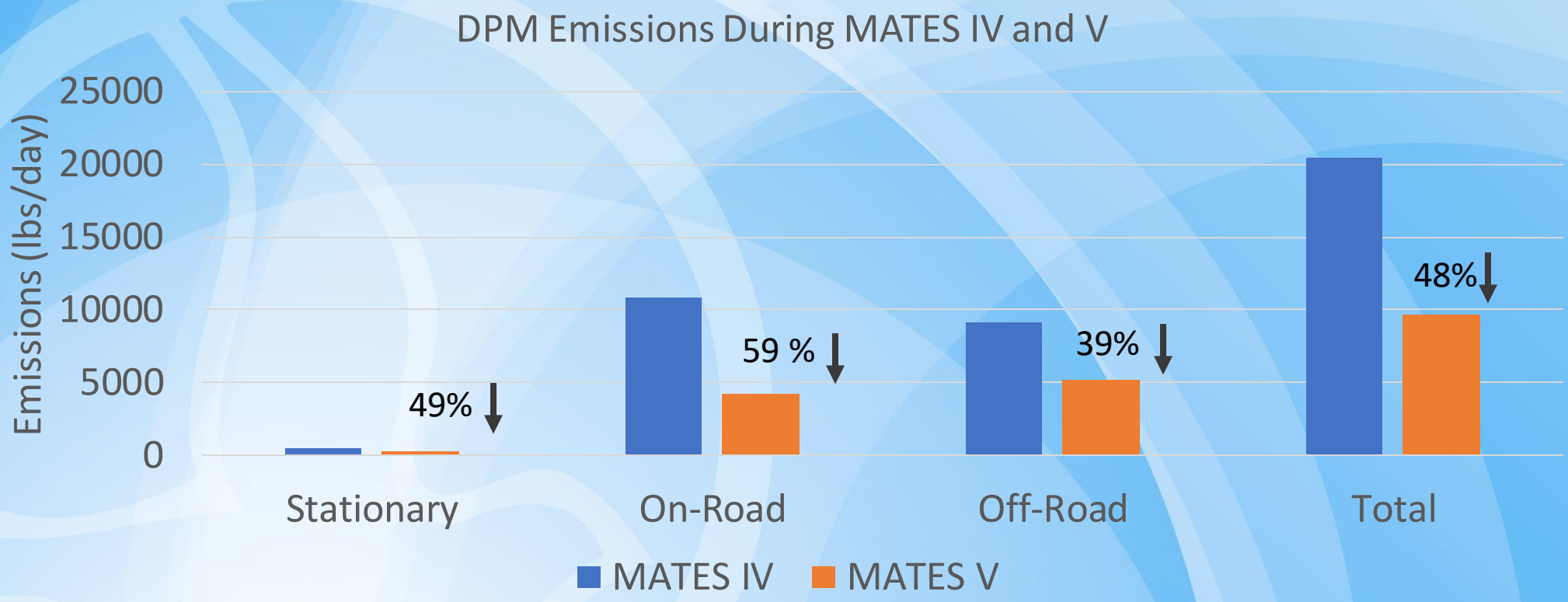
Changes in Cancer Potency Weighted Emissions



	On-road	Off-Road	Point	Area
MATES VI	13,026	10,586	1,281	803
MATES V	5,333	6,442	652	961

Normalized by DPM Cancer Potency

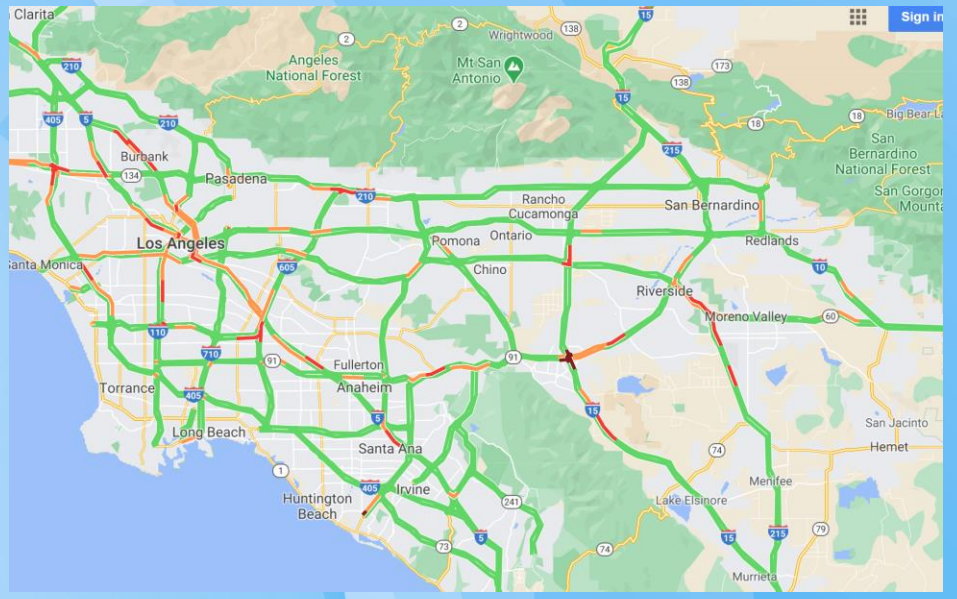
Changes in DPM Emissions from MATES IV to V



CAMx RTRAC Modeling and Risk Estimation

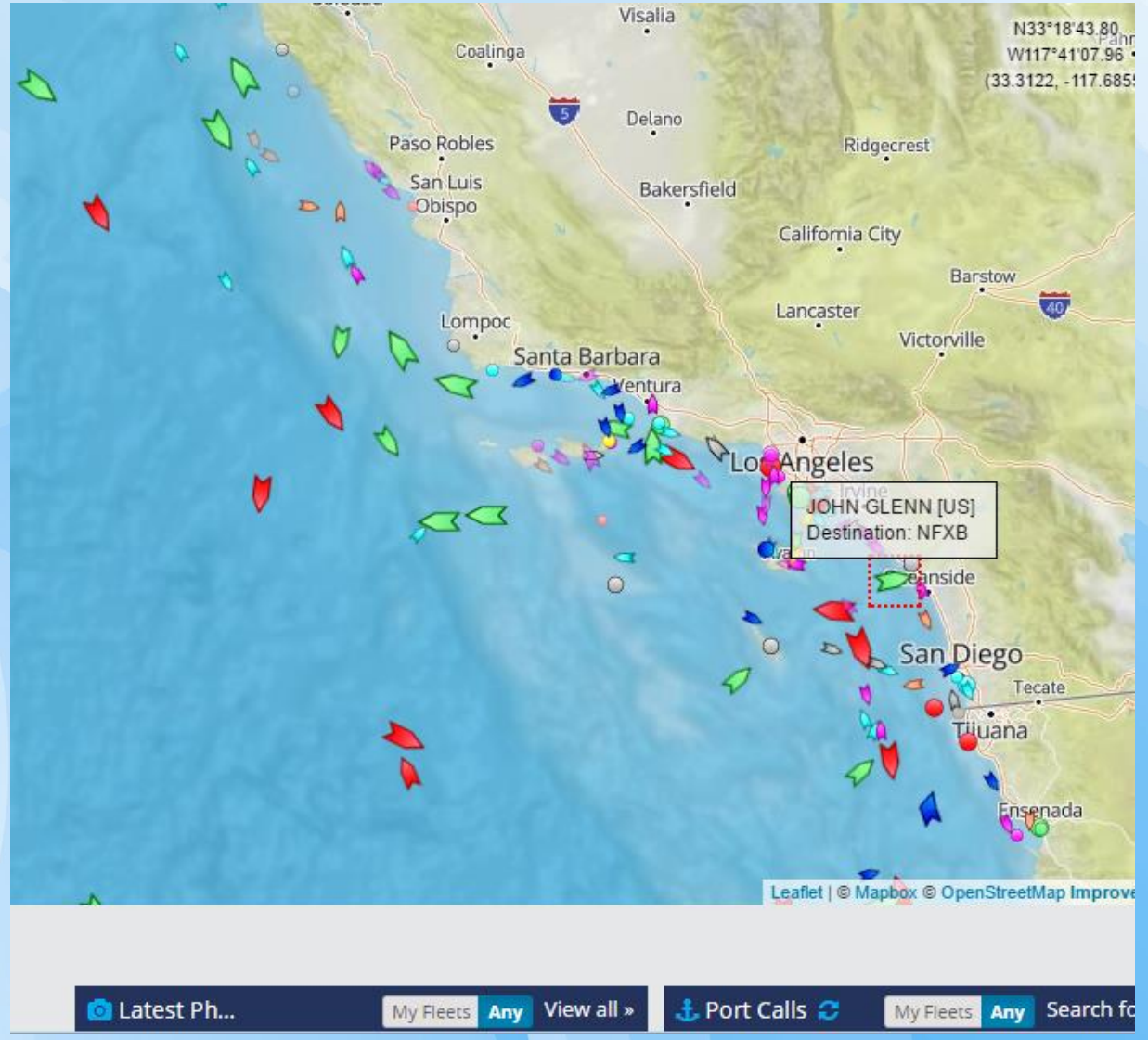
Allocating Emissions from On-Road Mobiles Sources

