TO: Regional Advisory Working Group DATE: August 26, 2015

FR: Dave Vautin, Planning

RE: Vital Signs: Environment

Over the past eight months, MTC has been releasing performance monitoring data as part of the Vital Signs initiative, which builds upon the performance framework established in Plan Bay Area by tracking regional trends. Vital Signs focuses on the measurement of regional progress towards key transportation, land use, environmental, and economic policy goals. The effort seeks to better inform the public and policymakers about critical regional issues by presenting historical data both at a regional and a local scale through an interactive and customizable website.

Environmental Indicators

MTC worked collaboratively with our regional partners at the Bay Area Air Quality Management District (BAAQMD) and the San Francisco Bay Conservation and Development Commission (BCDC) to identify seven key environmental indicators for tracking on Vital Signs. In August, MTC released data on these indicators to the Vital Signs website, marking the fourth and final release of the project:

- Particulate matter concentrations
- Ozone concentrations
- Greenhouse gas emissions
- Fatalities from crashes
- Injuries from crashes
- Bay restoration
- Vulnerability from sea level rise

The attached presentation highlights the four primary themes of the Environment release and incorporates a summary of data relevant to each theme:

1. While the region continues to grapple with particulate emissions in highly impacted areas, the fact remains that the region's air quality has never been better in the last half-century than it is today.
2. Frustratingly little can be said about the region's greenhouse gas emission trajectory, but thanks to shorter trip distances and high non-auto mode shares, San Franciscans lead the way with the lowest per-capita emissions amongst Bay Area residents.
3. Improved vehicle technologies have reduced fatalities and injuries from crashes despite growing traffic volumes and increasing regional population; despite this, vulnerable users have not seen declines commensurate with motorists.
4. Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resources over the past half-century; our region's 21st century challenge is to protect a significant and stable share of residents at risk from sea level rise.

More detailed narratives on environmental trends can be found on the Vital Signs website.

Overarching Key Findings

In total, Vital Signs incorporates nearly 40 performance indicators and approximately 200 datasets – with dozens of findings included across various narratives. Staff was directed by the joint MTC Planning and ABAG Administrative Committee to identify overarching findings across the various performance indicators, given the scope of the Vital Signs analysis. While it is impossible to incorporate every measure and conclusions into this findings, staff has identified four common threads across the measures as the key findings of the overall project:

1. Environmental protectionism has resulted in clean air, healthy ecosystems, and abundant open space in our region – but the associated regulatory hurdles have held back housing production and contributed to the region's unaffordability.
2. The region's recent tech-driven economic boom has come about despite these affordability challenges; residents are faced with tough choices about living in America's most expensive region or moving away to more affordable metros.
3. The Bay Area may be just starting to turn a corner towards more sustainable land use patterns – in particular, transit-served urban neighborhoods have been taking on a higher share of job and housing growth over the last several years. Job growth in urban neighborhoods could have positive effects on transit usage and congestion.
4. We're much more complex than "One Bay Area" – the significant gaps that exist between high, middle and low income households and between the various sub-geographies of the Bay Area demonstrate the complexity in tailoring policies that benefit our region as a whole.

SEPTEMBER 1, 2015

VITAL SIGNS

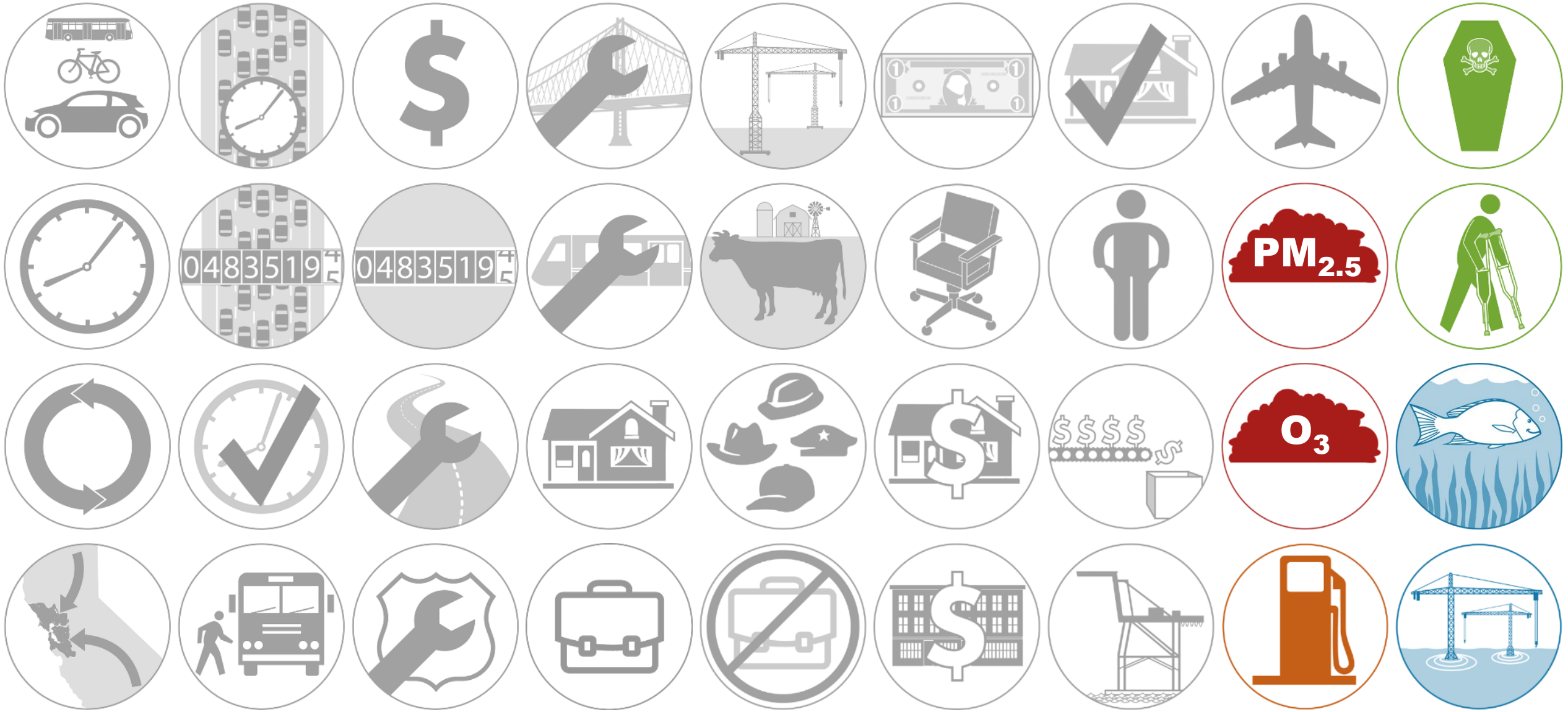
MTC ABAG BAAQMD BCDC

ENVIRONMENTAL INDICATORS & KEY FINDINGS

REGIONAL ADVISORY WORKING GROUP

Image Source: https://www.flickr.com/photos/miwok/7119900747

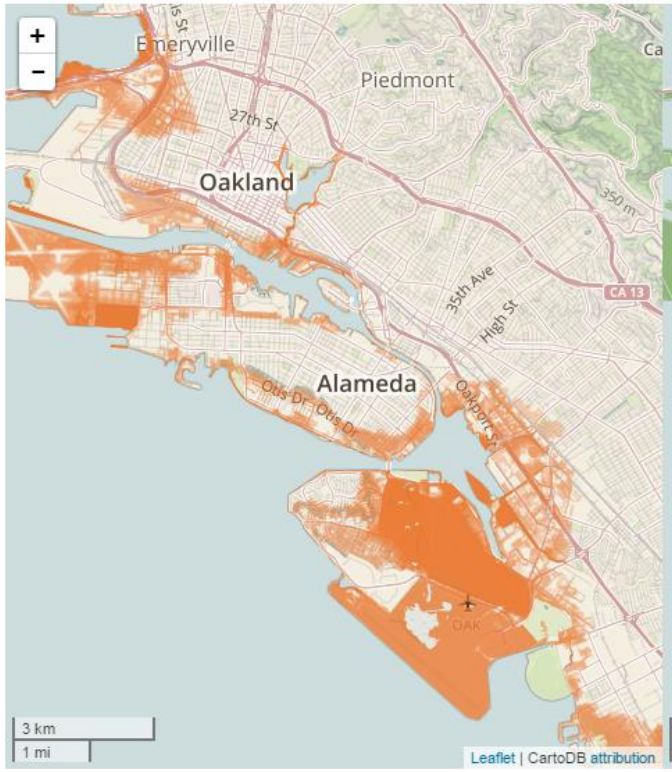
With the recent release of Vital Signs: Environment, the public now has access to a total of 36 performance indicators via nearly 100 interactive maps & charts.



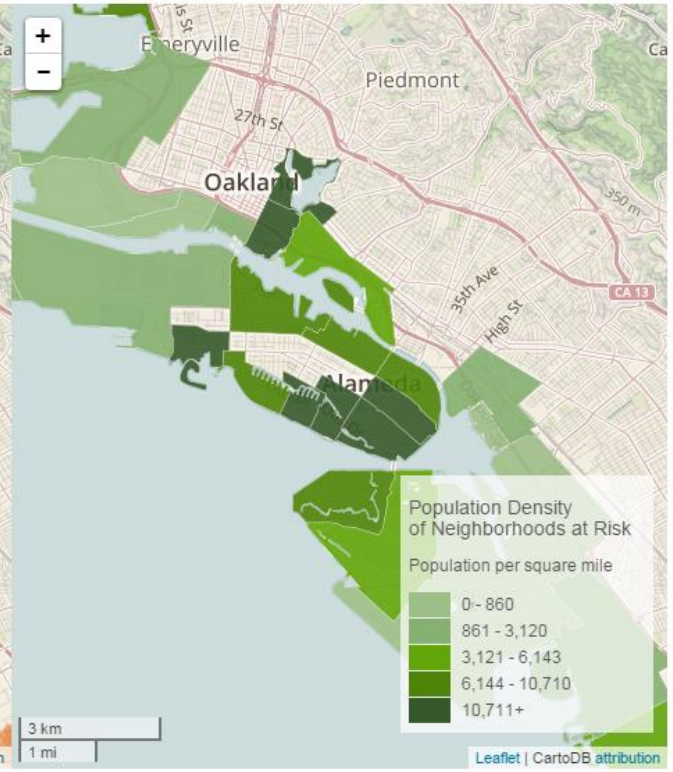
New interactive maps and charts on air quality, road safety, and San Francisco Bay are now available.

