



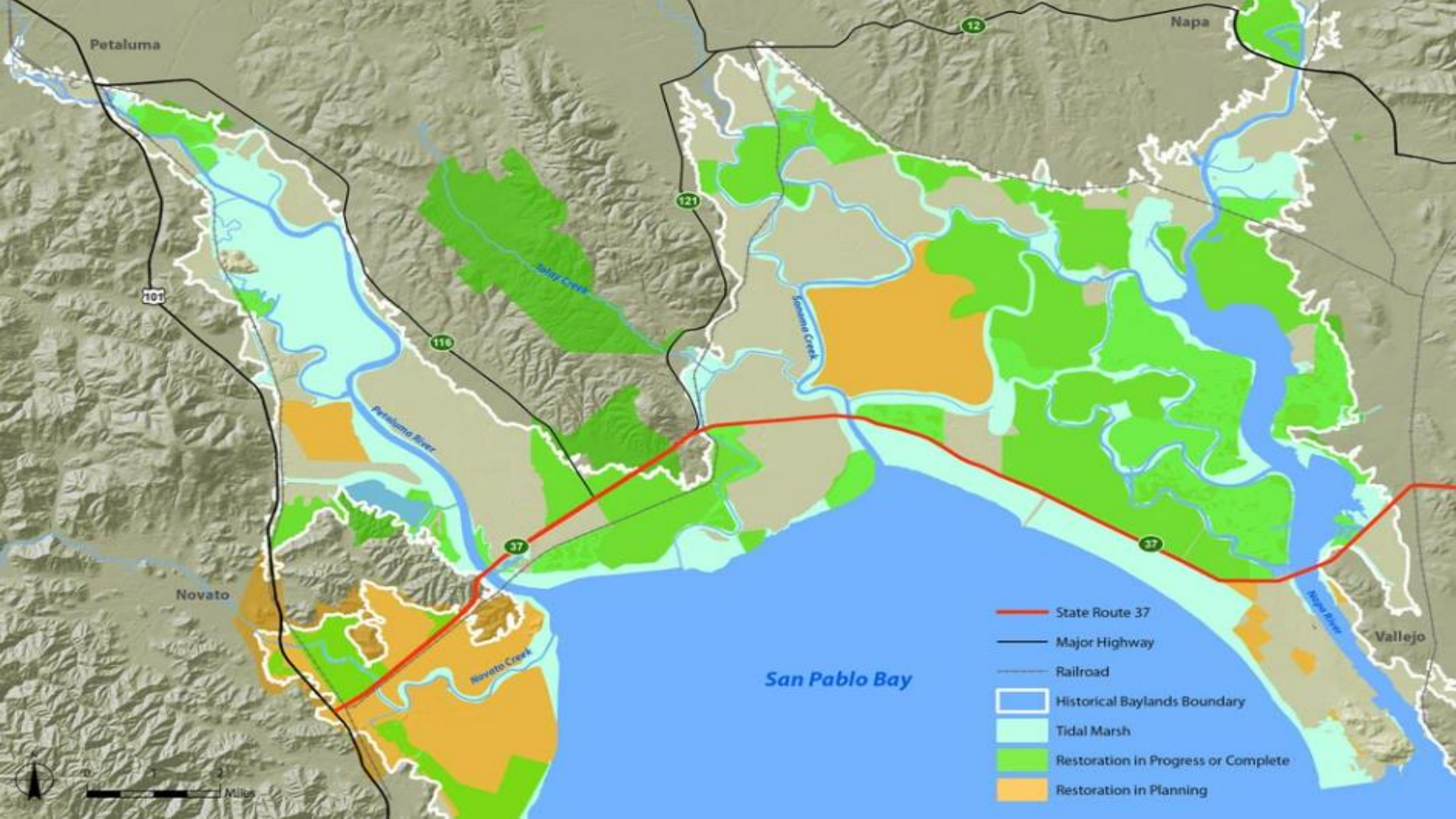
# North Bay Watershed Association









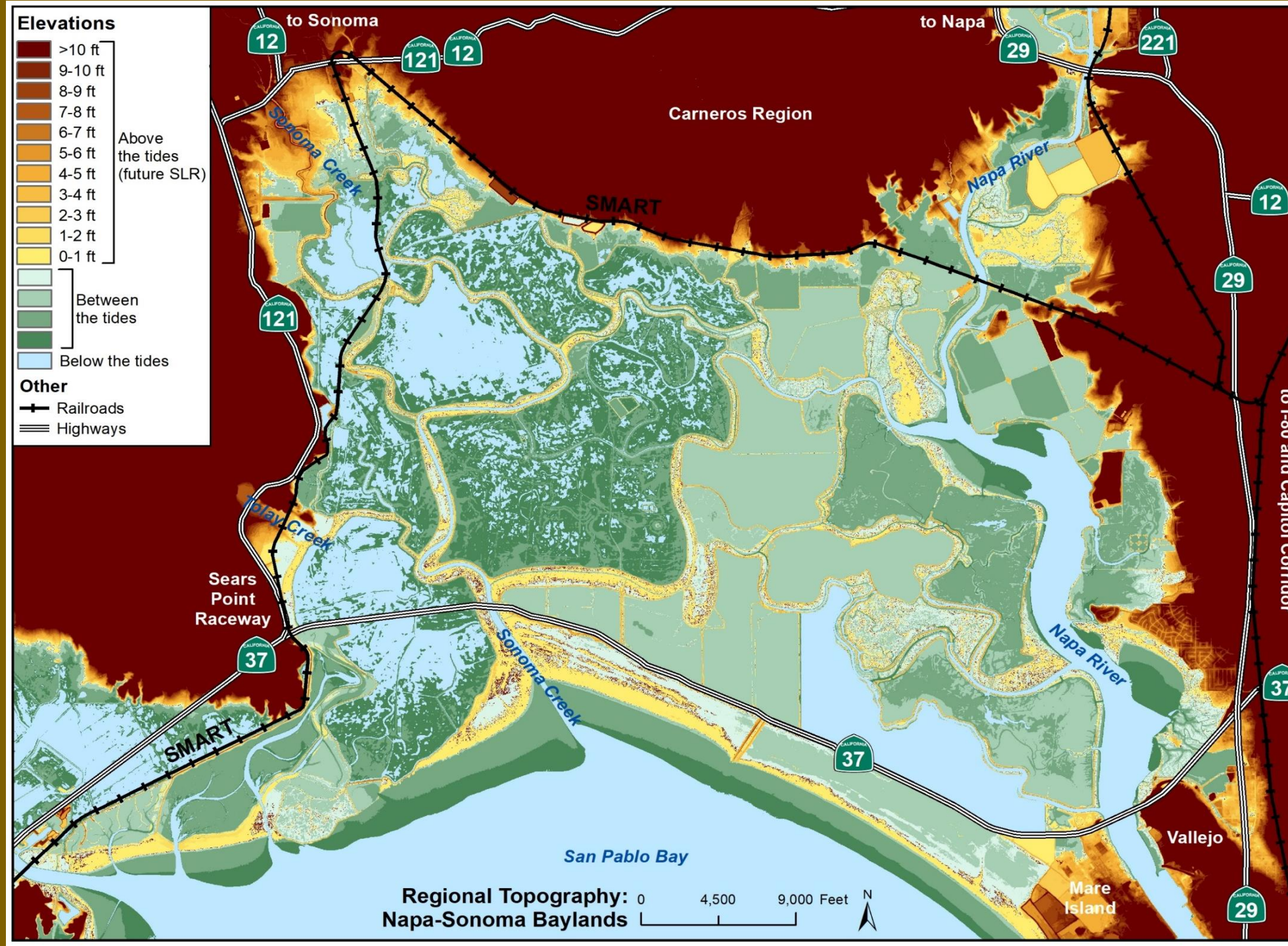


- State Route 37
- Major Highway
- Railroad
- Historical Baylands Boundary
- Tidal Marsh
- Restoration in Progress or Complete
- Restoration in Planning

# Hwy 37

Nature-based  
Solutions.....