- Based on real-time sensor data
- Light and Medium duty vehicles
  - California Department of Transportation Performance Measurement System (Caltrans PeMS)
  - > 9000 traffic monitoring stations
- Heavy duty vehicles
  - Single loop sensors to detect Heavy Duty traffic

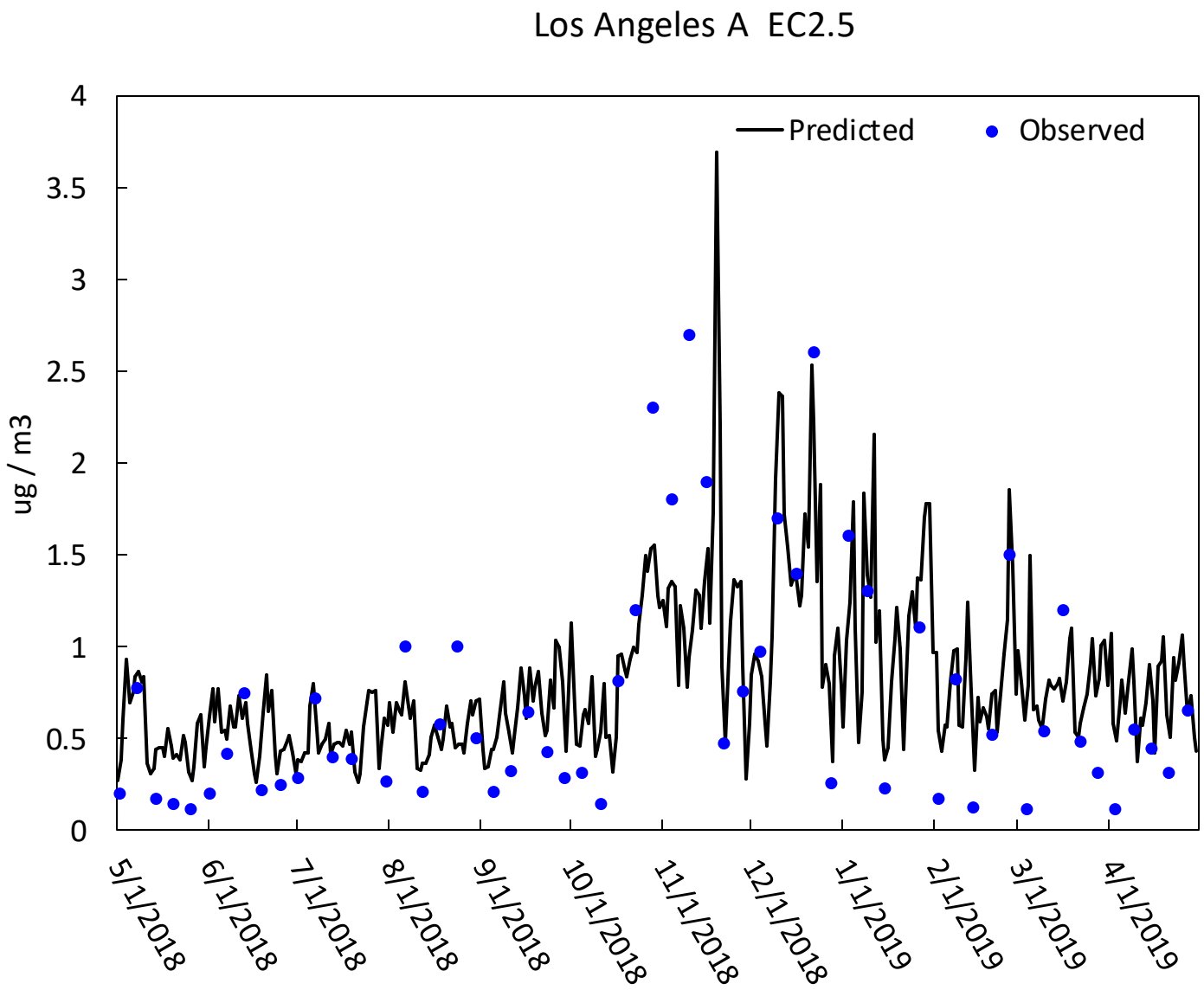


Allocation of Ocean Going Vessels Emissions

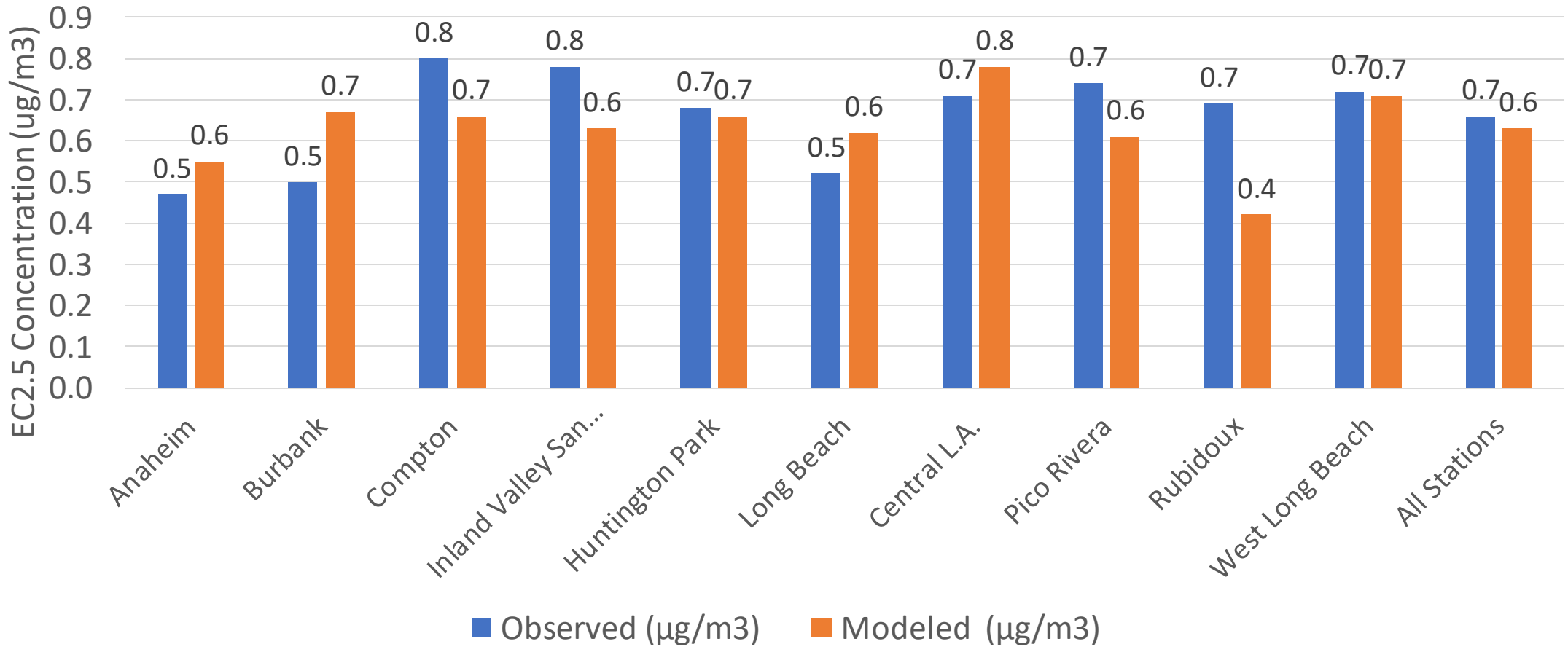
- The automatic identification system (AIS) is an automatic tracking system used for collision avoidance on ships and by vessel traffic services (VTS).
- Provides vessel type, size, position, course, and speed.