vitalsigns.mtc.ca.gov

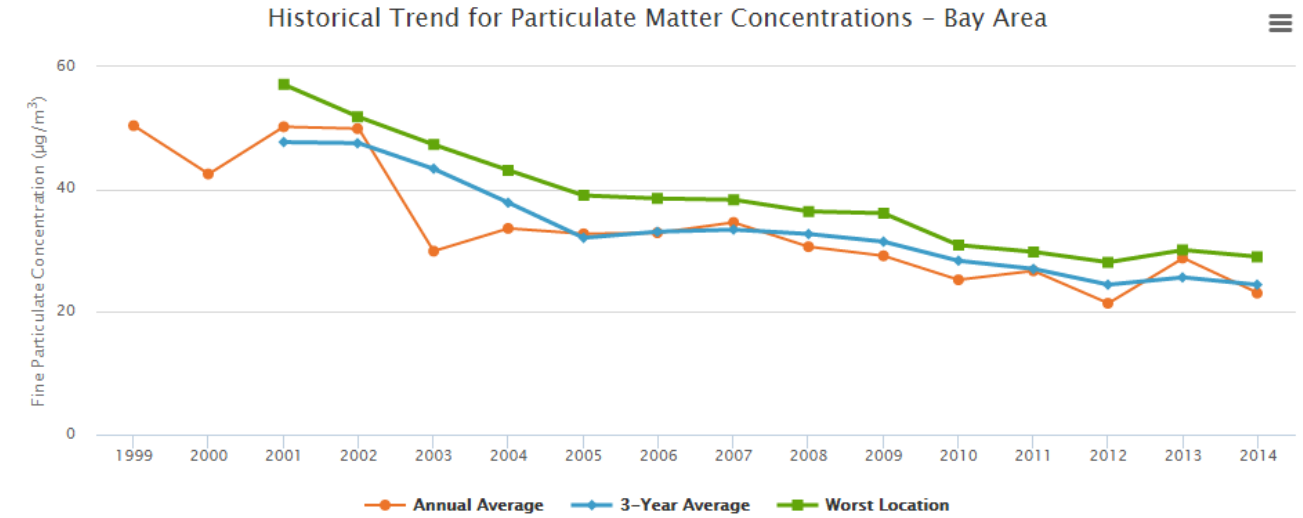
Impacted Land Area



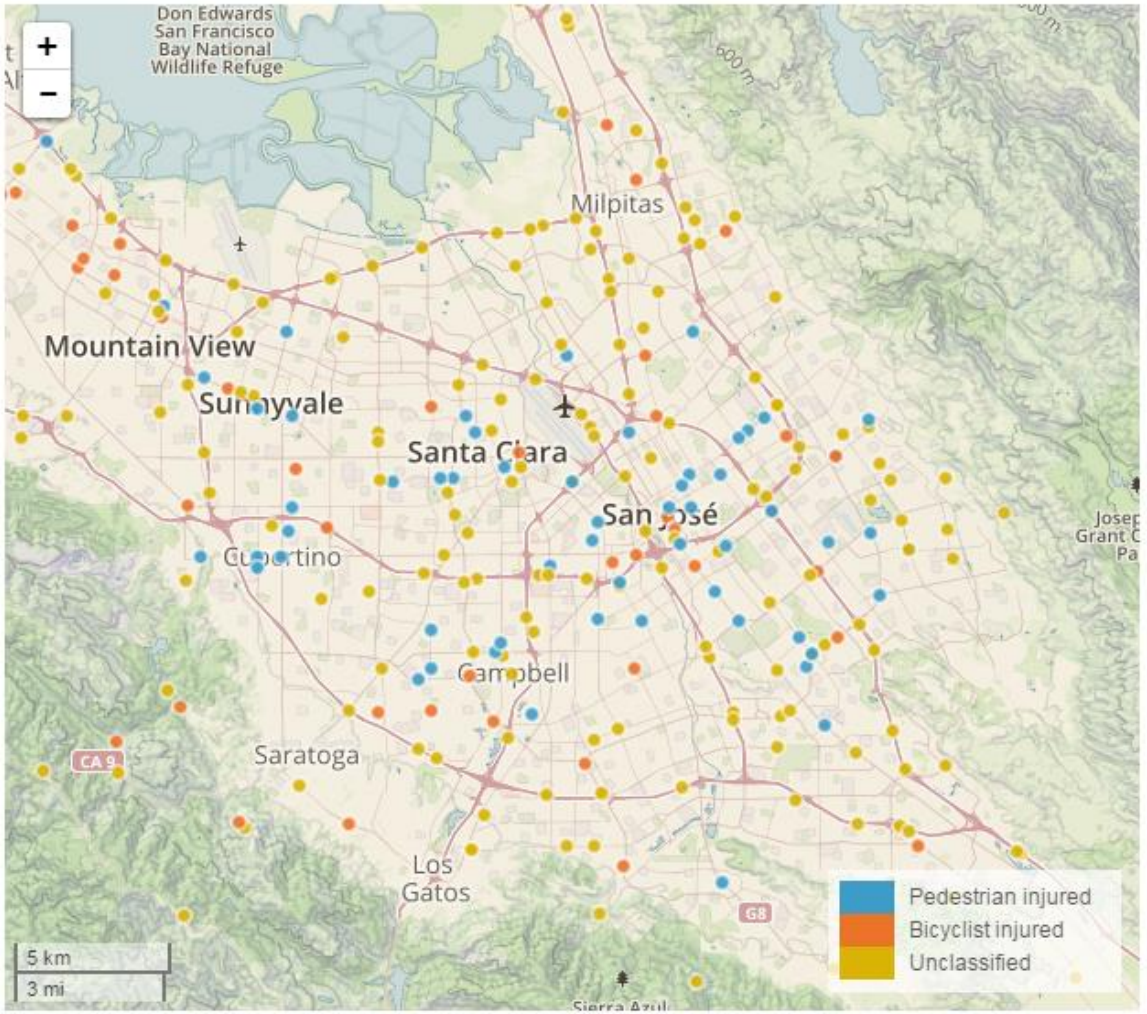
Population at Risk of Impacts



Annual Average Fine Particulate Concentrations | 98th Percentile Daily Fine Particulate Concentrations



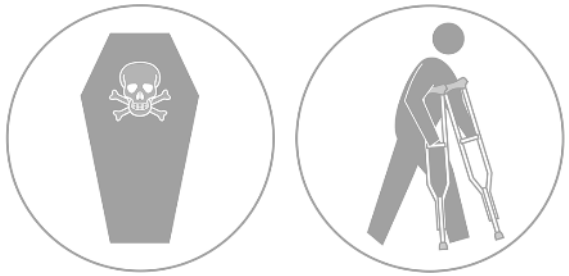
2012 Injuries from Crashes



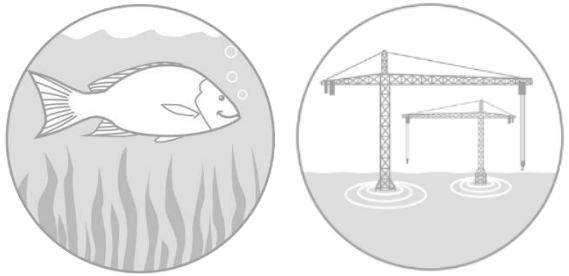
KEY FINDINGS FROM VITAL SIGNS: ENVIRONMENT

While the region continues to grapple with particulate emissions in highly impacted areas, **the fact remains that the region's air quality has never been better in the last half-century** than it is today.

Frustratingly little can be said about the region's greenhouse gas emission trajectory, but thanks to shorter trip distances and high non-auto mode shares, San Franciscans lead the way with the lowest per-capita emissions amongst Bay Area residents.



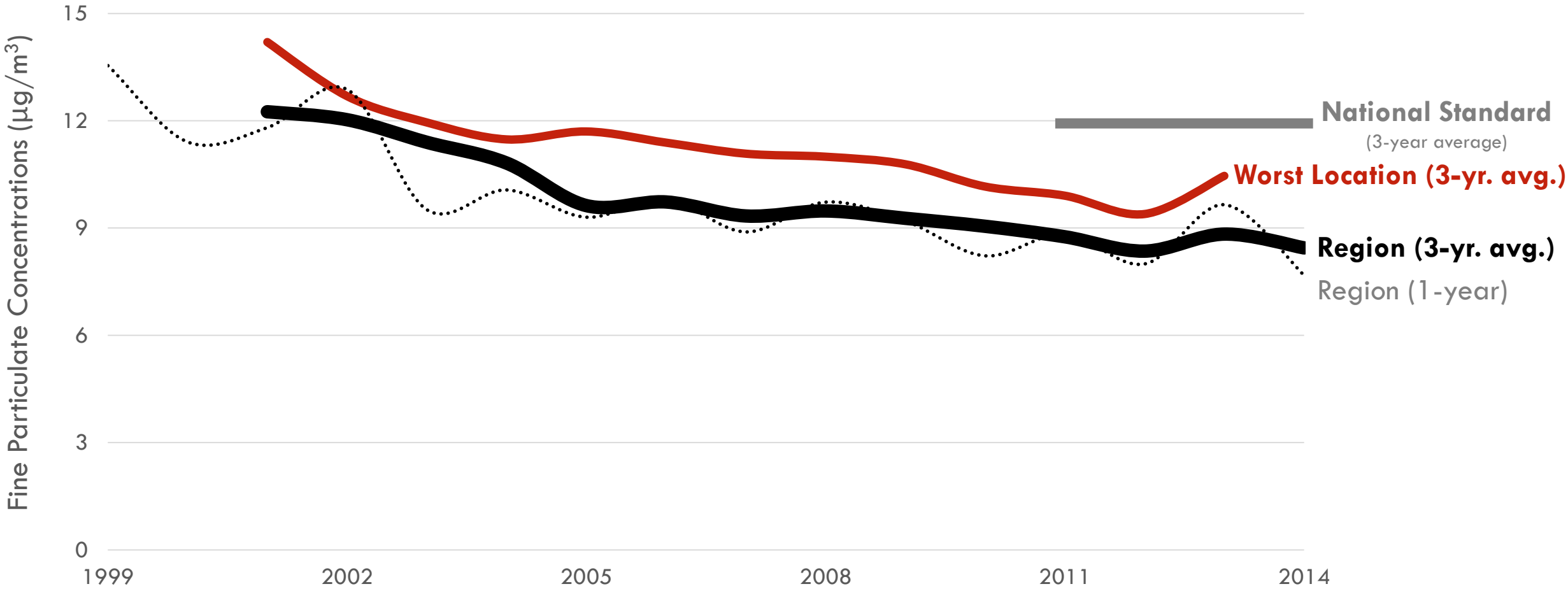
Improved vehicle technologies have reduced fatalities and injuries from crashes despite growing traffic volumes and increasing regional population; despite this, vulnerable users have not seen declines commensurate with motorists.



Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resources over the past half-century; **our region's 21st century challenge is to protect a significant and stable share of residents at risk from sea level rise.**

PARTICULATE MATTER: REGIONAL PERFORMANCE

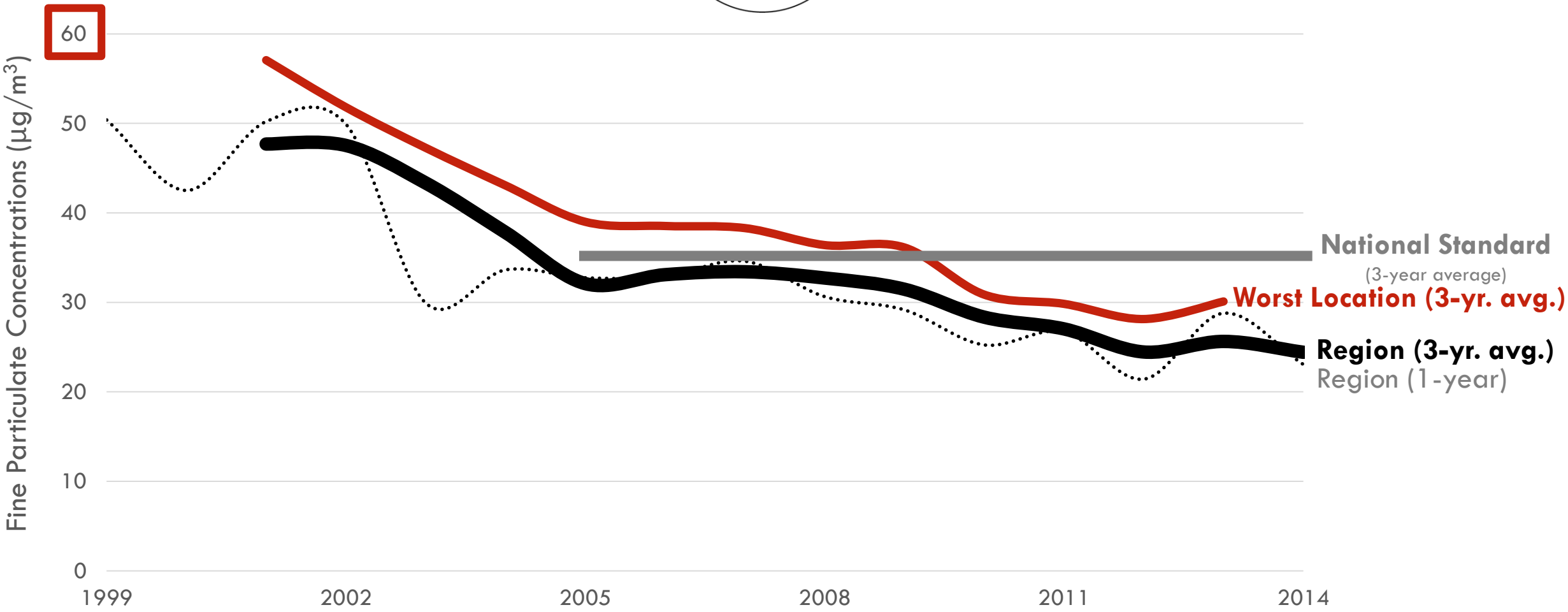
Annual Average



Source: BAAQMD Air Quality Sensors, 2014; *regional data measures average concentration of 8 longstanding sensors with iterated 2-way ANOVA for interpolation*

PARTICULATE MATTER: REGIONAL PERFORMANCE

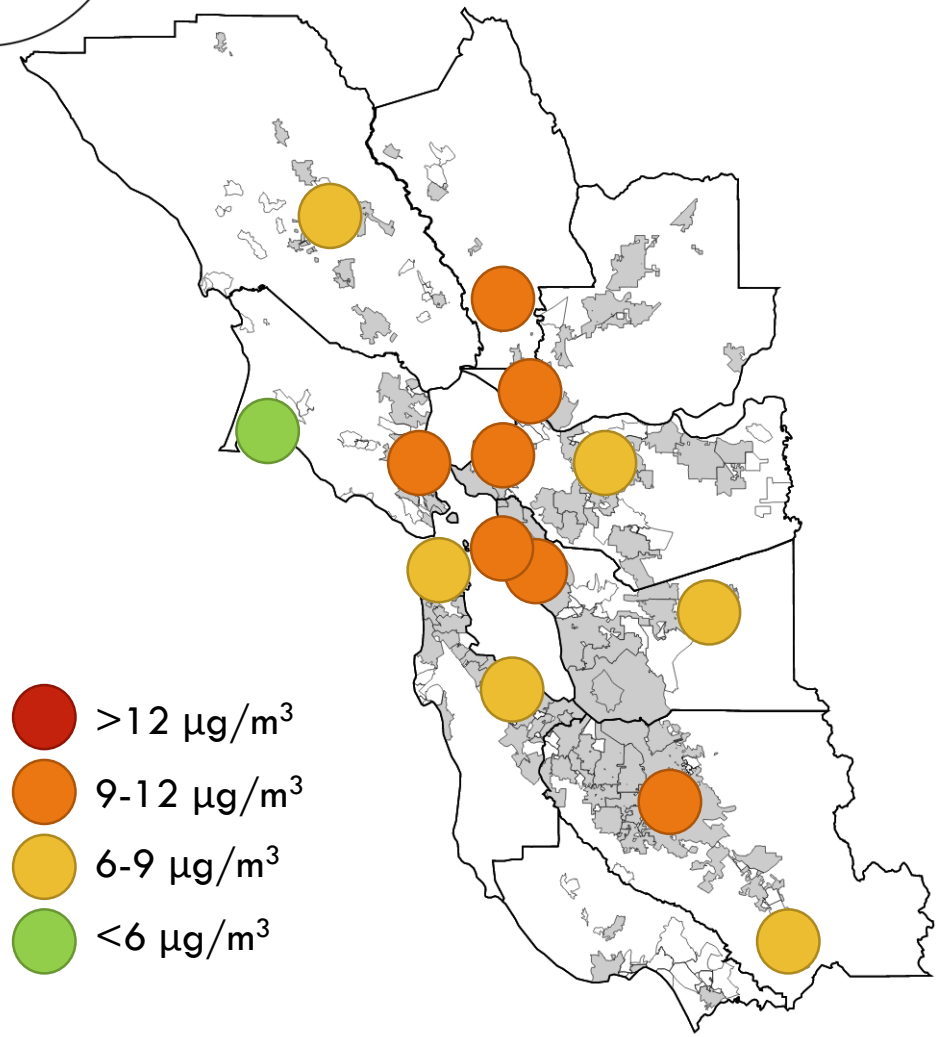
98th Percentile Day



Source: BAAQMD Air Quality Sensors, 2014; *regional data measures average concentration of 8 longstanding sensors*

