TO: Joint MTC Planning Committee with the ABAG Administrative Committee

DATE: September 4, 2015

FR: MTC Executive Director

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. 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 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. An emphasis on protecting our region's environment has resulted in cleaner air, healthier ecosystems, and more abundant open space.
2. The Bay Area's combination of a booming economy and constraints on development has resulted in limited housing production and serious affordability challenges, leaving residents and companies with the tough choice between the advantages of one of America's most innovative but expensive regions or locating in a more affordable metro.
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.
4. We are much more complex than "One Bay Area". The substantial differences that exist across the region – with respect to relative prosperity, housing opportunities, environmental conditions and transportation options, to name just a few – highlight the challenge we face in tailoring policies that benefit the region as a whole.

Steve Heminger

SH: dv
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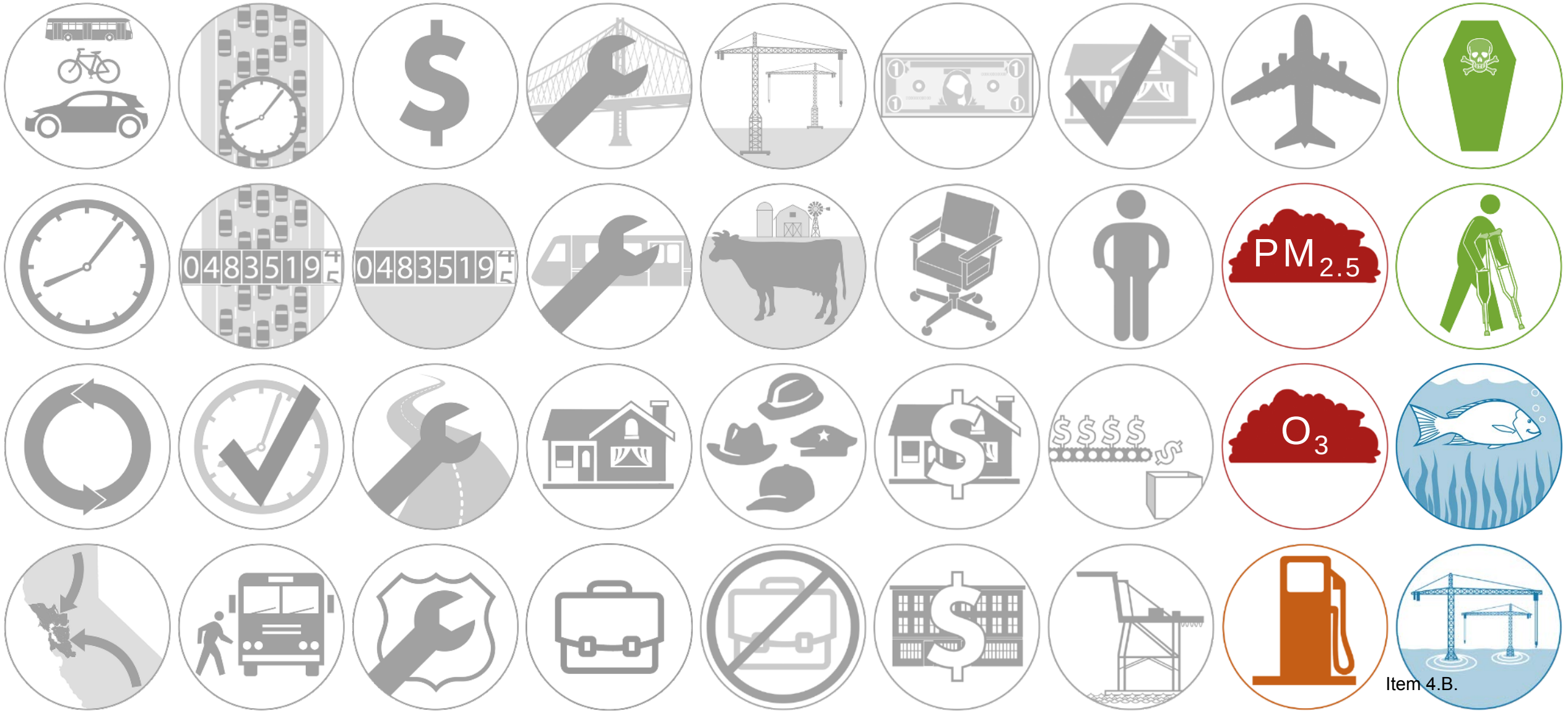
VITAL SIGNS
SEPTEMBER 4, 2015
ENVIRONMENTAL INDICATORS & KEY FINDINGS
JOINT MTC PLANNING COMMITTEE WITH THE
ABAG ADMINISTRATIVE COMMITTEE
MTC
ABAG
BAAQMD
BCDC
Item 4.B.
Image Source: https://www.flickr.com/photos/mlwok/7119900747

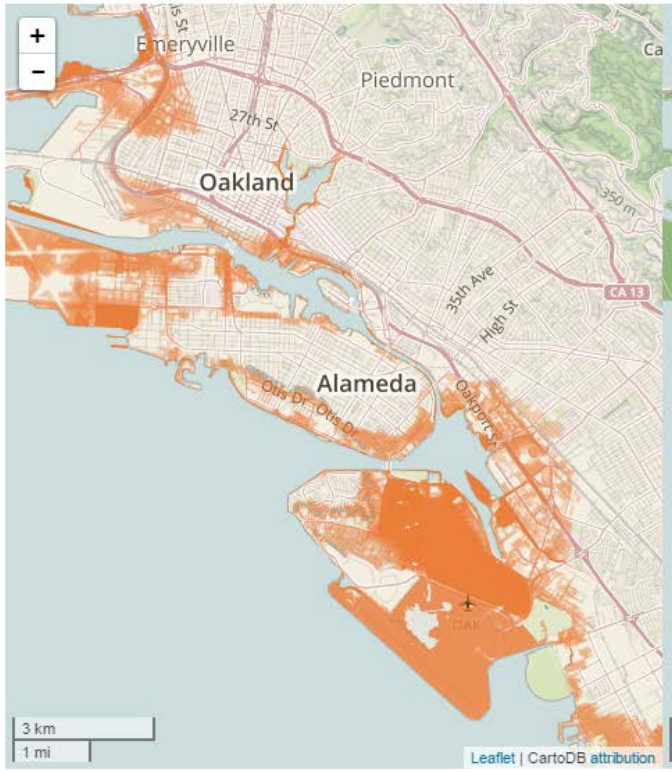
With the recent release of Vital Signs: Environment, the public now has access to a total of 36 performance indicators via nearly 100 interactive maps & charts.



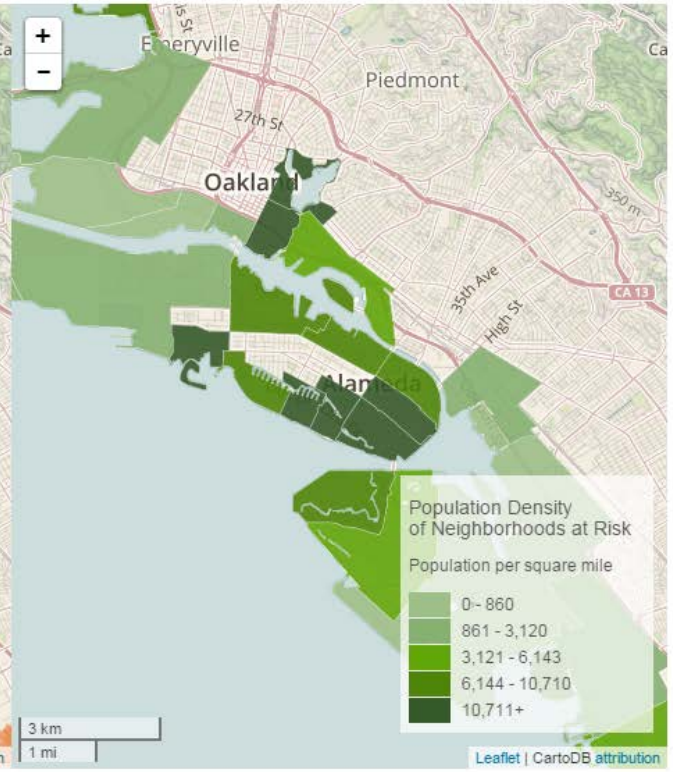
New interactive maps and charts on air quality, road safety, and San Francisco Bay are now available.

vitalsigns.mtc.ca.gov

Impacted Land Area

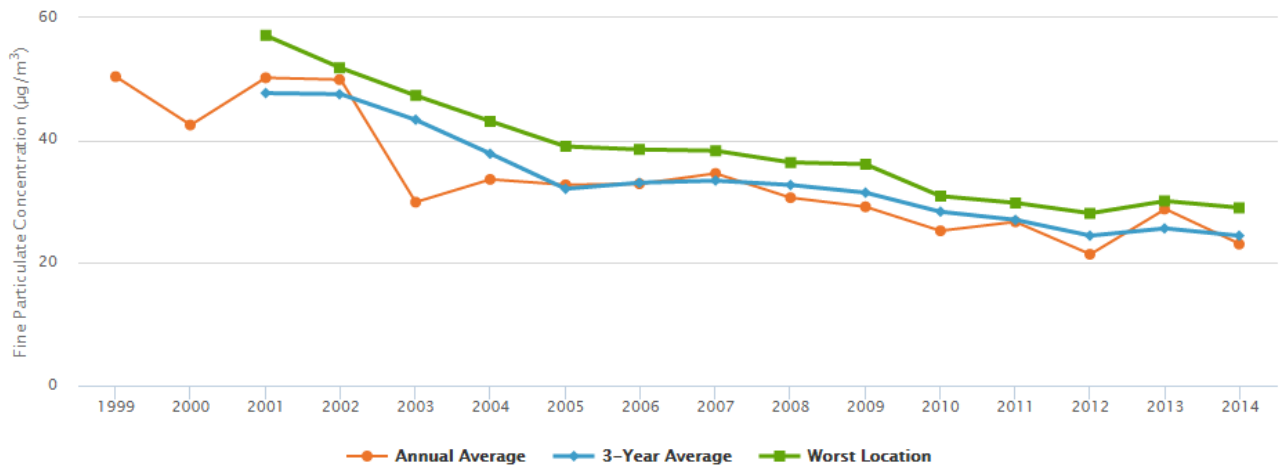


Population at Risk of Impacts

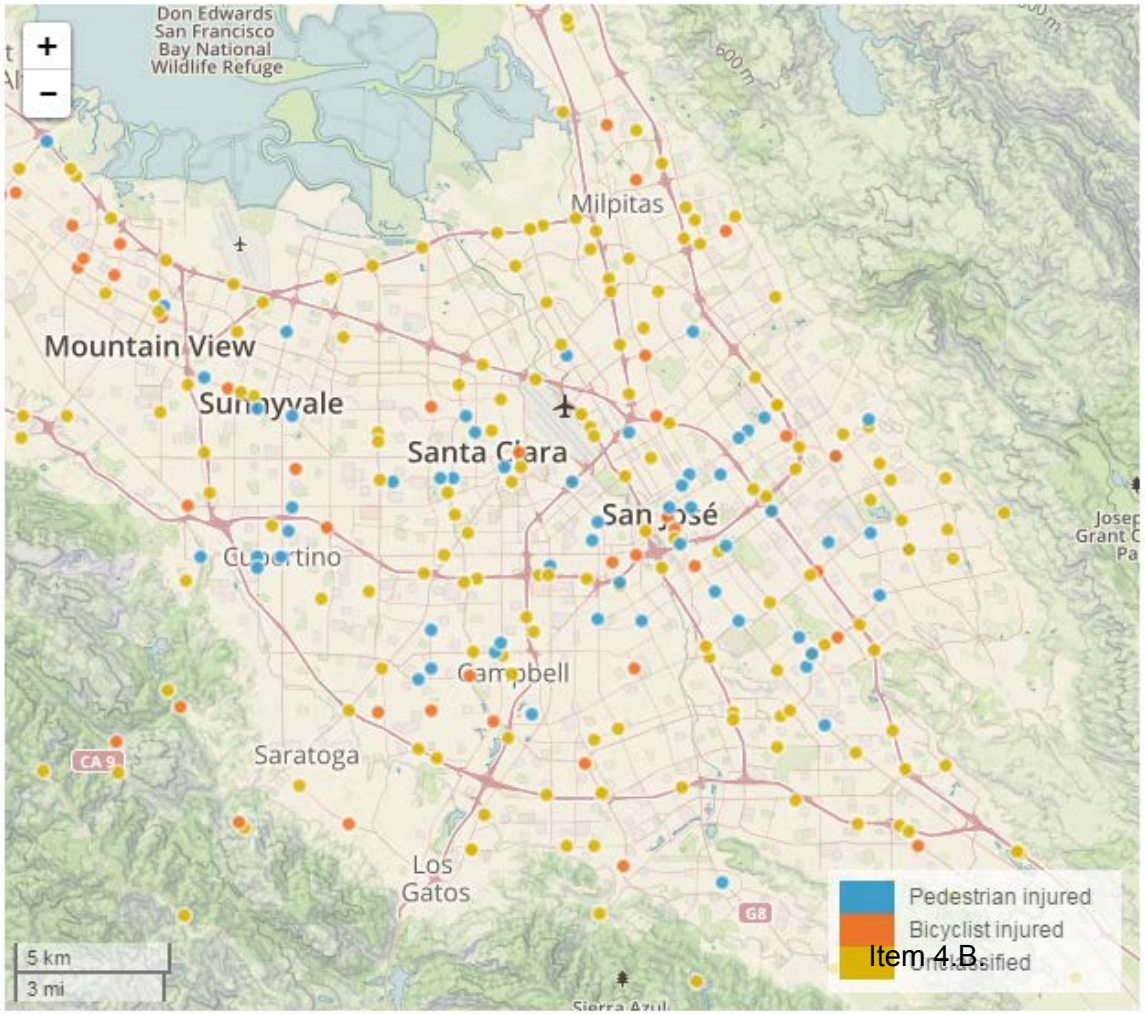


Annual Average Fine Particulate Concentrations | 98th Percentile Daily Fine Particulate Concentrations

