

Sea Level Rise Adaptation Funding and Investment Framework

Financing the Future Working Group

April 6, 2023

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Sea Level Rise and the Bay Area

The Bay Area is defined by its relationship to water, with our communities and regional culture centered around the Bay, the Delta, and the Outer Coast. **So how do we define what's at stake with sea level rise (SLR)?**

While the Framework explores key financial estimates to tackle this challenge, **it's important to remember why we want to prioritize the needs of people & places we deeply care about.**



2/3 of California's sea level rise impacts will be felt in the Bay Area



- Already seen: **+ 8 inches SLR**
- Projected by 2050: **+ 12 to 32 inches**
- End of century: **10+ feet?**

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

Assets at risk of SLR flooding¹:

75,000
total households,
including **12,000**
in the most
socially vulnerable
communities³.

200,000
total jobs, and
15,000 total
businesses.

20,000
vulnerable acres
at risk, including
wetlands,
lagoons, and tidal
marshes.³



Estimates of a Subset of Assets at Risk:
(in 2022 dollars)

\$85 billion
Estimated *assessed value* of parcels at risk¹ (market value is likely to be much higher)

\$151 billion
Estimated value of major roadways at risk²

¹ Assuming 4.9 feet of inundation by 2050.

² 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.

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

⁴ From Adapting to Rising Tides Bay Area, 2020

Regional "Hotspots"

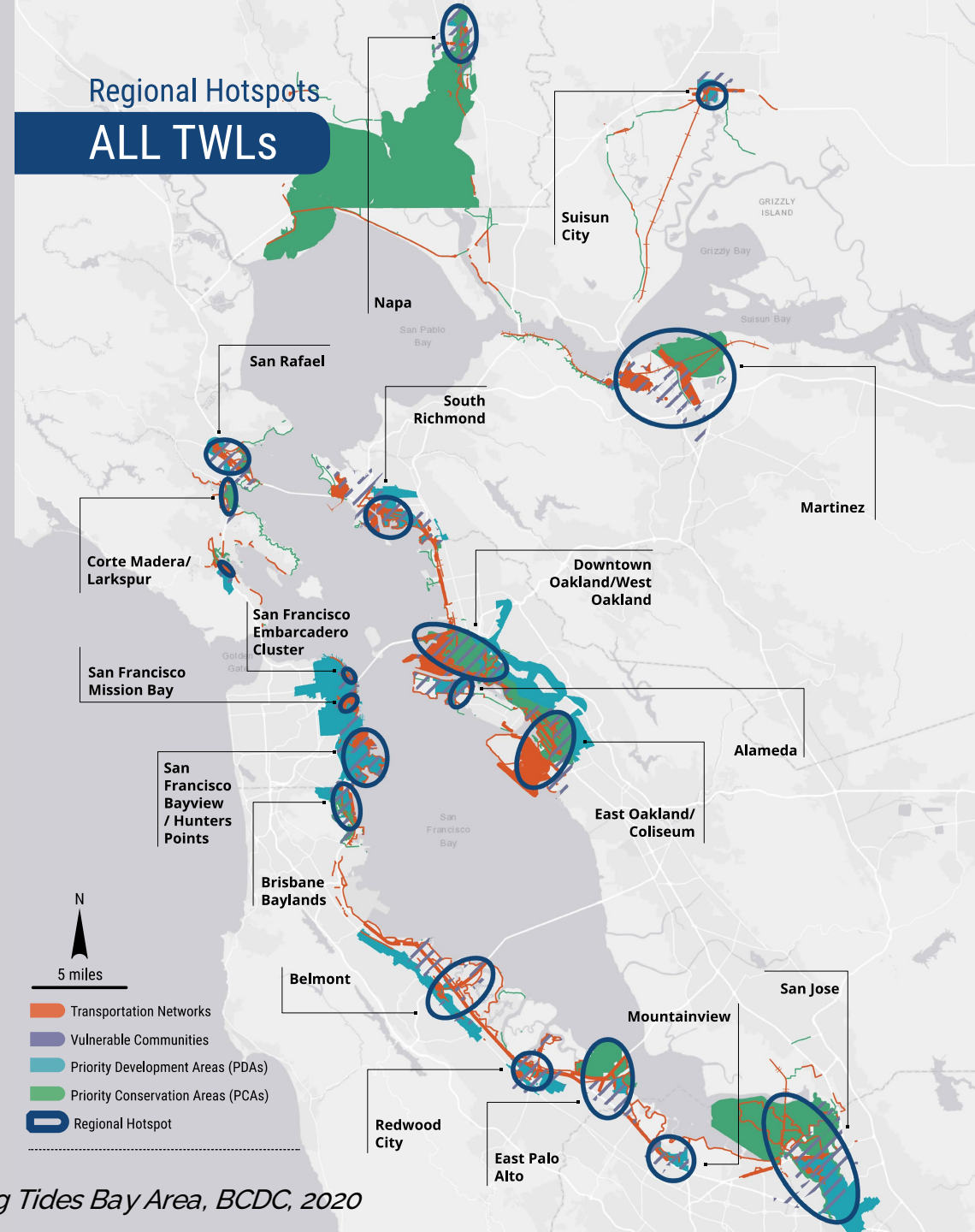
Certain areas share vulnerabilities across transportation, vulnerable communities, job and housing growth areas, and/or conservation areas

12" flooding hotspots

San Rafael
Corte Madera/Larkspur
Martinez

48" flooding hotspots

Napa
Martinez
Downtown Oakland/West Oakland
East Oakland/Coliseum
San Francisco Bayview/Hunters Point
San Francisco Mission Bay
San Francisco Embarcadero
Corte Madera/Larkspur



From Adapting to Rising Tides Bay Area, BCDC, 2020

A Rising Bay

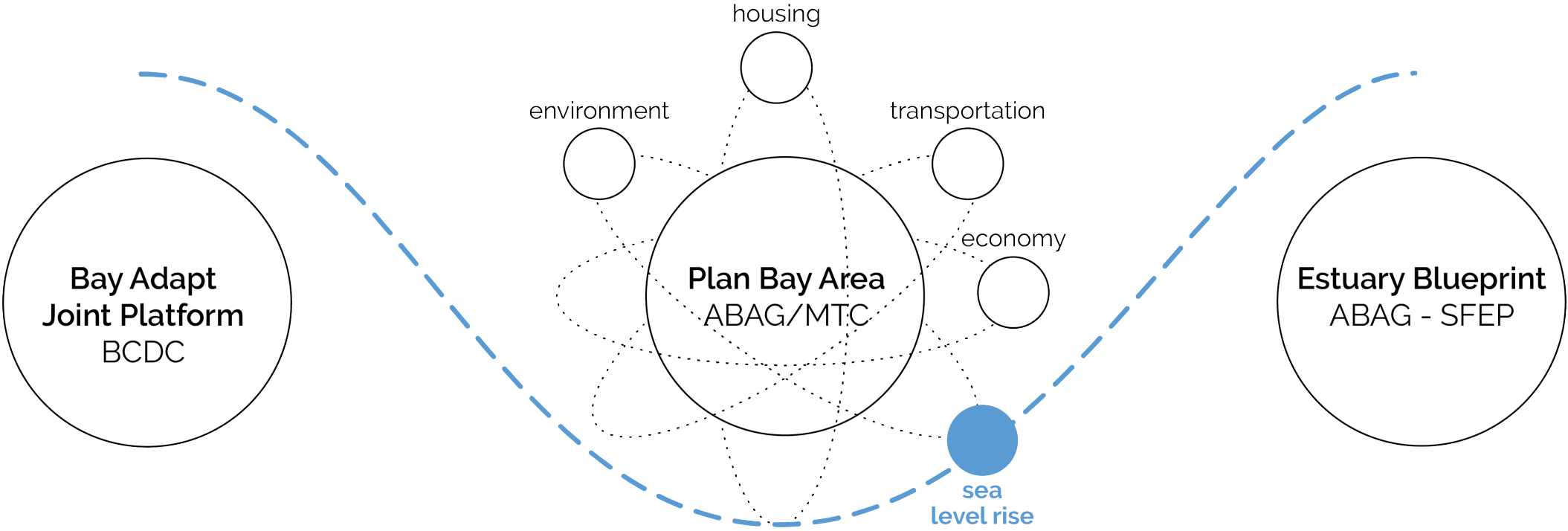
**A regional
problem
requires
regional
solutions**



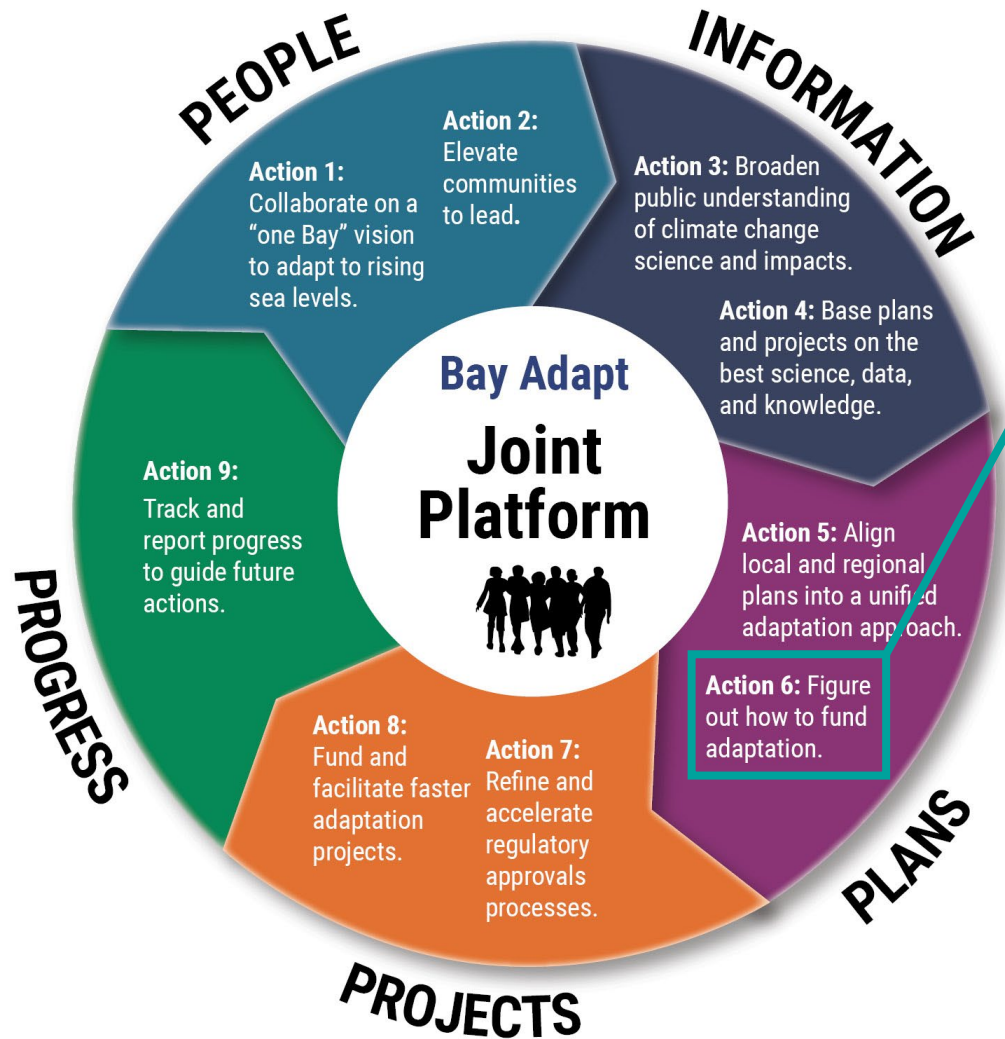
Why?

- Flooding knows no boundaries
- Frontline communities: Most impacted and fewest resources
- Patchwork of protective actions
- Inconsistent application of science
- Competition not collaboration for limited funding
- Near-term loss of wetlands
- No way to measure collective progress

Regional Alignment



Bay Adapt Joint Platform



Action 6: Figure out how to fund adaptation

- Task 6.1:** Expand understanding of the financial costs and revenues associated with regional adaptation.
- Task 6.2:** Establish a framework for funding plans and projects.
- Task 6.3:** Help cities and counties expand ways to fund adaptation planning projects.