PARTICULATE MATTER: LOCAL FOCUS

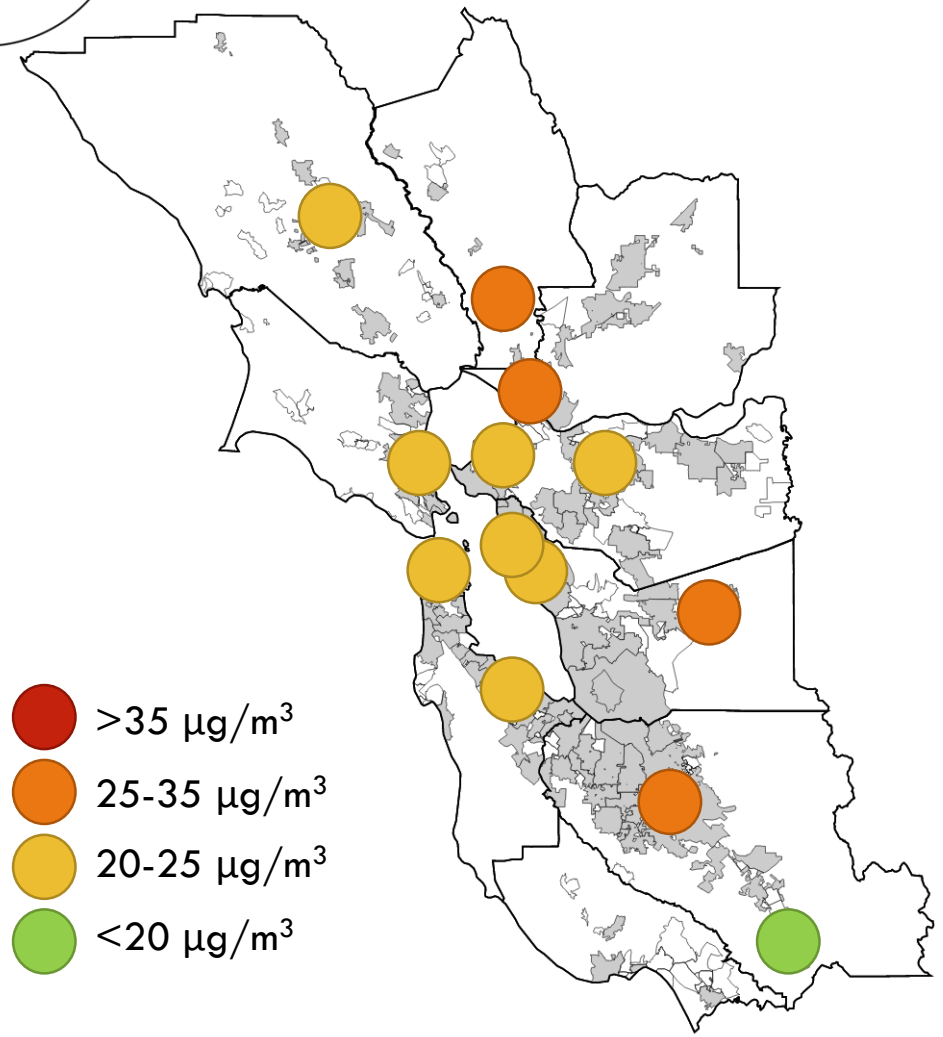
Ranked List of Fine Particulate Sensors (2012-14) *Annual Mean $PM_{2.5}$ Concentrations*		
#1	Napa	11.8 µg/m^3
#2	San Pablo	11.3 µg/m^3
#3	West Oakland	11.2 µg/m^3
#4	San Jose	10.0 µg/m^3
#5	San Rafael	9.8 µg/m^3
#6	Vallejo	9.6 µg/m^3
#7	Oakland	9.4 µg/m^3
#8	Redwood City	8.8 µg/m^3
#9	San Francisco	8.6 µg/m^3
#10	Santa Rosa	8.4 µg/m^3
#11	Gilroy	7.6 µg/m^3
#12	Livermore	7.5 µg/m^3
#13	Concord	7.0 µg/m^3
#14	Point Reyes	5.5 µg/m^3



Source: BAAQMD Air Quality Sensors, 2014; *relies upon 3-year rolling averages*

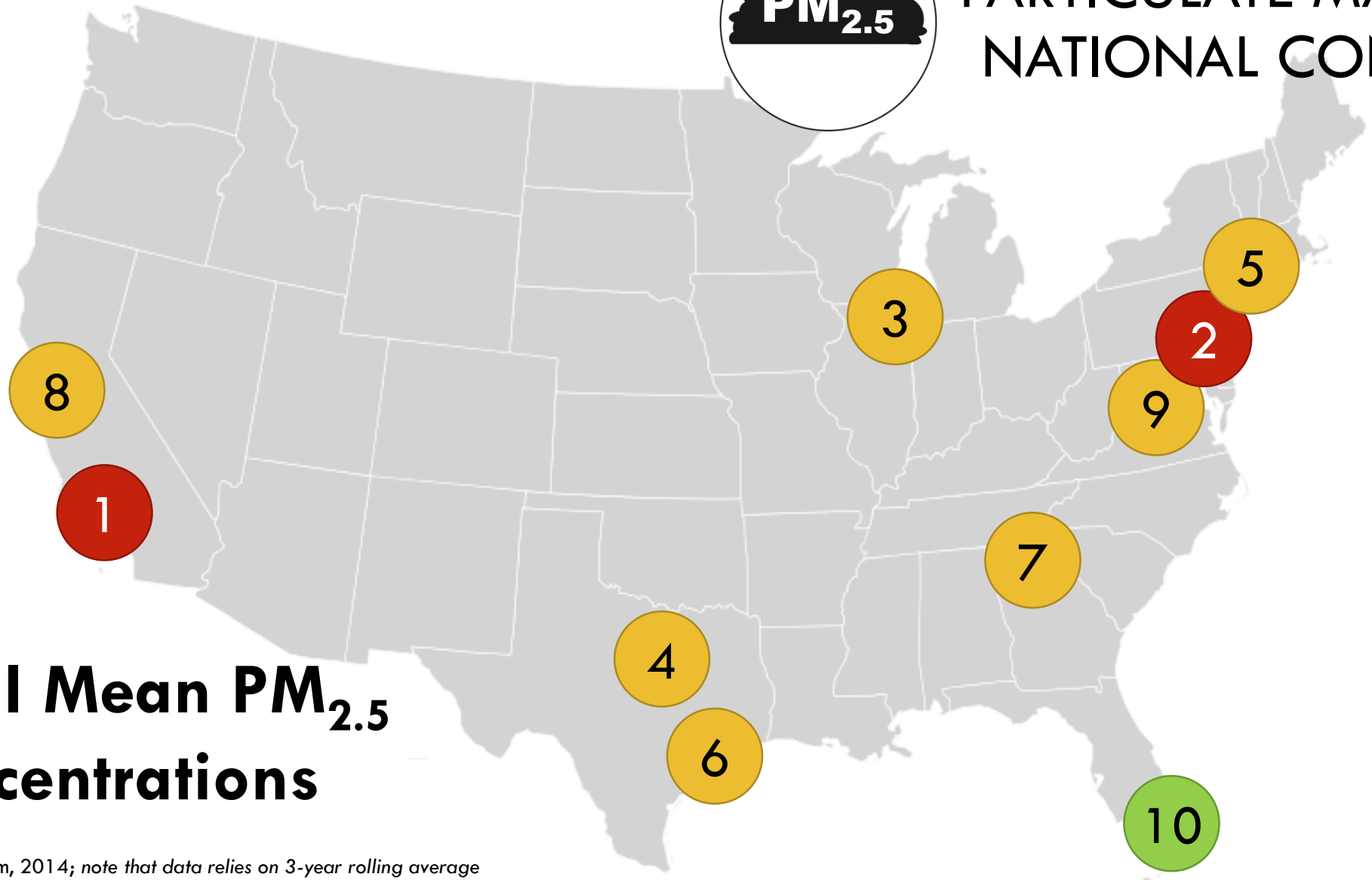
PARTICULATE MATTER: LOCAL FOCUS

Ranked List of Fine Particulate Sensors (2012-14) *98th Percentile Daily $PM_{2.5}$ Concentrations*		
#1	San Jose	29.0 µg/m³
#2	Livermore	26.6 µg/m³
#3	Vallejo	26.2 µg/m³
#4	Napa	25.1 µg/m³
#5	Oakland	24.2 µg/m³
#6	Redwood City	23.4 µg/m³
#7	San Francisco	23.2 µg/m³
#8	West Oakland	22.7 µg/m³
#9	San Rafael	22.0 µg/m³
#10	San Pablo	21.2 µg/m³
#11	Santa Rosa	21.2 µg/m³
#12	Concord	20.8 µg/m³
#13	Gilroy	17.7 µg/m³



Source: BAAQMD Air Quality Sensors, 2014; *relies upon 3-year rolling averages*

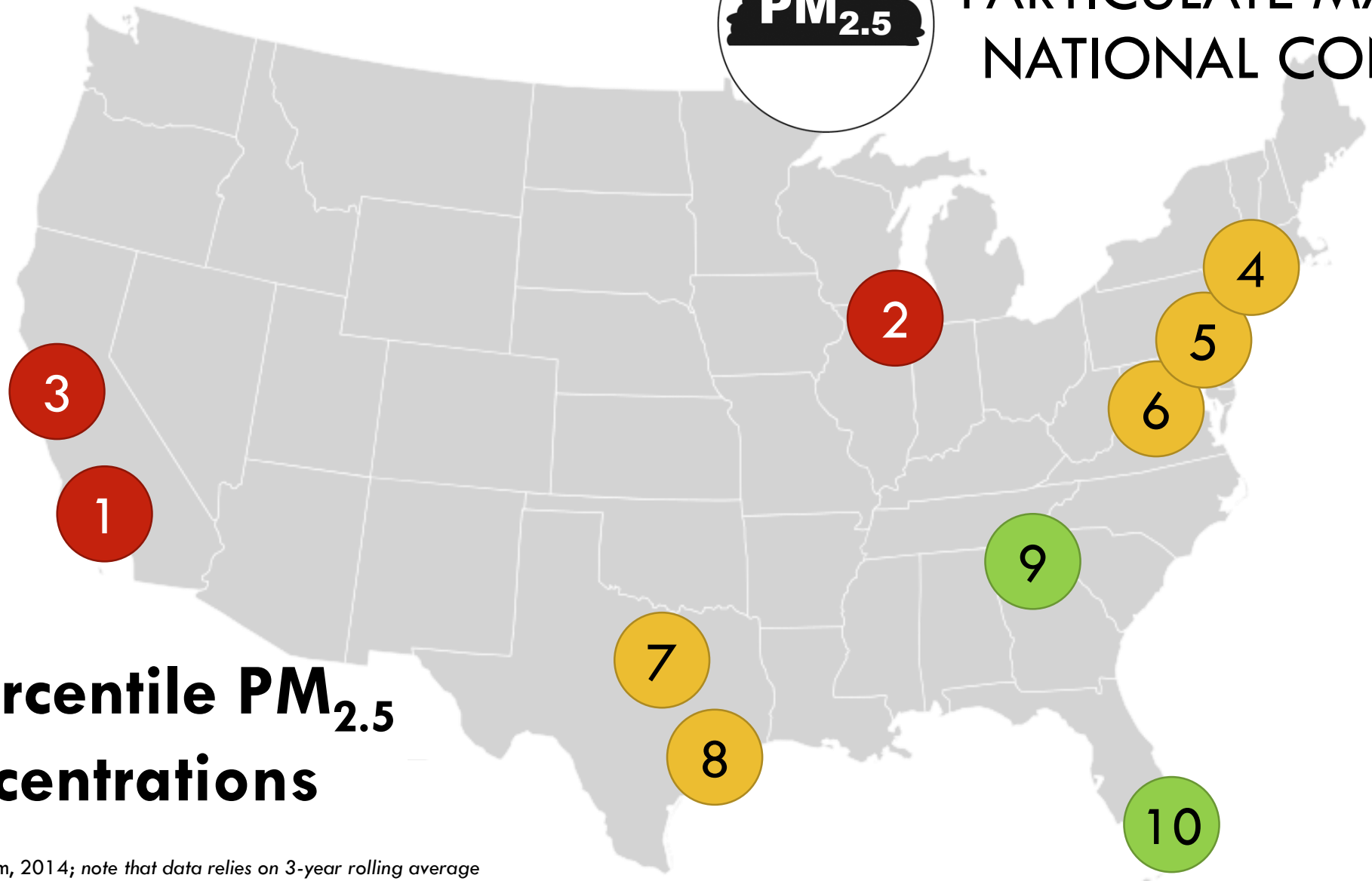
PARTICULATE MATTER: NATIONAL CONTEXT



Annual Mean $PM_{2.5}$ Concentrations

Source: EPA Air Quality System, 2014; *note that data relies on 3-year rolling average*

