Regional Shoreline Adaptation Plan:

One Bay Vision, Strategic Regional Priorities, and Subregional Shoreline Adaptation Plan Guidelines

December 2024

San Francisco
Bay Conservation
and Development
Commission (BCDC)

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Date Published: December 2024

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Letter from the Chair

Zack Wasserman, Chair of the San Francisco Bay Conservation and Development Commission

The Bay Area is already experiencing the impacts of climate change and rising sea levels through flooding from high tides, storm surge, and bigger storms with more rain. Their ramifications – threatened natural habitats that would otherwise protect shoreline communities, disrupted transportation networks, untreated wastewater flowing into the Bay, parks and open space under water, and water flowing into places that once were dry – are only projected to worsen in decades to come.

Indeed, all of California has begun experiencing the first tastes of the harsh lessons of not preparing for climate change. Now, BCDC and the Coastal Commission have been charged by the state Legislature and the Newsom administration to help prepare our shorelines for rising sea levels by supporting local sea level rise planning through consistent guidelines and standards for plans and approving the plans once complete.

The Regional Shoreline Adaptation Plan (RSAP) provides local governments – and the whole region – with the framework needed to protect the communities who live, work, and play in shoreline cities and counties. Planning for sea level rise will highlight each jurisdiction's different priorities and challenges. But the framework laid out in the RSAP provides the flexibility to enable every jurisdiction to prioritize values that are important locally but still in alignment with regional goals, make trade offs among outcomes to best fit their residents, and establish a socially, economically, and environmentally prosperous future.

Without a doubt this planning process will require local governments to allocate meaningful resources to make it robust, inclusive, and impactful. Thankfully, the state of California has already made initial planning funding available that is noncompetitive and aligned with the RSAP. In addition, shoreline adaptation projects within approved plans will be prioritized for state funding.

Finally, BCDC looks forward to working closely with local governments to move their plans forward as quickly as possible by answering questions, suggesting possible policy approaches, and learning with local governments how to use local plans to best protect their residents, places, and habitat. As a first-of-its kind plan, BCDC looks forward to working with the Bay Area's cities and counties over the next decade to continually refine and advance the RSAP, local plans, and adaptation projects as they advance through implementation. This version of the RSAP will change over the coming years as we observe how the plan is implemented and how conditions may change. Our collaborative effort must ensure that the Bay Area not only retains its diverse social fabric and economic prowess, but that our plans for adaptation strengthen both, as well as provide protection for our people, our places, and our habitats. By working together across our region, we can realize that goal.

Zack Wasserman
Chair, BCDC

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Right: Photo of Bay Farm Island, Alameda, during King Tides in 2023. Photo courtesy of California King Tides Project.

What this document IS and IS NOT

What this document is intended to do:	What this document is NOT intended to do:
Provide Guidelines and Minimum Standards that must be used in Subregional Shoreline Adaptation Plans as required by SB 272.	Change BCDC's current permitting authority or imply that the projects outlined in Subregional Shoreline Adaptation Plans to be submitted can necessarily be found consistent with BCDC's other current Bay Plan policies.
Be dynamic and updated on a regular basis.	Be a comprehensive overview of the sea level rise science, consequences, or adaptation options applicable to the Bay Area.
Be used by practitioners required to develop Subregional Shoreline Adaptation Plans as outlined in SB 272.	Be uniformly relevant to all situations. Some Guidelines and Minimum Standards may not be applicable in all situations; practitioners, in consultation with BCDC staff, must determine if and how Guidelines and/or standards may apply in any given situation.
Build on existing plans, policies, and requirements that are relevant and applicable. The Guidelines in this document align with and leverage local planning requirements, regional planning policies, and other state mandates.	Necessarily require all new analysis, decision-making, or project development. Existing sea level rise vulnerability assessment and adaptation planning efforts can and should be applied to meet these Guidelines.
Require adaptation strategies that respond to coastal flood hazards affected by sea level rise.	Require adaptation responses to all climate-driven hazards.