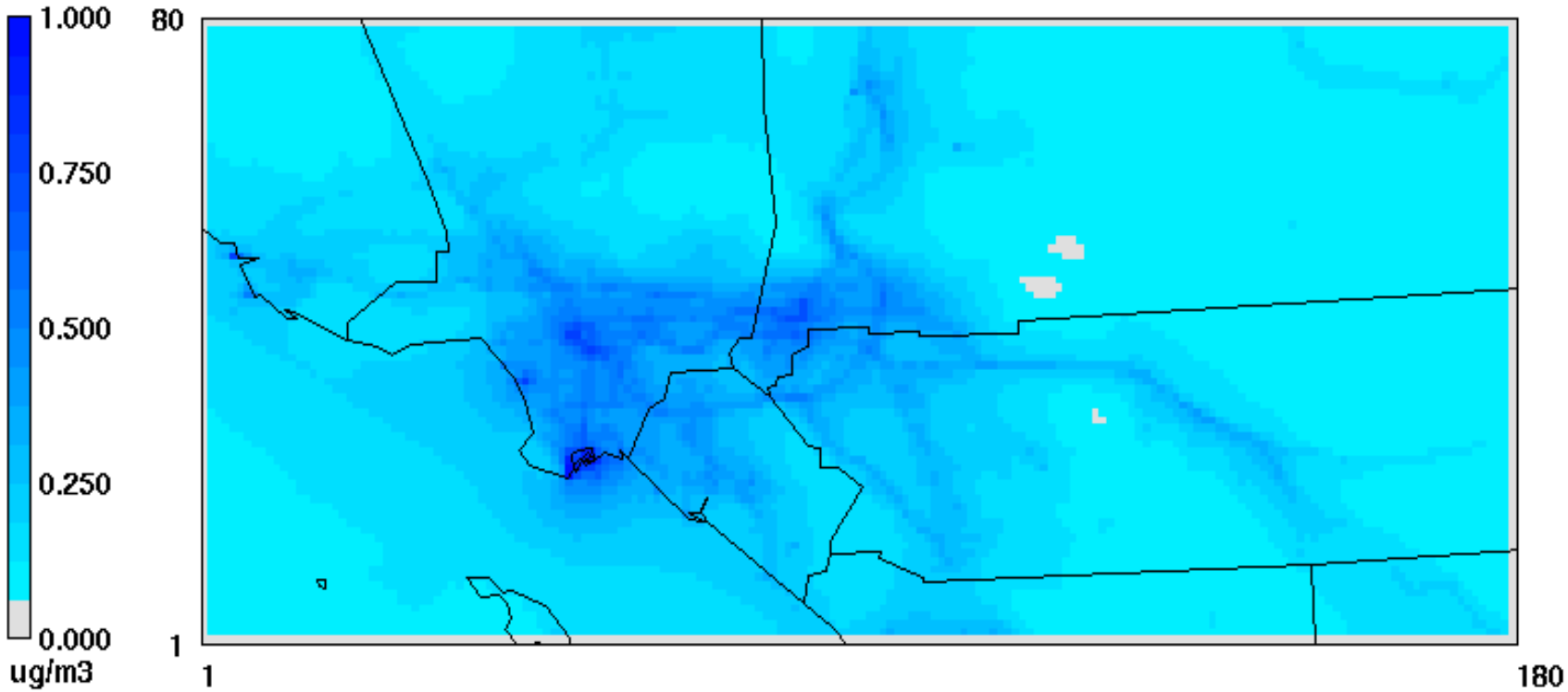
Predicted vs Observed EC2.5 concentrations