Guiding Principles

- ▶ Support socially vulnerable communities
- ▶ Put nature first whenever possible
- ▶ Solve interconnected problems at the same time
- ▶ Practice inclusive, community-led governance and decision-making
- ▶ Support existing efforts but plan for the long term
- ▶ Pick the right strategy for the right place at the right time

Building on Past Efforts with the Framework: Quantifying Needs and Revenues for Adaptation

Focus Areas

1

Update and improve regional accounting of anticipated sea level rise adaptation projects.

Outcomes

- Update prior regional analyses with local projects from recent planning efforts.
- Estimate the regional sea level rise adaptation need through 2050.

2

Update and characterize existing revenue sources for sea level rise adaptation.

- Inventory and forecast revenues for new state and federal funding programs.
- Characterize how existing adaptation funds are dispersed and for what purpose.

3

Study how new revenues for sea level rise adaptation needs can be raised most equitably.

- Analyze a range of possible revenue measures at different scales, to understand equitable approaches to close the sea level rise funding gap.

Inventory of Adaptation Needs

Local Adaptation Projects and Study Areas¹

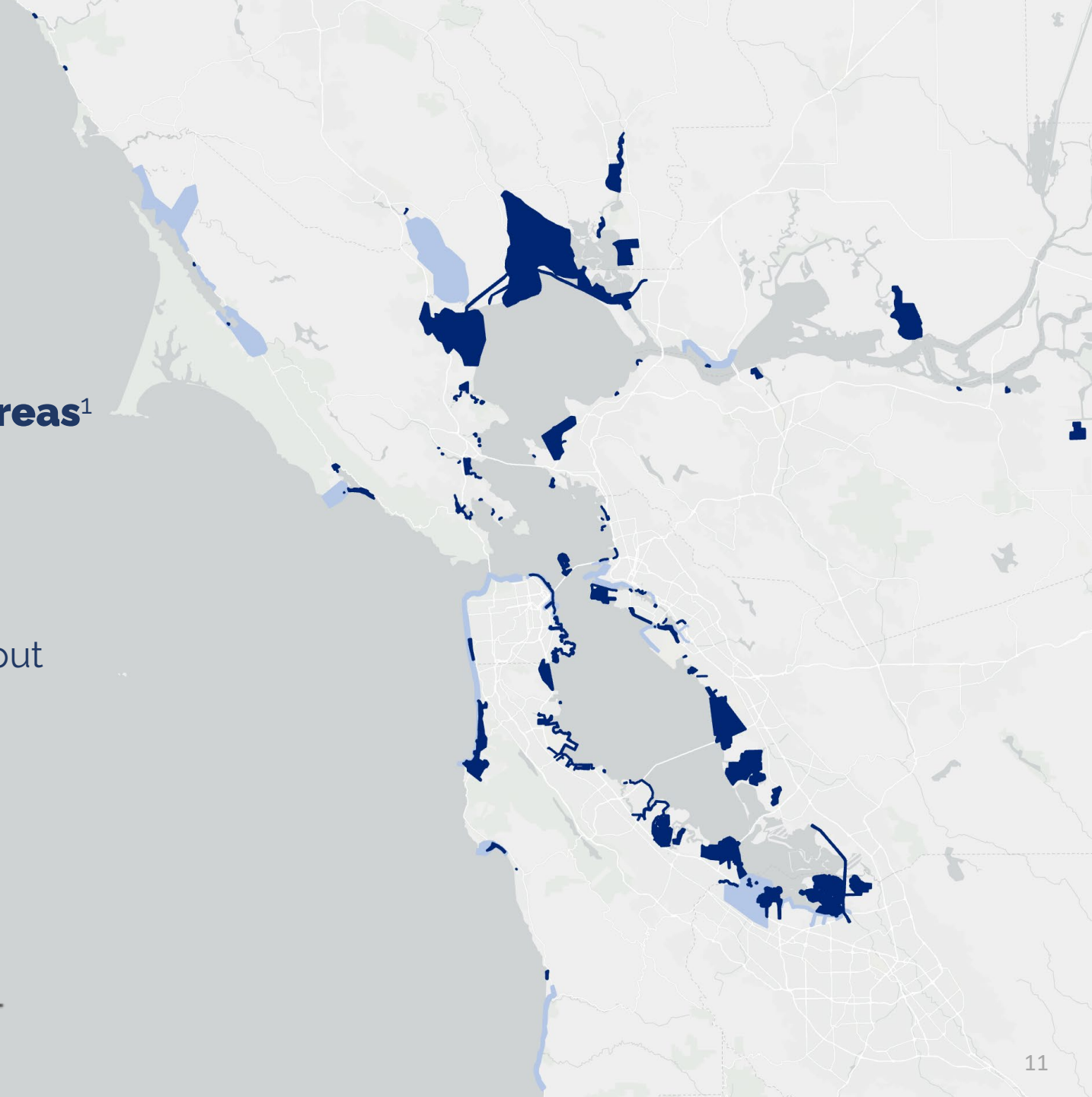
- Local Adaptation Projects
- Local Study Areas

192 projects in original inventory
132 projects updated with stakeholder input
Includes 47 new projects added

The degree of data availability varies:



- Flood protection less than 4.9 ft TWL
- Flood protection more than 4.9 ft TWL
- Flood protection level not available



Inventory of Adaptation Needs (2)

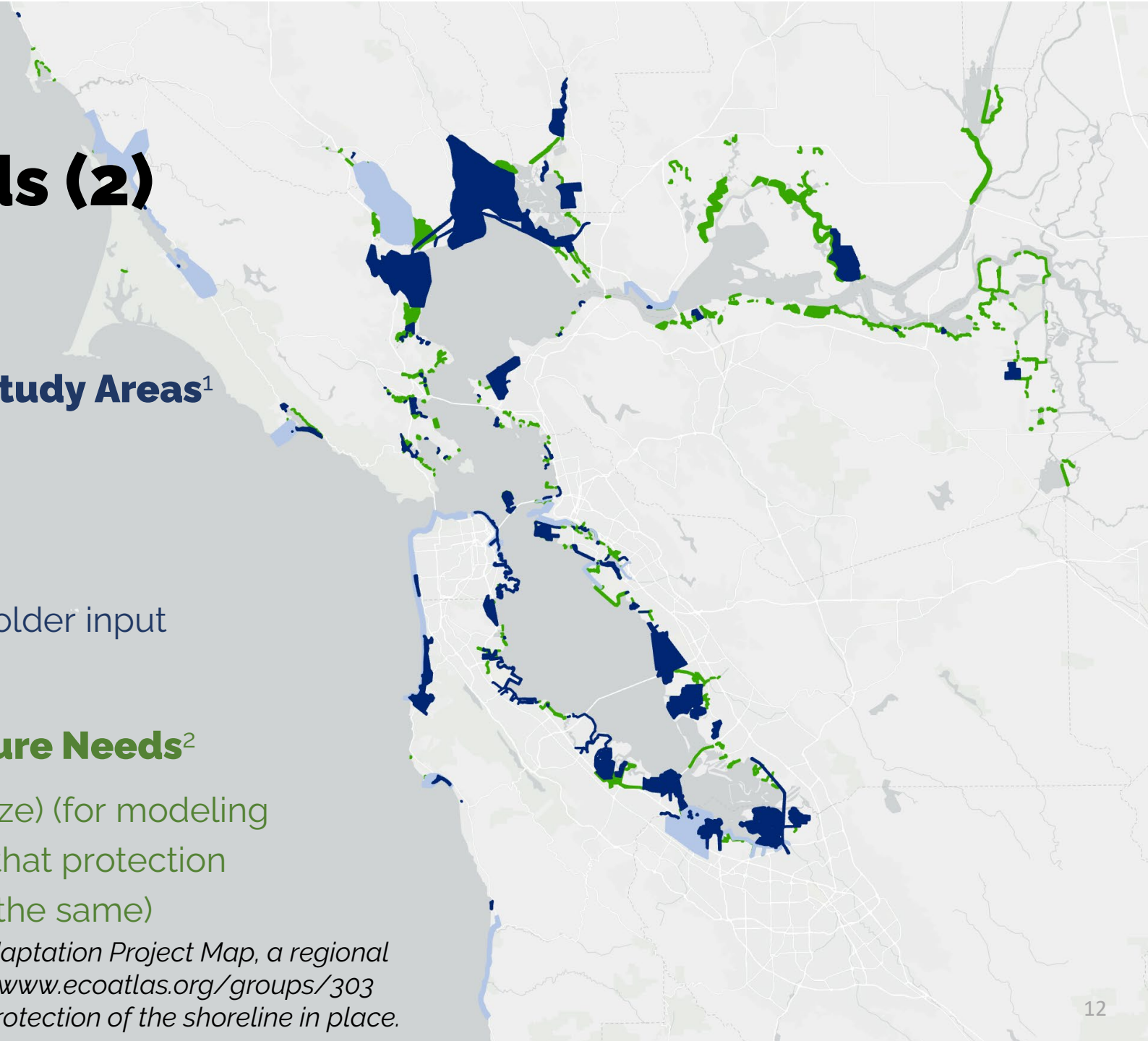
Local Adaptation Projects and Study Areas¹

- 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 Needs²

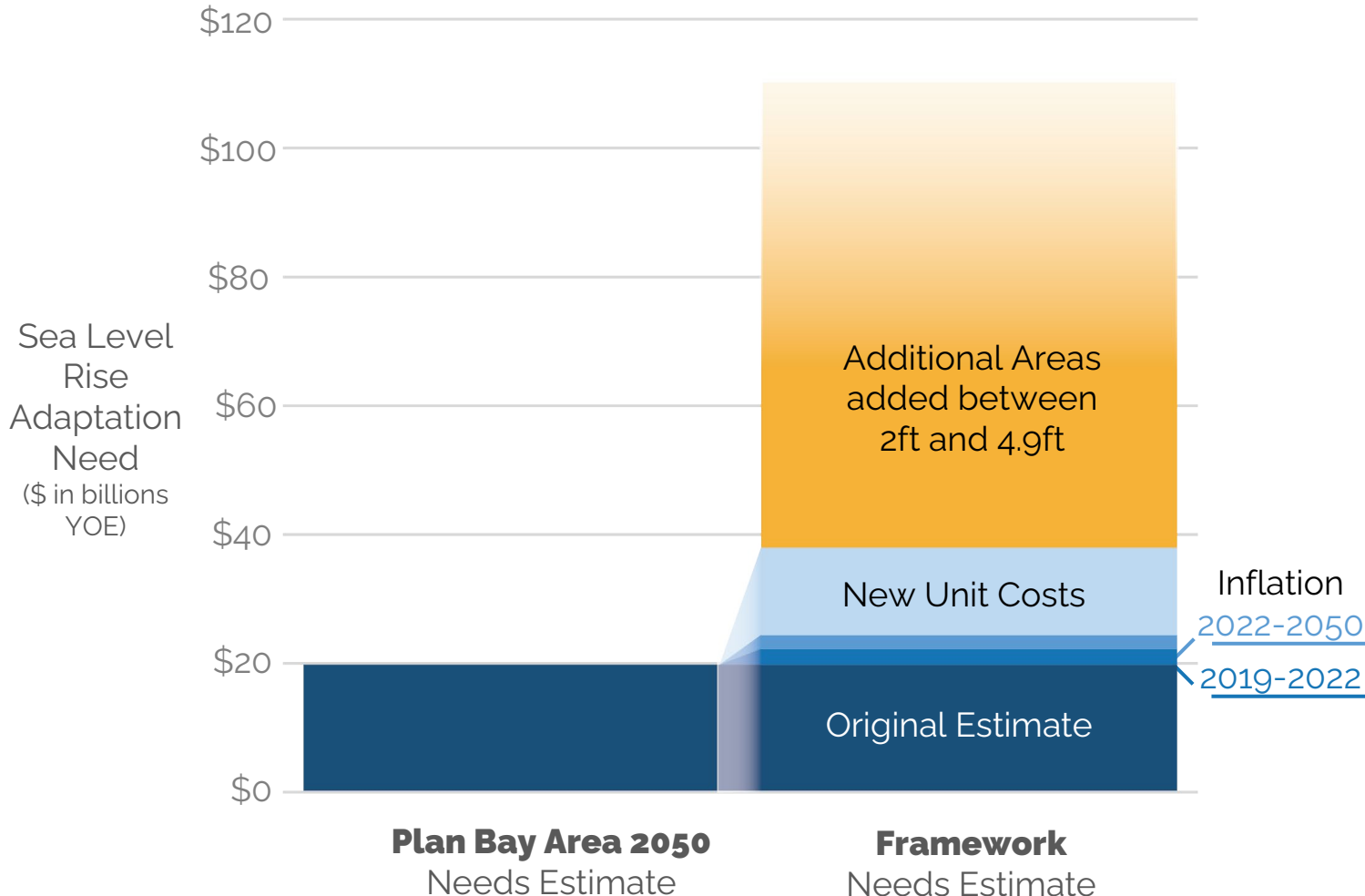
- Placeholder Adaptation Needs (size) (for modeling purposes only; does not assume that protection will occur or that the type will be the same)



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

² Placeholder needs determined by assuming the protection of the shoreline in place.