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Executive Summary

Living with more water along our shoreline through rising seas, more and higher storm surge, rising groundwater, and flood events has emerged as the premier challenge facing the San Francisco Bay shoreline. The decisions we make today are not just for current Bay Area residents, they are for future generations who will live with the consequences of our ability to prepare—or not prepare—for what is inevitable with increased greenhouse gas emissions.

The enactment of SB 272 (Laird)[1] in October 2023 requires the San Francisco Bay Conservation and Development Commission (BCDC) to create guidelines that cities and counties will use to develop Subregional Shoreline Adaptation Plans—plans that will protect their residents, neighborhoods, communities, infrastructure, and habitats from rising seas.

BCDC was created almost 60 years ago to stop local governments and private development interests from filling the Bay and potentially shrinking it into nothing more than a river.

A decade ago, the Commission pivoted from its original mission of limiting fill and ensuring maximum feasible public access along the shoreline to ensuring that the Bay Area is prepared for rising sea levels caused by climate change. BCDC's regulatory and planning programs have spent that past decade learning how best to provide guidance to—and regulate—development along the shoreline so that both current and future communities are protected from the changes that the region already have started to experience due to rising sea levels.

This past decade of work has made it clear that Bay shoreline communities cannot afford to wait for the consequences of rising seas before they act. Two-thirds of the economic damage caused by rising sea levels in California are forecast to occur along the Bay shoreline absent significant adaptation.[2] Such damage will be outrageously costly and may exceed the $230 billion estimate in damage to private property and transportation infrastructure published by MTC/ABAG in 2023.[3] Flooding will devastate lower-income communities, triggering social dislocation. Fragile shoreline habitats, home to endangered species and key to global bird migration, will drown, accelerating shoreline inundation. And key infrastructure that enables the movement of people and goods; powers homes, schools, businesses, and places of worship; and allows us to flush our toilets will be rendered useless unless we have a truly regional solution to all these challenges.

1 S. Laird, California Senate Bill 272: Sea Level Rise Planning and Adaptation (California Legislative Information, 2023), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB272.

2 Paul Barnard et al., "Dynamic Flood Modeling Essential to Assess the Coastal Impacts of Climate Change," Scientific Reports 9 (2019): 4309, https://doi.org/10.1038/s41598-019-40742-z.

3 Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG) and Bay Conservation and Development Commission (BCDC), Sea Level Rise Adaptation Funding and Investment Framework Final Report (July 2023), https://mtc.ca.gov/sites/default/files/documents/2023-07/SLR_Framework_Final_Report.pdf.

Achieving such a regional solution that marries local planning with a regional focus will rely on coordination, collaboration, and partnerships with stakeholders from all sectors. Government agencies at all levels, visionary business community leaders, environmental advocates, Environmental Justice representatives, elected officials, and community members have all informed the vision and Guidelines in this Regional Shoreline Adaptation Plan (RSAP), and the Bay Area requires even more collaborative solutions to unlock effective and comprehensive adaptation.

The region's response to sea level rise requires more than 50 cities and counties that ring the Bay to align around shared values, plans, and actions. How the Bay Area chooses to address the interconnected flooding risks across the region will shape the region's future, which is why the RSAP requires locally planned sea level rise adaptation actions that all fit together to realize shared goals.

A successfully implemented RSAP will result in adaptation that balances equity, protects and expands shoreline ecosystems and habitats, increases access to the shoreline and shoreline-dependent uses, and helps spur new development and housing – the cornerstones of a thriving and sustainable economy.