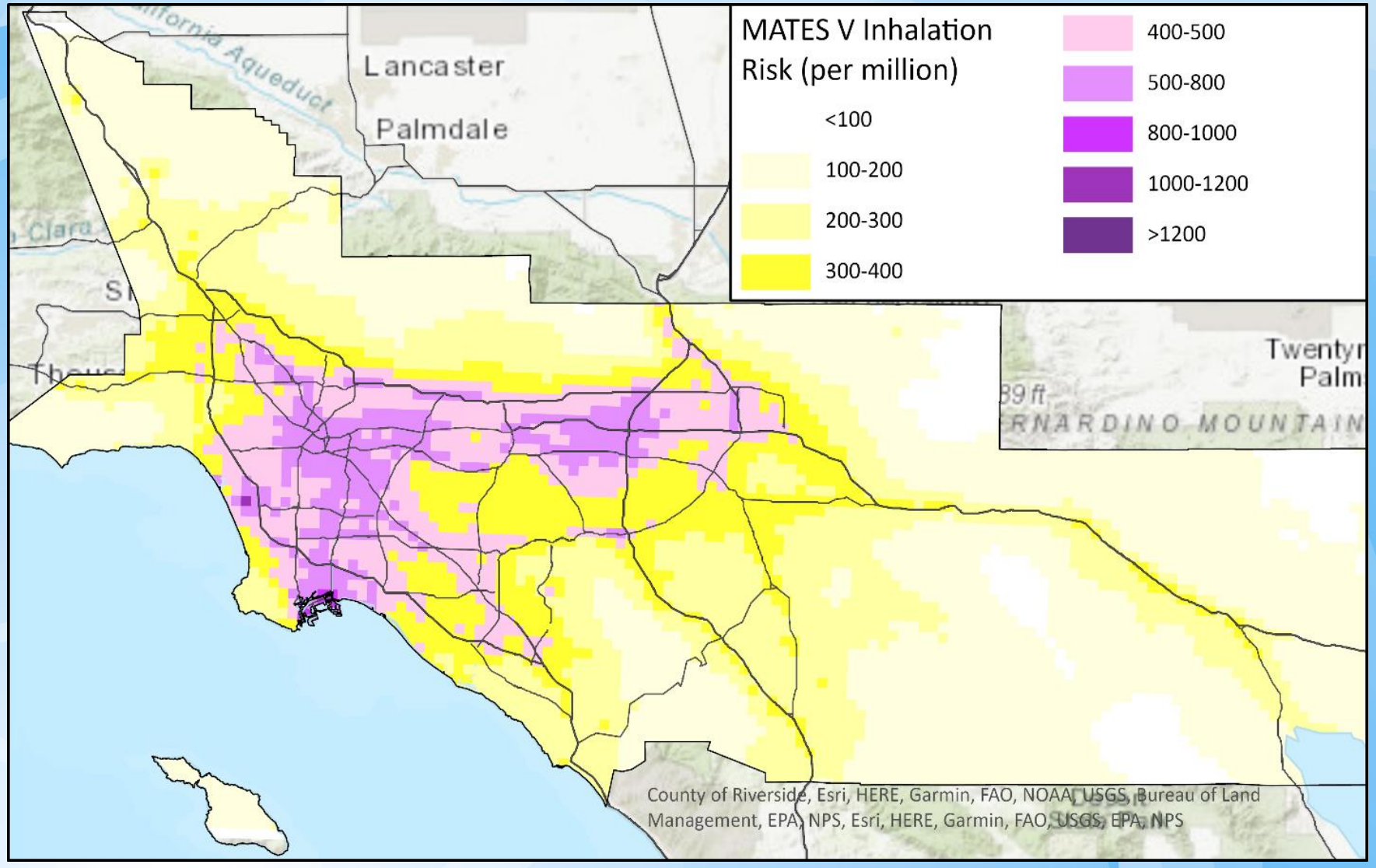
Measured vs Predicted EC2.5



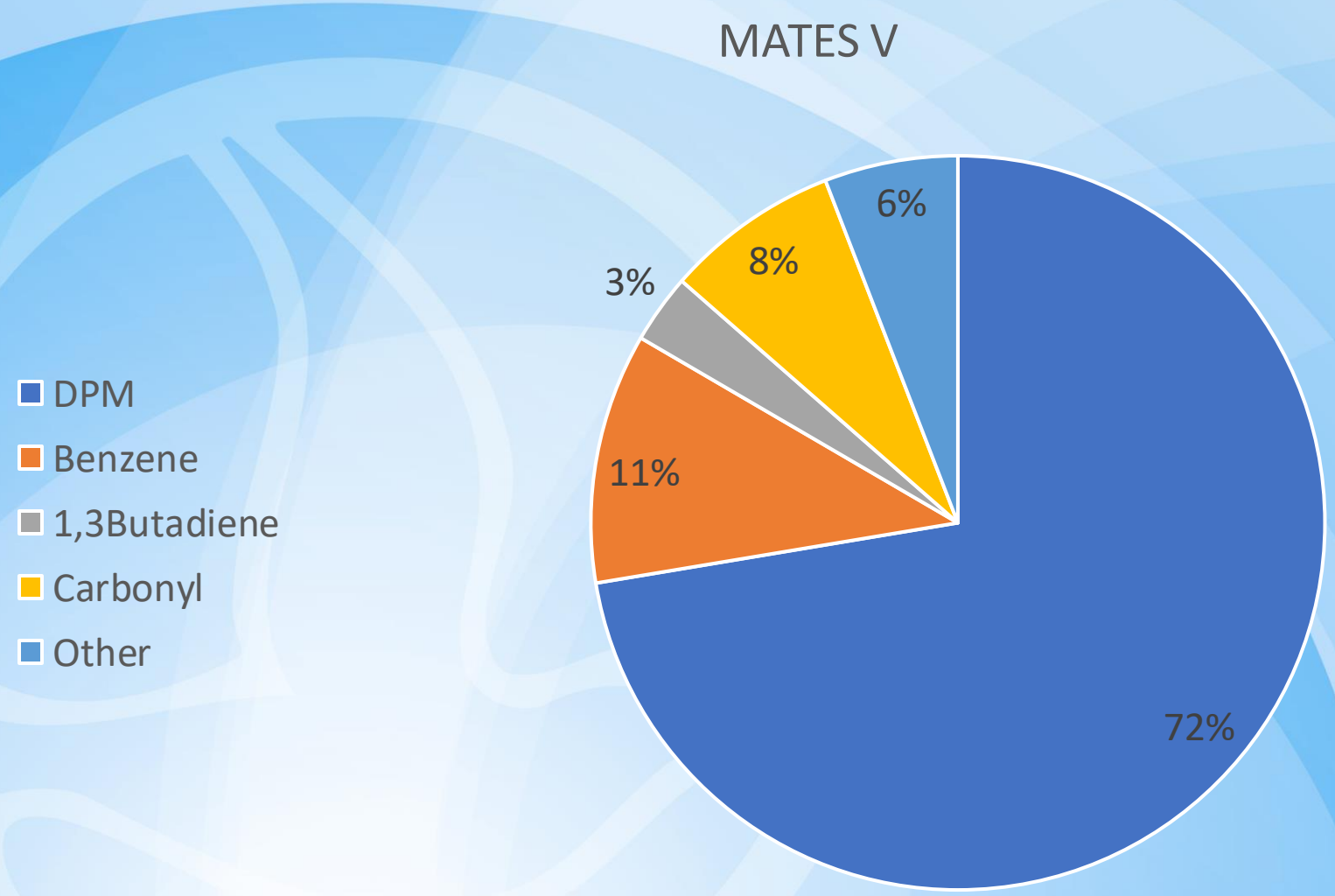
Simulated Diesel PM Concentrations



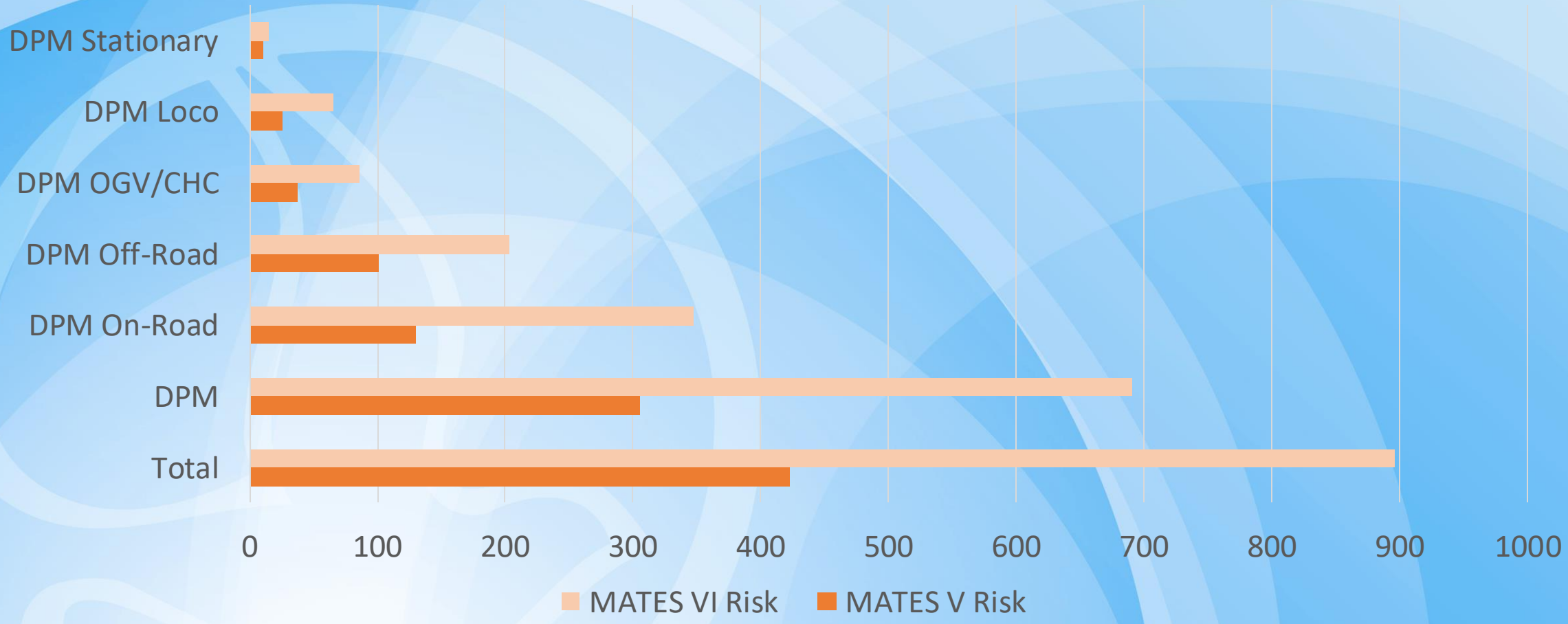
Simulated Inhalation Only Cancer Risk



TACs Contributing to Modeled Inhalation Risk



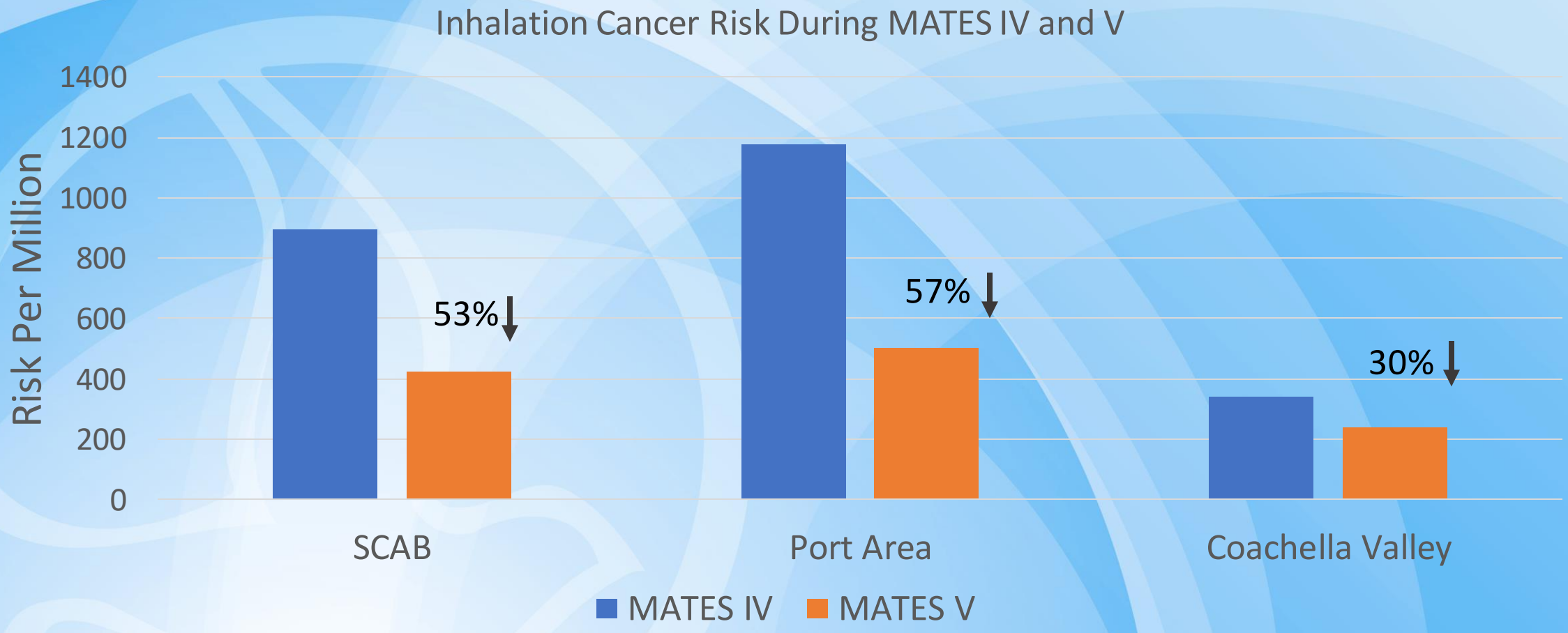
Modeled Inhalation Only Risks for South Coast Air Basin (risk per million)



Reductions in Emissions and Risks from MATES IV to V

South Coast Air Basin		
Category	Emissions	Inhalation Risk
DPM	53%	56%
Total	48%	53%