Historical Trend for Particulate Matter Concentrations – Bay Area



2012 Injuries from Crashes



KEY FINDINGS FROM VITAL SIGNS: ENVIRONMENT

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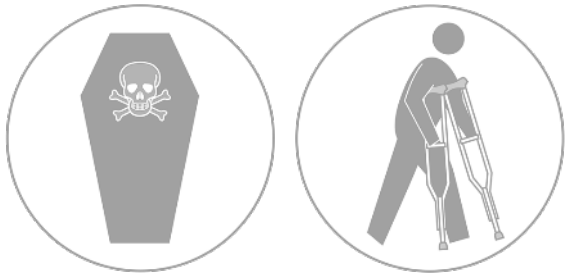

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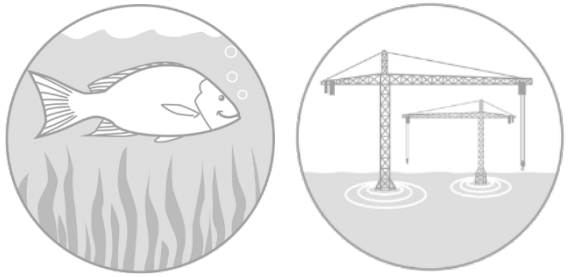
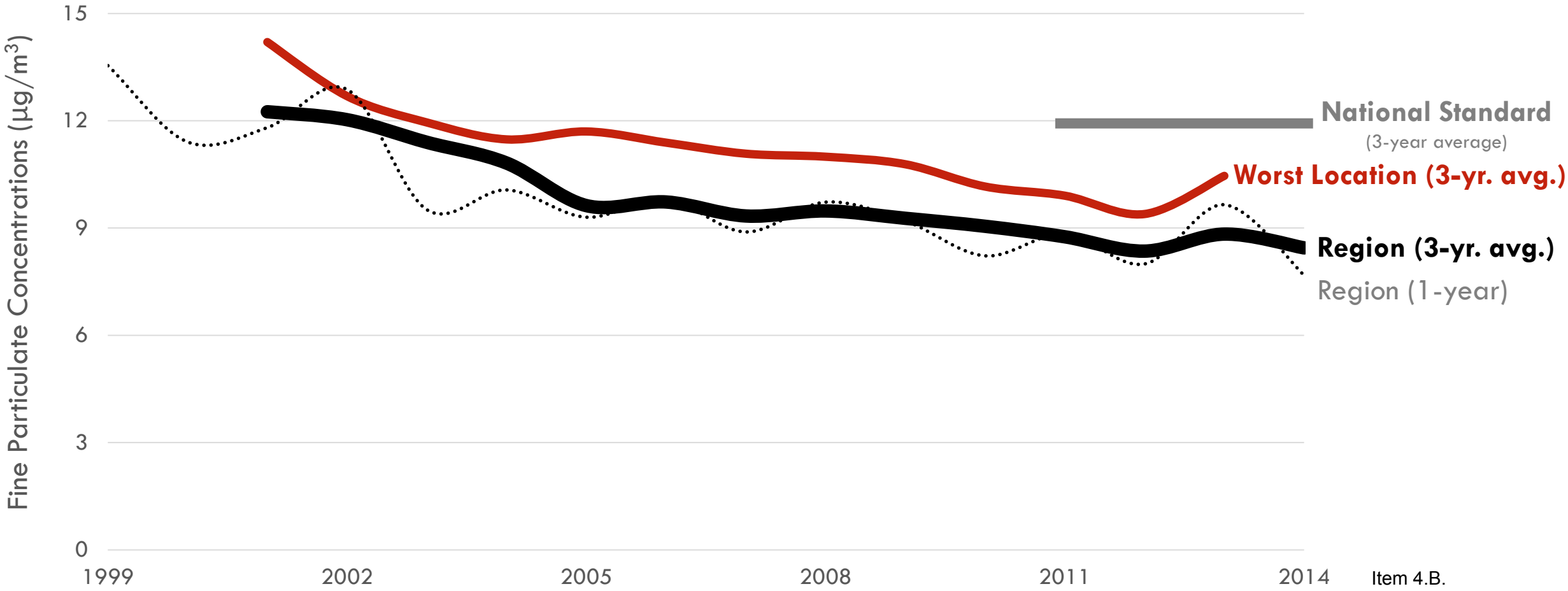


Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resource over the past half-century; **our region's 21st century challenge is to protect residents at risk from sea level rise.**