....Integrated  
vs.  
Mitigation













# Science for a Healthy Bay Area

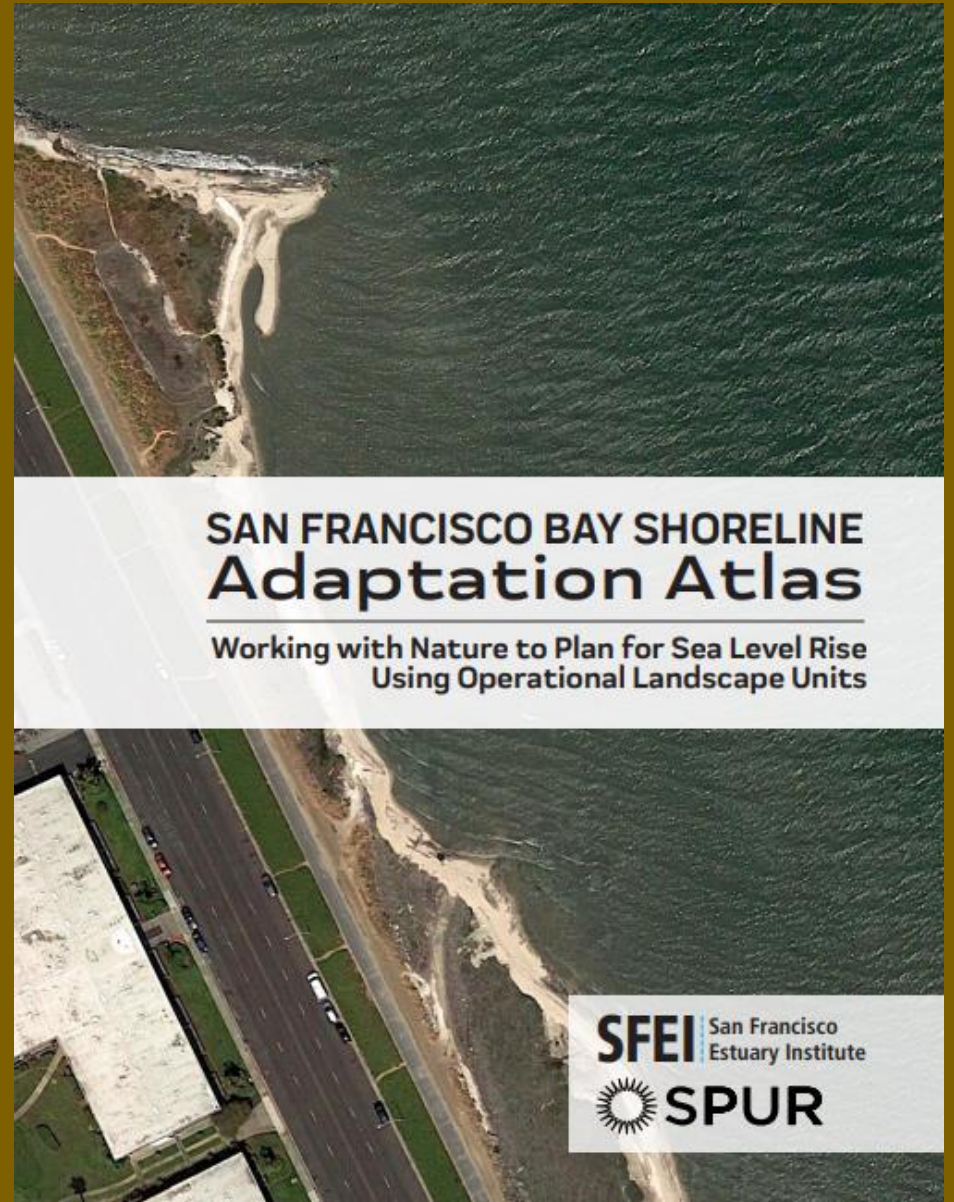
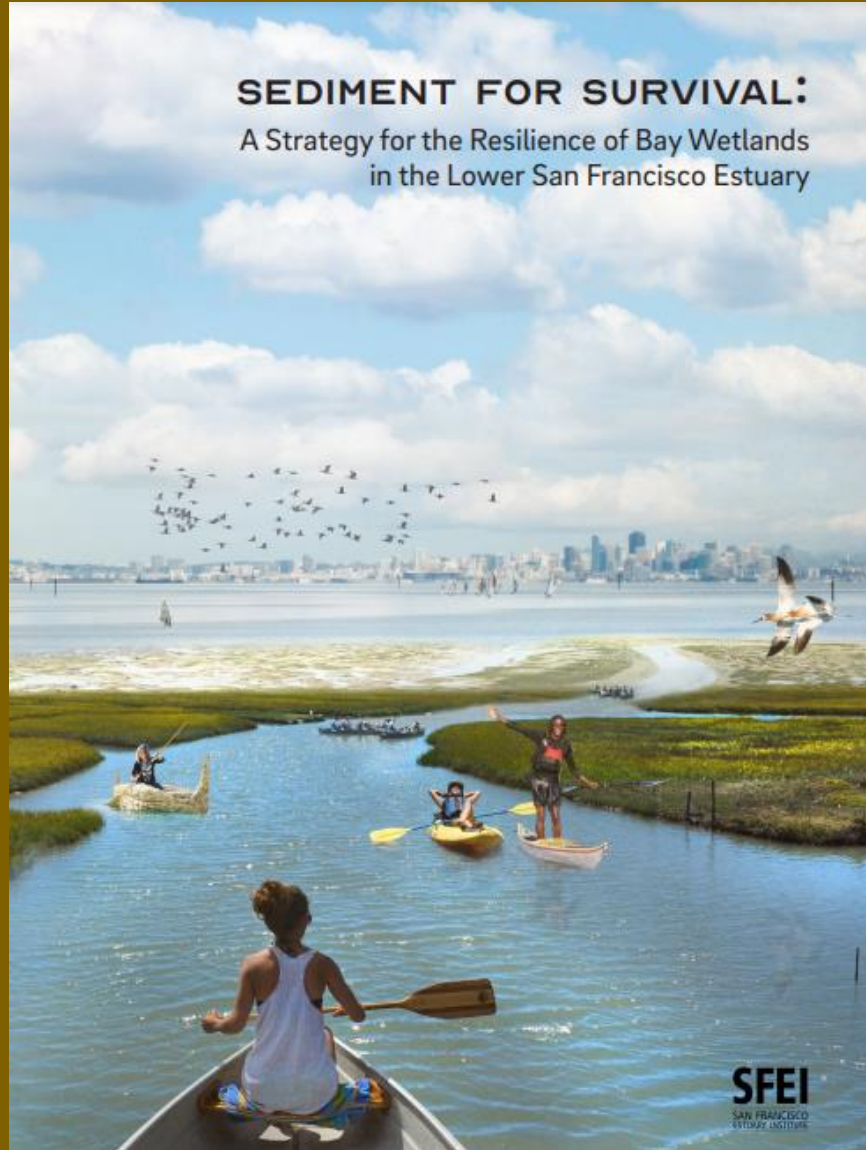
The San Francisco Estuary Institute