Context for the Regional Shoreline Adaptation Plan

While SB 272 provides the mandate for these plans, BCDC has led regional sea level rise adaptation planning for well over a decade. Two key milestones in particular have set a strong foundation for local and regional adaptation through the RSAP. The San Francisco Bay Plan (Bay Plan) is BCDC's guiding policy document for implementing the laws as outlined in the McAteer-Petris Act. In 2011, BCDC updated the Bay Plan to include Climate Change Policies, which call for the creation of "a regional sea level rise adaptation strategy for protecting critical developed shoreline areas and natural ecosystems, enhancing the resiliency of Bay and shoreline systems and increasing their adaptive capacity."[4]

At the same time, BCDC's Adapting to Rising Tides program has led over a decade of groundbreaking research, studies, data, and partnerships to advance sea level rise adaptation. This work culminated in 2021 in the publication of the collaboratively-developed, consensus-driven Bay Adapt Joint Platform, a "Regional Strategy for a Rising Bay." The Joint Platform lays out nine actions and 21 tasks the region must take to protect people and the natural and built environment from rising sea levels, including creating a strong vision for adaptation and collaboration around sea level rise planning –the cornerstones of the RSAP.

4 San Francisco Bay Conservation and Development Commission, San Francisco Bay Plan: Climate Change Policy 6 (May 2020), 38, https://bcdc.ca.gov/resources/plans/sanfrancisco-bay-plan/.

What is the RSAP?

The state of adaptation planning around the Bay is as varied as its shoreline. Some cities and counties have already completed vulnerability assessments or adaptation plans, while others need support to just get started. Therefore, the RSAP and Guidelines for local governments are designed to meet cities and counties where they are through being:

- **Flexible** – providing multiple paths to compliance, based on work that has already been done.
- **Aligned** – fulfilling multiple plan requirements and coordinating planning processes when possible.
- **Right-Sized** – targeting key outcomes that lead to change without being overly burdensome.
- **Building on Existing Efforts** – leveraging and expanding on existing work when possible.
- **Impactful** – providing the right level of information to catalyze implementation of policies and projects for sea level rise adaptation.

The RSAP contains three major components: a One Bay Vision, Strategic Regional Priorities, and Subregional Shoreline Adaptation Plan Guidelines.

One Bay Vision

The **One Bay Vision** paints the big-picture goals of what successful adaptation for the Bay shoreline could look like. It reflects the Bay Area's values today and acknowledges that the future Bay shoreline will look different as communities adapt over time. The One Bay Vision guides the priorities and requirements embedded in the RSAP. The One Bay Vision addresses the following topic areas that the Bay Area faces today and in the future:

- Community Health and Well-being
- Ecosystem Health and Resilience
- Development, Housing and Land Use
- Critical Infrastructure and Services
- Public Access and Recreation
- Transportation and Transit
- Shoreline Contamination
- Collaborative Governance, Flood Management, and Funding

Strategic Regional Priorities

The set of **Strategic Regional Priorities** are key issues that impact the entire region and can only be resolved through coordinated local adaptation. Achieving these regional "big moves" relies on critical actions in specific locations that must be integrated into local adaptation plans to ensure that the Bay Area's regional systems continue to serve everyone. Strategic Regional Priorities include:

- Reduced Involuntary Displacement Risk
- Complete and Connected Ecosystems
- Safe and Strategic Shoreline Growth and Density
- Reliable Critical and Emergency Services
- Connected Regional Shoreline Access
- Regional Movement of People and Goods
- Clean Communities and Environmental Justice
- Cross-Jurisdictional Flood Risk Reduction

Combined, the One Bay Vision and Strategic Regional Priorities set forth a road map that outlines what the region wants to accomplish, and the key policies, enacted in key locations, that will help achieve them.

Subregional Shoreline Adaptation Plan Guidelines

The Subregional Shoreline Adaptation Plan Guidelines describe how cities and counties will develop Subregional Shoreline Adaptation Plans, including what they should contain and what standards they should meet. The Guidelines also outline which Bay Area jurisdictions are required to create a plan by law and what plan submittal, review, and approval process involves. The Guidelines consist of Plan requirements and Minimum Standards. Plan requirements are organized into seven **Plan Elements**:

- Element A: Planning Process
- Element B: Existing Conditions
- Element C: Vulnerability Assessment
- Element D: Adaptation Strategies and Pathways
- Element E: Land Use and Policy Plan
- Element F: Project Implementation Plan and Funding Strategy
- Element G: Project List