PARTICULATE MATTER: REGIONAL PERFORMANCE

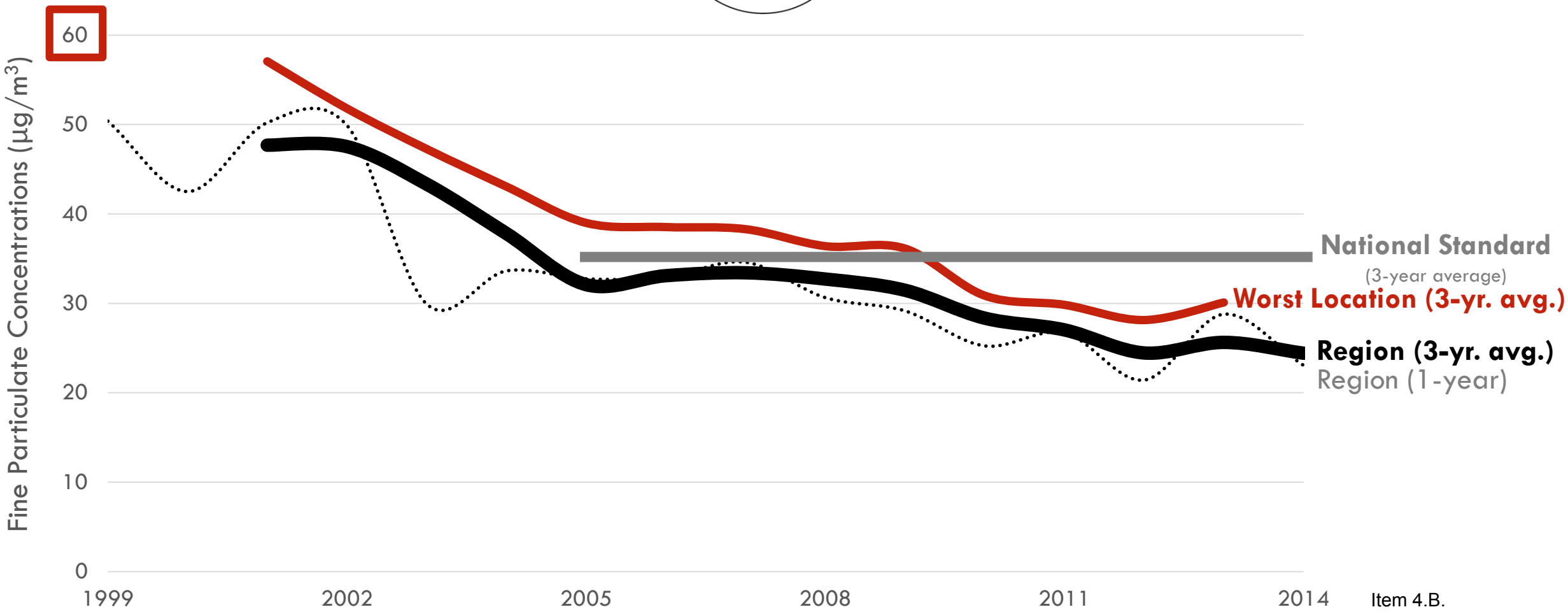
Annual Average



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

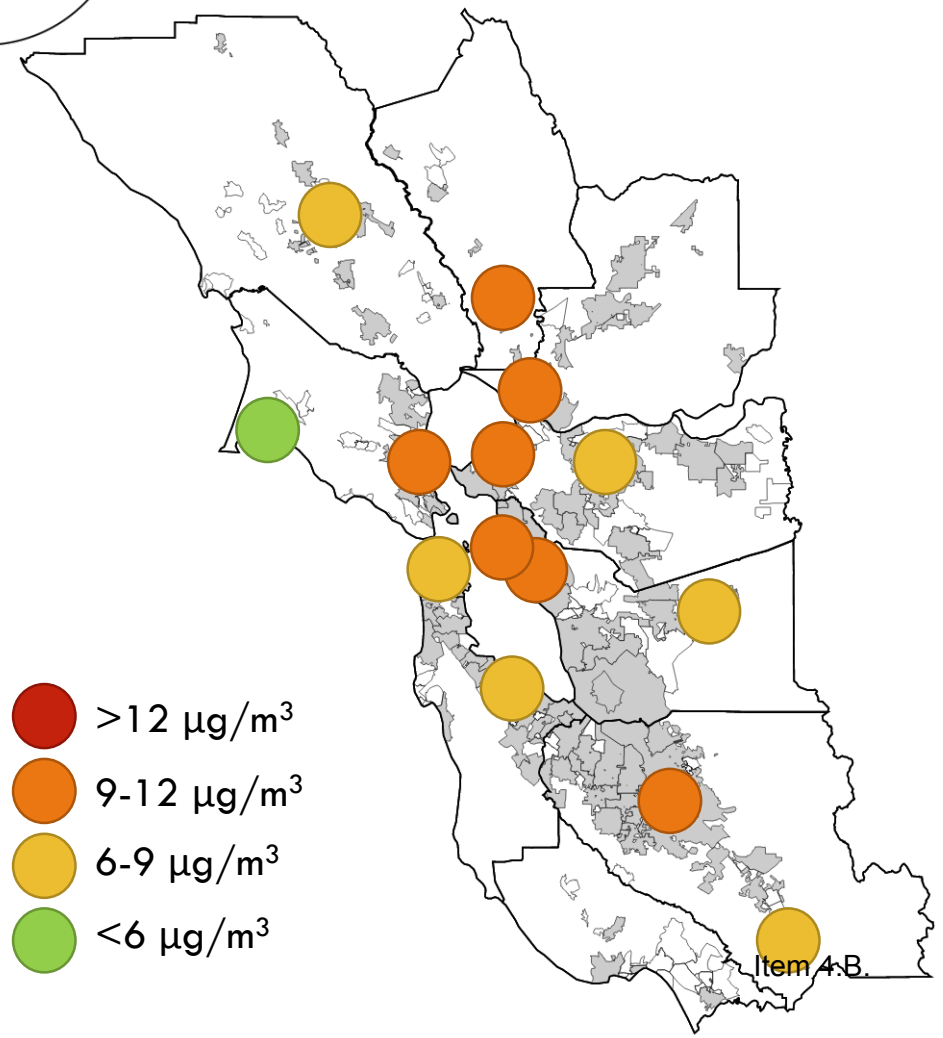
98th Percentile Day



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

PARTICULATE MATTER: LOCAL FOCUS

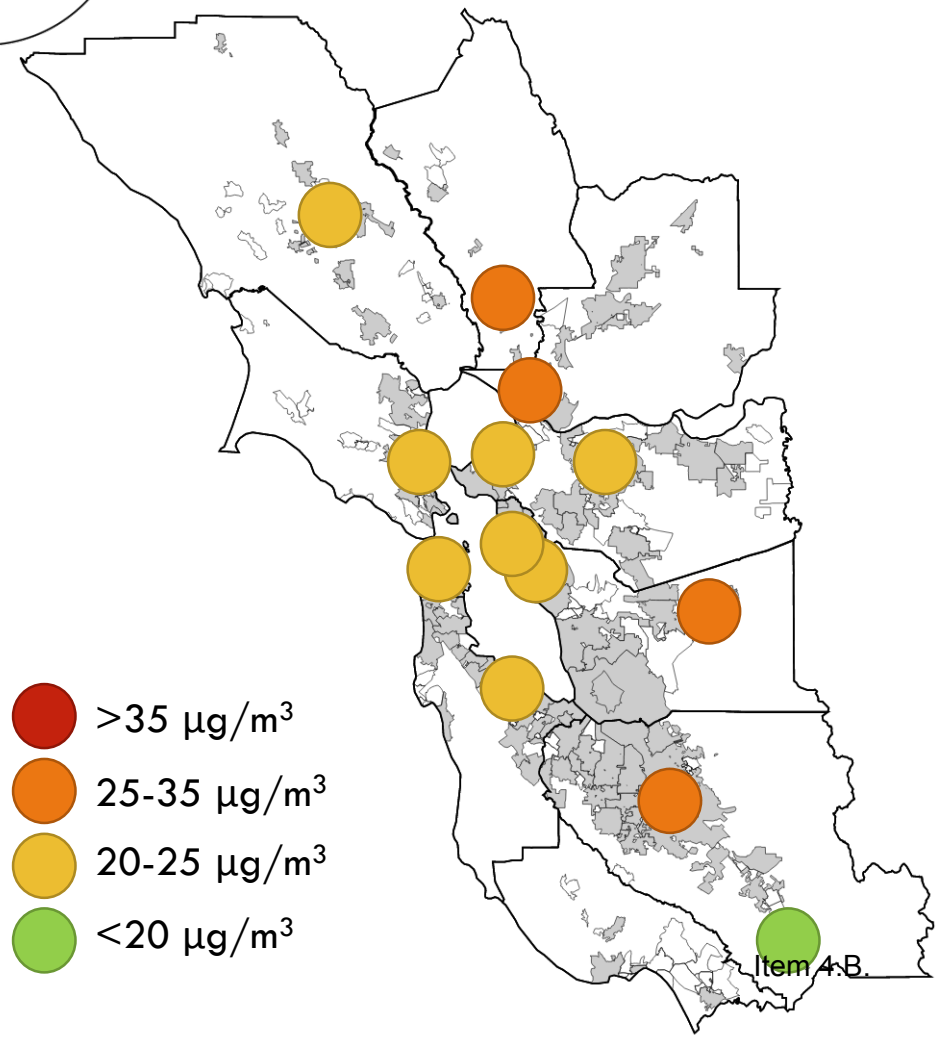
Ranked List of Fine Particulate Sensors (2012-14) *Annual Mean $PM_{2.5}$ Concentrations*		
#1	Napa	11.8 µg/m³
#2	San Pablo	11.3 µg/m³
#3	West Oakland	11.2 µg/m³
#4	San Jose	10.0 µg/m³
#5	San Rafael	9.8 µg/m³
#6	Vallejo	9.6 µg/m³
#7	Oakland	9.4 µg/m³
#8	Redwood City	8.8 µg/m³
#9	San Francisco	8.6 µg/m³
#10	Santa Rosa	8.4 µg/m³
#11	Gilroy	7.6 µg/m³
#12	Livermore	7.5 µg/m³
#13	Concord	7.0 µg/m³
#14	Point Reyes	5.5 µg/m³