# Triple Challenge

- Sea Level Rise
- Groundwater
- Lowland Flooding



# SFEI Reports



# Needed Sediment: 477M Cubic Yards

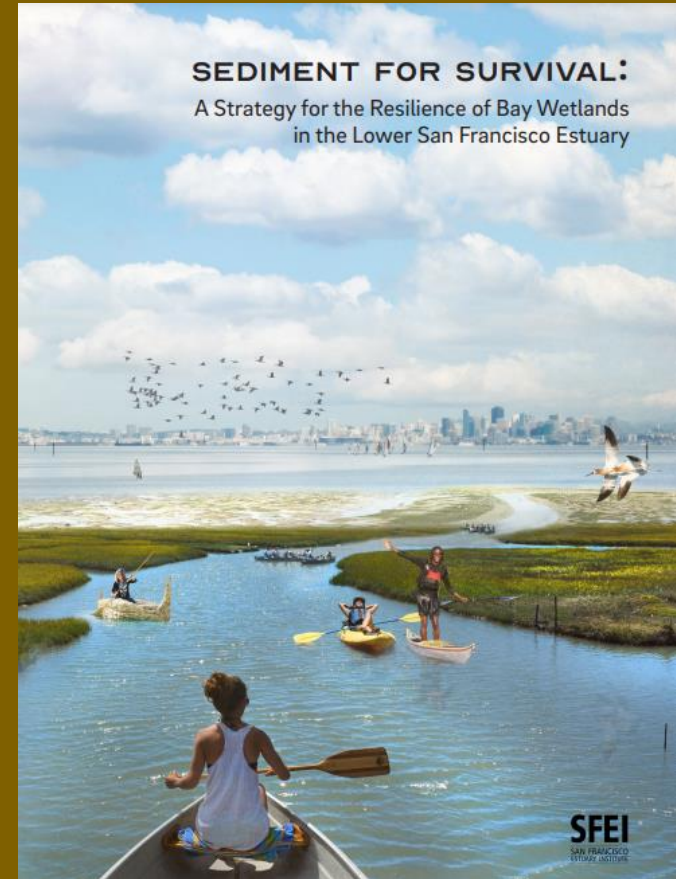
VOLUME OF SEDIMENT  
NEEDED FOR TIDAL WETLANDS  
AND MUDFLATS BY 2100

Amount of sediment that can be  
supplied by nature and current  
management approaches

The sediment need that could be met by  
changing management practices to access  
more in-bay and watershed sediment

## SEDIMENT FOR SURVIVAL:

A Strategy for the Resilience of Bay Wetlands  
in the Lower San Francisco Estuary



SFEI  
SAN FRANCISCO  
ESTUARY INSTITUTE

San Jose Mercury News

<https://www.mercurynews.com/2021/04/13/san-francisco-bay-protection-from-future-disasters-is-being-thrown-away-scientists-say/>



Photograph by Shira Bezael (SFEI)

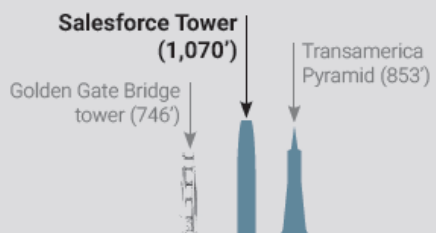
## VOLUME COMPARISON

**SFEI**  
SAN FRANCISCO  
ESTUARY INSTITUTE



### AMOUNT OF SEDIMENT NEEDED

HEIGHT **1,089** feet  
RADIUS **3,036** feet  
VOLUME **477,000,000** cubic yards



### SALESFORCE TOWER (San Francisco)

HEIGHT **1,070** feet  
VOLUME **711,000** cubic yards





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# Near Term Projects - \$500 M



# Preferred Alternative \$6-11 Billion

- 2. Causeway
- 4. Causeway
- 7. Causeway



# The “\$110 Billion Dollar” Report\*

## Sea Level Rise Adaptation Funding and Investment Framework

\* <https://mtc.ca.gov/digital-library/5024464-sea-level-rise-adaptation-funding-and-investment-framework-final-report>



### Sea Level Rise Adaptation Funding and Investment Framework Final Report

Metropolitan Transportation Commission / Association of Bay Area Governments  
and the San Francisco Bay Conservation and Development Commission