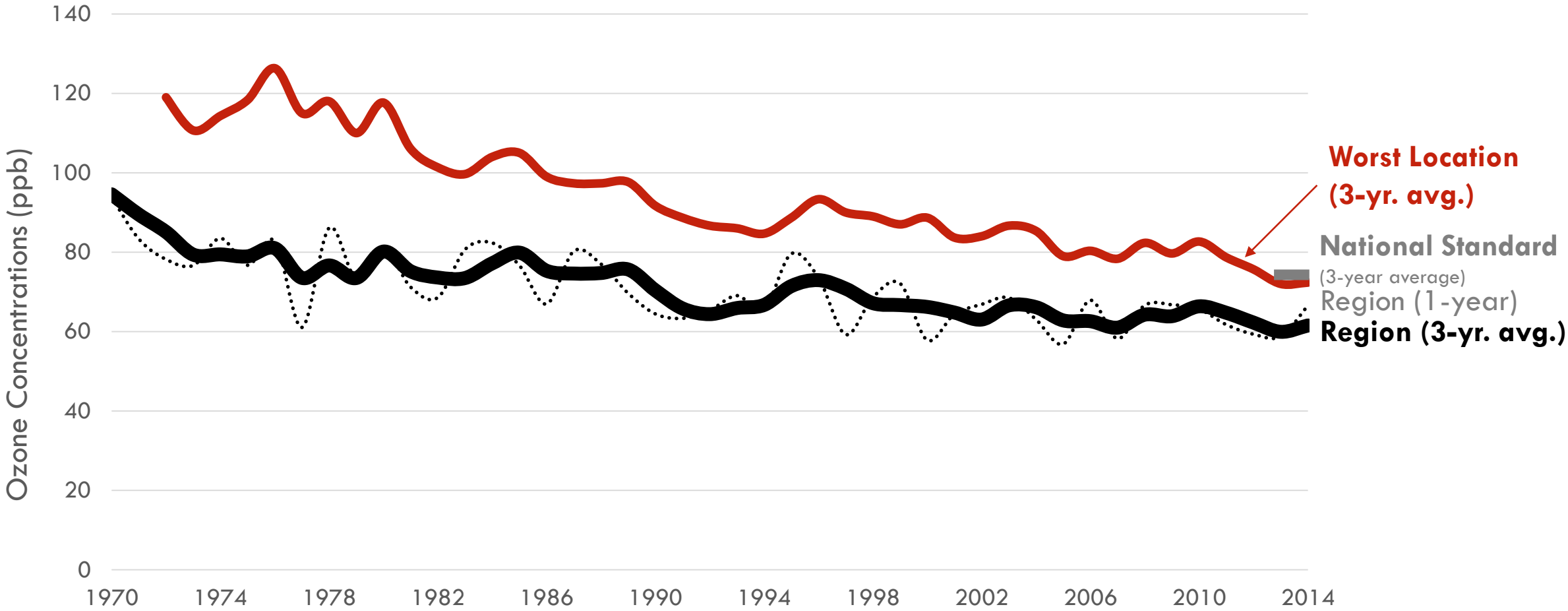
PARTICULATE MATTER: NATIONAL CONTEXT



98th Percentile $PM_{2.5}$ Concentrations

Source: EPA Air Quality System, 2014; *note that data relies on 3-year rolling average*

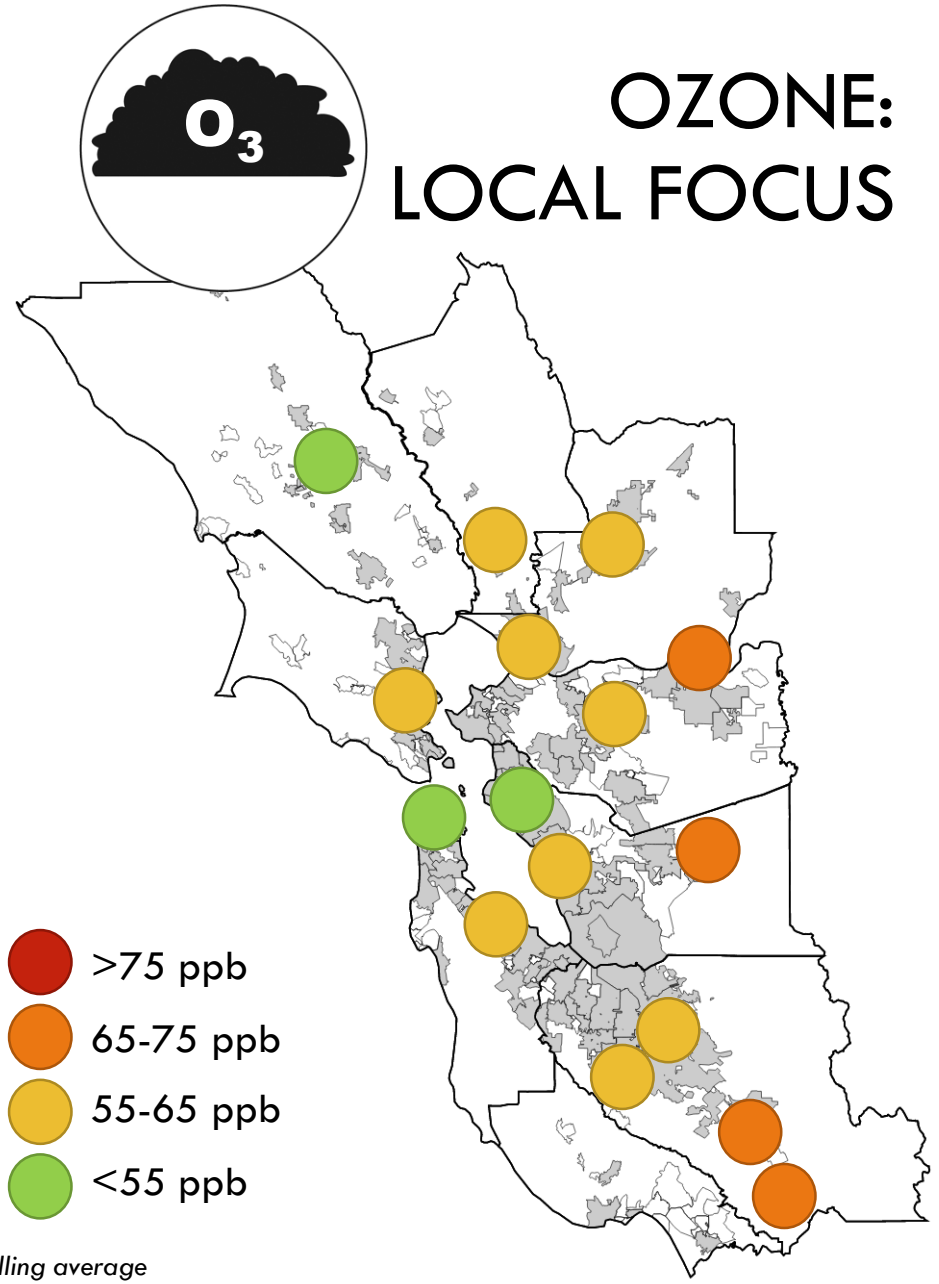
OZONE: REGIONAL PERFORMANCE



Source: BAAQMD Air Quality Sensors, 2014; *all measures reflect 8-hour peak concentration on 4th worst day of the year*

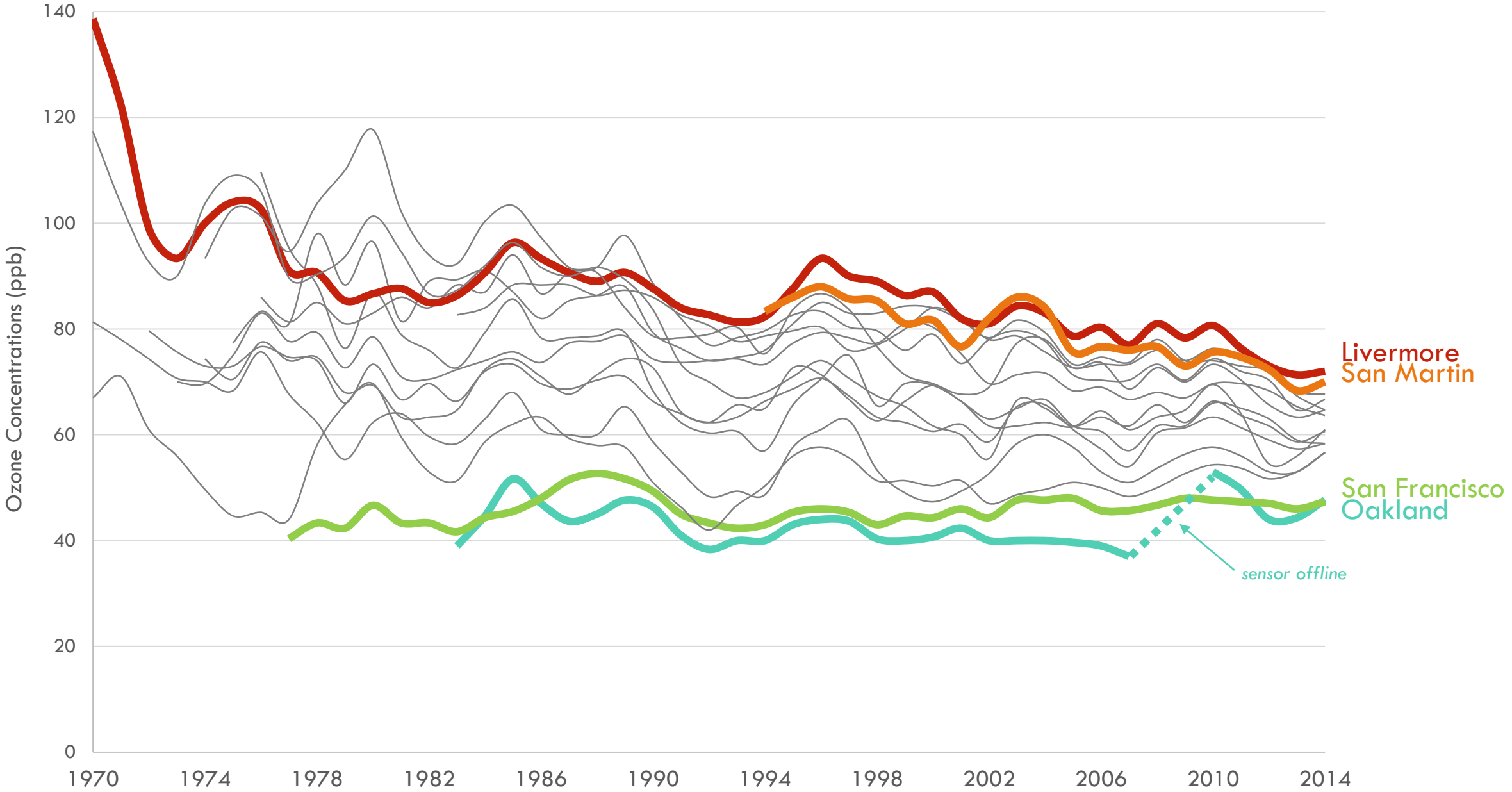
OZONE: LOCAL FOCUS

Ranked List of Ozone Sensors (2012-2014)		
#1	Livermore	72 ppb
#2	San Martin	70 ppb
#3	Bethel Island	68 ppb
#4	Gilroy	67 ppb
#5	Concord	65 ppb
#6	Los Gatos	65 ppb
#7	Fairfield	64 ppb
#8	Hayward	61 ppb
#9	San Jose	61 ppb
#10	Napa	58 ppb
#11	Vallejo	58 ppb
#12	Redwood City	57 ppb
#13	San Rafael	57 ppb
#14	Santa Rosa	49 ppb
#15	Oakland	48 ppb
#16	San Francisco	47 ppb