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

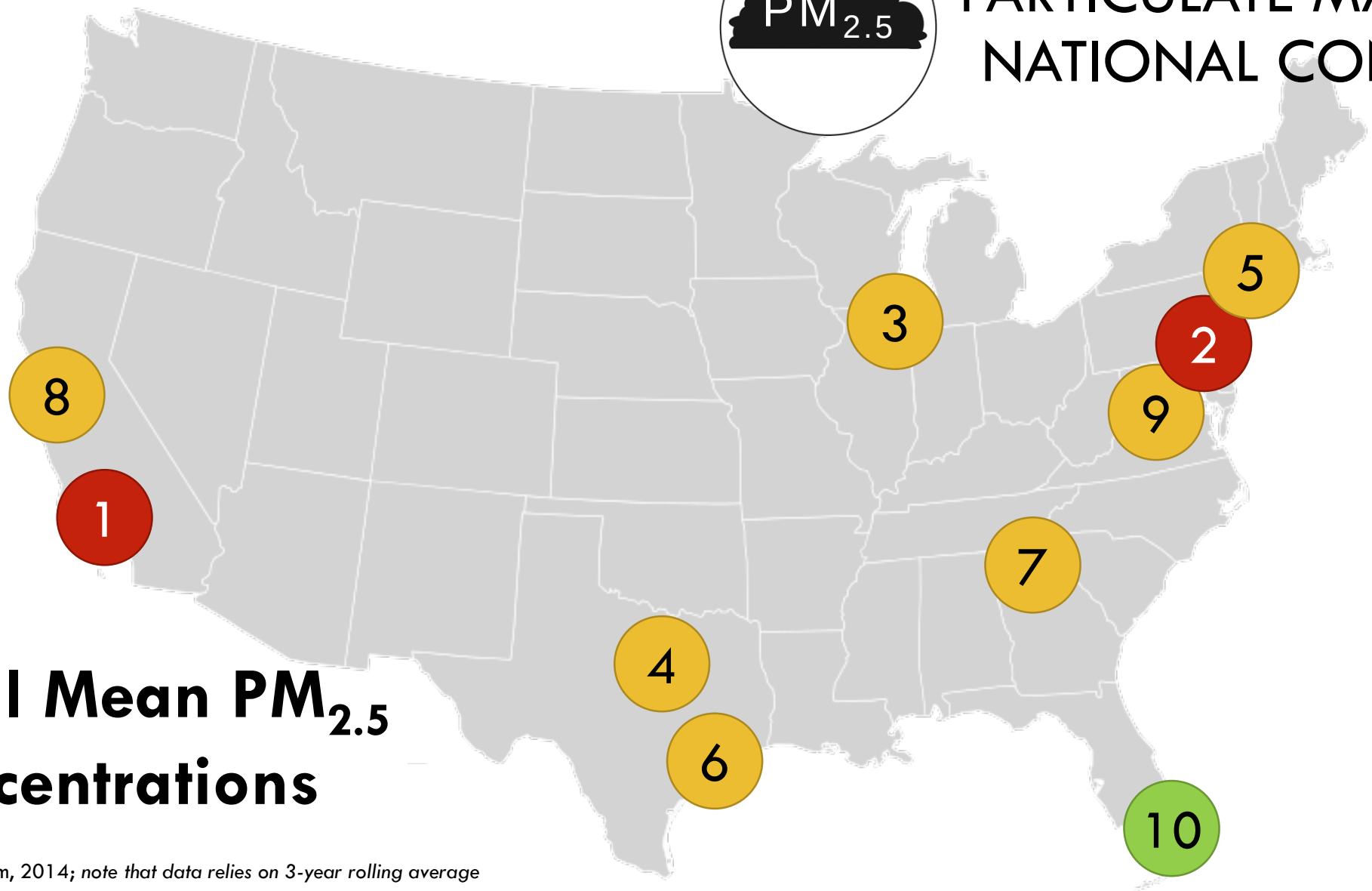
PARTICULATE MATTER: LOCAL FOCUS

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*

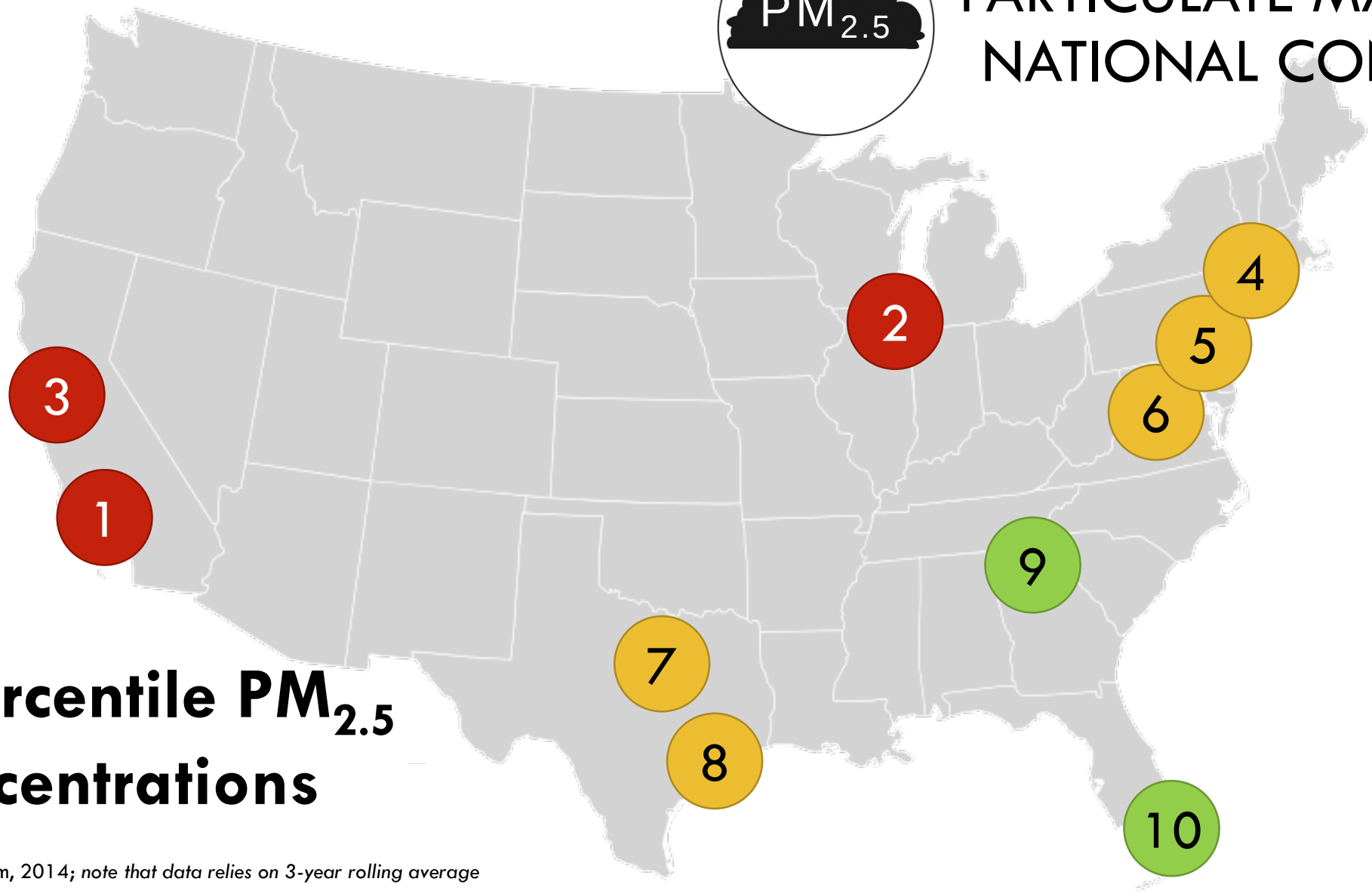
PARTICULATE MATTER: NATIONAL CONTEXT



Annual Mean $PM_{2.5}$ Concentrations

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

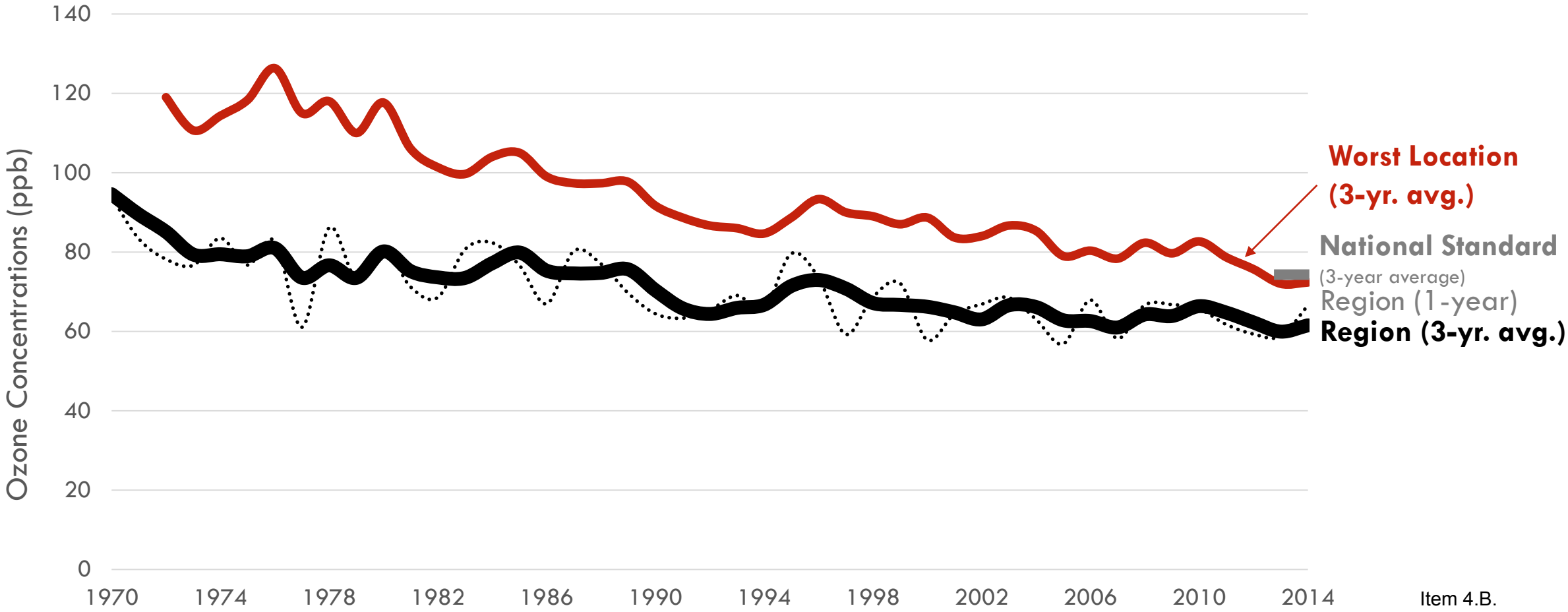
PARTICULATE MATTER: NATIONAL CONTEXT



98th Percentile $PM_{2.5}$ Concentrations

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

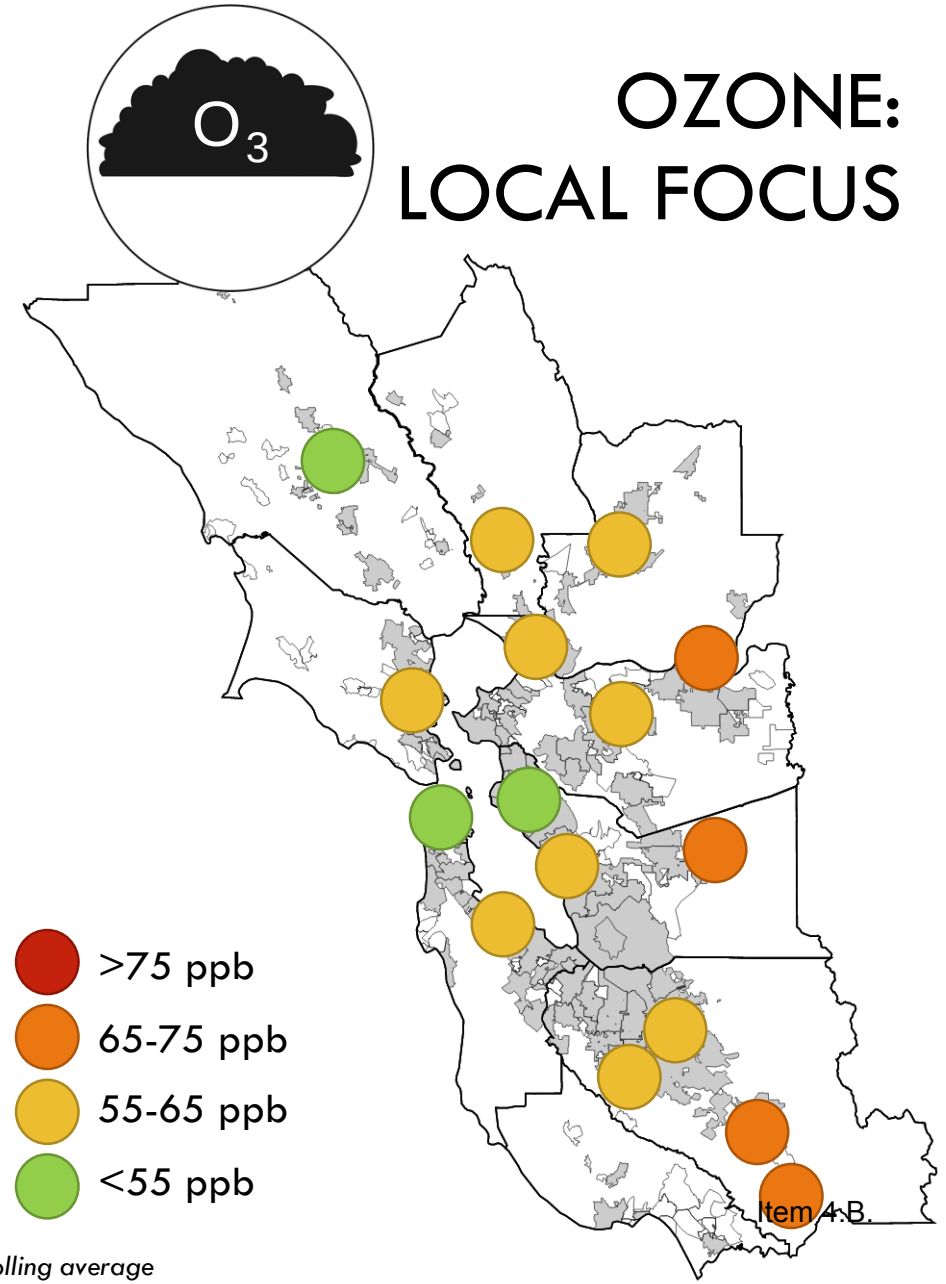
OZONE: REGIONAL PERFORMANCE



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

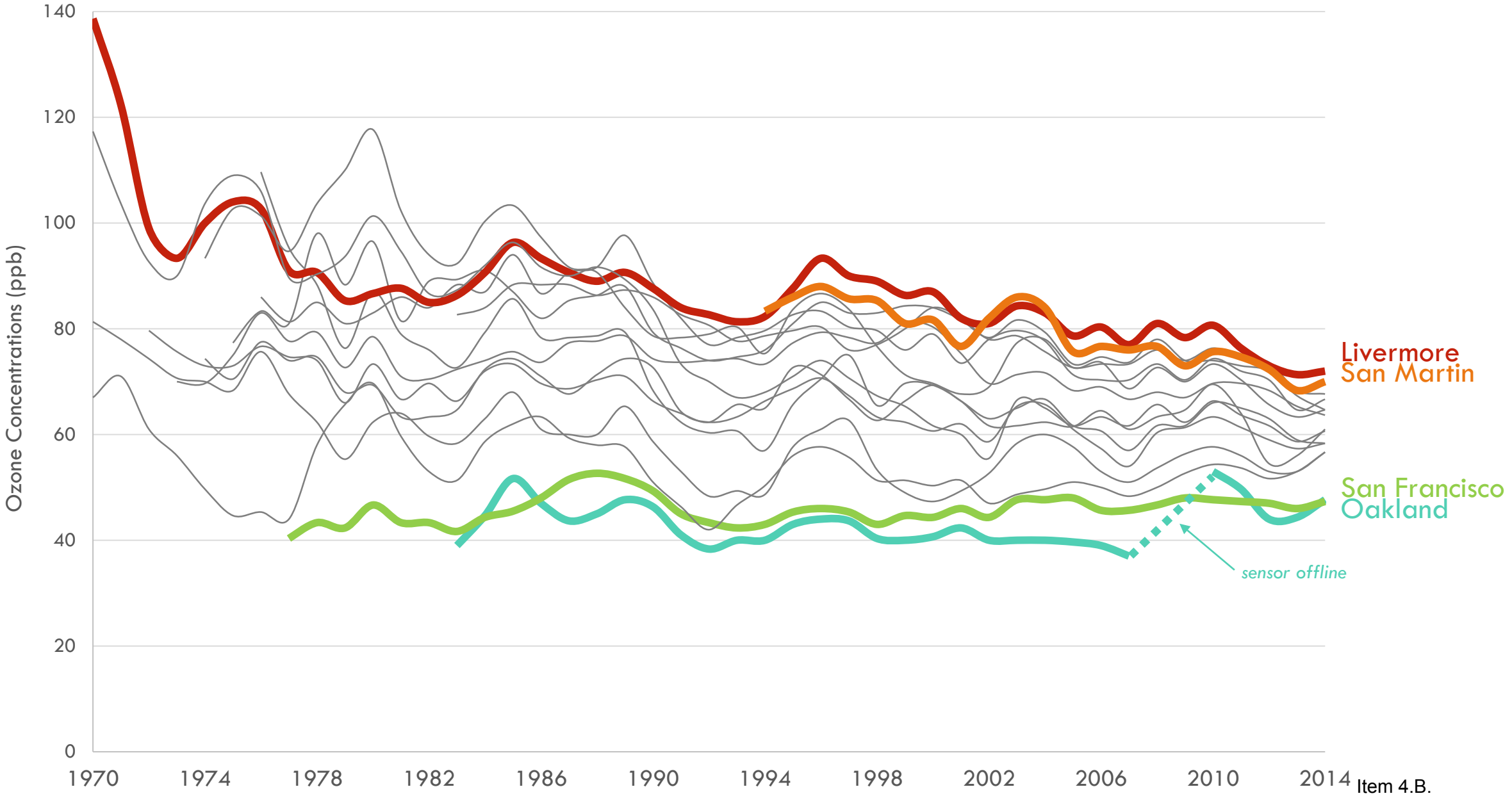
OZONE: LOCAL FOCUS

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



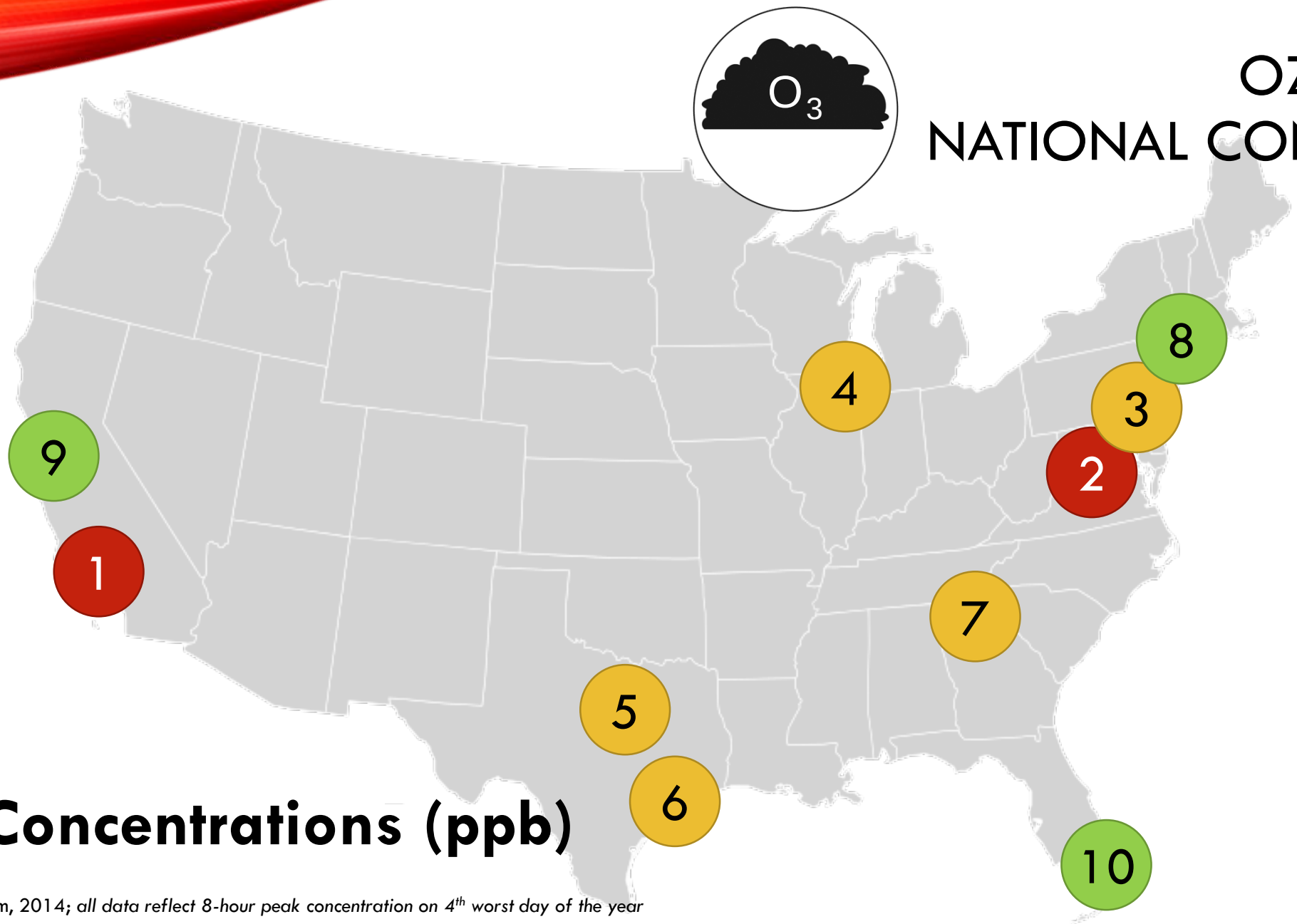
Source: BAAQMD Air Quality Sensors, 2014; *all sensors reflect 8-hour peak concentration on 4th worst day of the year; 3-year rolling average*