Population-Weighted Inhalation Cancer Risk



Summary

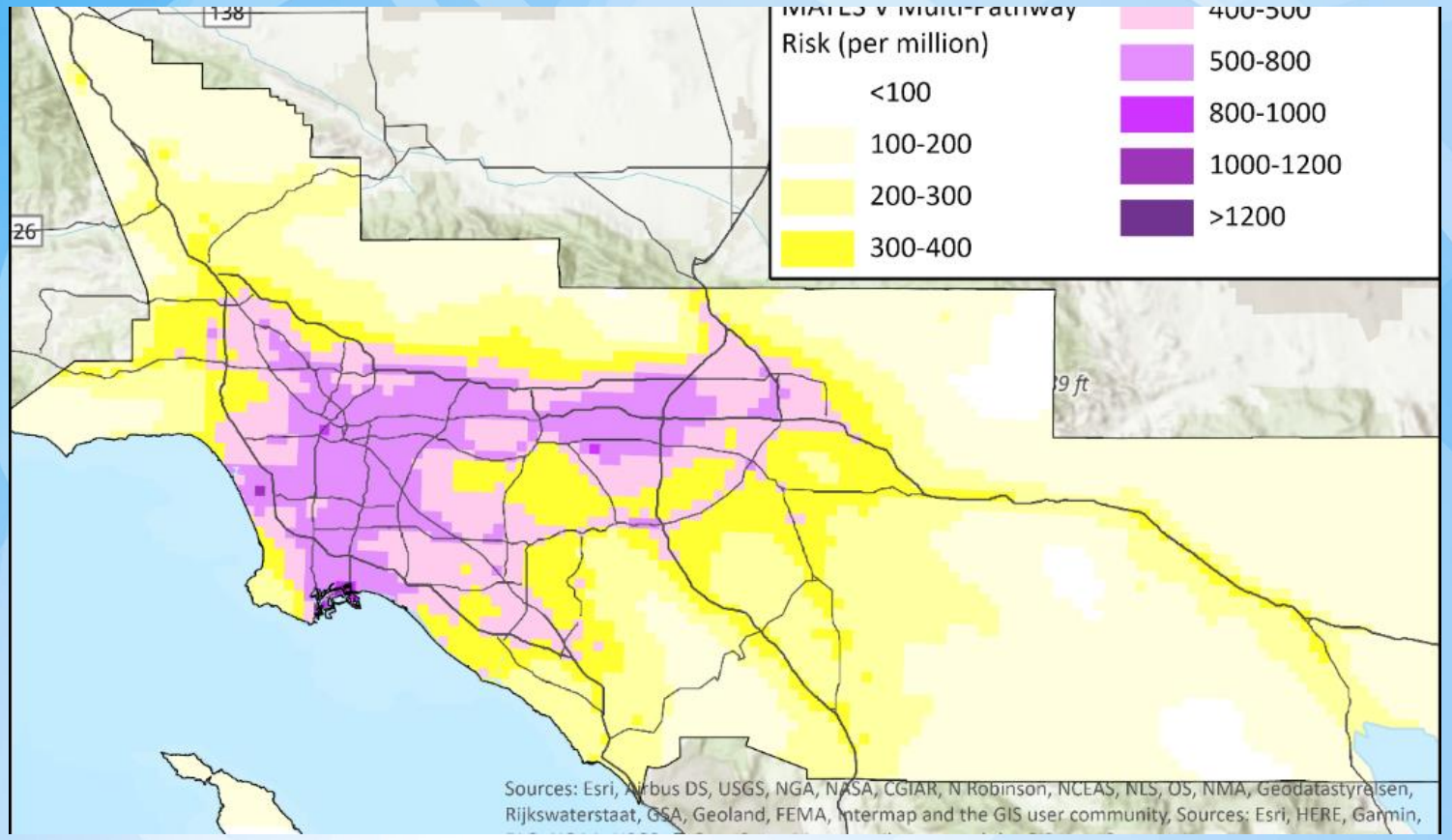
- MATES V emissions inventory shows 48% overall reduction of carcinogenic pollutants from MATES IV
- Diesel PM contributes 73% of the overall cancer potency weighted emissions
- Model-prediction based inhalation only risk decreased by 53% for the South Coast Air Basin and 30% for Coachella Valley from MATES IV.
- Diesel PM continues to be the primary risk driver, contributing to more than 72% of the inhalation-only risk and 67% of the overall multiple pathway air toxics cancer risk.

Modeling Health Risk Results

Jo Kay Ghosh

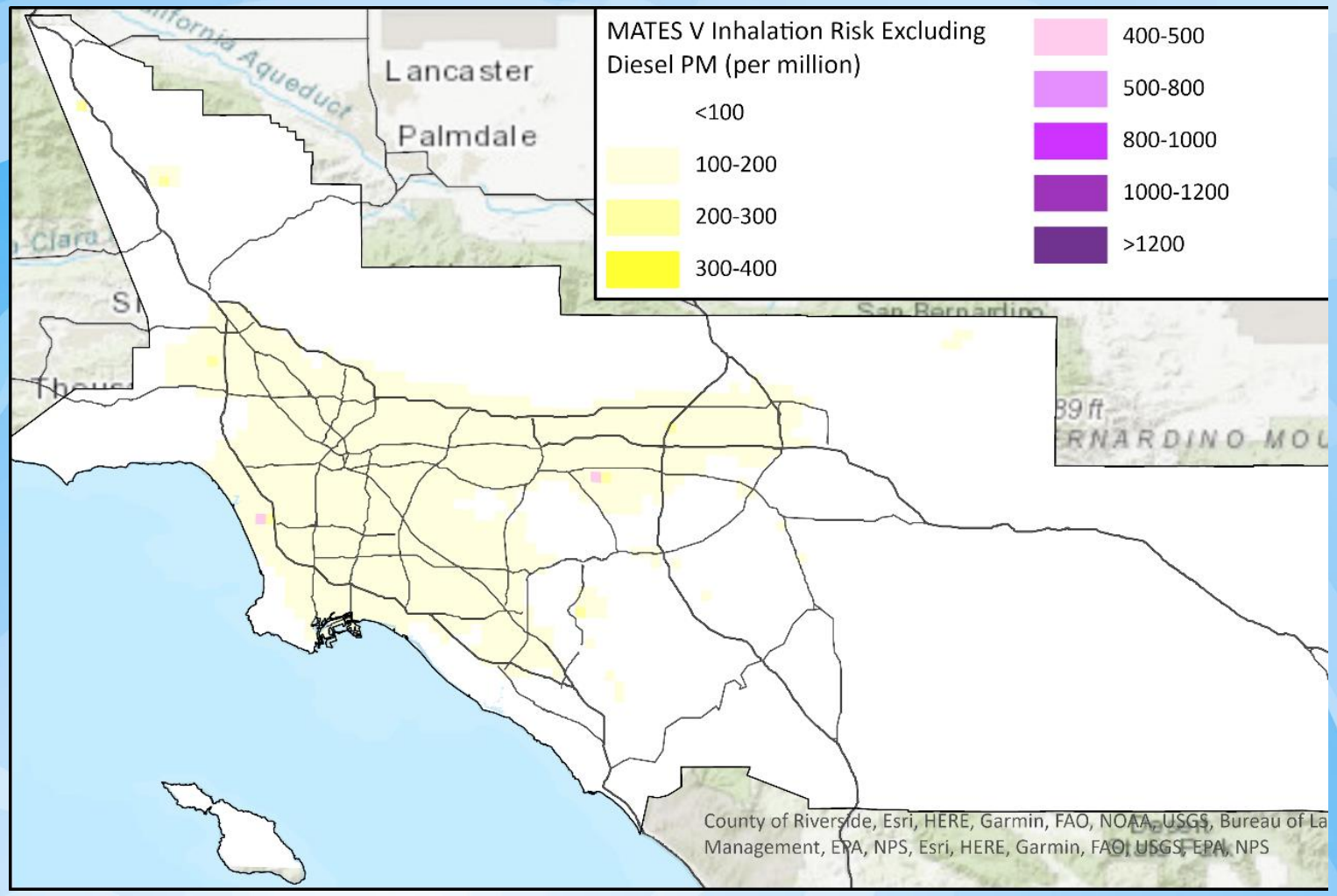
Health Effects Officer

MATES V Air Toxics Cancer Risk – Modeling Data



Population-Weighted Multi-Pathway Cancer Risk:

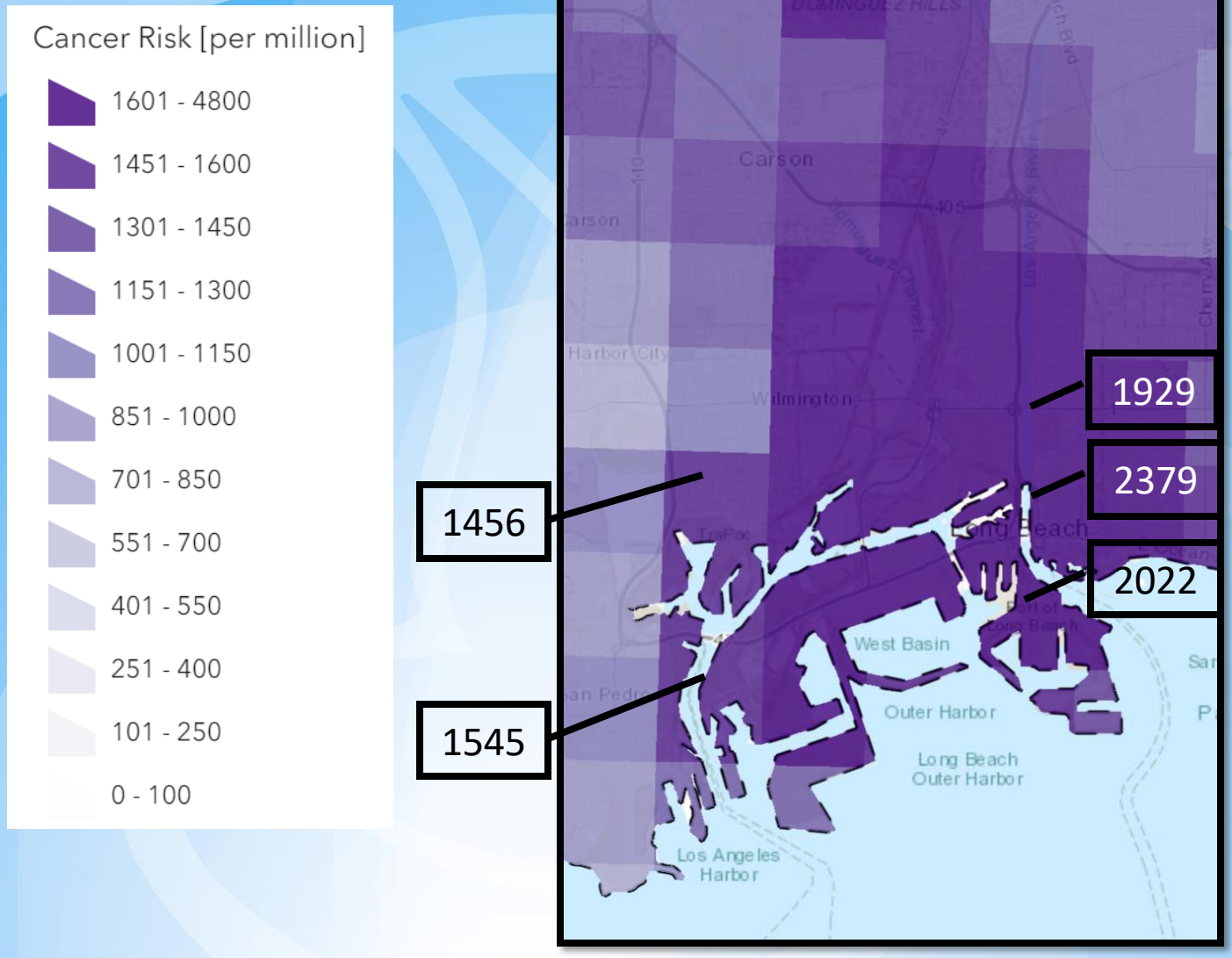
- Basin: 454-in-a-million
- Coachella Valley: 249-in-a-million
- LA County: 497-in-a-million
- Orange County: 388-in-a-million
- Riverside County: 332-in-a-million
- San Bernardino County: 470-in-a-million



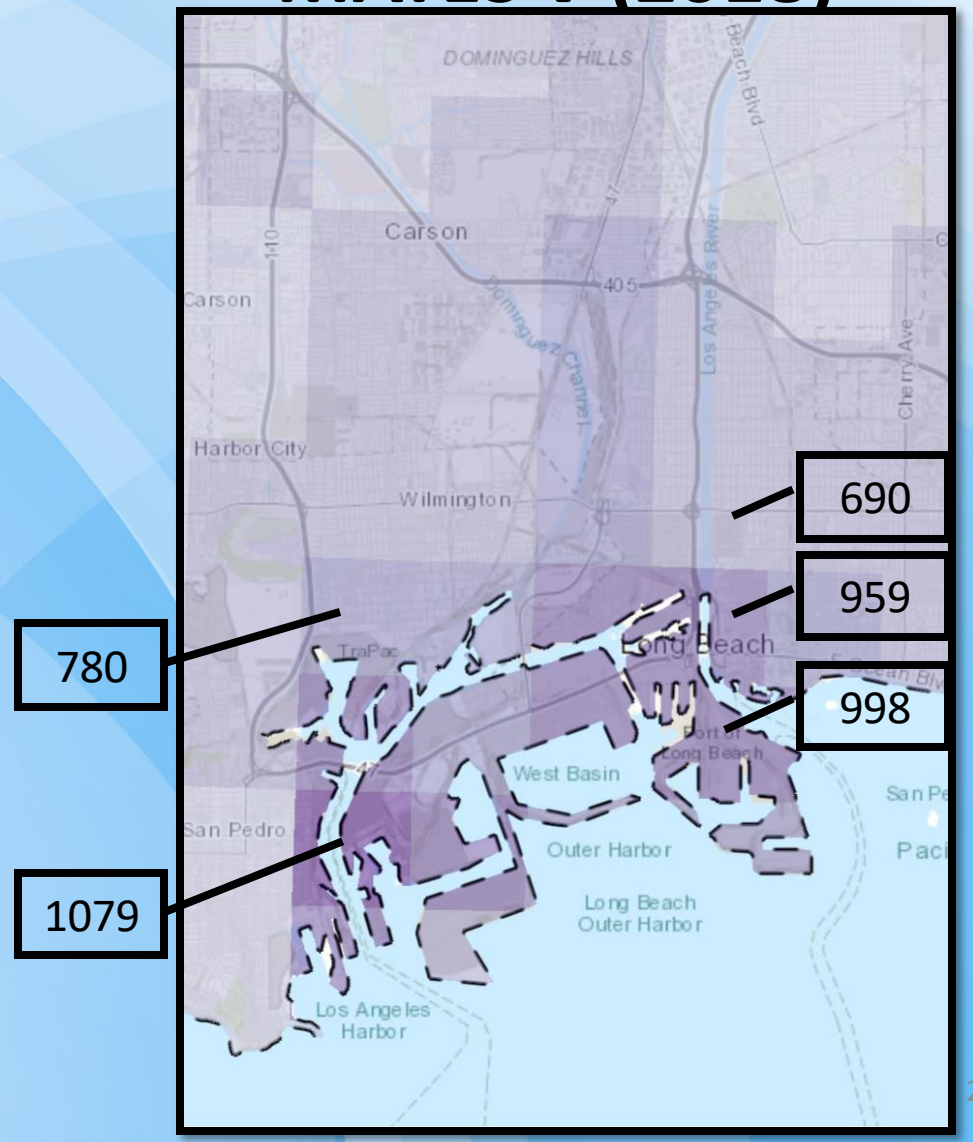
MATES Inhalation Air Toxics Cancer Risk excluding Diesel PM

Ports Area – Multi-Pathway Air Toxics Cancer Risk

MATES IV (2012)



MATES V (2018)