Estimate of Adaptation Funding Needs



Key Assumptions

- Increased **sea level rise height** from 2-feet to 4.9-feet¹.
- Assumed **“protect in place” adaptation action for all vulnerable shoreline**, including areas without planning and those in need of augmented plans.
- **Per-unit cost estimates** increased.
- **Inflation** over the past three years has been higher than the 2.2% assumed in Plan Bay Area 2050. In addition, the Framework assumes a higher rate of 3.0% going forward.¹

¹ Increased planning height to account for permanent sea level rise projected from OPC as well as a 100 year storm.

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 needs¹

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 total water level 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

¹ Estimate developed by BCDC and SFEI analysis.

Comparing the Numbers

Cost of adaptation compared to cost of inaction

\$110_B¹

Estimated cost of sea level rise adaptation through 2050

\$230⁺_B²

Estimated value of a subset of assets at risk through 2050

**The cost of inaction is far higher than the cost of adaptation;
We stand to lose much more if we do not act**

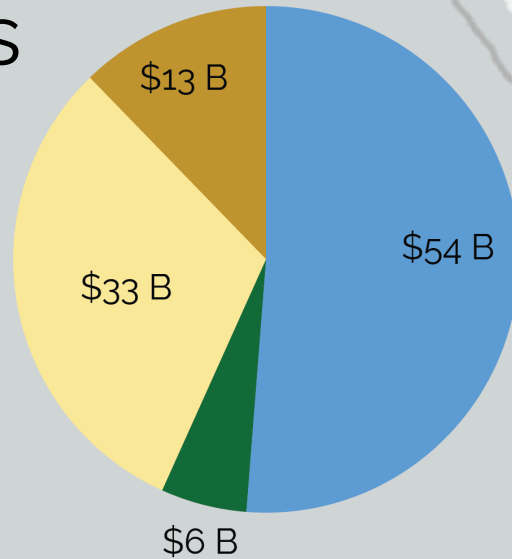


¹ In year of expenditure (YOE) dollars. ² In 2022 dollars. Photos: CA King Tides Project 2023.

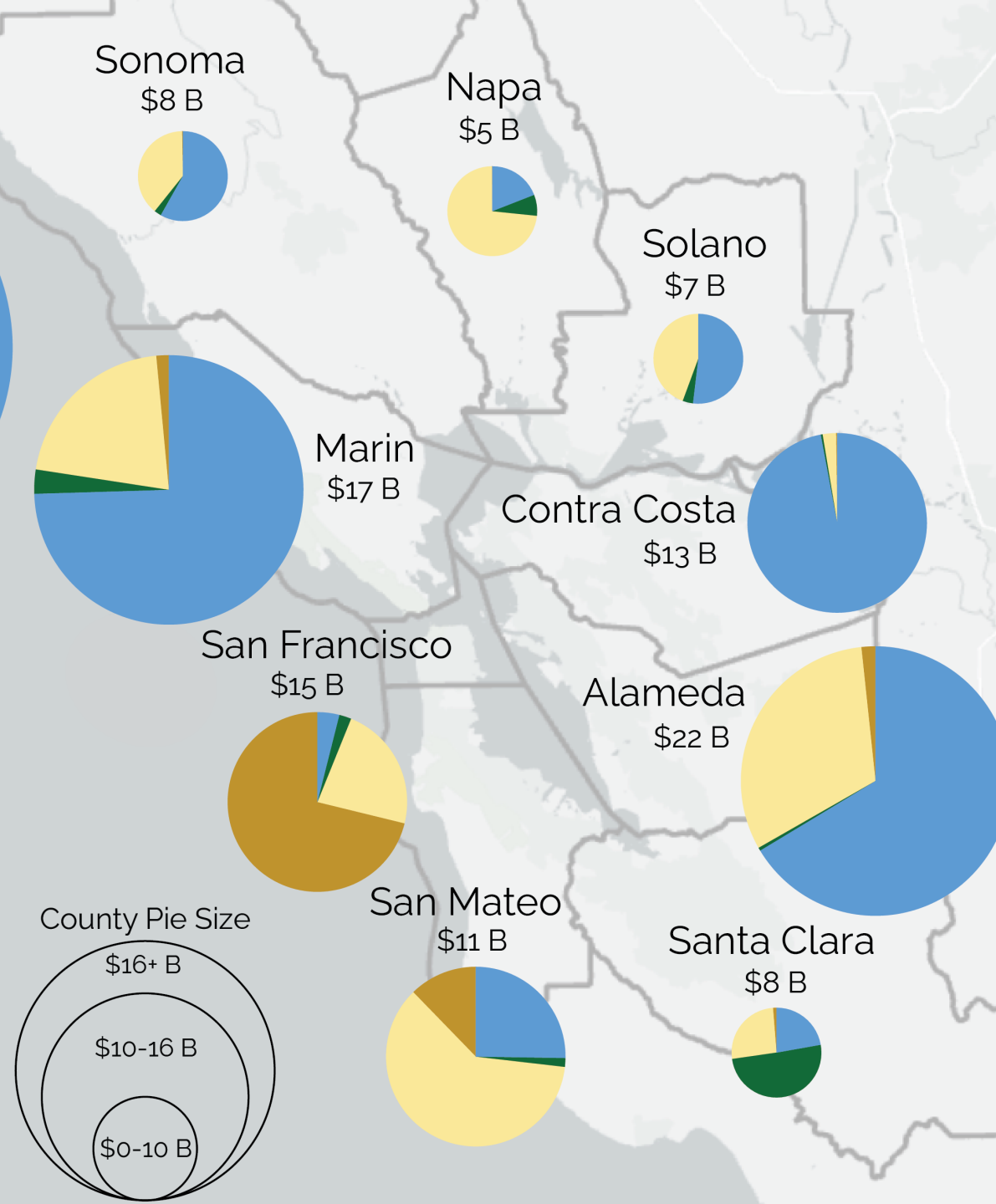
Adaptation Needs

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 Marin².

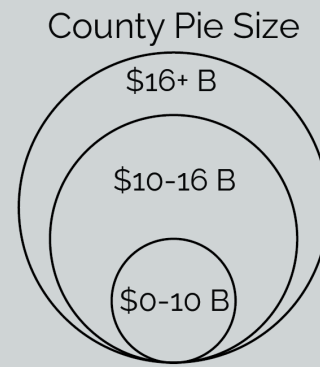


Escalated Regional Cost by Project Type¹
\$110 billion (B)



¹Values represented in Year of Expenditure dollars; Regional cost includes \$3B in additional sediment need.

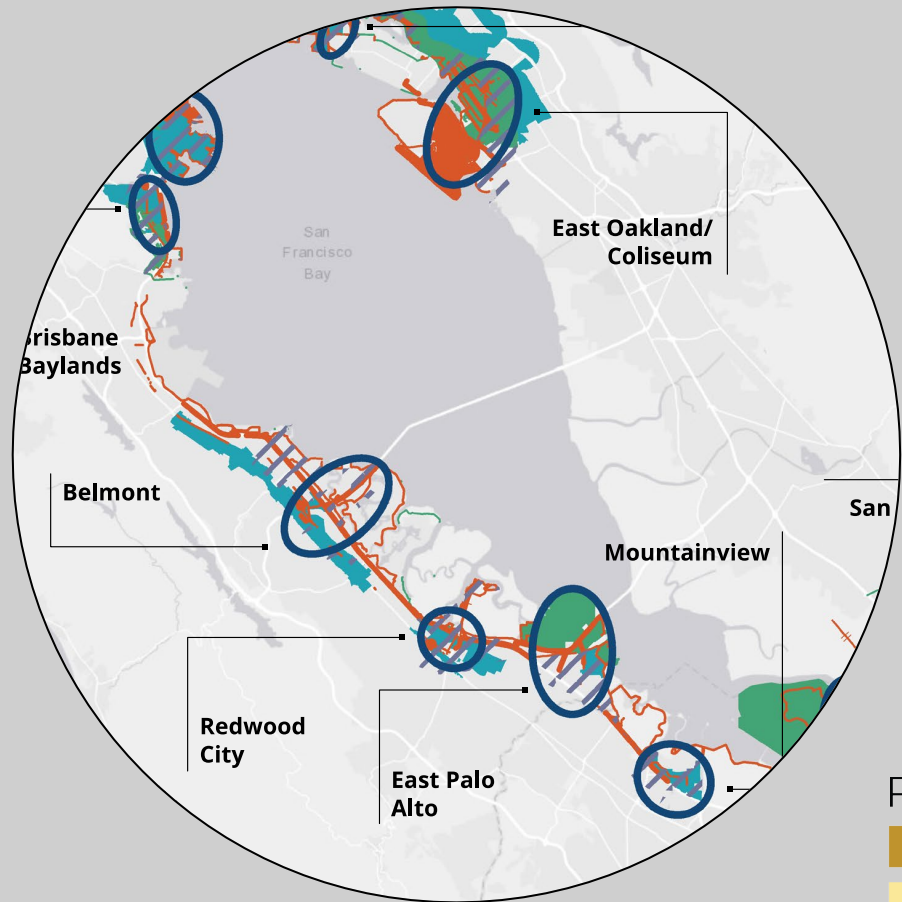
²Locally identified projects do not account for studies or plans without defined interventions.



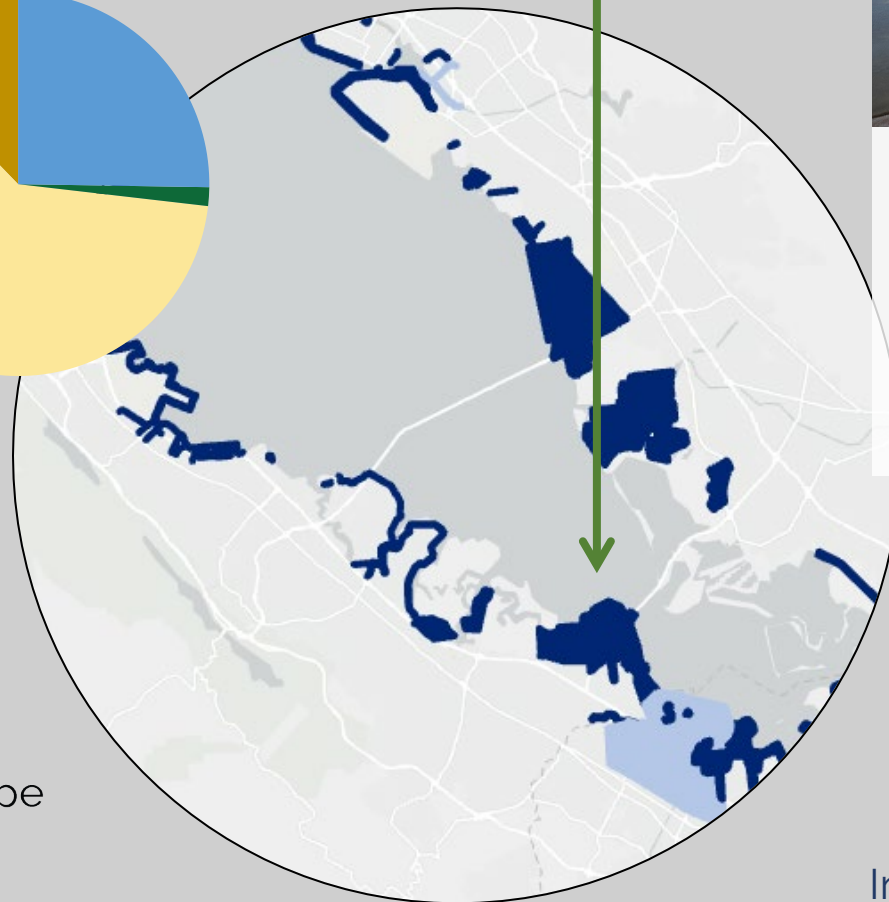
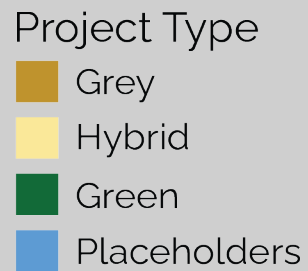
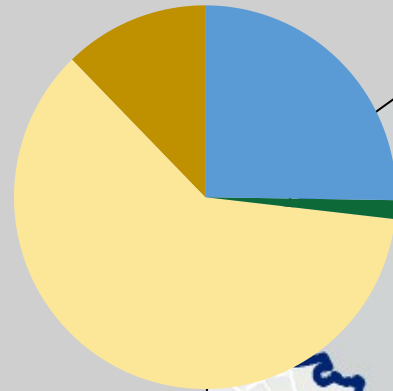
County Highlight

What do these findings mean to each county's planning?