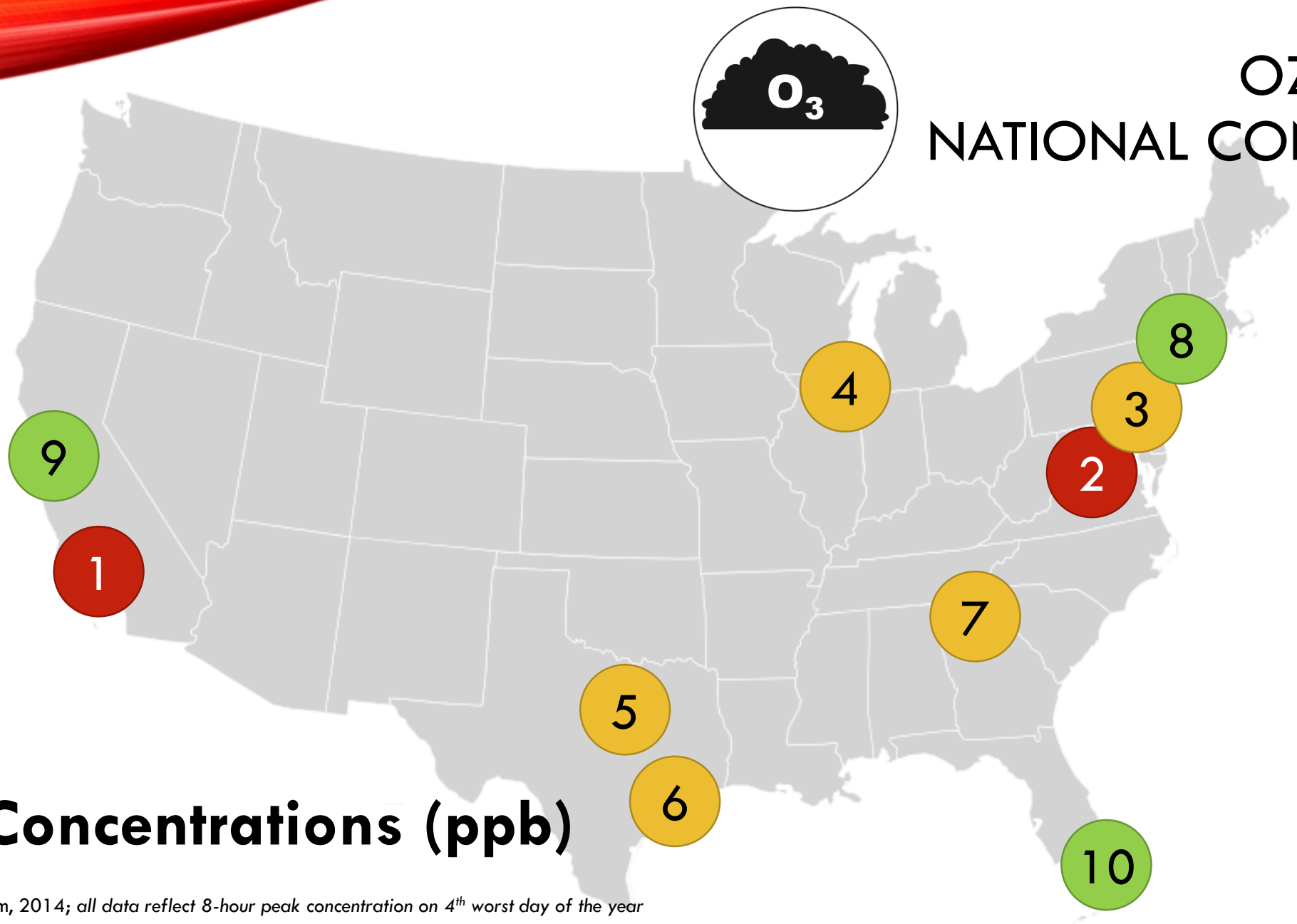
Source: BAAQMD Air Quality Sensors, 2014; *all sensors reflect 8-hour peak concentration on 4th worst day of the year; 3-year rolling average*

OZONE CONCENTRATIONS BY SENSOR LOCATION (**3-YEAR** DATA)



Source: BAAQMD Air Quality Sensors, 2014; *all sensors reflect 8-hour peak concentration on 4th worst day of the year; minor sensor relocations are considered successors to the same sensor in graph above*

OZONE: NATIONAL CONTEXT



Ozone Concentrations (ppb)

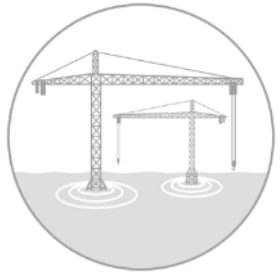
Source: EPA Air Quality System, 2014; *all data reflect 8-hour peak concentration on 4th worst day of the year*

KEY FINDINGS FROM VITAL SIGNS: ENVIRONMENT

While the region continues to grapple with particulate emissions in highly impacted areas, **the fact remains that the region's air quality has never been better in the last half-century** than it is today.

Frustratingly little can be said about the region's greenhouse gas emission trajectory, but thanks to shorter trip distances and high non-auto mode shares, San Franciscans lead the way with the lowest per-capita emissions amongst Bay Area residents.

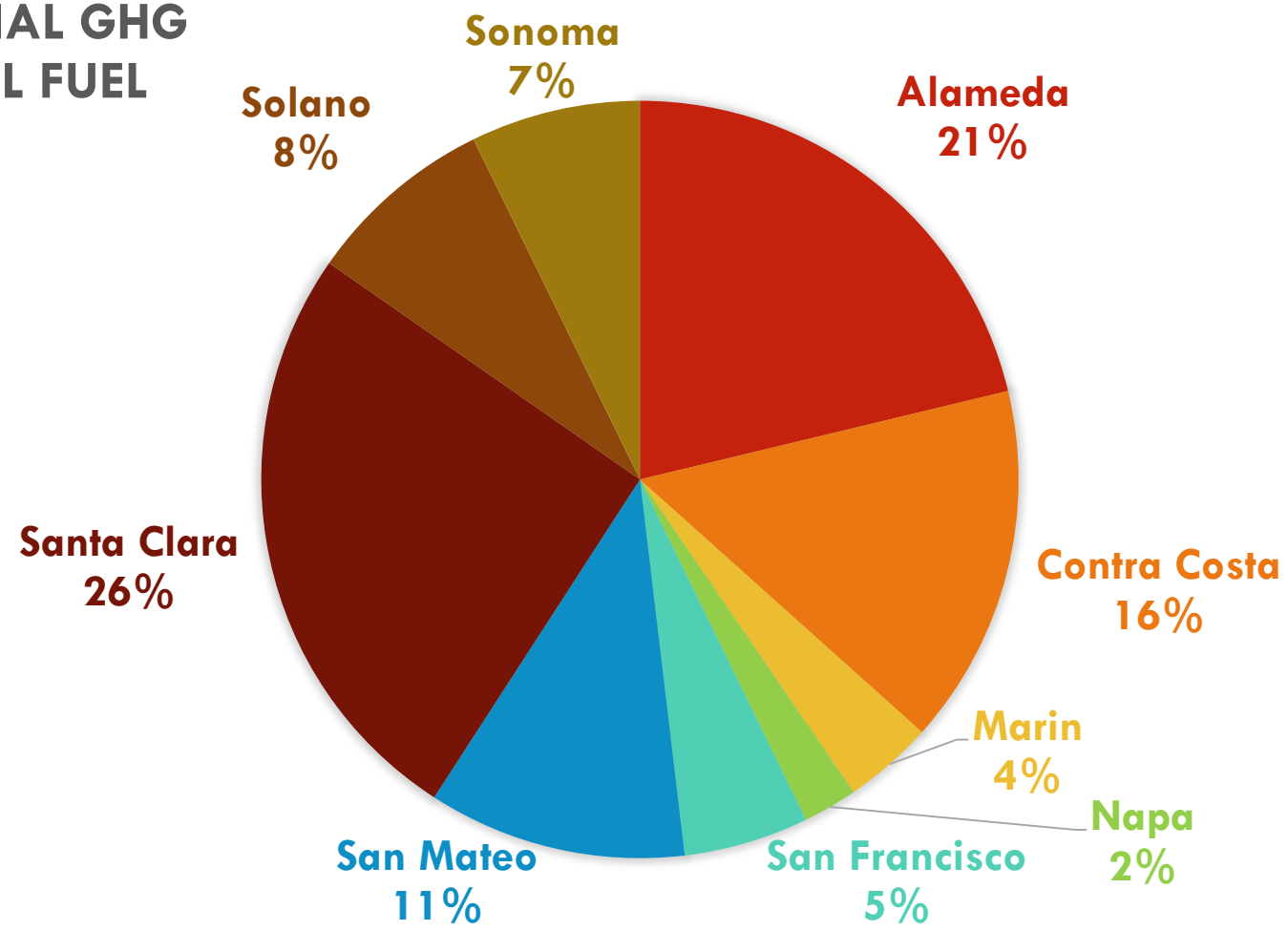
Improved vehicle technologies have reduced fatalities and injuries from crashes despite growing traffic volumes and increasing regional population; despite this, vulnerable users have not seen declines commensurate with motorists.



Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resources over the past half-century; **our region's 21st century challenge is to protect a significant and stable share of residents at risk from sea level rise.**