The Guidelines contain four Minimum Standards:

- The **Coastal Flood Hazards and Sea Level Rise Scenarios Standard** includes the hazards that plans should evaluate and respond to, including sea level rise, tidal inundation, storm surge, groundwater emergence flooding, and shallow groundwater. The Plan requirements require vulnerability assessments to be conducted using four sea level rise scenarios, at a minimum, based on the most up-to-date science from the California Sea Level Rise Guidance (2024).[5] This includes 0.8 ft (2050) and three scenarios for 2100: 3.1 ft (Intermediate), 4.9 ft (Intermediate-High), and 6.6 ft (High). Additionally, the Plan requirements require adaptation strategies to respond to identified vulnerabilities at a conceptual level for 0.8 ft (2050 Intermediate) and provide narrative descriptions of adaptation pathways for the 2100 sea level rise scenarios that are aligned with the concepts developed for the 0.8 ft (2050 Intermediate).
- The **Minimum Categories and Assets Standard** identifies essential assets that should be evaluated and considered across adaptation planning to ensure important issues are not left out of planning.
- The **Equity Assessment Standard** ensures that equity considerations are incorporated across all plan elements that are tailored to individual communities. This includes assessments for integrating equitable practices into the planning process, engagement, and adaptation outcomes.
- The **Adaptation Strategy Standards** are designed to enable local governments to balance adaptation outcomes that align with the One Bay Vision with the flexibility to determine what suite of adaptation strategies are most appropriate for their communities and shorelines. They guide users through the myriad considerations and decision points in adaption planning to identify what solutions work best where, while considering which outcomes will contribute to regional success by reducing flood risk and increasing the long-term health and well-being of people, natural habitats, and the regional economy.

The RSAP is a major step forward for Bay Area climate adaptation – but it's not the end. Much work lays ahead to fund, regulate, and implement projects for a resilient shoreline. This beginning provides the context, background, and strategies upon which region-wide adaptation planning can succeed. Furthermore, it creates a transparent public policy process that can set the region on a path toward a future Bay shoreline that is resilient and supports a thriving and sustainable Bay Area now and for generations to come.

5 Ocean Protection Council, State of California Sea Level Rise Guidance: 2024 Science and Policy Update (January 2024), https://opc.ca.gov/2024/01/draft-slr-guidance-2024/.

How to Use This Document

This document is a guidebook for understanding how to develop a Subregional Shoreline Adaptation Plan. It drives these Plans by explicitly laying out the purpose, background and context for planning, a regional vision and priorities for shoreline adaptation, the required elements that must be included in a Subregional Shoreline Adaptation Plan, Minimum Standards that must be met by all Plans, and the planning process and responsibilities. Figure 1–1 to the right describes each section's primary content and function.

DEFINING LANGUAGE IN THE RSAP

This document contains information that is required and information that provides necessary context for sea level rise adaptation planning.

"Must" and **"required"** are used to denote content that is mandatory to be completed in Subregional Shoreline Adaptation Plans.

"Should" means local governments make every attempt possible to meet the information listed.

"Existing resources" refers to resources developed prior to the adoption of the RSAP and are encouraged to be used in Subregional Plans.

Figure 1–1. How the RSAP sections guide development of a local jurisdiction's Subregional Shoreline Adaptation Plan

SECTION 3: SUBREGIONAL SHORELINE ADAPTATION PLAN GUIDELINES

Subregional Plans: Defines what a Subregional Shoreline Adaptation Plan is and the roles and responsibilities of cities and counties in BCDC's jurisdiction to complete plans per SB 272.