San Mateo County "Hotspots"



San Mateo
\$11b

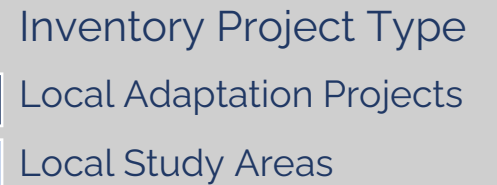


SAFER Bay



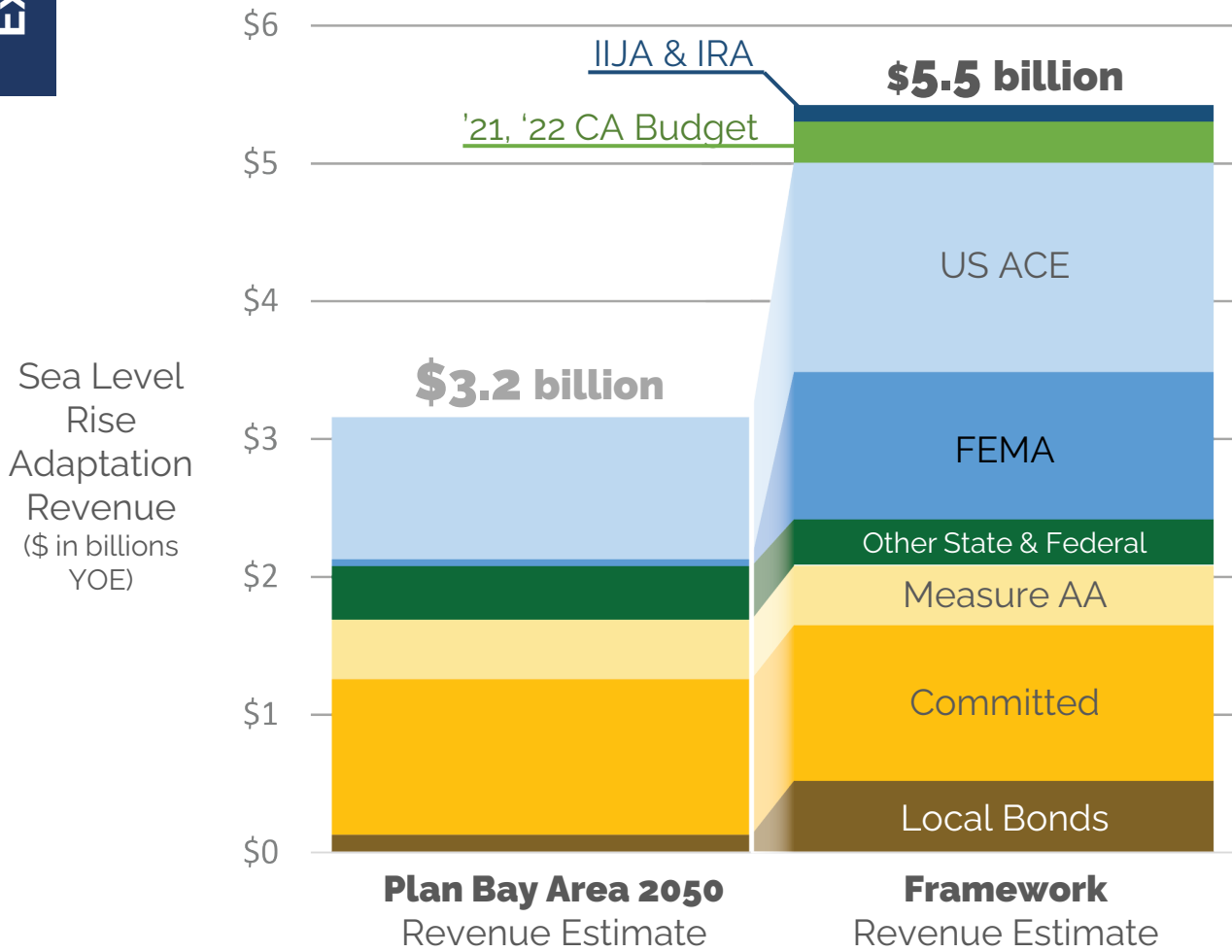
Levees and dikes; restoration

Estimated Cost:
\$228 million
Status: In Progress



Forecasting Existing Public Revenues

Updated Revenue Forecast (2022-2050)



Key Updates

- Federal action by IIJA & IRA account for ~\$120 million in new revenues.¹
- 2021 and 2022 State budget line items account for ~\$800 million in new revenues.²
- Emergence of FEMA's BRIC program greatly increases anticipated FEMA revenue.
- Inclusion of \$425 million SF Prop A (2018)³ increases locally generated sources.

¹ US ACE's IIJA allocation increase is not yet accounted for. It may add between \$0.02-0.15 billion. Waiting for US ACE feedback.

² The Governor's proposed 2023 budget is estimated to reduce the regional estimate by \$200 million.

³ Prop A was not included in Plan Bay Area 2050 because the analysis focused on areas that flooded with only 2' of permanent rise.

Exploratory Funding Sources: Context

To fill this funding gap, the region may need multiple additional funding sources at multiple scales.

The Framework explored three possible new revenue measures at the local, county, and regional scales to understand:

- **Revenue generation potential:** how much funding can be raised annually?
- **Bond issuance potential:** how funding can different measures raise for near-term project implementation?
- **Initial equity implications:** who pays?

Three measures were reviewed based on their overall feasibility and regional precedence.



¹ Including value capture mechanisms such as Community Facilities Districts and Tax Increment Financing.

Note: This Framework research is high level and exploratory only, and it is intended to provide insight for further research and discussion in the years ahead.

Case Studies for Three Funding Measure Types

Key Finding: Regional and/or local measures will not be capable of closing the funding gap. Additional funding from federal and/or state sources will also be necessary.

Scale: County & Regional

Regional and county taxes distribute tax burden across wider base

Scale: District-based (sub-local)

Only parcels that directly benefit pay

Parcel Tax

- Typically a flat rate property tax: each parcel charged the same amount
- Does not account for value or size of the property

Ad Valorem Property Tax/GO Bond

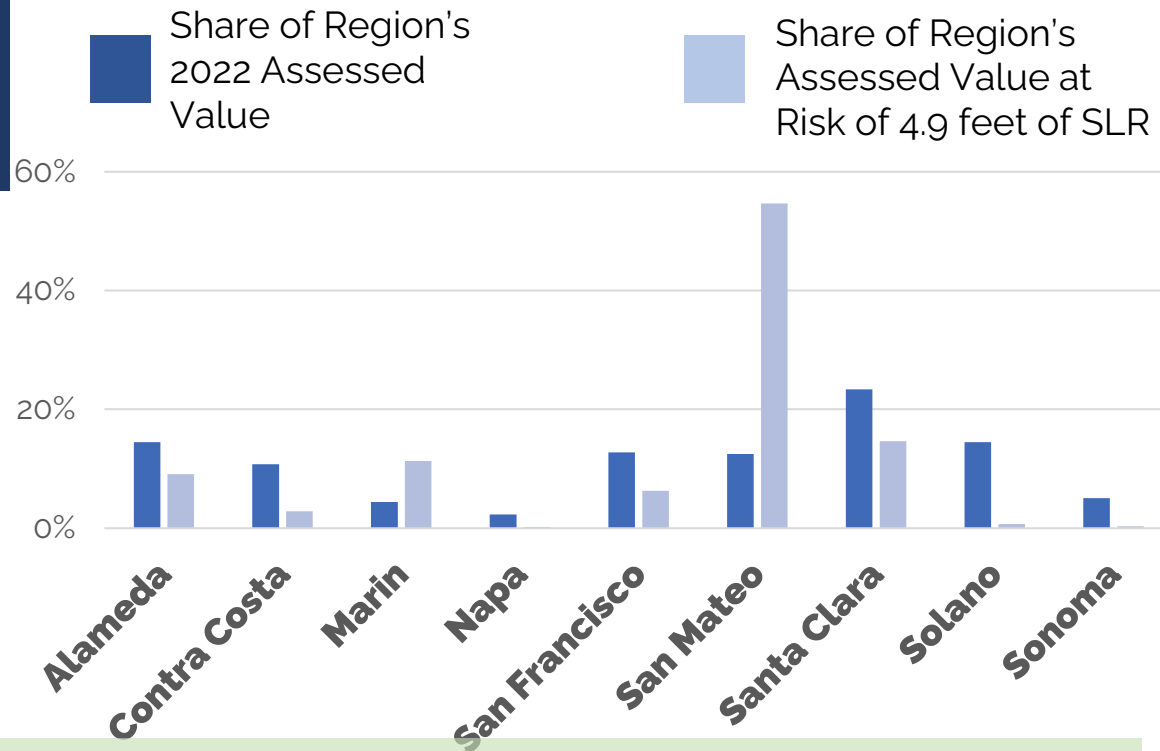
- Property-related tax that *can* be progressive: higher assessed properties pay more
- Subject to Prop 13 limitations

Assessment District

- Directly tied to specific benefits
- Most feasible in areas with greater resources and/or more direct impacts of SLR

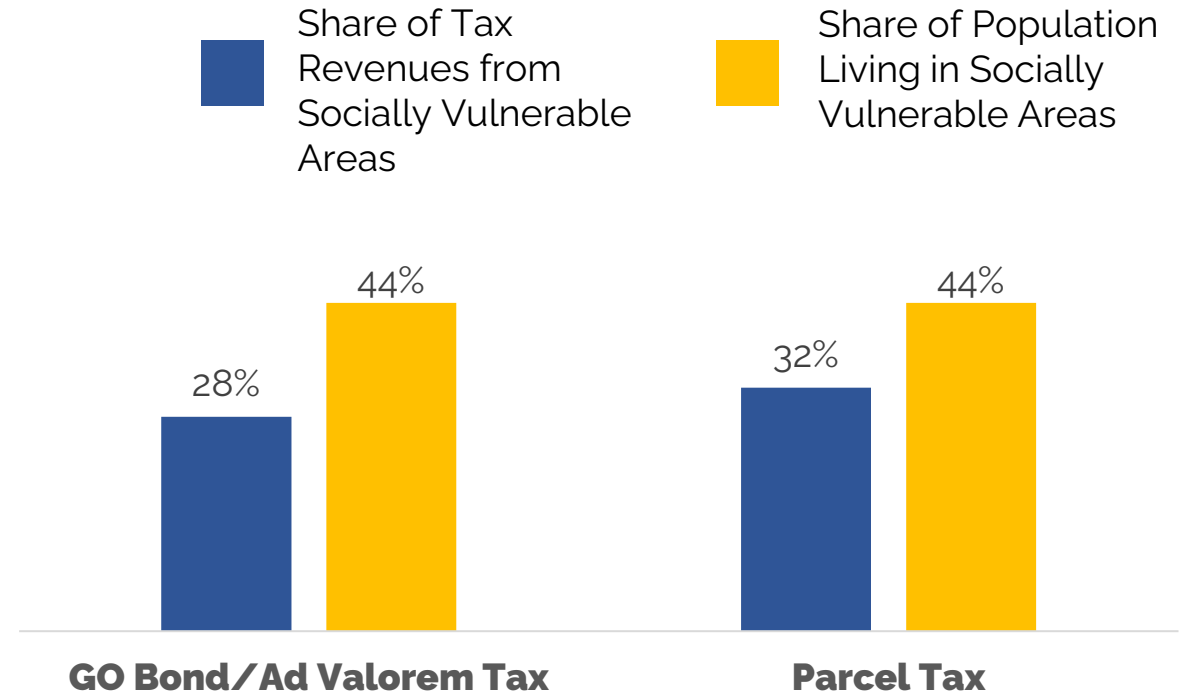
Exploring Potential Revenue Sources

Geographic Equity Lens



Key Findings: For geographic equity, using multiple types of funding measures would help to balance tax burden.