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*

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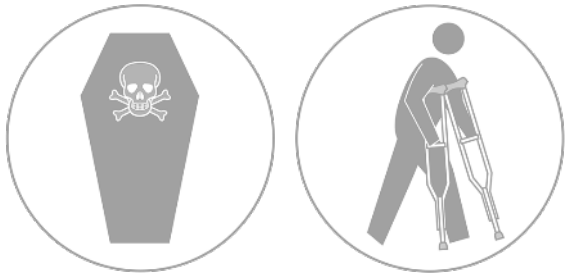

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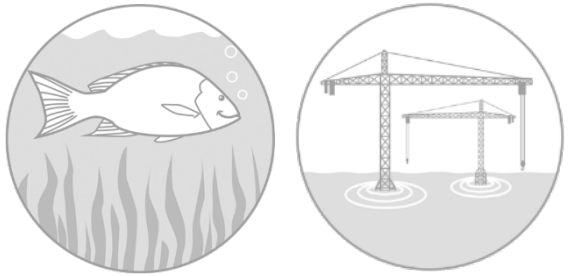
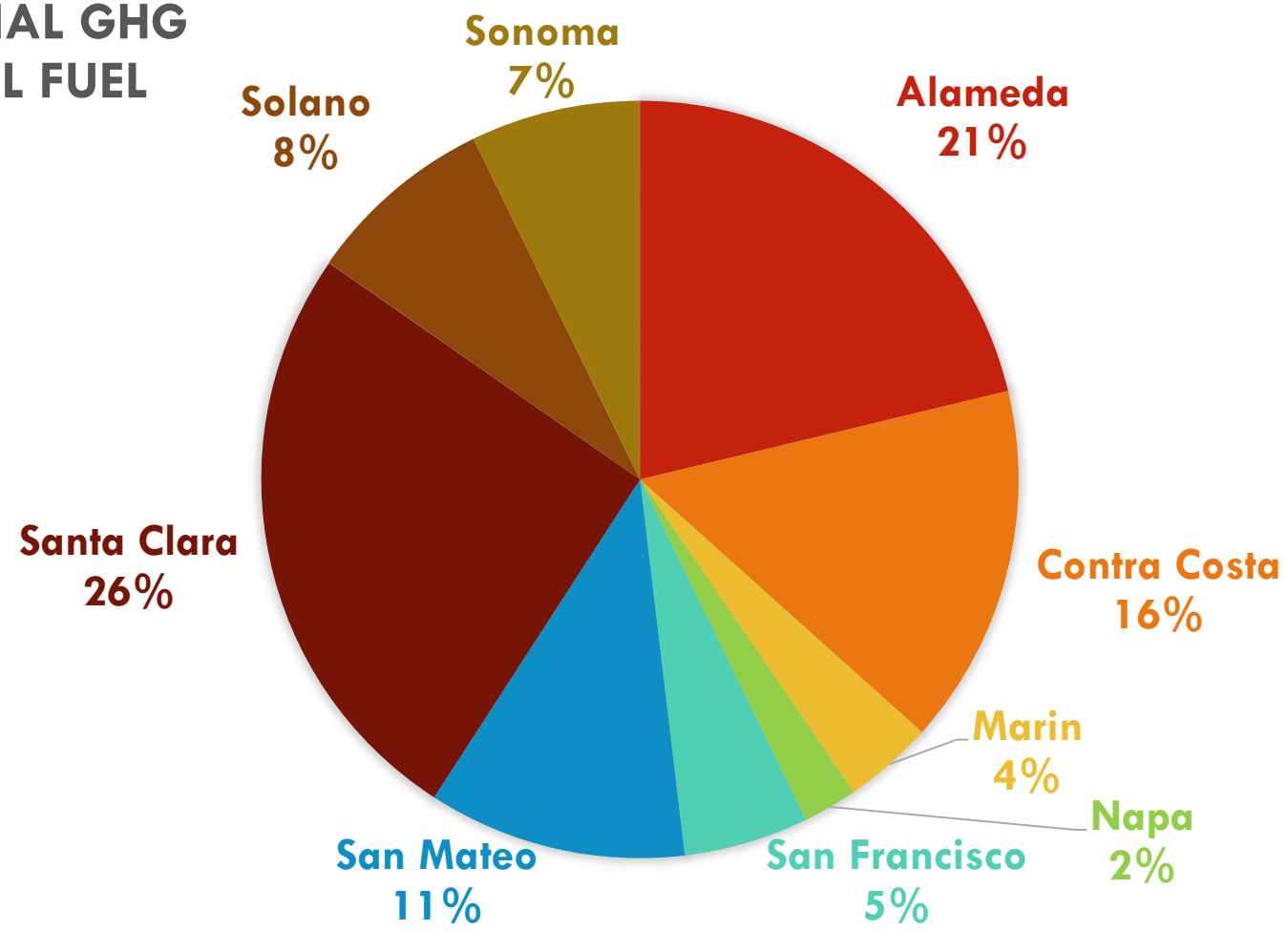


Strict bay fill regulations enacted in the late 20th century have prevented degradation to this natural resource over the past half-century; **our region's 21st century challenge is to protect residents at risk from sea level rise.**

GREENHOUSE GAS EMISSIONS: LOCAL FOCUS

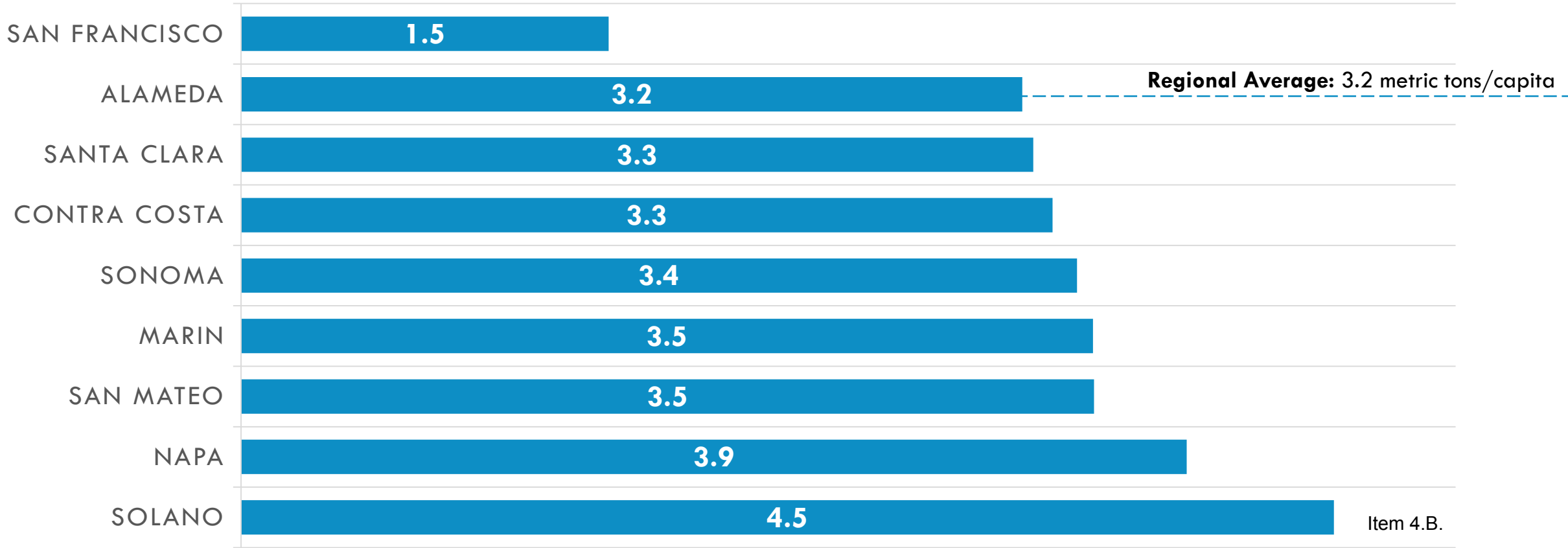
BREAKDOWN OF REGIONAL GHG EMISSIONS FROM RETAIL FUEL BY COUNTY



Source: California Energy Commission, 2012

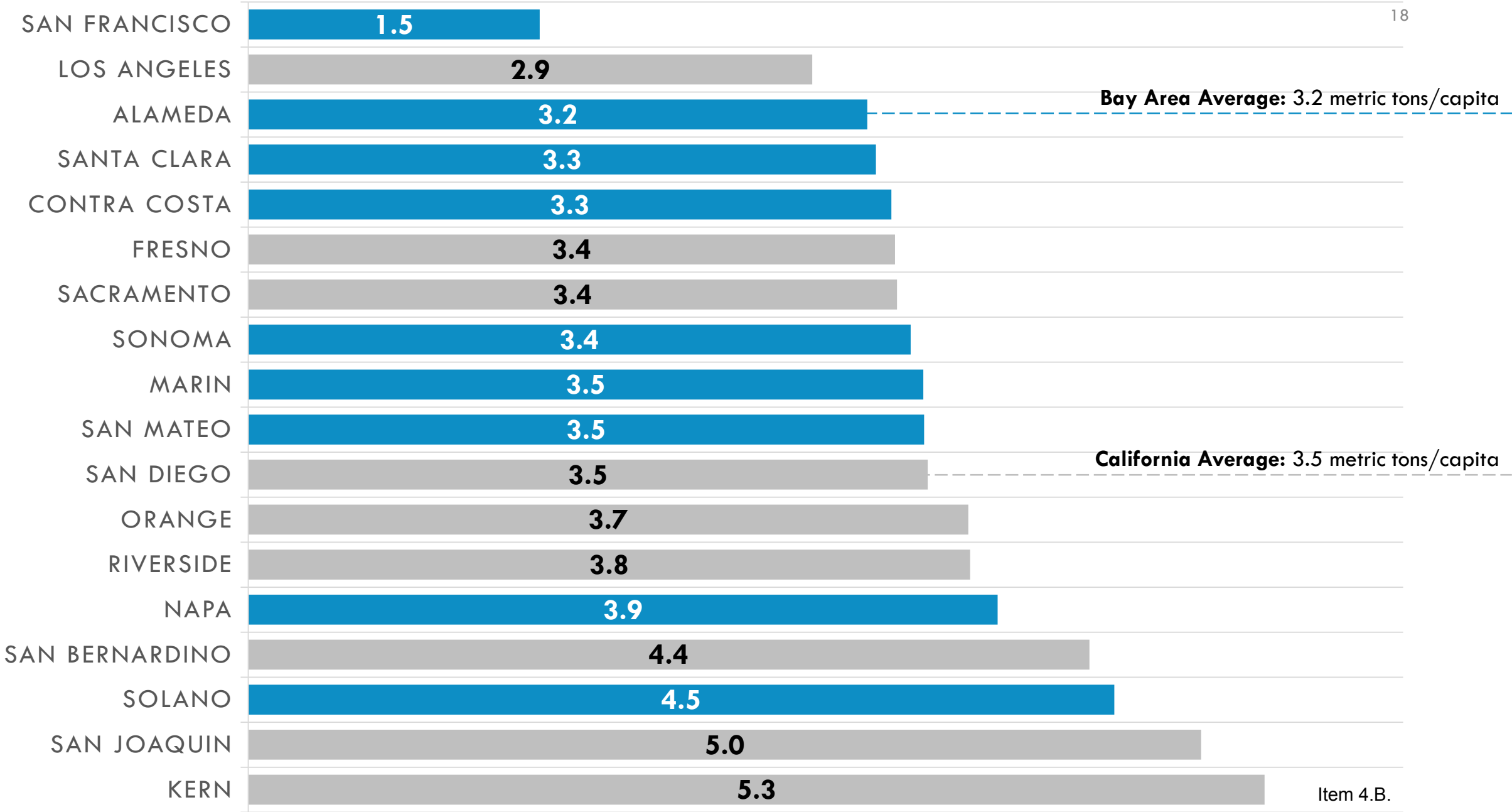
GREENHOUSE GAS EMISSIONS: LOCAL FOCUS

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

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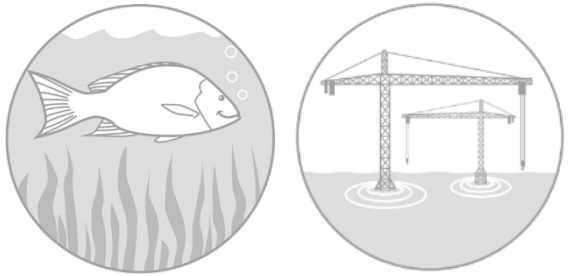