GREENHOUSE GAS EMISSIONS: LOCAL FOCUS

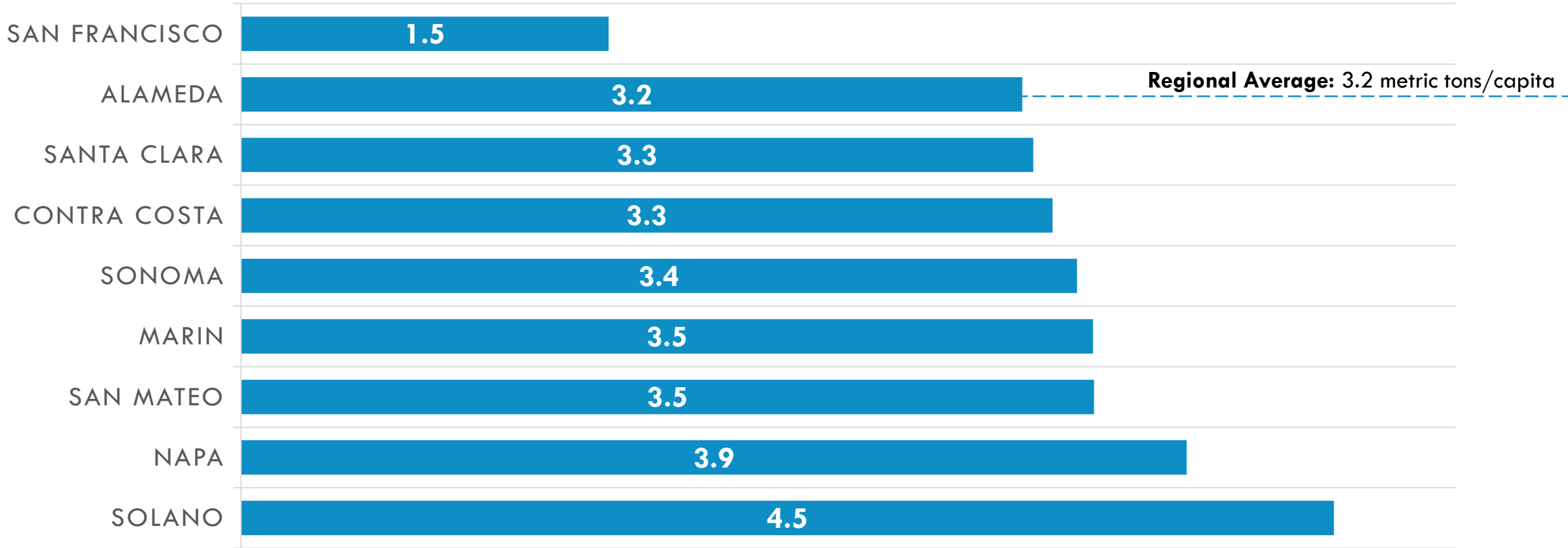
BREAKDOWN OF REGIONAL GHG EMISSIONS FROM RETAIL FUEL BY COUNTY



Source: California Energy Commission, 2012

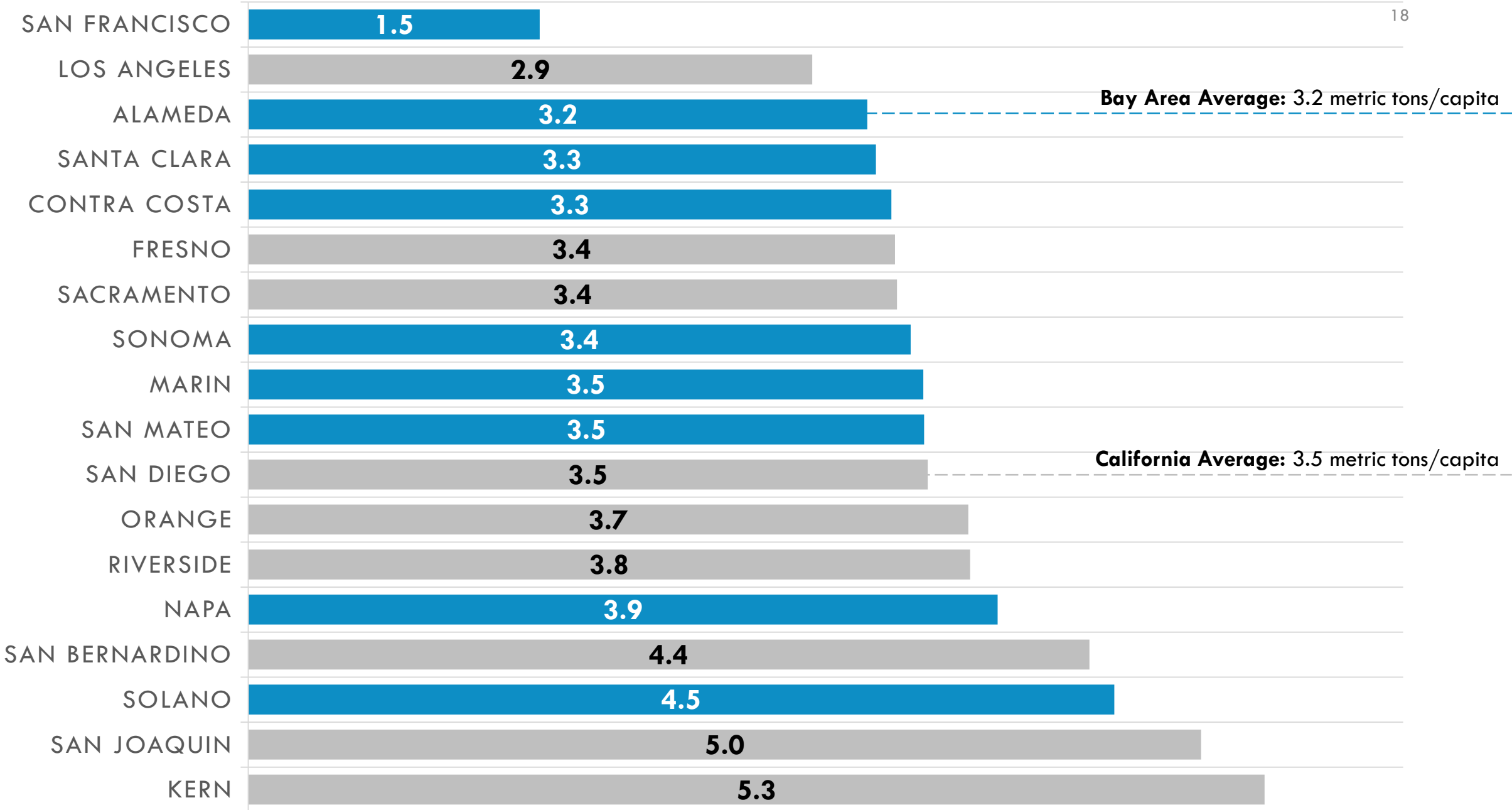
GREENHOUSE GAS EMISSIONS: LOCAL FOCUS

PER-CAPITA GHG EMISSIONS FROM RETAIL FUEL SALES BY COUNTY (IN METRIC TONS)



Sources: California Energy Commission, 2012; California Department of Finance, 2012

PER-CAPITA GHG EMISSIONS FROM RETAIL FUEL SALES BY COUNTY (IN METRIC TONS)



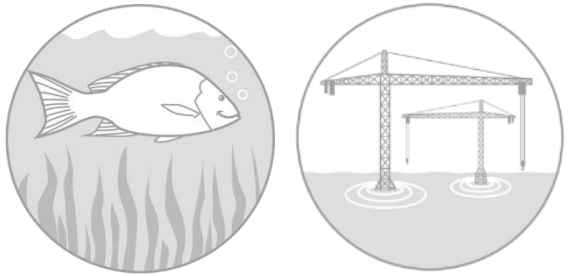
Sources: California Energy Commission, 2012; California Department of Finance, 2012

KEY FINDINGS FROM VITAL SIGNS: ENVIRONMENT

While the region continues to grapple with particulate emissions in highly impacted areas, **the fact remains that the region's air quality has never been better in the last half-century** than it is today.

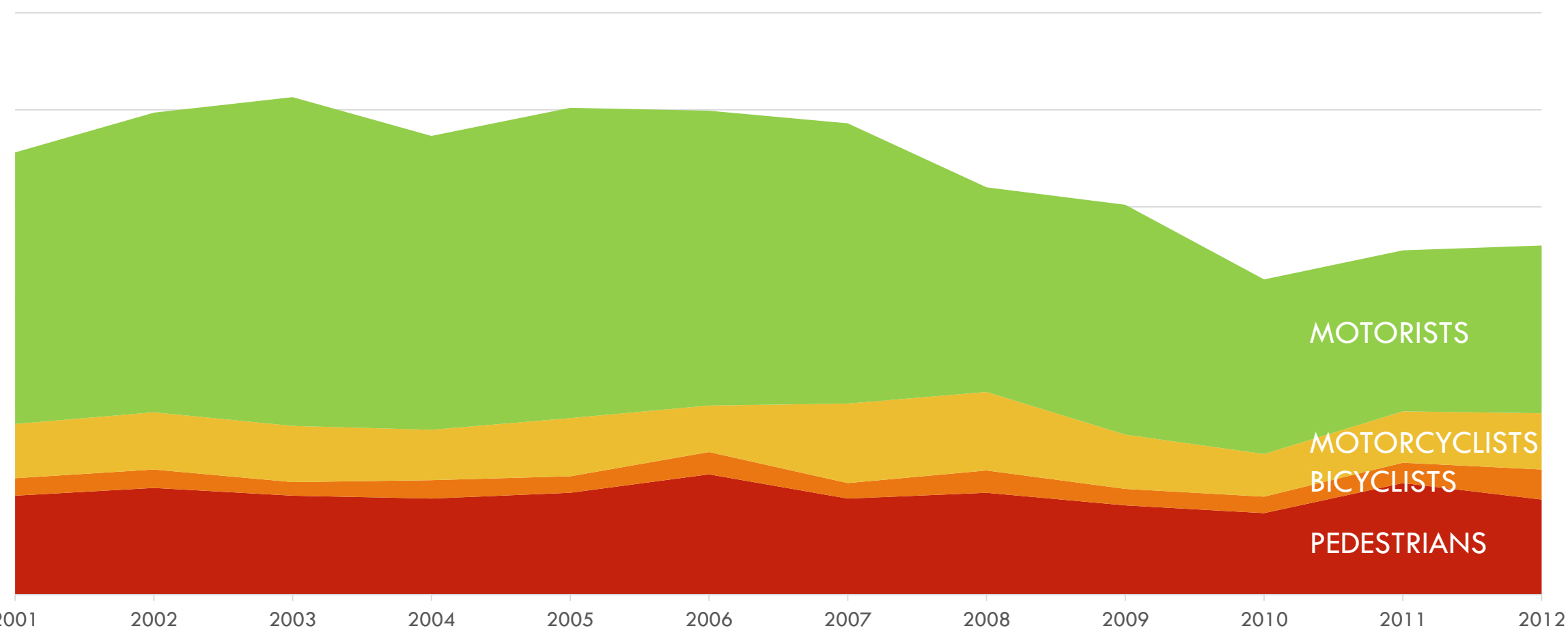
Frustratingly little can be said about the region's greenhouse gas emission trajectory, but thanks to shorter trip distances and high non-auto mode shares, San Franciscans lead the way with the lowest per-capita emissions amongst Bay Area residents.

Improved vehicle technologies have reduced fatalities and injuries from crashes despite growing traffic volumes and increasing regional population; despite this, vulnerable users have not seen declines commensurate with motorists.



Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resources over the past half-century; **our region's 21st century challenge is to protect a significant and stable share of residents at risk from sea level rise.**