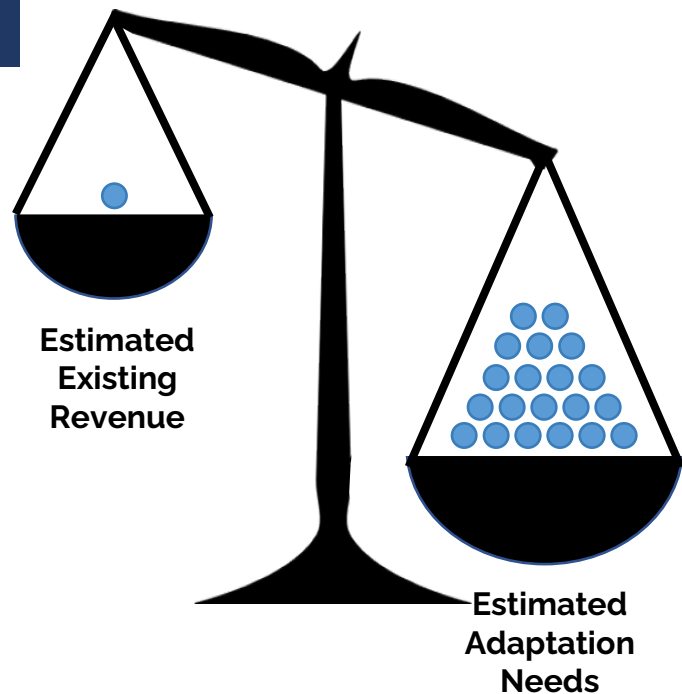
Social Equity Lens



Key Findings: Parcel taxes are less socially equitable than an ad-valorem tax, as they place a higher burden on socially vulnerable areas¹.

¹ Social vulnerability defined by medium, high and highest levels of BCDC's Community Vulnerability Data.

Recap of Key Learnings



● Represents \$5.5 billion

1. **Mix of “Green” and “Grey”.** Roughly half of the known project costs are for green or hybrid projects, reflecting the region's shift towards multi-benefit adaptation.
2. **Significant Funding Gap.** Current revenues are inadequate to meet the need, leaving a funding gap of over \$100 billion.
3. **Key Differences between Counties.** More than 50% of the costs are in only three counties, and the level of local planning for sea level rise varies widely.
4. **Multiple Fund Sources Required.** Even with prioritizing and phasing adaptation projects, there is no single funding measure that will be able to fill the gap.
5. **Prioritizing Equity.** GO bonds/ad valorem property taxes place a lower burden on socially vulnerable areas while providing a greater benefit to socially vulnerable areas than their regional share.
6. **Importance of Regional Approach.** Differences among counties in terms of vulnerability, level of planning, and our findings are all indicative of the need for a regional approach for funding and project development to avoid leaving anyone behind.

Adaptation in Progress

While there's much to be done ahead, major projects across the region are already underway.

SR-37 Corridor Adaptation

Transportation Project

Estimated Cost: \$8 billion

Status: Planning

North Richmond Shoreline Living Levee

Ecotone Levee

Estimated Cost: \$16 million

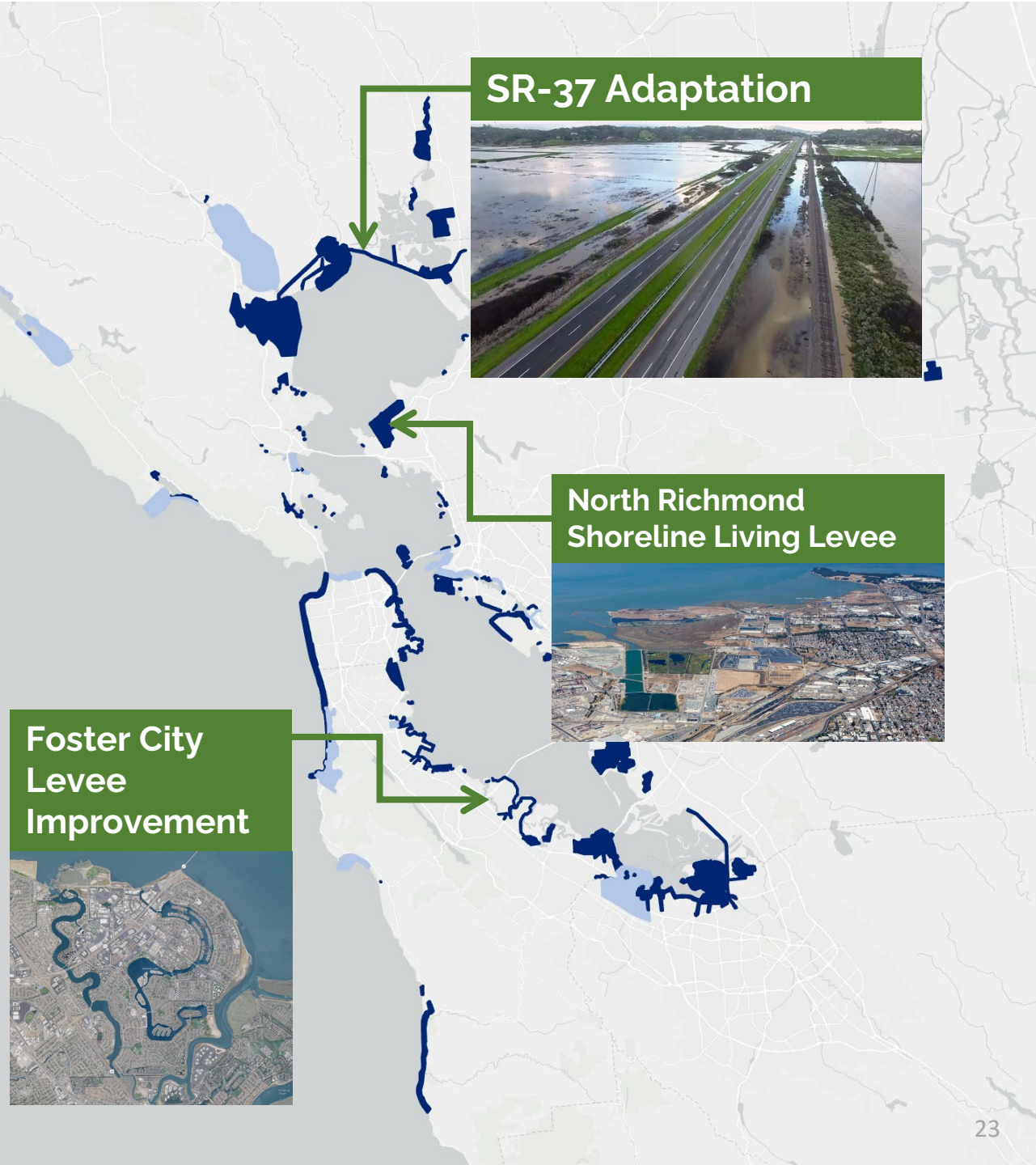
Status: Design

Foster City Levee Improvement

Levees and Restoration

Estimated Cost: \$90 million

Status: Construction



SR-37 Adaptation



North Richmond Shoreline Living Levee



Foster City Levee Improvement

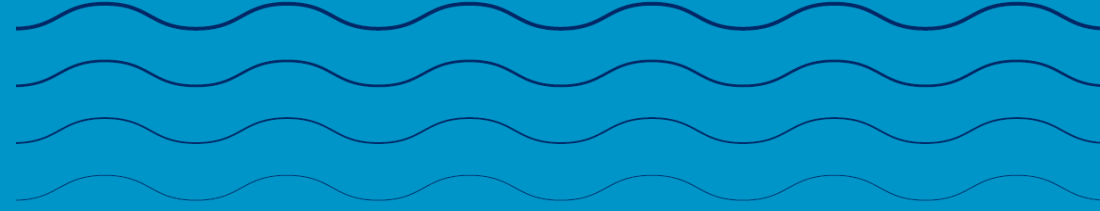


What's Next After the Framework?

- 1. Prioritize SLR investments through upcoming plans to reduce the funding gap.** Includes exploring which resilience projects require early actions and which low-density areas might be more appropriate for lower cost solutions. **[BCDC & MTC/ABAG]**
- 2. Explore how envisioned regional measures can make communities and transportation more resilient.** To the extent possible, planned measures for affordable housing and transportation should integrate policies or programs to advance more resilient outcomes. **[MTC/ABAG]**
- 3. Complete and maintain the development of the Shoreline Adaptation Project Mapping Program** to ensure that the region has access to the best possible inventory data. **[BCDC, others]**
- 4. Engage, educate, and mobilize elected officials to accelerate advocacy at the federal and state levels to secure more monies for the Bay Area.** Messaging the magnitude of the need here in the San Francisco Bay Area and competing for available funds will be key. **[BCDC, MTC/ABAG, BARC, others]**
- 5. Better define lead roles for funding plans and projects in the Bay Area.** The lack of clear roles and process to secure monies and distribute them equitably hinders the Bay Area's ability to mitigate climate impacts. (Joint Platform Task 6.2) **[BCDC, MTC/ABAG, BARC, others]**
- 6. Support cities, counties, and the private sector to develop funding and financing tools** at multiple scales. (Joint Platform Task 6.3) **[TBD]**

Discussion Questions

- What are the best forums to engage, educate, and mobilize elected officials for accelerated advocacy for state and federal funding?
- How do we catalyze funding and financing now that we have real data to back up our needs?
- Who should spearhead decisions around the funding governance question (and how should they decide)?



BAY ADAPT

REGIONAL STRATEGY FOR A RISING BAY

Rising Sea Level Commissioner Working Group

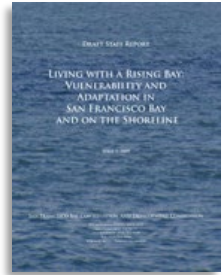
April 6, 2023

Dana Brechwald, Assistant Planning Director for Climate Adaptation

Ethan Lavine, Assistant Regulatory Director for Climate Adaptation

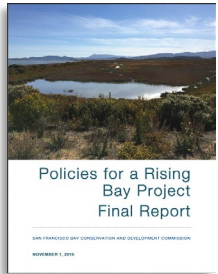
Jackie Mandoske, Senior Climate Adaptation Planner

Climate Change **Planning** at **BCDC**



2011
Climate Change Policies

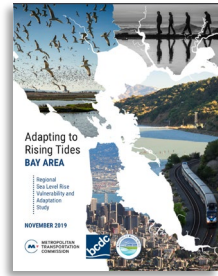
2012-16
Adapting to Rising Tides Portfolio Projects – Alameda, Contra Costa County, etc.



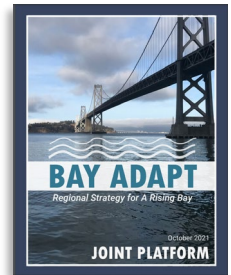
2015-16
Policies for a Rising Bay



2017
Raising the Bar on Regional Resilience



2020
ART Bay Area



2021
Bay Adapt Joint Platform



ART Program Established
2012



BCDC Commissioner SLR Workshops
2016-17

Environmental Justice and Fill for Habitat Bay Plan Amendments
2018-19

Plan Bay Area 2050
2021



A Rising Bay

**A regional
problem
requires
regional
solutions**



Why?