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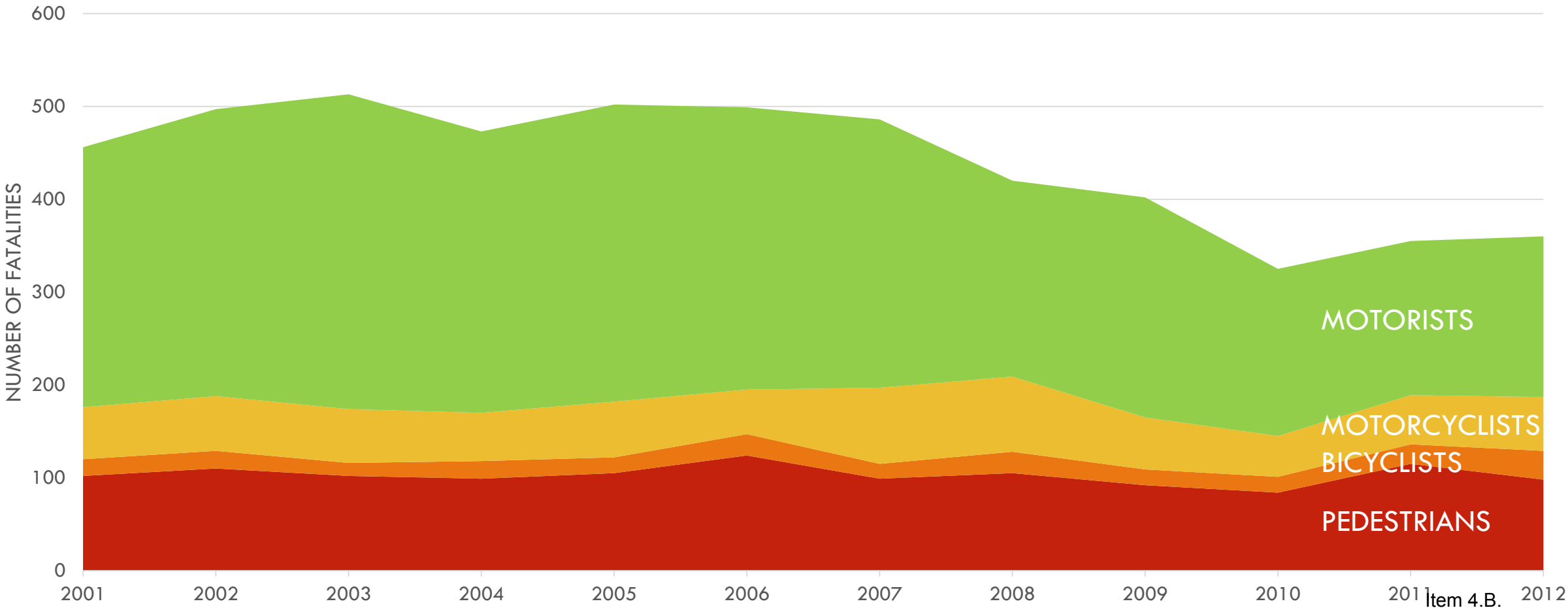
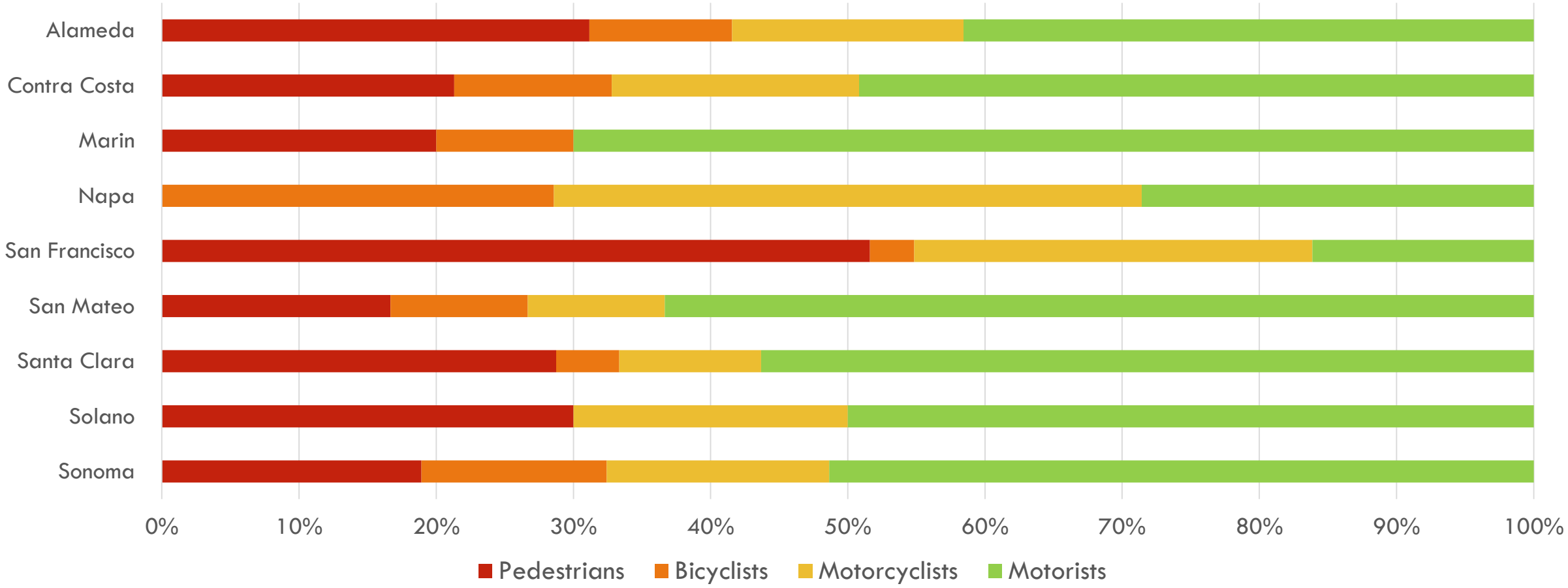
FATALITIES FROM CRASHES: REGIONAL PERFORMANCE



Source: CHP SWITRS, 2012

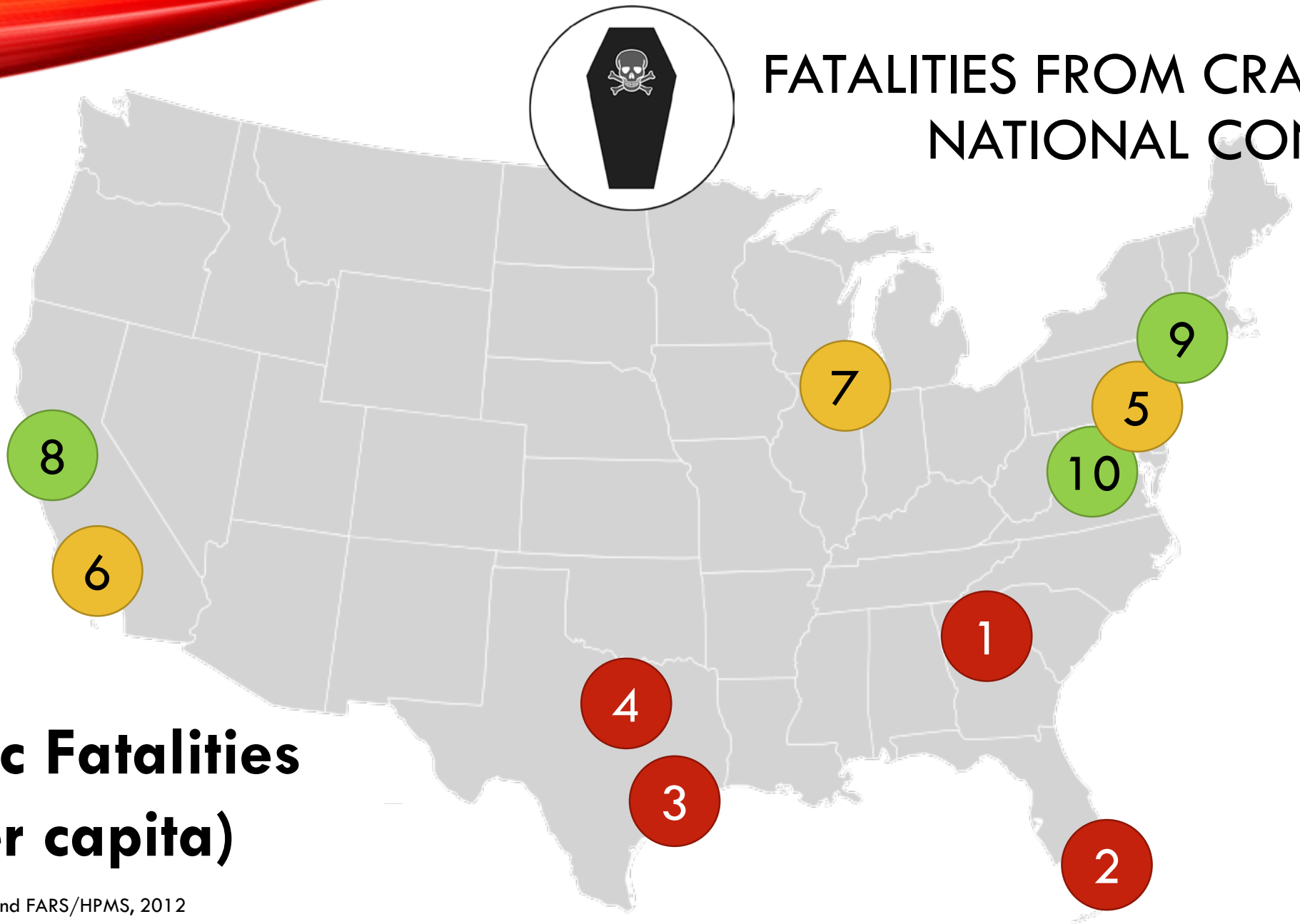
FATALITIES FROM CRASHES: LOCAL FOCUS

Modal Breakdown



Source: CHP SWITRS, 2012

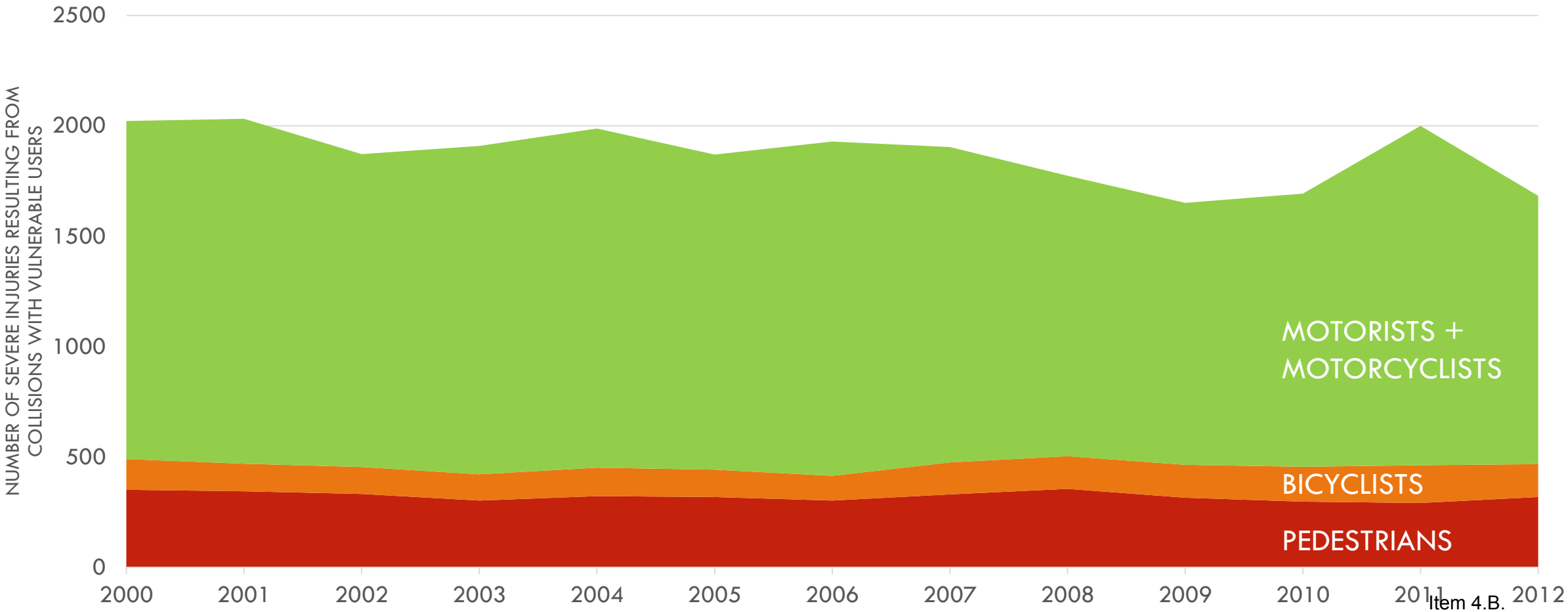
FATALITIES FROM CRASHES: NATIONAL CONTEXT



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)