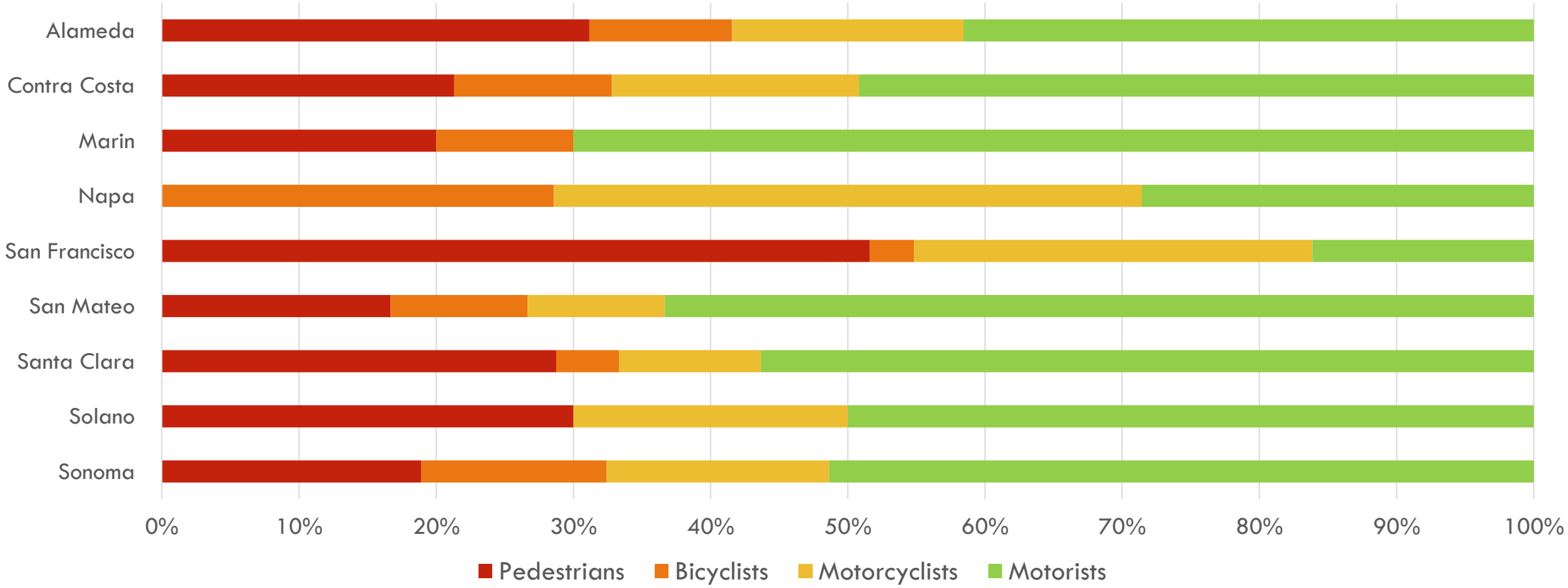
FATALITIES FROM CRASHES: REGIONAL PERFORMANCE



Source: CHP SWITRS, 2012

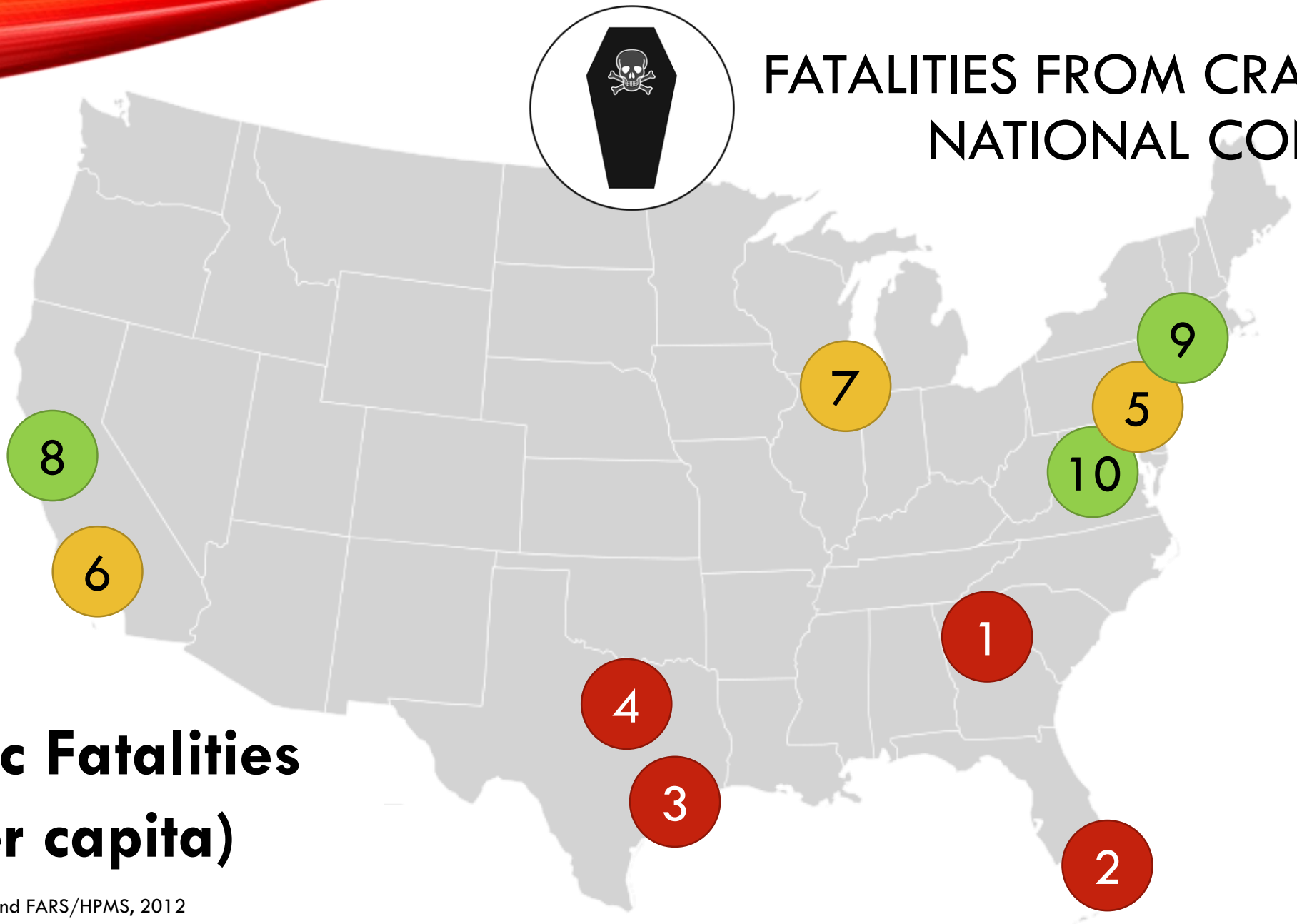
FATALITIES FROM CRASHES: LOCAL FOCUS

Modal Breakdown



Source: CHP SWITRS, 2012

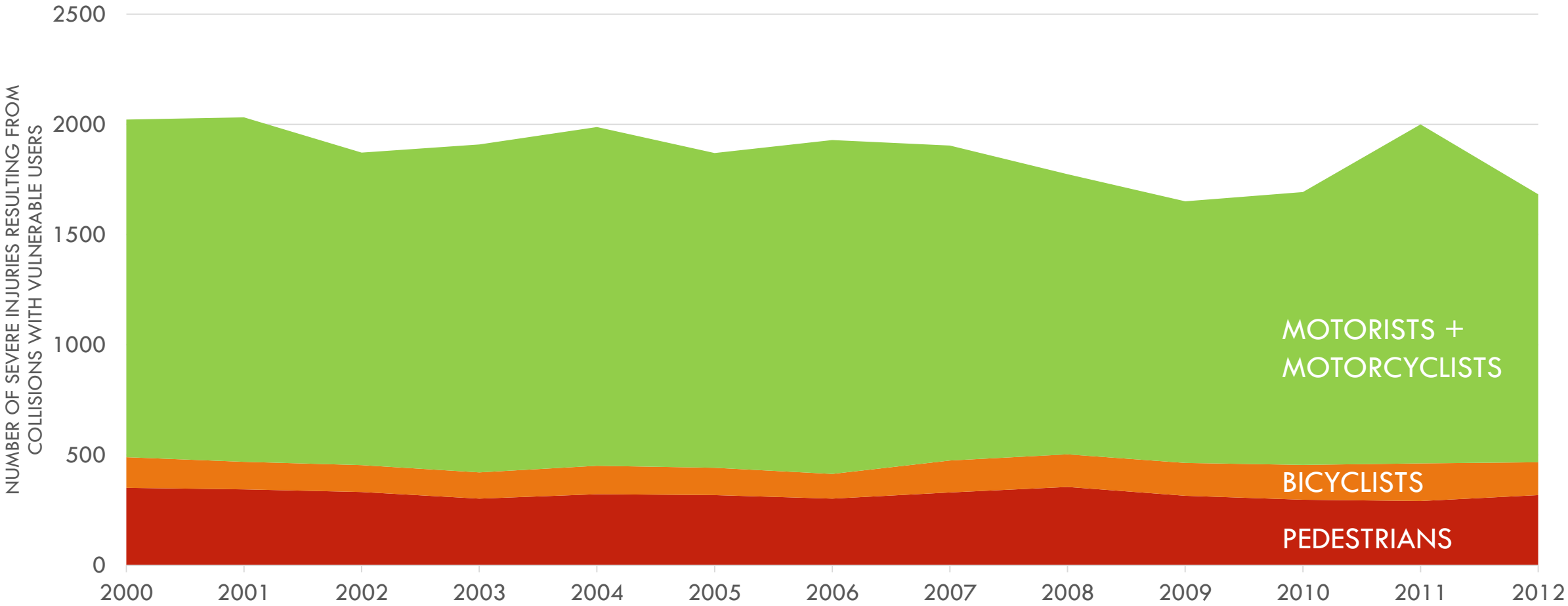
FATALITIES FROM CRASHES: NATIONAL CONTEXT



Traffic Fatalities (per capita)

Sources: CHP SWITRS, 2012 and FARS/HPMS, 2012

INJURIES FROM CRASHES: REGIONAL PERFORMANCE



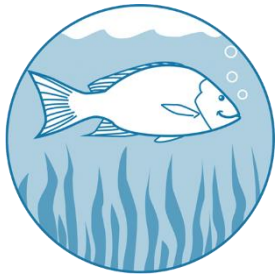
Sources: CHP SWITRS, Caltrans HPMS, U.S. Census Bureau (2001-2012)

KEY FINDINGS FROM VITAL SIGNS: ENVIRONMENT

While the region continues to grapple with particulate emissions in highly impacted areas, **the fact remains that the region's air quality has never been better in the last half-century** than it is today.

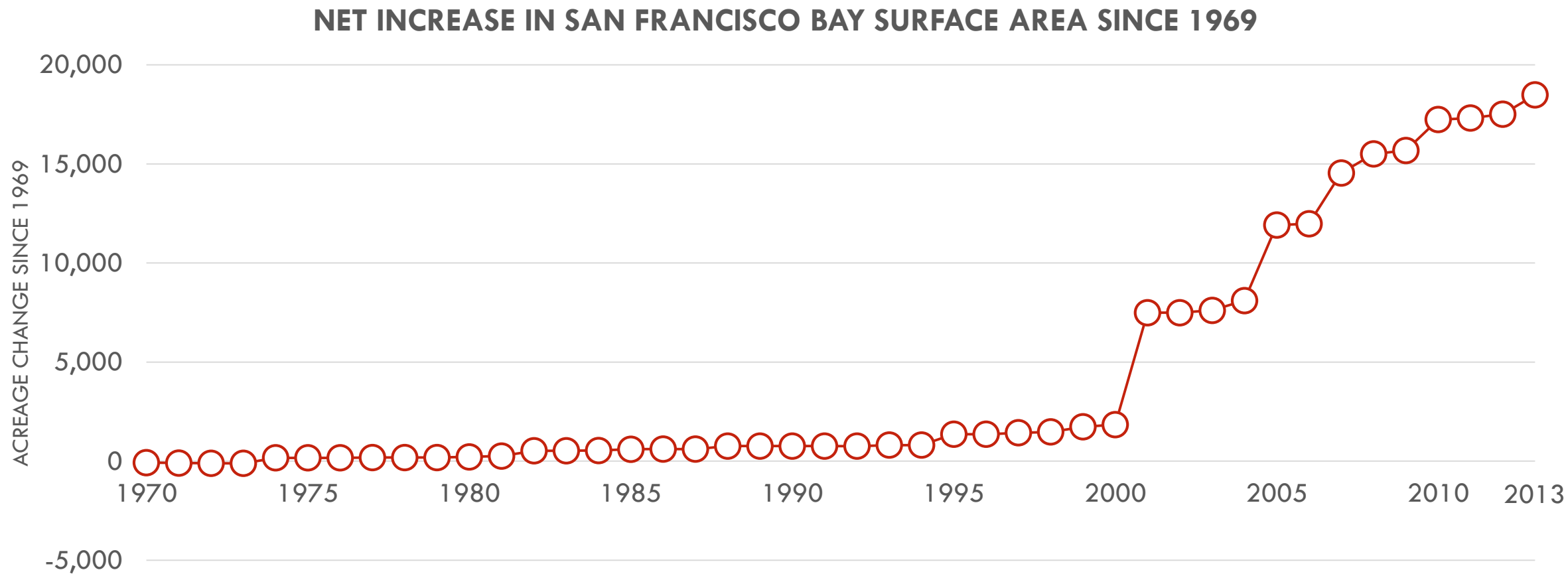
Frustratingly little can be said about the region's greenhouse gas emission trajectory, but thanks to shorter trip distances and high non-auto mode shares, San Franciscans lead the way with the lowest per-capita emissions amongst Bay Area residents.

Improved vehicle technologies have reduced fatalities and injuries from crashes despite growing traffic volumes and increasing regional population; despite this, vulnerable users have not seen declines commensurate with motorists.



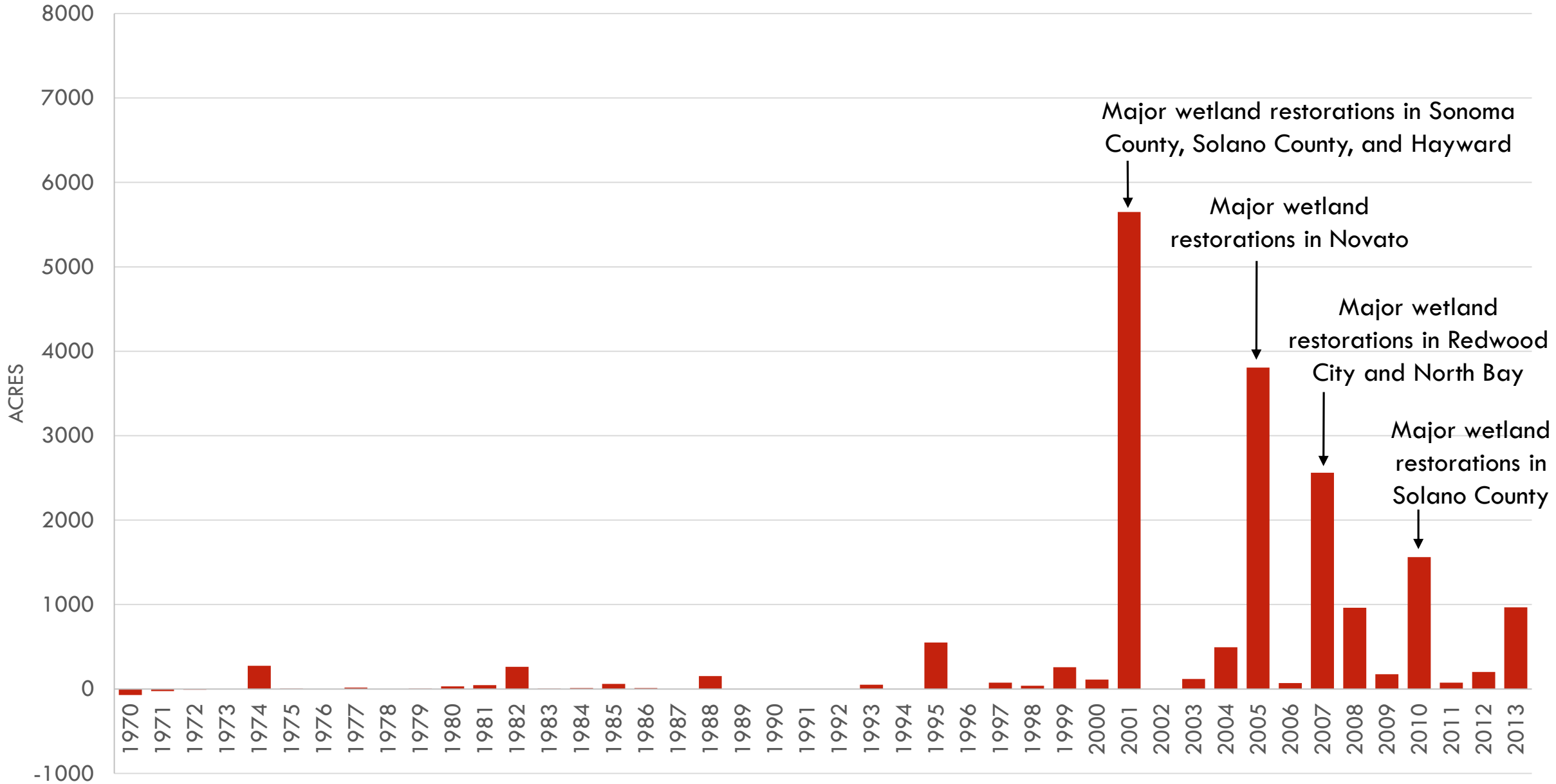
Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resources over the past half-century; **our region's 21st century challenge is to protect a significant and stable share of residents at risk from sea level rise**.