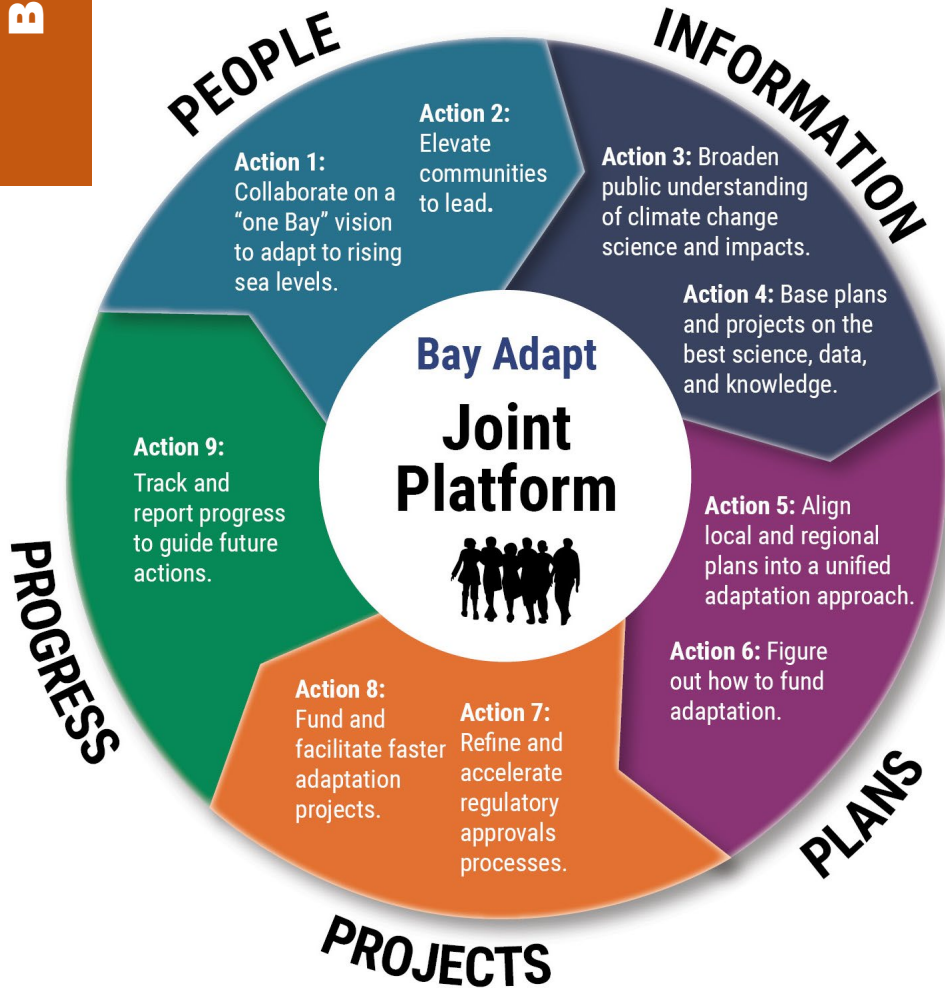
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Guiding Principles

- ▶ Support socially vulnerable communities
- ▶ Put nature first whenever possible
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- ▶ Support existing efforts but plan for the long term
- ▶ Pick the right strategy for the right place at the right time

Bay Adapt Joint Platform



Task 1.1 Create a long-term regional vision rooted on communities, bay habitats, and the economy.

Task 1.2 Lay the foundation for a proactive regional legislative agenda.

Task 2.1 Improve how communities and public agencies learn from each other and work together.

Task 2.2 Fund the participation and leadership of community-based organizations (CBOs) and frontline communities in adaptation planning.

Task 3.1 Tell local and regional stories about people and places adapting to climate change.

Task 3.2 Weave climate literacy into school programs.

Task 4.1 Align research and monitoring with information gaps.

Task 4.2 Make scientific data, information, and guidance easier to use.

Task 4.3 Increase access to technical consultants for local adaptation partners.

Task 5.1 Provide incentives for robust, coordinated adaptation plans.

Task 5.2 Align state-mandated planning processes around adaptation.

Task 6.1 Expand understanding of the financial costs and revenues associated with regional adaptation.

Task 6.2 Establish a framework for funding plans and projects.

Task 6.3 Help cities and counties expand ways to fund adaptation planning and projects.

Task 7.1 Accelerate permitting for equitable, multi-benefit projects.

Task 7.2 Assess environmental regulations and policies that slow down progress on projects.

Task 8.1 Incentivize projects that meet regional guidelines.

Task 8.2 Encourage collaboration among people doing projects in the same places.

Task 8.3 Facilitate faster construction of nature-based projects.

Task 9.1 Measure regional progress using metrics and share results.

Task 9.2 Monitor and learn from pilot projects.

Implementing **Bay Adapt**



1

Increasing
**Community
Capacity**

2

Regional
**Shoreline
Adaptation
Plan**

3

Regulatory
**Improve-
ments**

4

**Backbone
Agency
Strategy**



OCEAN
PROTECTION
COUNCIL



Vision

BCDC will be a proactive and responsive, equitable, and collaborative organization that successfully addresses the regulatory and planning challenges facing the Bay, its shoreline, and the communities that it serves.

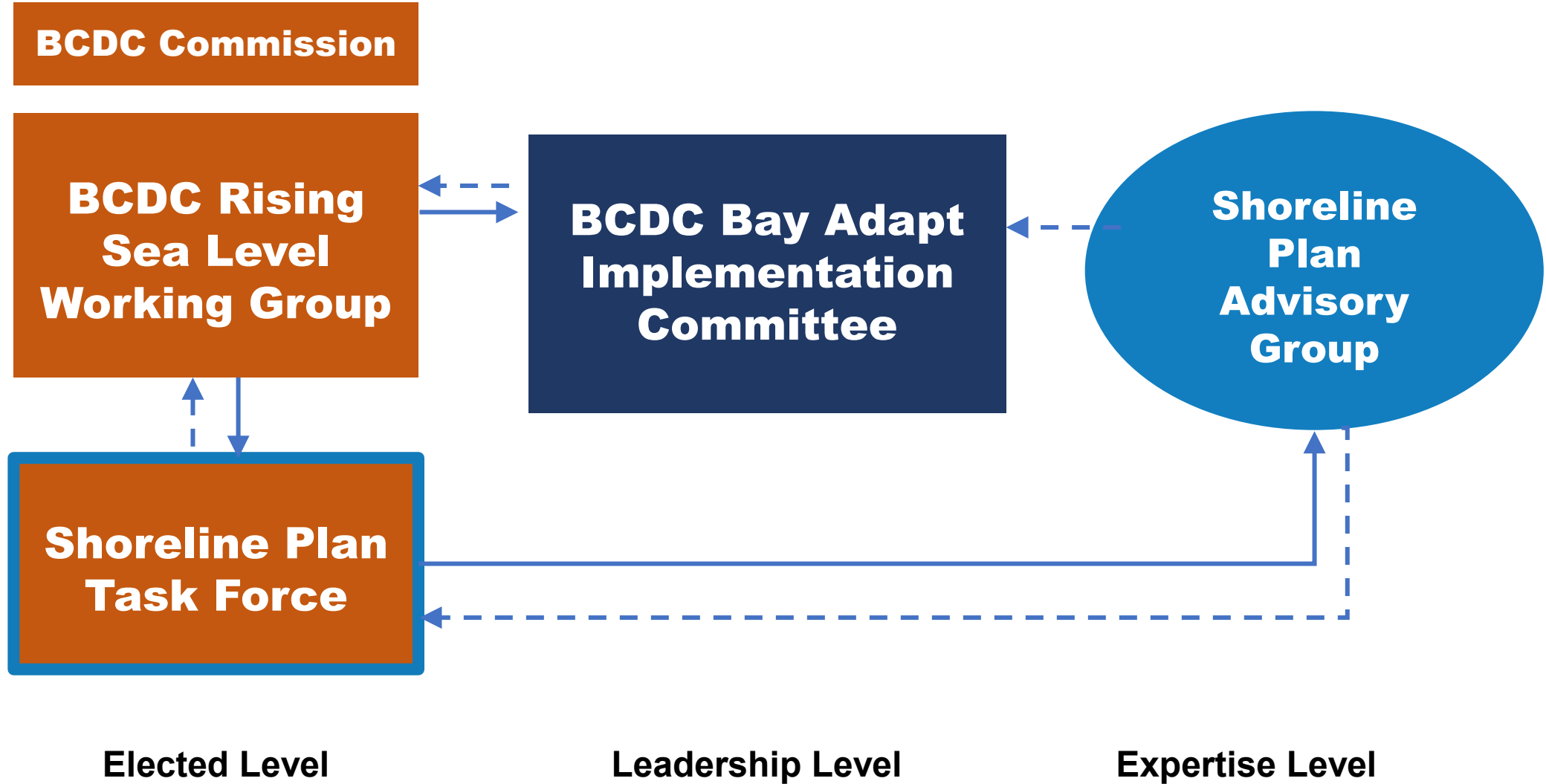
Goals

- 1** Lead regional planning efforts that result in successful and equitable adaptation, restoration, development, and public access projects for the Bay Area in light of rising sea levels.
- 2** Review BCDC's regulatory and planning functions to create a more unified and consistent regional-scale approach to managing the Bay and its shoreline in light of the uncertain future caused by rising sea levels.
- 3** Implement equity initiatives and practices throughout BCDC's policies, programs, and processes to resolve historic inequities.
- 4** Develop and implement more effective methods to communicate more successfully externally with stakeholders and internally among divisions.
- 5** Build and maintain an adequately resourced and more responsive and diverse organization that can meet its growing challenges more effectively and sustainably.

Anticipated Outcomes

- Through BCDC's bold leadership and collaboration, the Bay Area is prepared to adapt faster, better, and more equitably to rising sea levels, protect and restore its natural habitats, and increase access to the Bay.
- Enlarge the focus of BCDC's regulatory program to permit larger-scale and more complex subregional projects that are aligned with the Regional Shoreline Adaptation Plan.
- By advancing equity practices internally and externally BCDC will seek to eliminate its past historic disparities and achieve tangible equitable results for its stakeholders and the communities it serves moving forward.
- BCDC will be more transparent and accessible to all, and Commissioners, staff, and stakeholders will have a shared knowledge of the agency's priorities and objectives and have meaningful opportunities to shape policies.
- BCDC will better fulfill its mission by increasing its capacity and attracting and retaining a more diverse staff and Commission who are responsive to the variety of diverse communities around the Bay.