July 2023

# Inventory of Adaptation Needs

## Local Adaptation Projects and Study Areas<sup>1</sup>

- Local Adaptation Projects
- Local Study Areas

192 projects in original inventory

132 projects updated with stakeholder input

Includes 47 new projects added

## Potential Protective Infrastructure Needs<sup>2</sup>

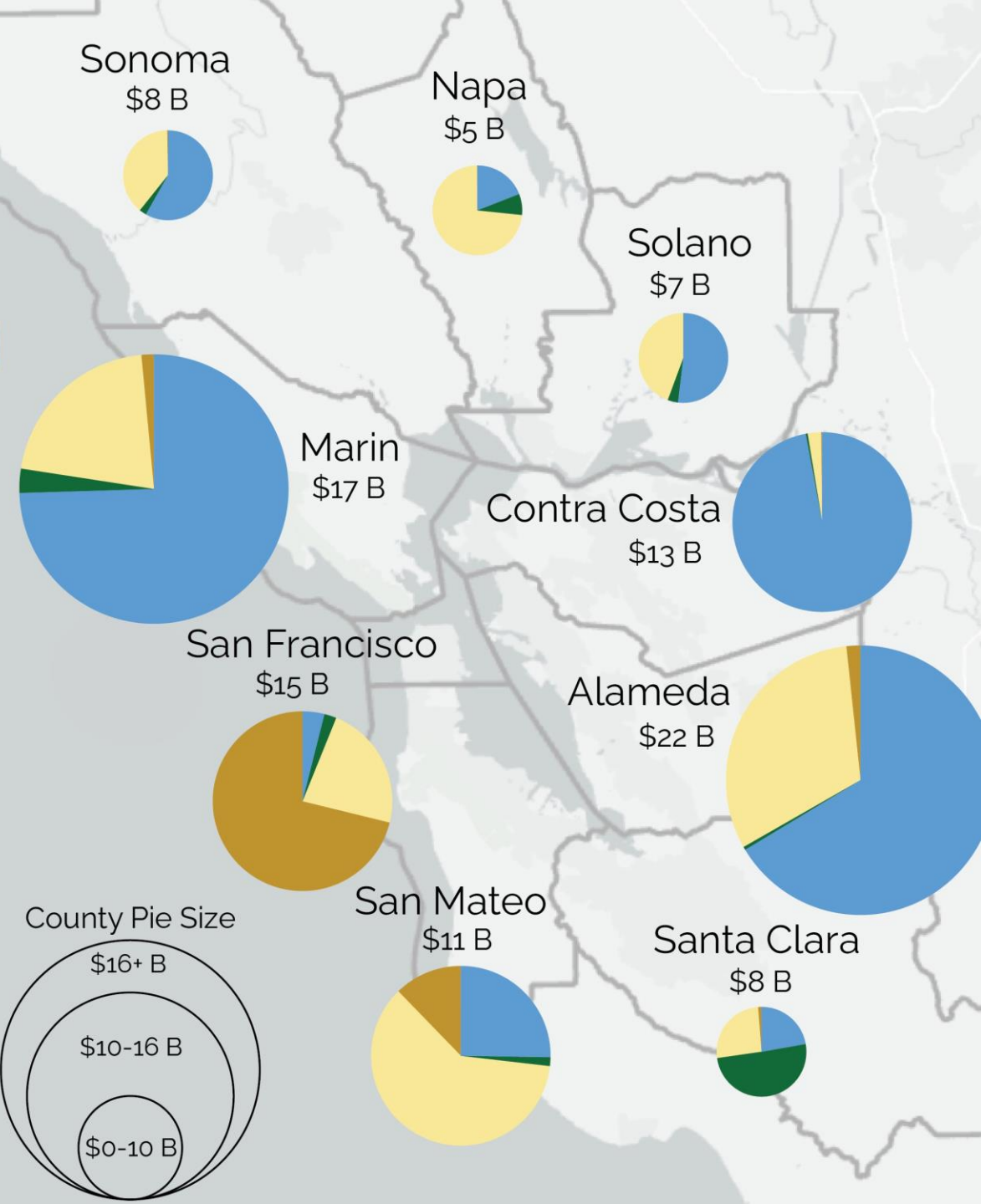
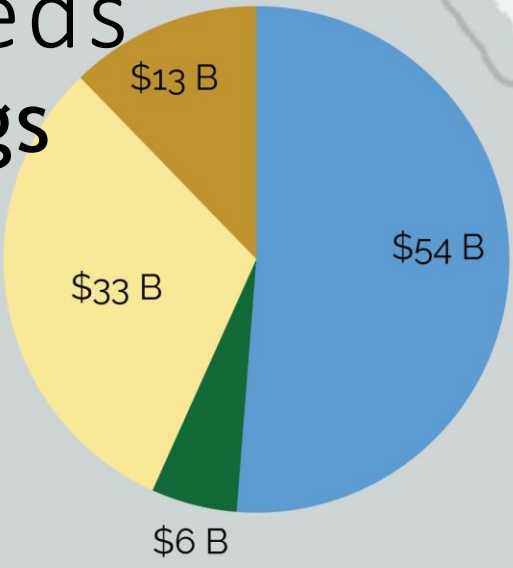
- Placeholder Adaptation Needs