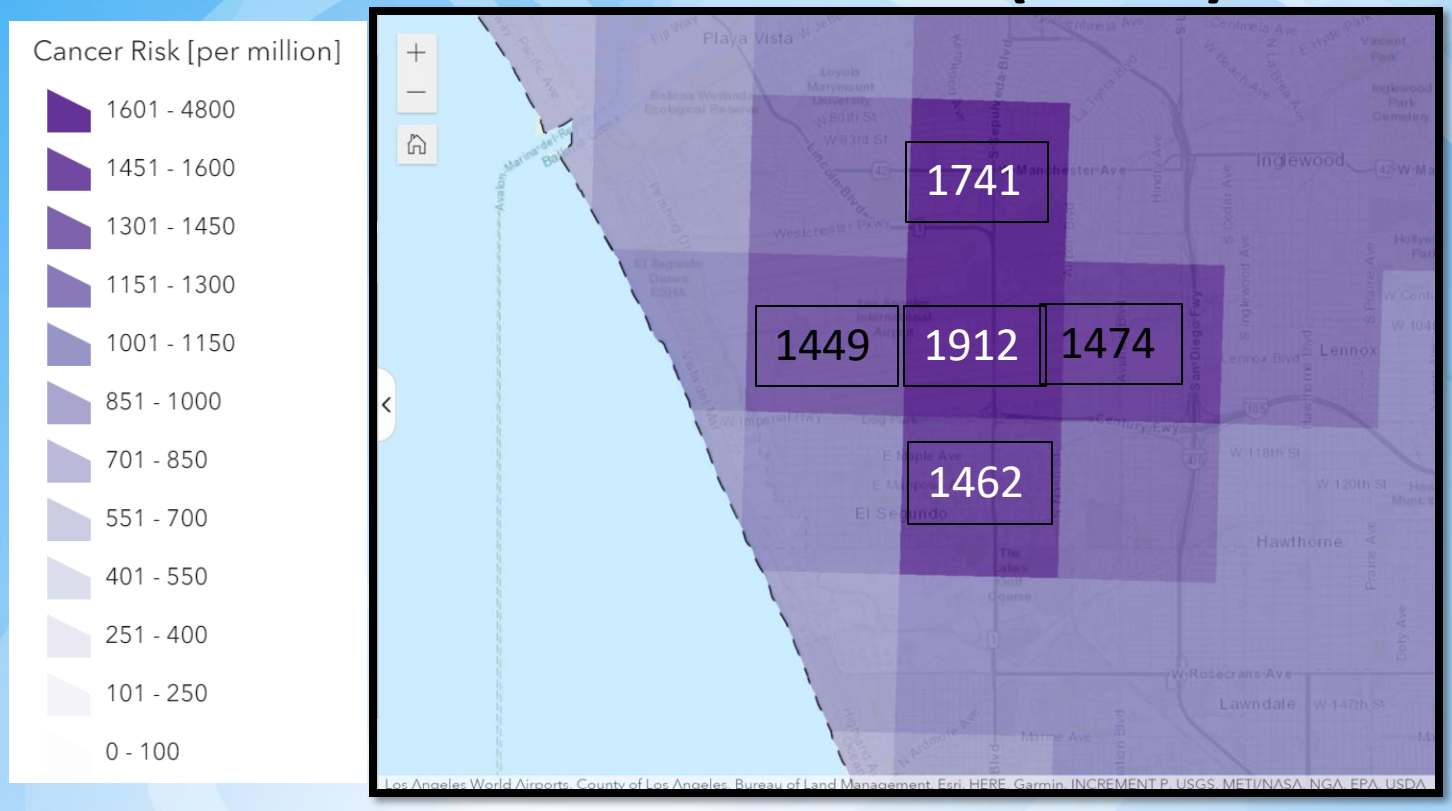


Ports Area – Multi-Pathway Air Toxics Cancer Risk

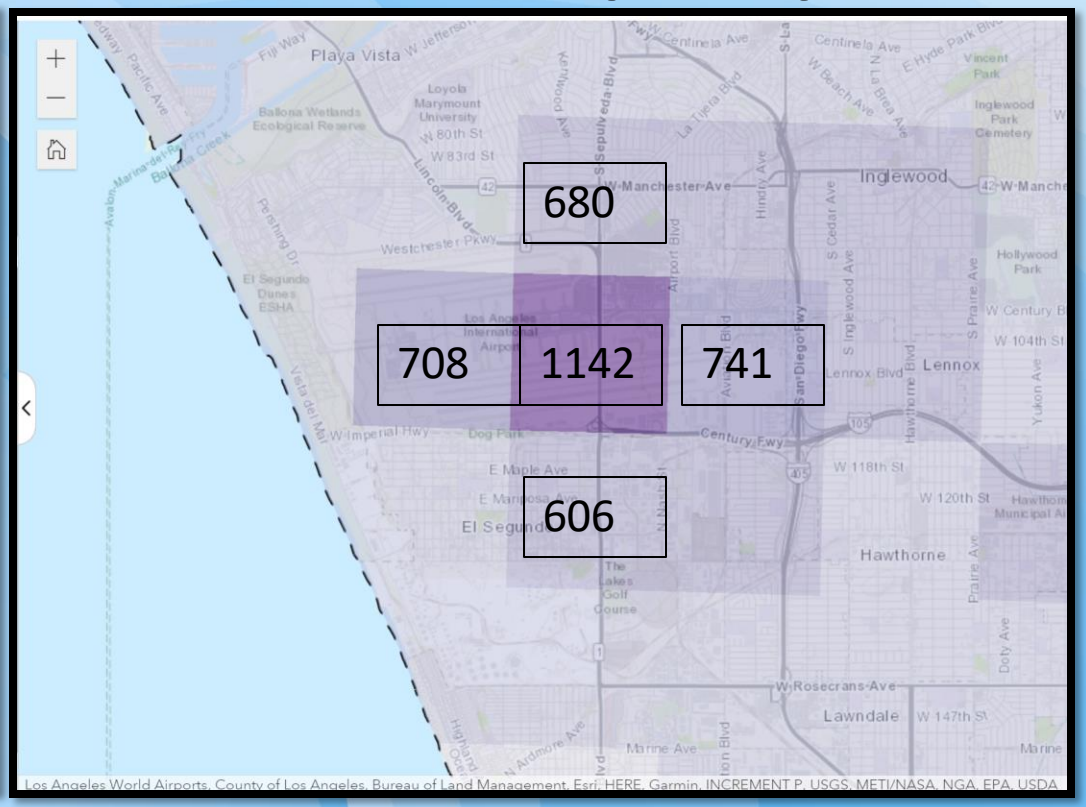
Region	MATES IV		MATES V		Average Percentage Change in Risk
	2012 Population	Average Risk (Per Million)	2018 Population	Average Risk (Per Million)	
Basin	15,991,150	997	16,599,786	454	-54%
Ports Area	998,745	1293	1,004,938	558	-57%
Basin Excluding Ports Area	14,992,806	978	15,994,848	447	-54%

LAX– Multi-Pathway Air Toxics Cancer Risk

MATES IV (2012)

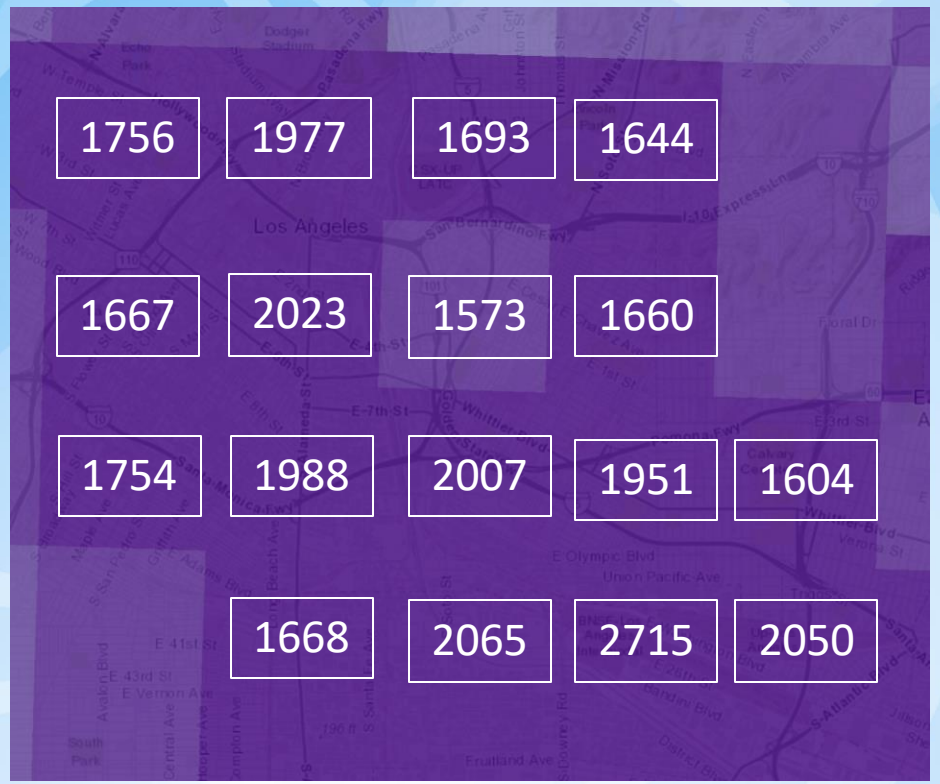


MATES V (2018)