BAY RESTORATION: REGIONAL PERFORMANCE

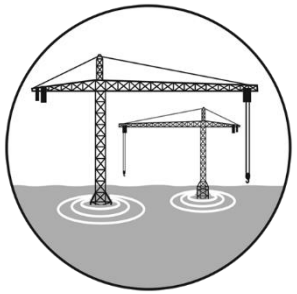


Source: BCDC Annual Report, 2013

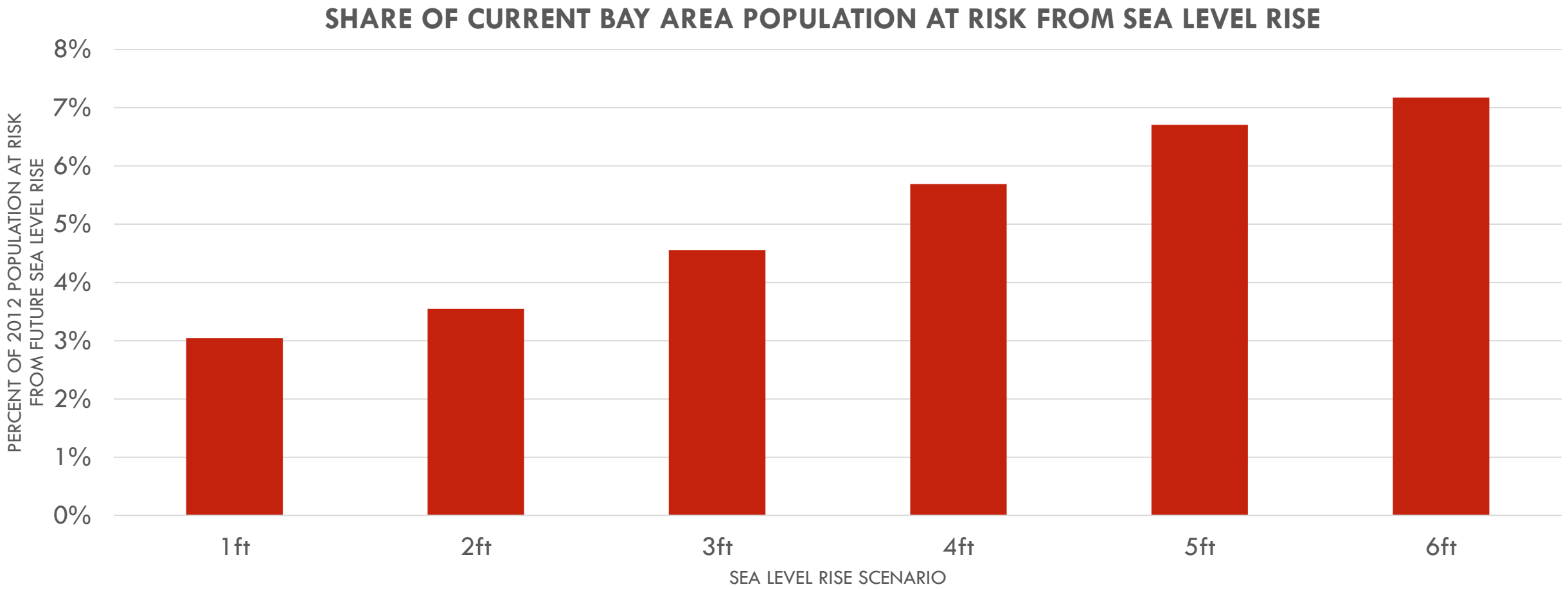
ANNUAL CHANGE IN SAN FRANCISCO BAY SURFACE AREA



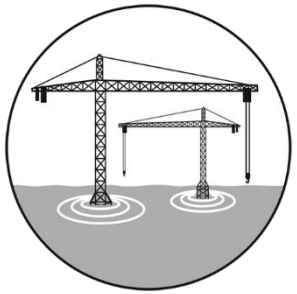
Source: BCDC Annual Report, 2013



VULNERABILITY TO SEA LEVEL RISE: REGIONAL PERFORMANCE

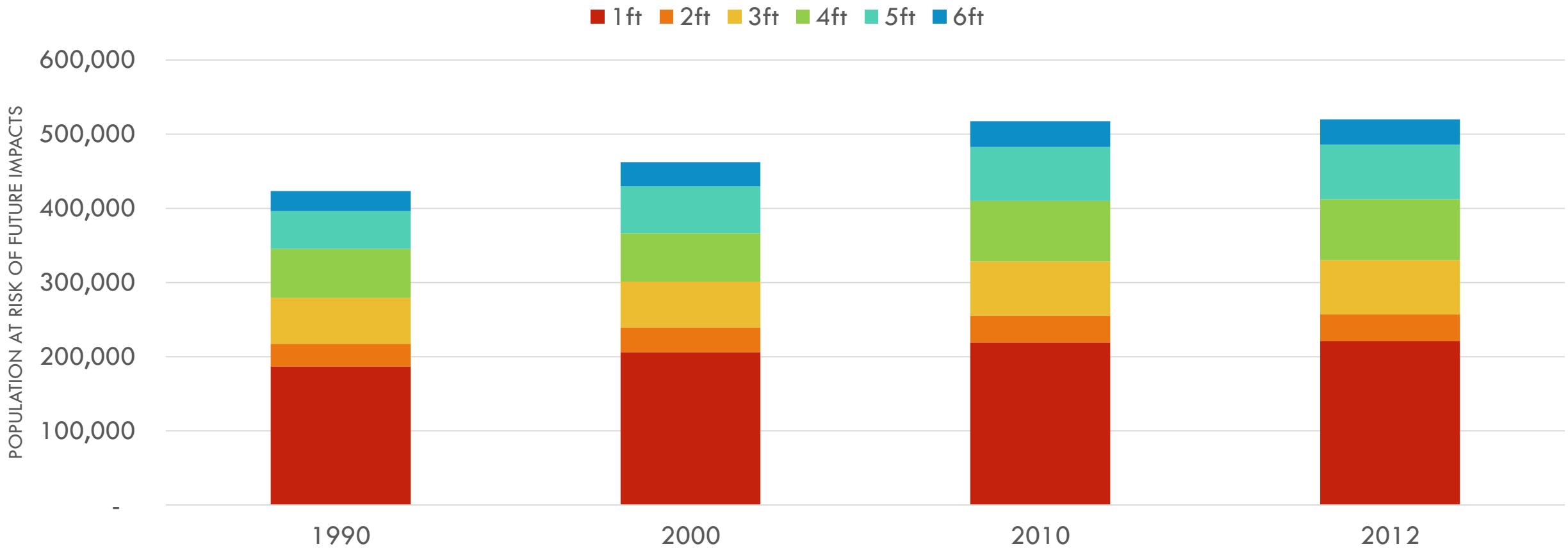


Sources: NOAA; BCDC; U.S. Census Bureau

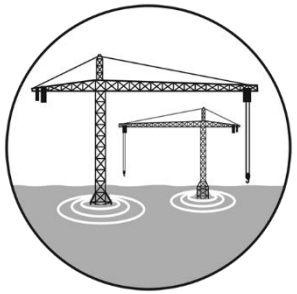


VULNERABILITY TO SEA LEVEL RISE: REGIONAL PERFORMANCE

POPULATION AT RISK FROM SEA LEVEL RISE (HISTORICAL TREND)

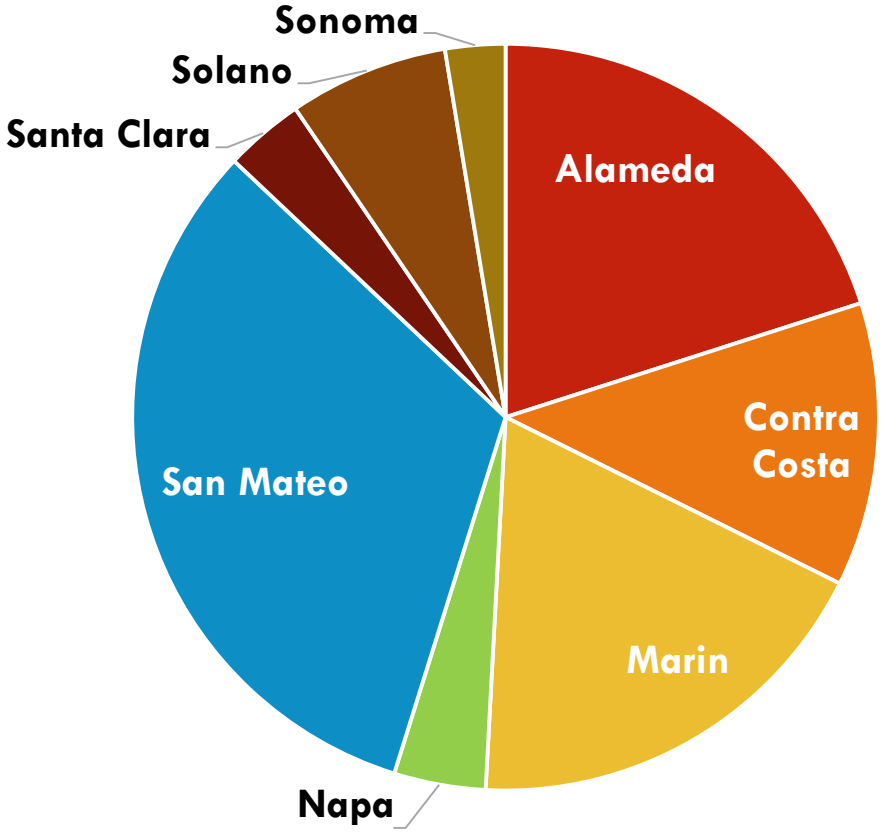


Sources: NOAA; BCDC; U.S. Census Bureau

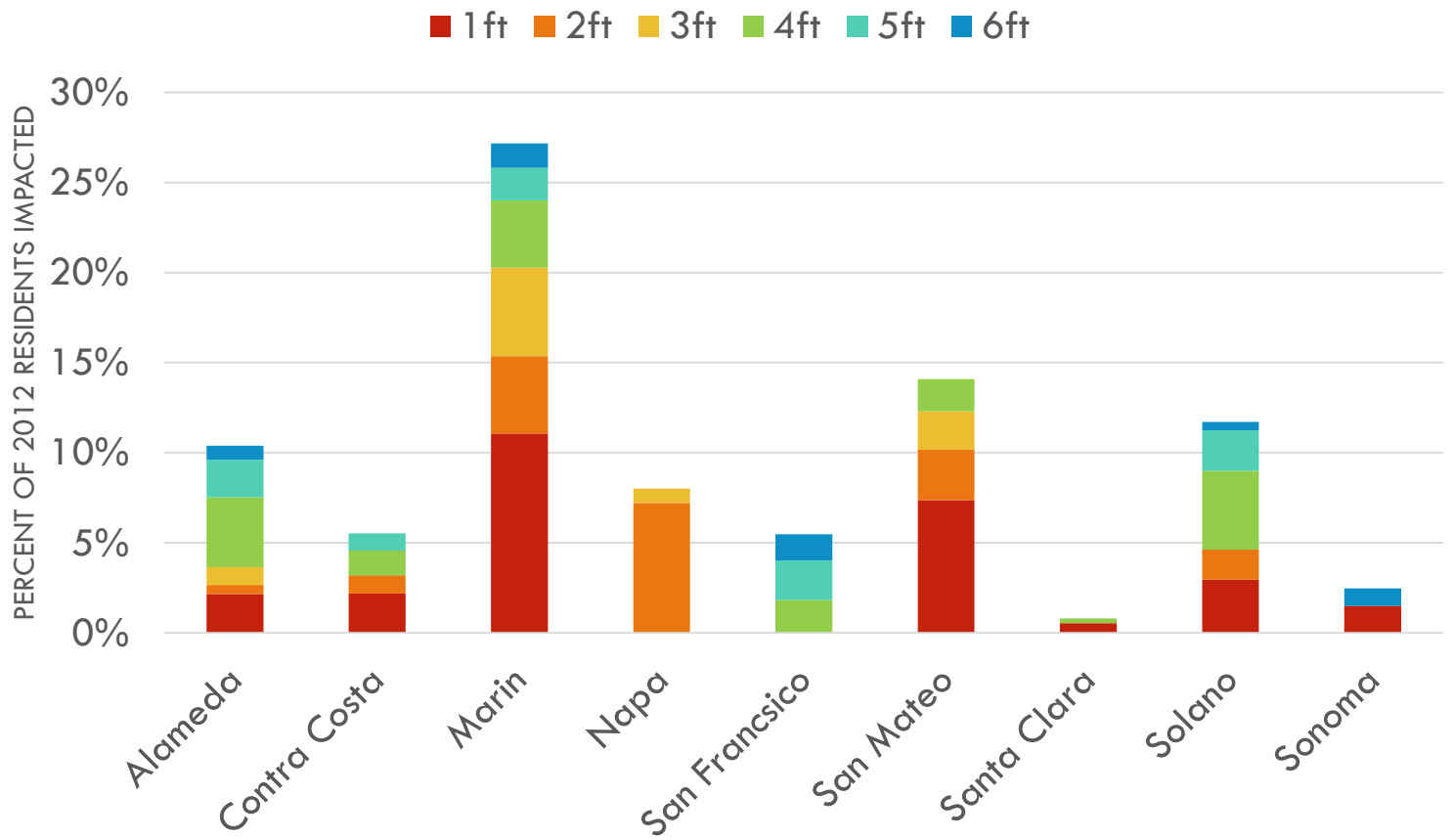


VULNERABILITY TO SEA LEVEL RISE: LOCAL FOCUS

RESIDENTS AFFECTED BY 3 FEET OF SEA LEVEL RISE



PERCENT OF COUNTY RESIDENTS AFFECTED BY SEA LEVEL RISE



Sources: NOAA; BCDC; U.S. Census Bureau

KEY TAKEAWAYS

from the Vital Signs Initiative

Key Takeaway #1

Environmental protectionism has resulted in clean air, healthy ecosystems, and abundant open space in our region – but the associated regulatory hurdles have held back housing production and contributed to the region's unaffordability.

Image Source: https://www.flickr.com/photos/ta2cute/4686596197

Key Takeaway #2

The region's recent tech-driven economic boom has come about despite these affordability challenges; residents are faced with tough choices about living in America's most expensive region or moving away to more affordable metros.

Image Source: https://www.flickr.com/photos/arballoimages/11095571233

Key Takeaway #3

The Bay Area may be just starting to turn a corner towards more sustainable land use patterns – in particular, transit-served urban neighborhoods could have positive effects on transit usage and congestion.

Image Source: https://www.flickr.com/photos/parksdh/9086774456

Key Takeaway #4

We're much more complex than "One Bay Area" – the significant gaps that exist between the haves and have-nots and between the various sub-geographies of the Bay Area demonstrate the complexity in tailoring policies that benefit our region as a whole.

Image Source: https://www.flickr.com/photos/kptripathi/6345691882


Transportation Data:
Now Available!
Land & People Data:
Now Available!
Economy Data:
Now Available!
Environment Data:
Now Available!
VITAL SIGNS
VITALSIGNS.MTC.CA.GOV
Image Source: https://www.flickr.com/photos/warzauwynn/10789613323