<sup>1</sup> Includes projects identified in BCDC's Shoreline Adaptation Project Map, a regional project inventory hosted through EcoAtlas: <https://www.ecoatlas.org/groups/303>

<sup>2</sup> Placeholder needs determined by assuming the protection of the shoreline in place.

# Adaptation Needs Additional Findings

- Most planned projects are hybrid, representing a focus on multiple benefits.
- Alameda and Marin are estimated to have the highest adaptation costs.
- Significant implementation gaps are present across the region; the largest gaps are in Alameda, Contra Costa, and Marin<sup>2</sup>.



<sup>1</sup>Values represented in Year of Expenditure dollars; Regional cost includes \$3B in additional sediment need.  
<sup>2</sup>Locally identified projects do not account for studies or plans without defined interventions.

# Adaptation Needs By 2050 \$110 Billion

- \$52 B: Planned Projects
- \$54 B: Estimated Projects
- \$3 B: Sediment Needs

# Assets at Risk \$236 Billion

- \$85 B: Parcels
- \$151 B: Roadways

- **The Inventory Map: What & Where**

<https://mtc.maps.arcgis.com/apps/webappviewer/index.html?id=4cfbec7006d542a5913a46ec15d7cd24>

- **The Technical Report: Assumptions & Methods**

[https://mtc.ca.gov/sites/default/files/documents/2023-07/SLR\\_Framework\\_Technical\\_Methodology\\_Report\\_0.pdf](https://mtc.ca.gov/sites/default/files/documents/2023-07/SLR_Framework_Technical_Methodology_Report_0.pdf)



# Adaptation Needs

What is the regional estimate to fund adaptation?

# \$110 billion

Estimated cost of sea level rise adaptation through 2050 (in Year of Expenditure dollars)

- \$52 billion: Estimated cost for known or planned projects
- \$54 billion: Estimated placeholder cost for areas with adaptation needs
- \$3 billion: Estimated additional sediment management needs<sup>1</sup>

## The estimate includes:

- Assumed “protect in place” adaptation action for all vulnerable shoreline, including low density areas and agricultural land
- Assumed areas vulnerable to up to 4.9 feet of inundation are protected

## The estimate does not include:

- Alternative approaches that do *not* protect in place, which could change the cost estimate for adaptation in some shoreline segments
- Building code or other local policy adjustments
- Riverine and groundwater adaptations
- Adaptation plans made by utilities

<sup>1</sup> Estimate developed by BCDC and SFEI analysis.