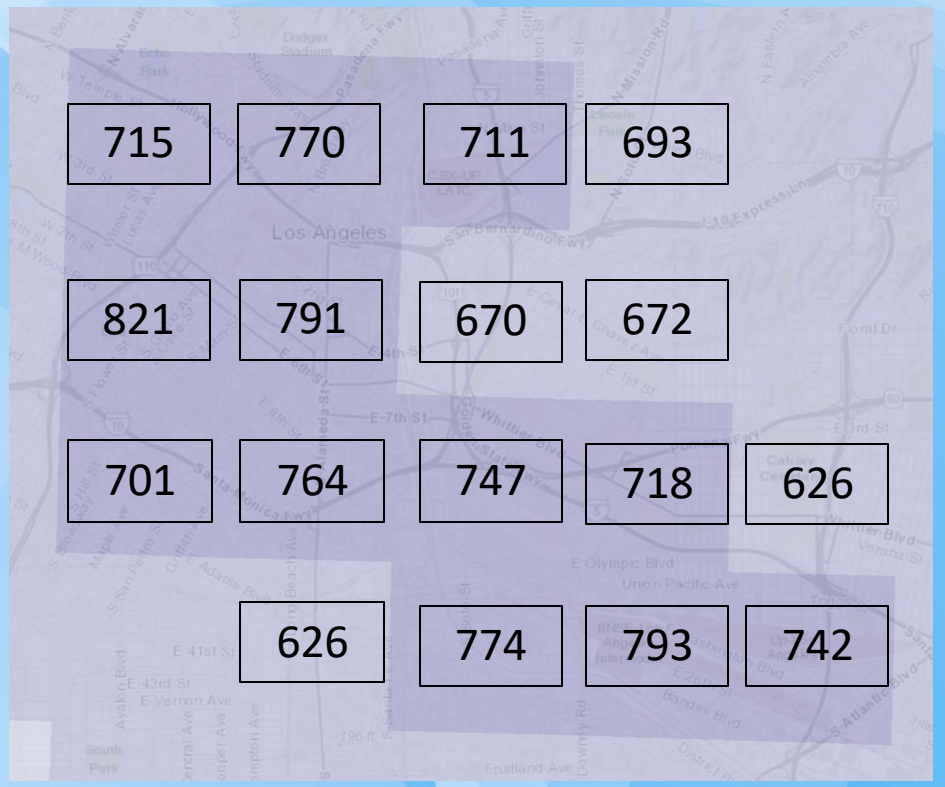


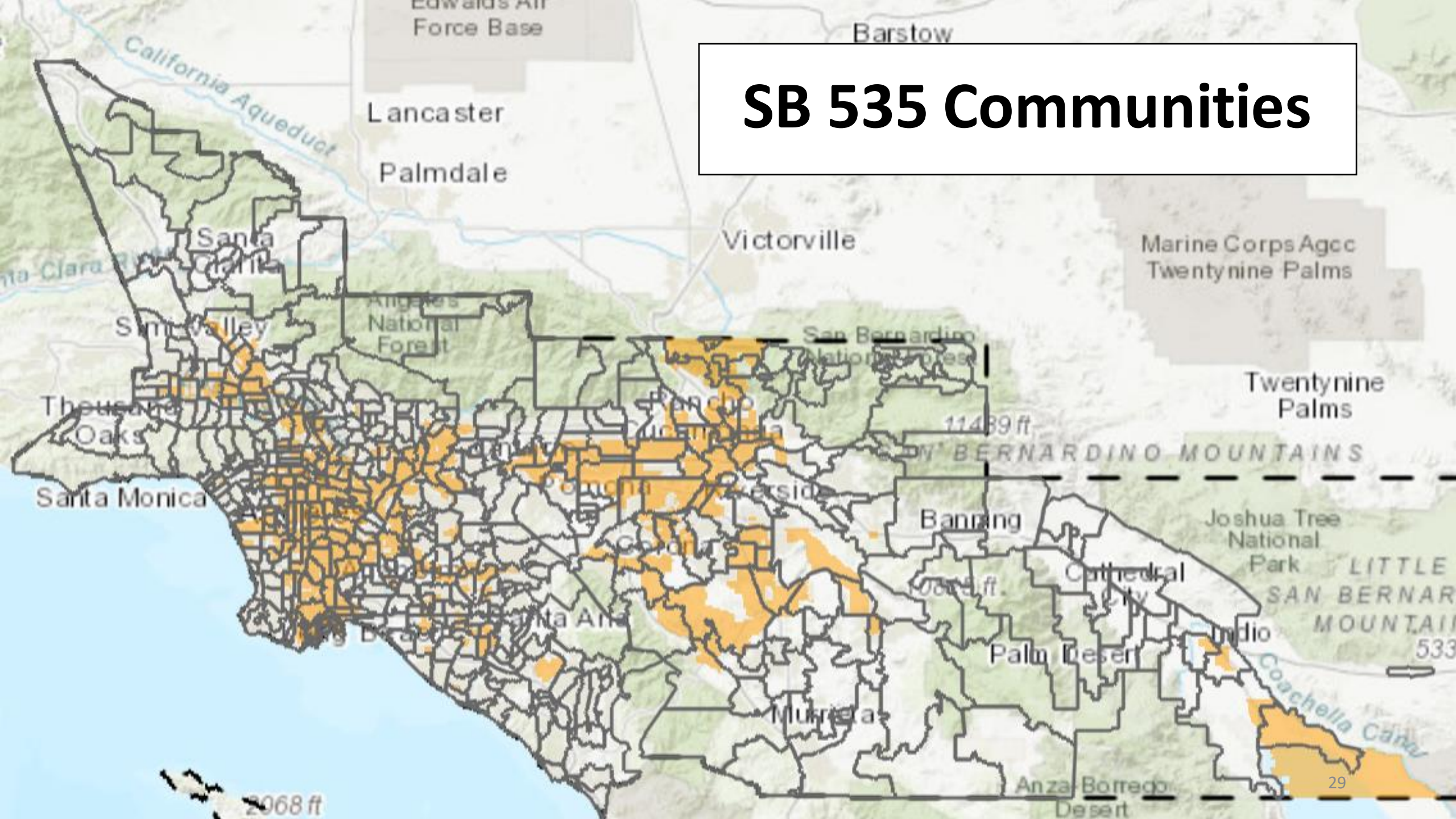
Downtown LA/East LA – Multi-Pathway Air Toxics Cancer Risk

MATES IV (2012)



MATES V (2018)



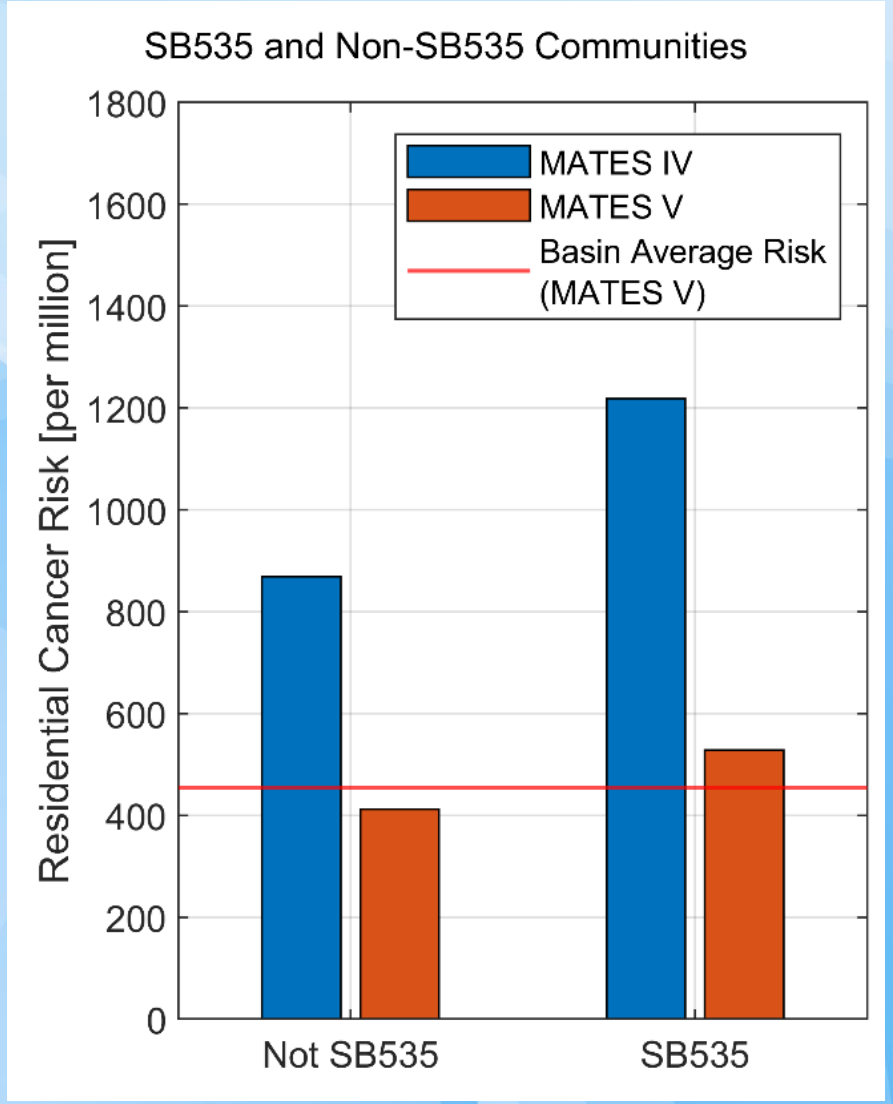


SB 535 Communities

Trends in EJ Communities

AB 617 Community	MATES V Air Toxics Cancer Risk*	Change since MATES IV
Wilmington, Carson, West LB	612	-57%
San Bernardino, Muscoy	506	-43%
East LA, Boyle Heights, West Commerce	652	-61%
Southeast LA	567	-63%
Eastern Coachella Valley	282	-31%

*shown in chances per one million



Summary of MATES V Air Toxics Cancer Risk Modeling Results

- Basin average risk* is 54% lower than in MATES IV
- Coachella Valley average risk* is 30% lower than in MATES IV
- Diesel PM contributes 67% of the air toxics cancer risk* in the Basin
- LAX and Ports area have the highest air toxics cancer risks
- LA County and SB County have higher average air toxics cancer risks than OC and Riverside County
- Risks in EJ communities declined substantially, but EJ communities continue to experience higher risks compared to non-EJ communities

*For Multi-pathway risk