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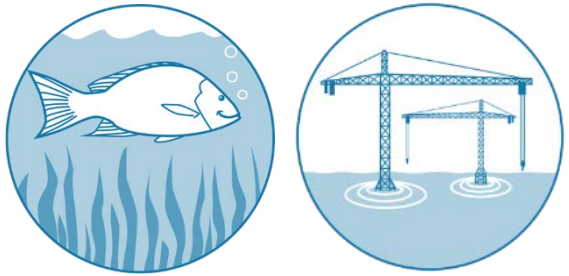

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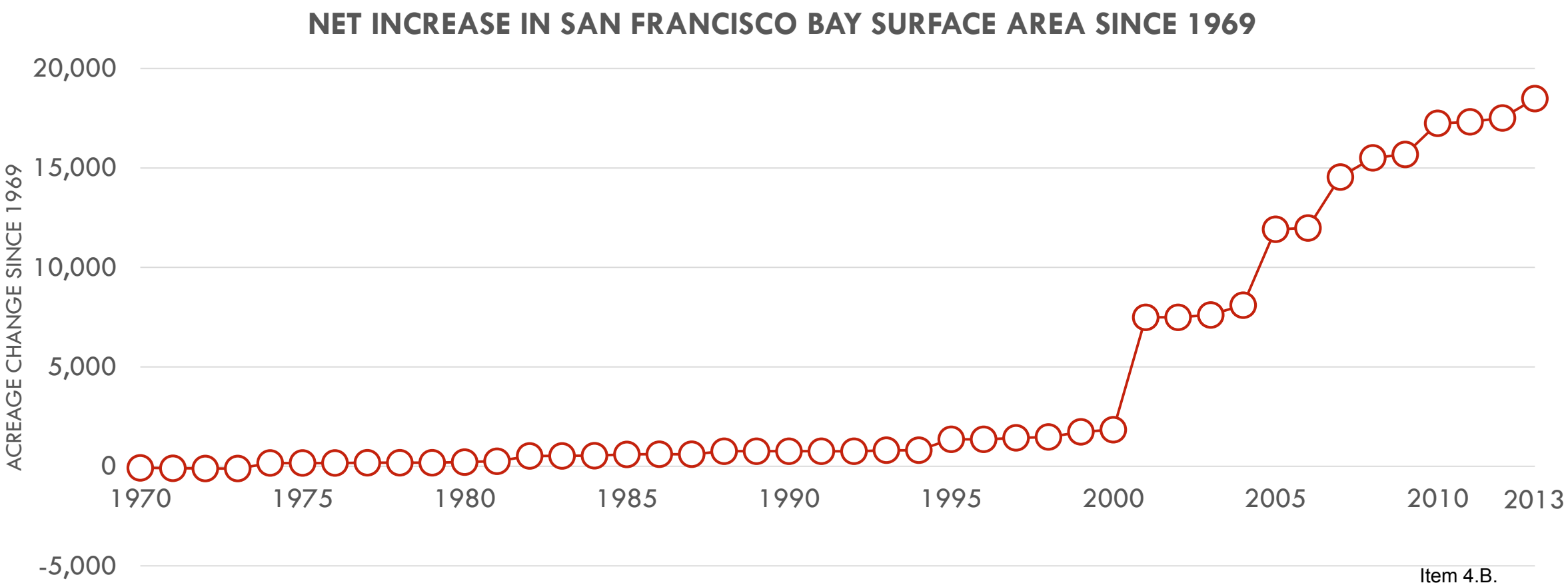
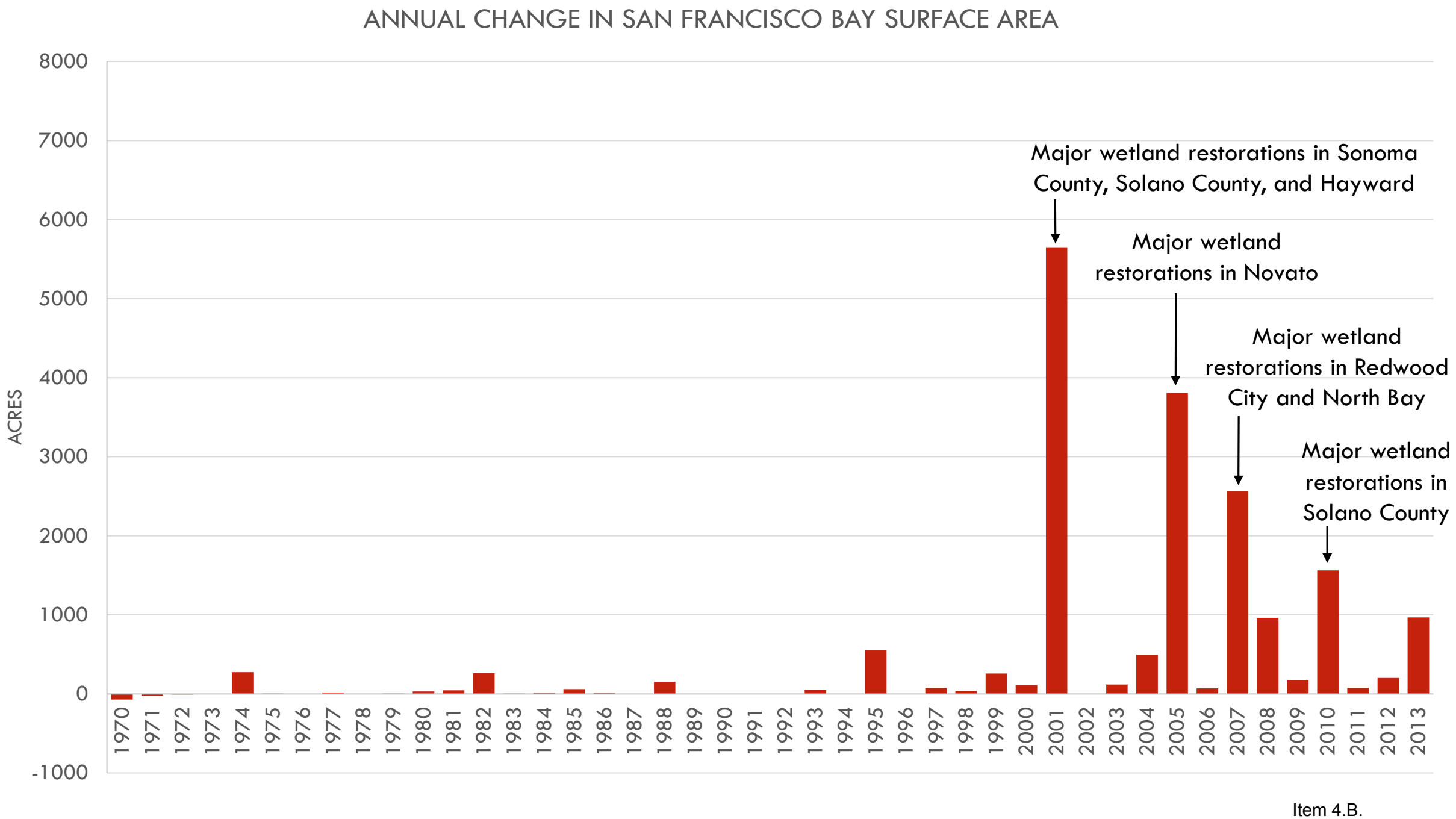
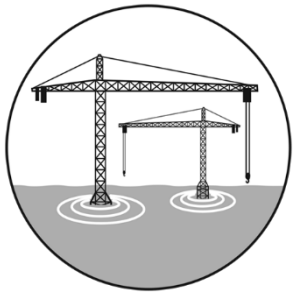
BAY RESTORATION: REGIONAL PERFORMANCE



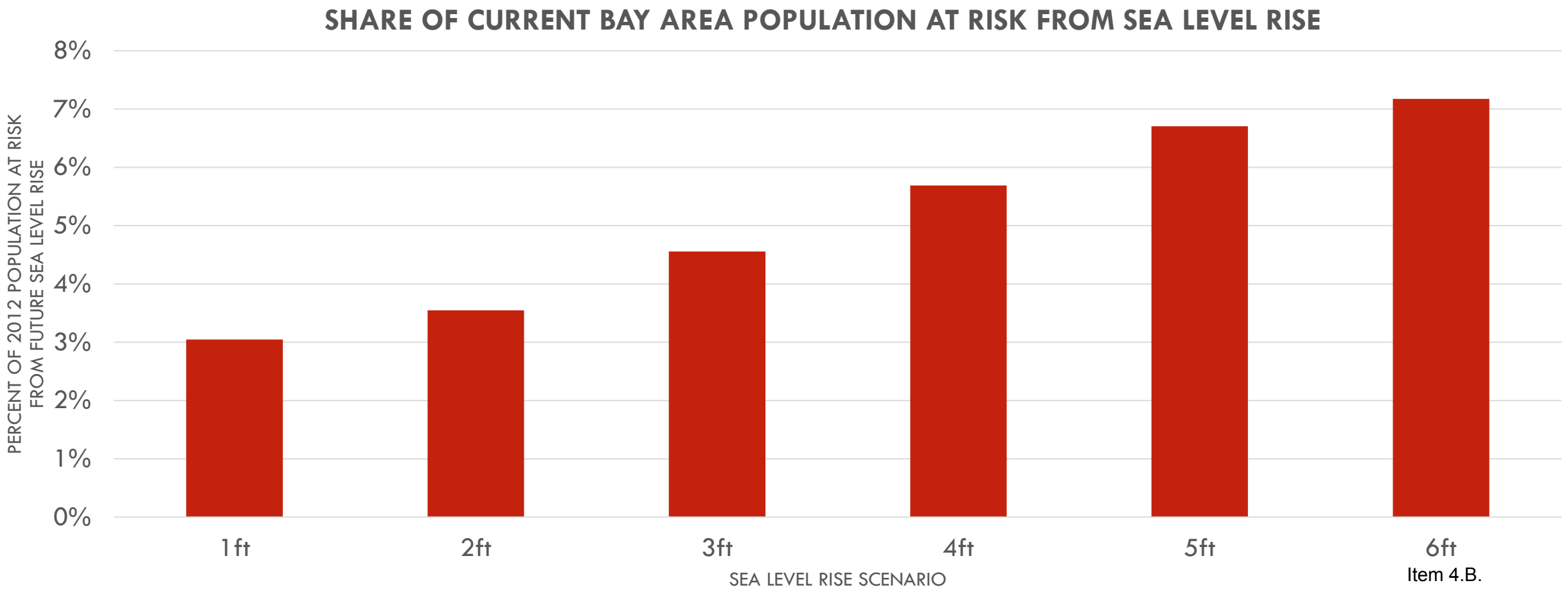
Source: BCDC Annual Report, 2013



Source: BCDC Annual Report, 2013

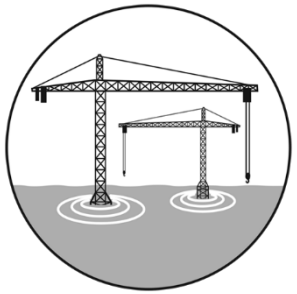


VULNERABILITY TO SEA LEVEL RISE: REGIONAL PERFORMANCE

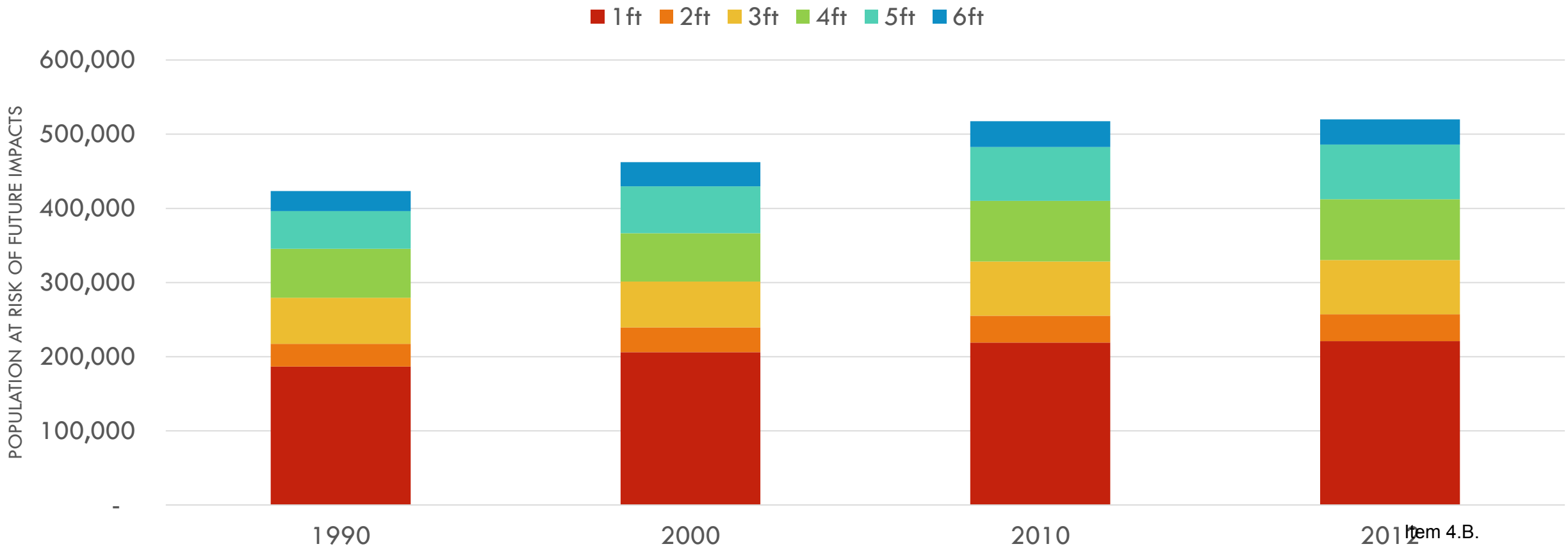


Sources: NOAA; BCDC; U.S. Census Bureau

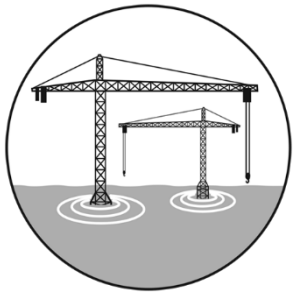
VULNERABILITY TO SEA LEVEL RISE: REGIONAL PERFORMANCE



POPULATION AT RISK FROM SEA LEVEL RISE (HISTORICAL TREND)