# What's at Risk if We Don't Adapt?

## Assets at risk of SLR flooding<sup>1</sup>:

**75,000**

total households, including 12,000 in the most socially vulnerable communities<sup>3</sup>.

**200,000**

total jobs, and 15,000 total businesses.

**20,000**

vulnerable acres at risk, including wetlands, lagoons, and tidal marshes.<sup>3</sup>



Photo credit: Ben Botkin, 2020

## Estimates of a Subset of Assets at Risk:

(in 2022 dollars)

**\$85 billion**

Estimated *assessed value* of parcels at risk<sup>1</sup>

**\$151 billion**

Estimated value of major roadways at risk<sup>2</sup>

<sup>1</sup> Assuming 4.9 feet of inundation by 2050.

<sup>2</sup> Calculated based on 230 miles of vulnerable major class roadways, using a median transportation adaptation cost of \$125,000 per foot. Adaptation assumes only elevation or realignment and not protection in place or multi-benefit solutions.

<sup>3</sup> Social vulnerability defined by the high and highest levels of BCDC's Community Vulnerability Data.

# Funding Sources



Grant Program	Organization	Category	Description
<input type="checkbox"/> Grant program	Organization	Category	Description
11 Climate Pollution Reduction Implementation Grants (Phase 2)	Environmental Protection Agency (EPA)	Air Quality Climate resilience Climate justice	The Climate Pollution Reduction Grants (CPRG) program will provide grants to states, local governments, tribes, and territories to develop and implement plans for reducing greenhouse gas emissions and other harmful air pollution. EPA...
12 Measure AA Grant Rounds	San Francisco Bay Restoration Authority	Coastal resilience Conservation / restoration Climate resilience Waste	The San Francisco Bay Restoration Authority is a regional government agency whose purpose is to raise and allocate funds for the restoration and enjoyment of wetland and wildlife habitat along the San Francisco Bay shoreline. Funds are raise...
13 Community Grants	San Francisco Bay Restoration Authority	Climate resilience Coastal resilience Urban greening Water	For the Community Grants Program, we are looking for projects that meet the Measure AA requirements and do the following:  -Support community visioning aimed at developing conceptu...
14 Extreme Heat and Community Resilience Grant Program	CA Office of Planning and Research (OPR)	Climate resilience Health	ICARP's Extreme Heat and Community Resilience Program coordinates the state's comprehensive response to this climate impact and builds capacity for heat action planning -- creating

# Funding - Additional Resources

- **ARCCA - Alliance of Regional Collaboratives for Climate Adaptation**

CA Climate Resilience Grant Program Tracker:  
<https://arccacalifornia.org/grant-tracker/>

- **San Francisco Bay Joint Venture**

Funding Guide:  
<https://sfbayjv.org/funding/>

- **Governor's Office of Planning and Research**

ICARP – Integrated CA Adaptation and Resiliency Program Grants <https://opr.ca.gov/climate/icarp/grants/>



**Housing**

**Transportation**

**Climate**



**FEAR**

---

**HOPE**

# Measure AA \$500M



## LIVE EDGE ADAPTATION PROJECT

This is a constructed wetland. LEAP is an endeavor to provide habitat with dynamic habitat and human spaces in addition to tracing natural systems and processes as a key strategy for future societal resilience to a changing world.



Measure AA+ \$1-10 Billion?



# Stockton\*

58% Yes Vote for  
A \$14 Million Tax

To leverage a  
\$1.2 Billion Project

\*Property Owners Vote

News Release Link: 6-21-23

<https://www.sjgov.org/press-releases/press-release-detail/2023/06/21/stockton-property-owners-levee-improvements>





# Climate Boot Camp – Governance & Finance, Advanced Climate Adaptation Workshop





A nighttime photograph of the San Francisco skyline and the Golden Gate Bridge. The bridge is illuminated with warm lights, and the city skyline is visible in the background with various skyscrapers lit up. The sky is a deep blue, and the water in the foreground is dark.

**San Francisco Estuary Institute**

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**510-375-2141**