Leadership Groups



Implementing **Bay Adapt**

1

Increasing
**Community
Capacity**

2

Regional
**Shoreline
Adaptation
Plan**

3

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**Improve-
ments**

4

**Backbone
Agency
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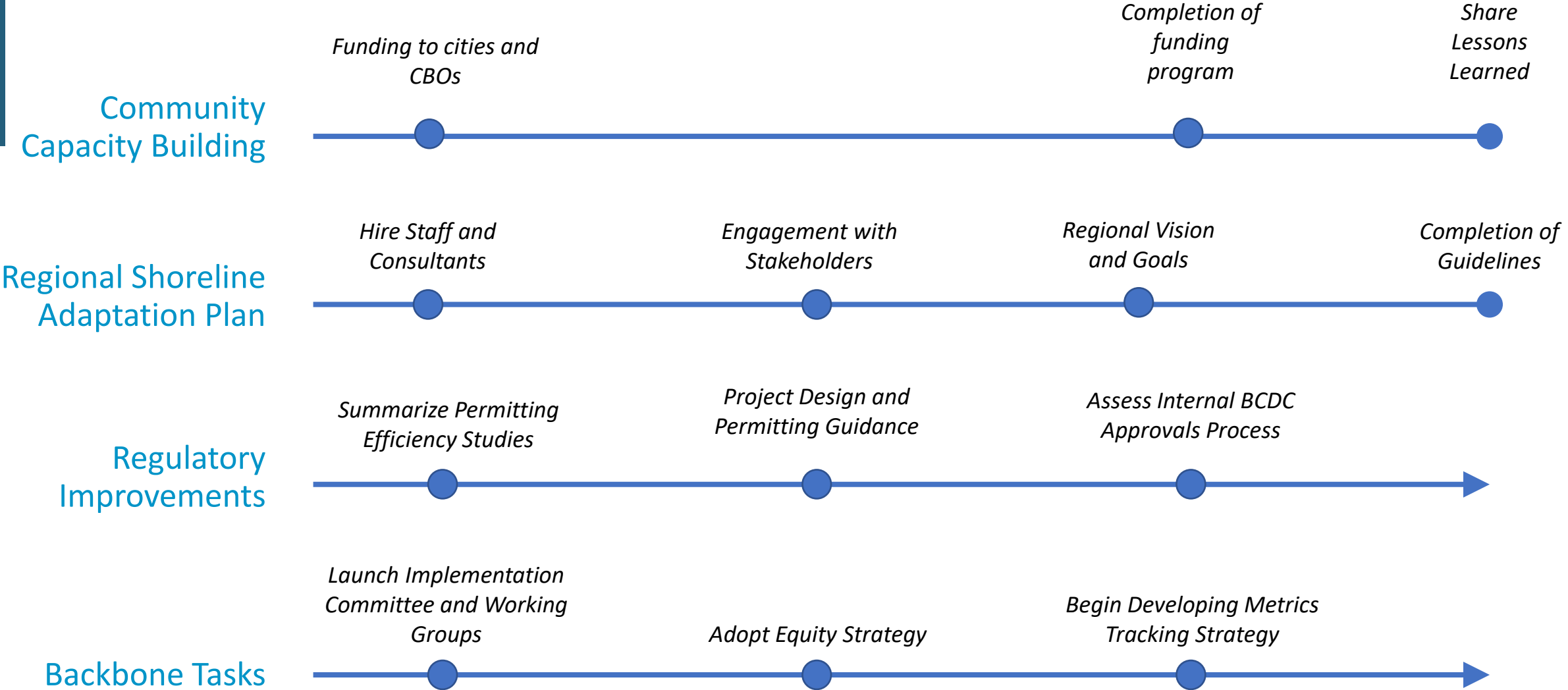
Backbone Agency Strategy

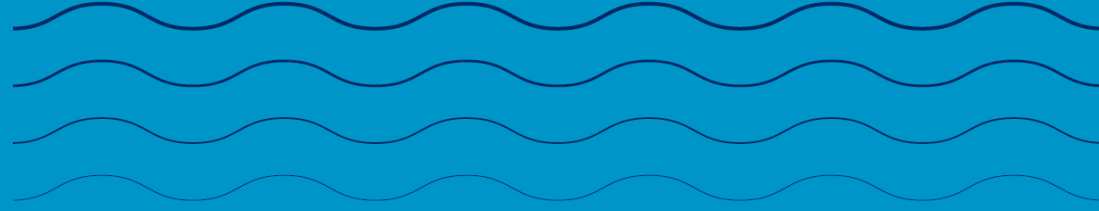
- Leadership and engagement
 - BCDC
 - Elected Official briefings
 - Bay Adapt Implementation Committee
 - Working Groups to advance tasks
 - Annual or Bi-Annual Regional Forums
- Metrics – tracking progress and success
- Communicating and maintaining the Bay Adapt “brand”
- Building long-term equity

What is an Equity Strategy?

- *Expanding “seats” on leadership groups for diverse CBO/NGO representatives*
- *Baseline funding for EJ Advisors, CBO representatives on working groups*
- *Increased support and training for EJ leadership positions*
- *Funding EJ-focused staff to work on Bay Adapt*
- *Commitment to transparency about BCDC’s equity practices*

Bay Adapt Implementation Milestones





BAY ADAPT

REGIONAL STRATEGY FOR A RISING BAY

Regional Shoreline Adaptation Plan

Implementing **Bay Adapt**

1

Increasing
**Community
Capacity**

2

Regional
**Shoreline
Adaptation
Plan**

3

Regulatory
**Improve-
ments**

4

**Backbone
Agency
Strategy**



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PROTECTION
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Regional Shoreline Adaptation Plan

Regional Shoreline Adaptation Plan



Develop Regional Sea Level Rise
Adaptation Planning Guidelines by
May 2024

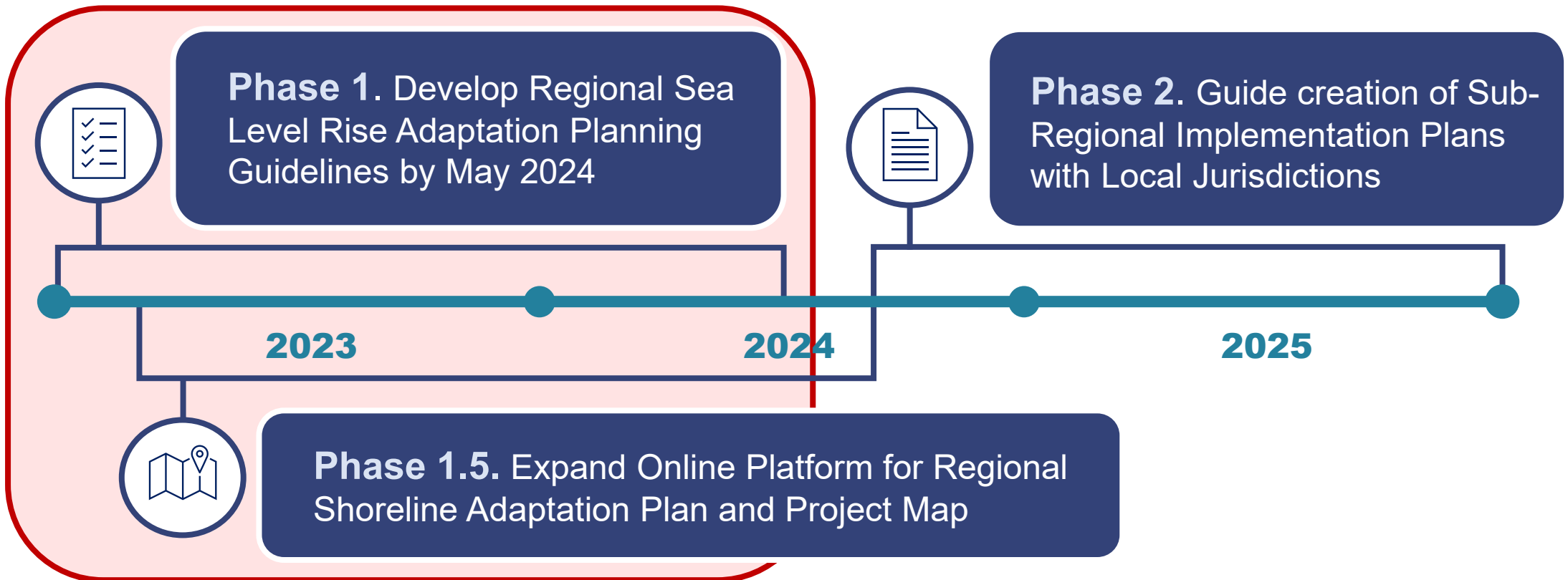


Guide creation of Sub-Regional
Implementation Plans with Local
Jurisdictions



Expand Online Platform for Regional
Shoreline Adaptation Plan and Project
Map

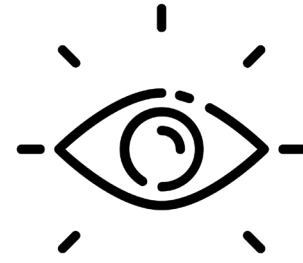
Regional Shoreline Adaptation Plan Timeline



Developing the **Regional Guidelines**

Topic areas to be included:

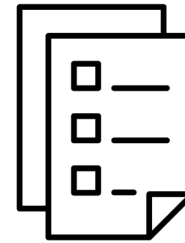
- Environmental Justice communities
- Contaminated Sites
- Habitat
- New and Redevelopment
- Transit
- Critical Infrastructure
- Multi-jurisdictional planning
- Others as needed



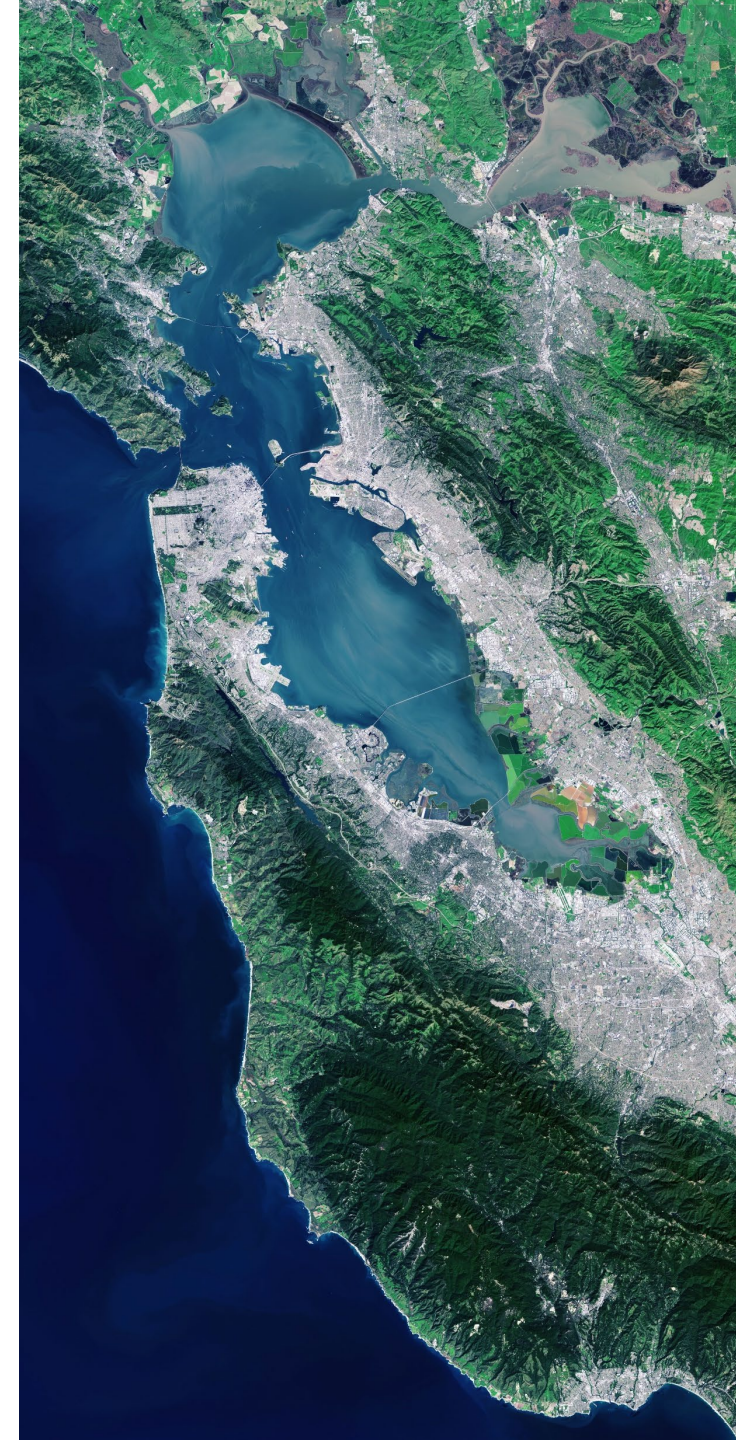
SHARED VISION



GOALS FOR SUCCESS



**GUIDELINES TO BE
APPLIED LOCALLY**



Project **Goals**



Develop Regional Sea Level Rise Adaptation Planning Guidelines



Expand Online Platform for Regional Shoreline Adaptation Plan and Project Map

GOAL 1

Collaborate and engage equitably with stakeholders

GOAL 2

Build a shared regional vision of adaptation

GOAL 3

Create regional guidelines for subregional plans

GOAL 4

Improve accessibility of applicable data and tools

GOAL 5

Identify incentives for strategic implementation

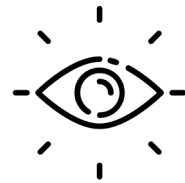
What can the Regional Shoreline Adaptation Plan achieve?