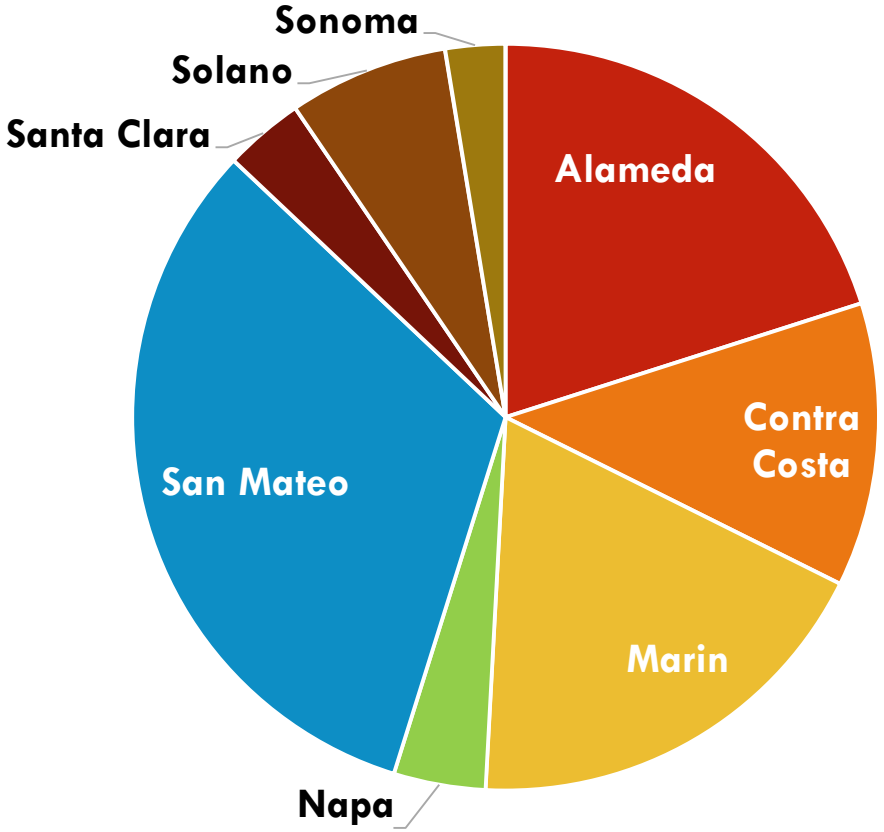


Sources: NOAA; BCDC; U.S. Census Bureau

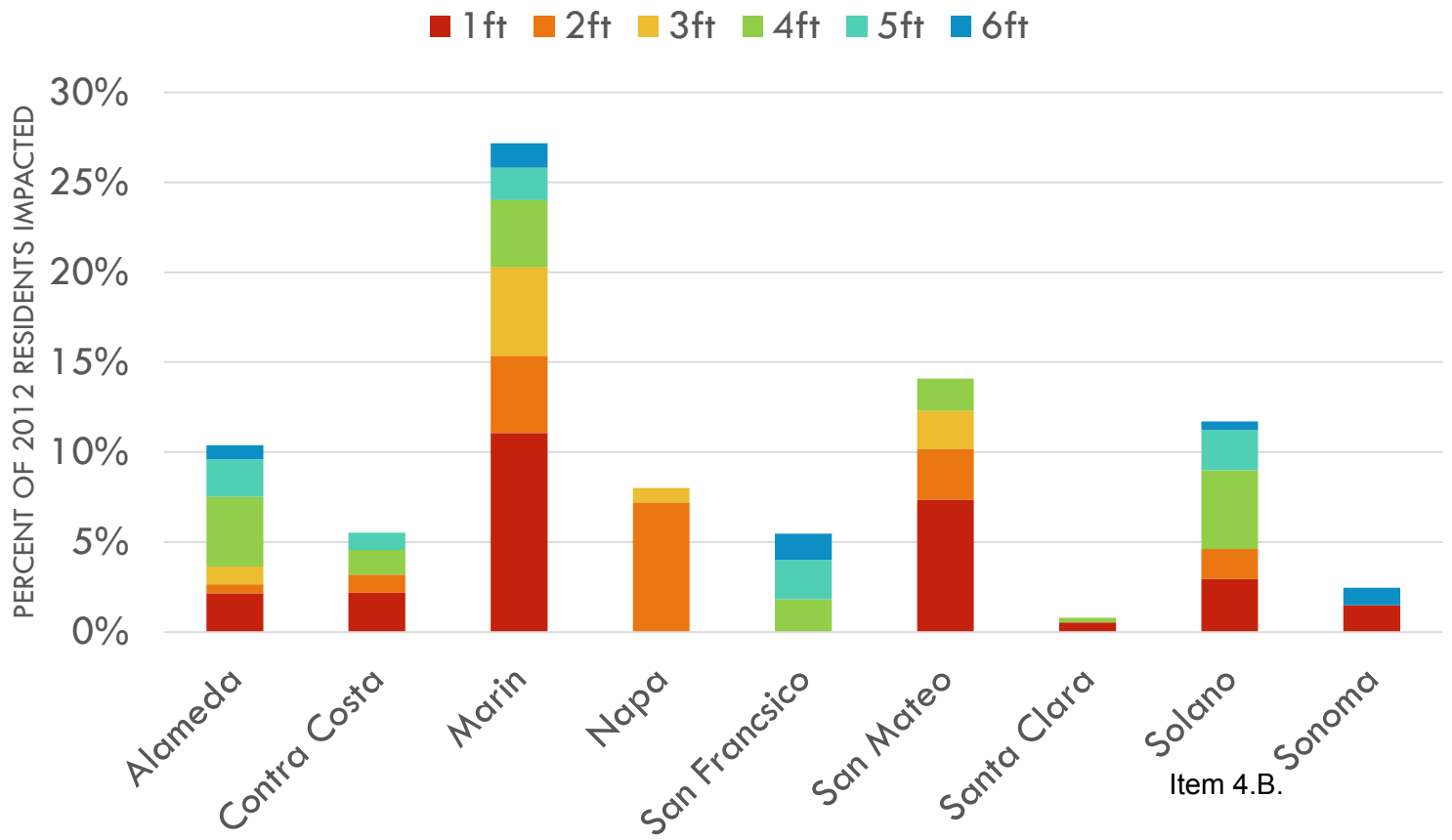


VULNERABILITY TO SEA LEVEL RISE: LOCAL FOCUS

RESIDENTS AFFECTED BY 3 FEET OF SEA LEVEL RISE



PERCENT OF COUNTY RESIDENTS AFFECTED BY SEA LEVEL RISE

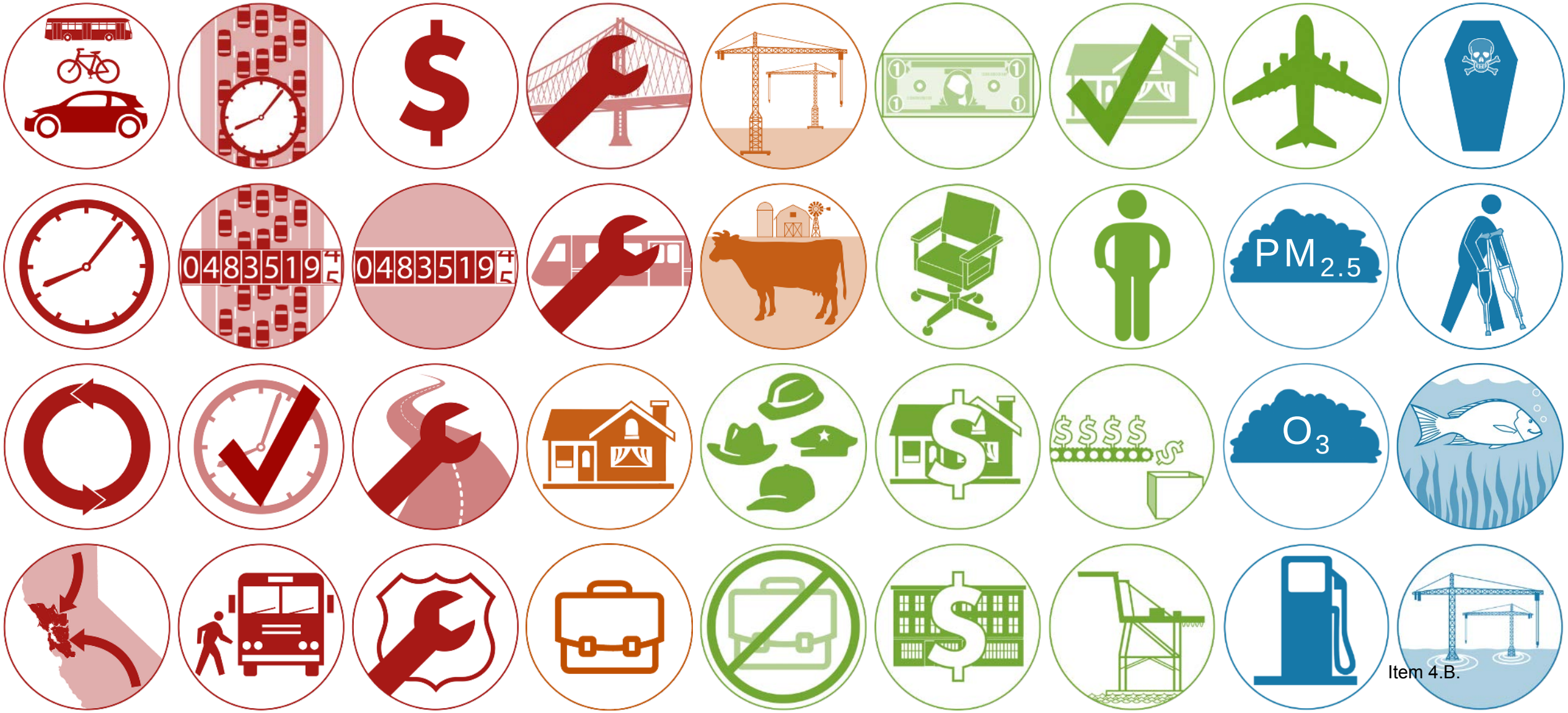


Sources: NOAA; BCDC; U.S. Census Bureau

KEY TAKEAWAYS

ACROSS ALL PHASES OF VITAL SIGNS

4 phases
36 indicators
~100 interactives
~200 datasets



Overarching Findings: **Key Takeaway #1**

An emphasis on protecting our region's environment has resulted in cleaner air, healthier ecosystems, and more abundant open space.

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

Overarching Findings: **Key Takeaway #2**

The Bay Area's combination of a booming economy and constraints on development has resulted in limited housing production and serious affordability challenges, leaving residents and companies with the tough choice between the advantages of one of America's most innovative but expensive regions or locating in a more affordable metro.

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

Overarching Findings: **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

Overarching Findings: **Key Takeaway #4**

We are much more complex than "One Bay Area". The substantial differences that exist across the region – with respect to relative prosperity, housing opportunities, environmental conditions and transportation options, to name just a few – highlight the challenge we face in tailoring policies that benefit the 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

Item 4.B.

Image Source: https://www.flickr.com/photos/warzauw/11078961323