- Adaptation that **coordinates** with neighboring jurisdictions
- **Priority** resources to frontline communities
- Long-term **health** of wetlands
- Strategy for **adaptation implementation** based on risk
- Common **standards and methods** for applying science
- **Funding pipeline** that reduces burdens on local jurisdictions
- Tracking and evaluation towards **collective vision of progress**

Engaging Diverse Stakeholders Throughout the Process

(Subject to change)



Regional Vision and Goals

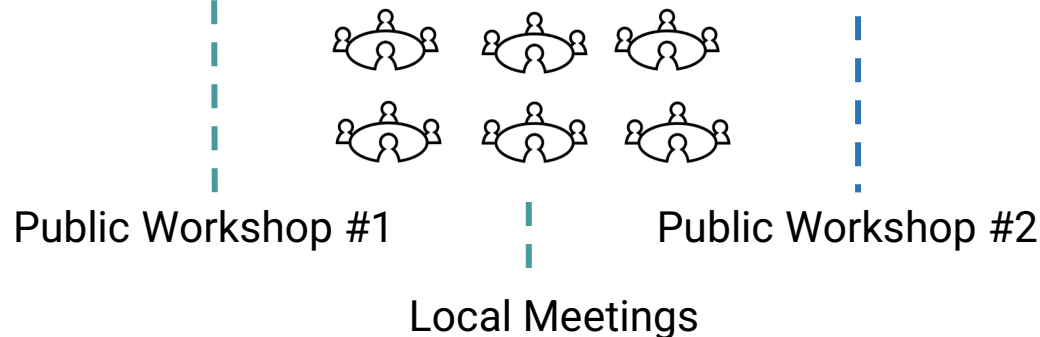
Regional Guidelines

Public Comment

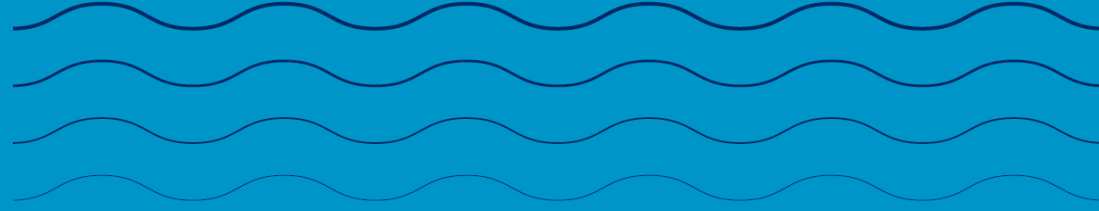
BCDC Adoption



- Leadership Groups**
- BCDC Commission
 - Local Elected Regional Task Force
 - Advisory Group



- Additional Outreach*
- Potential focus groups
 - Presentations as requested
 - Community pop-up events
 - Other creative ideas



BAY ADAPT

REGIONAL STRATEGY FOR A RISING BAY

Regulatory Improvements

Implementing **Bay Adapt**

1

Increasing
**Community
Capacity**

2

Regional
**Shoreline
Adaptation
Plan**

3

Regulatory
**Improve-
ments**

4

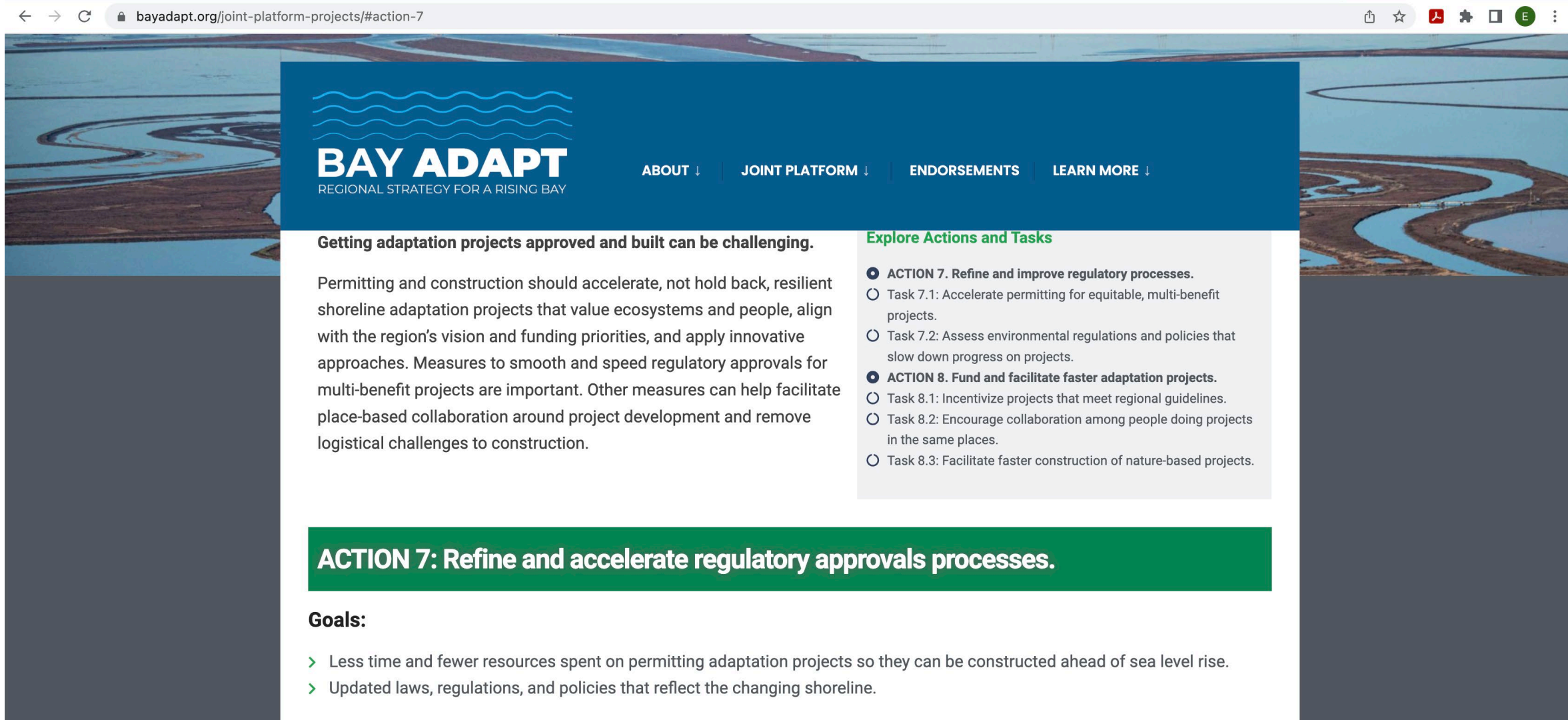
**Backbone
Agency
Strategy**



OCEAN
PROTECTION
COUNCIL



Based in Bay Adapt



bayadapt.org/joint-platform-projects/#action-7

BAY ADAPT
REGIONAL STRATEGY FOR A RISING BAY

ABOUT ↓ | JOINT PLATFORM ↓ | ENDORSEMENTS | LEARN MORE ↓

Getting adaptation projects approved and built can be challenging.

Permitting and construction should accelerate, not hold back, resilient shoreline adaptation projects that value ecosystems and people, align with the region’s vision and funding priorities, and apply innovative approaches. Measures to smooth and speed regulatory approvals for multi-benefit projects are important. Other measures can help facilitate place-based collaboration around project development and remove logistical challenges to construction.

Explore Actions and Tasks

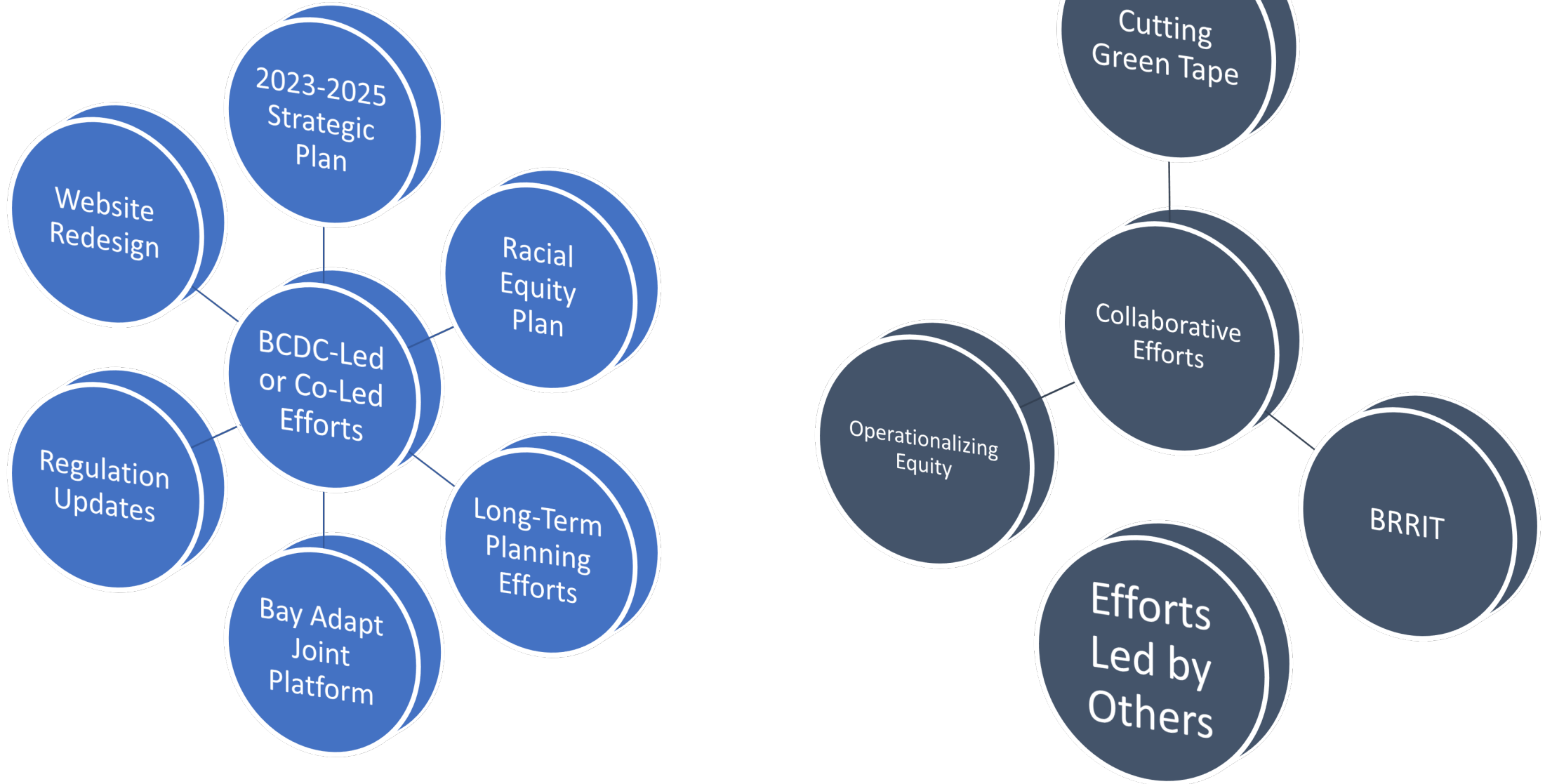
- **ACTION 7. Refine and improve regulatory processes.**
 - Task 7.1: Accelerate permitting for equitable, multi-benefit projects.
 - Task 7.2: Assess environmental regulations and policies that slow down progress on projects.
- **ACTION 8. Fund and facilitate faster adaptation projects.**
 - Task 8.1: Incentivize projects that meet regional guidelines.
 - Task 8.2: Encourage collaboration among people doing projects in the same places.
 - Task 8.3: Facilitate faster construction of nature-based projects.

ACTION 7: Refine and accelerate regulatory approvals processes.

Goals:

- > Less time and fewer resources spent on permitting adaptation projects so they can be constructed ahead of sea level rise.
- > Updated laws, regulations, and policies that reflect the changing shoreline.

Connecting to other **Efforts**



Program Outcomes



Discussion **Questions**

- Did we capture the ways in which this group would like to engage in SLR planning at BCDC?
- What aspects of the Bay Adapt tasks are you most interested in?
 - Backbone tasks
 - Regional Shoreline Adaptation Plan
 - Regulatory Improvements