Subregional Plan Elements: Contains Plan requirements that local governments within BCDC's jurisdiction must meet when submitting Subregional Plans. The Plan requirements are organized into the following elements:

- **A** Planning Process
- **B** Existing Conditions
- **C** Vulnerability Assessment
- **D** Adaptation Strategies and Pathways
- **E** Land Use and Policy Plan
- **F** Project Implementation Plan and Funding Strategy
- **G** Project List

Minimum Standards: Certain Guidelines require compliance with minimum standards to provide regional consistency and support local and regional outcomes. The minimum standards are organized in the following four standards:

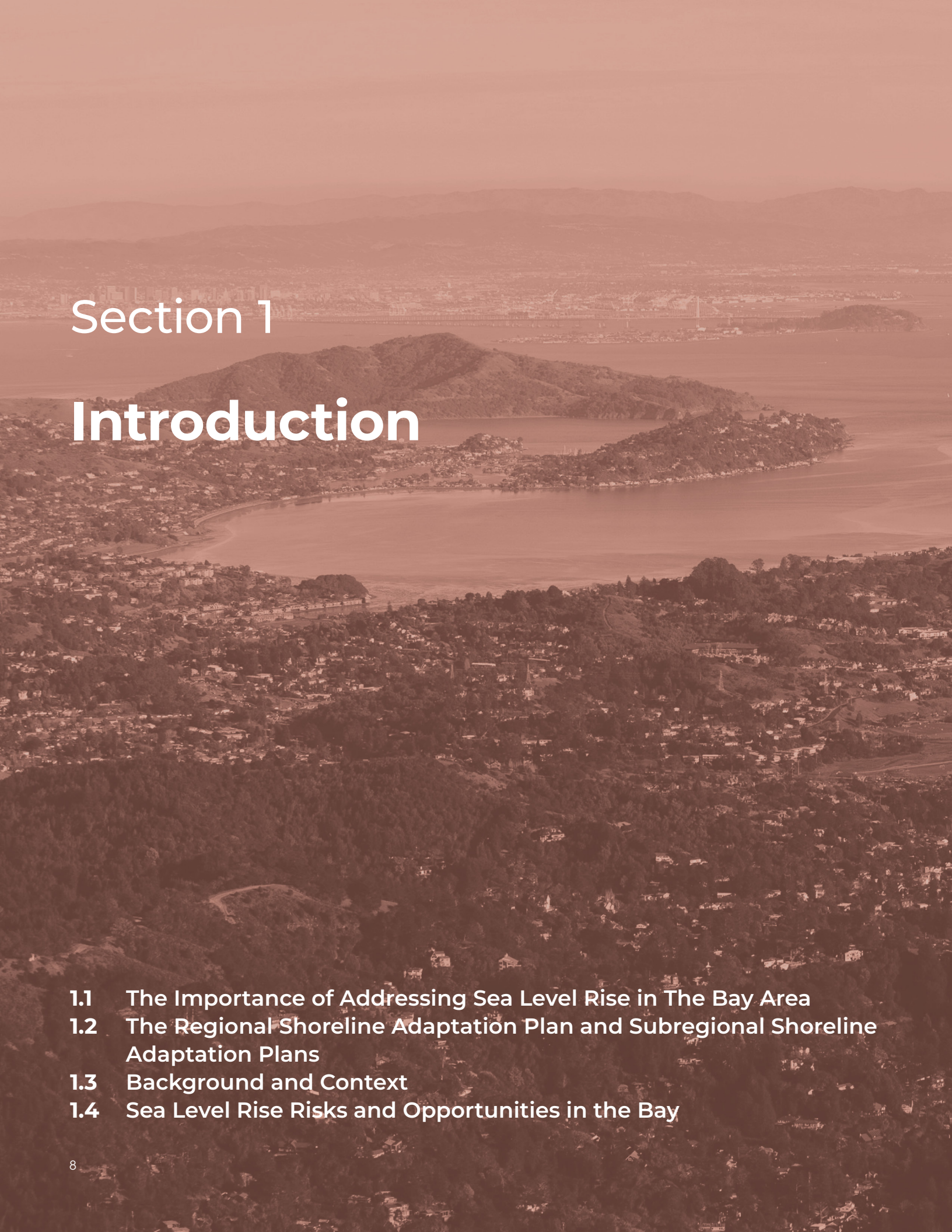
Coastal Flood Hazards and Sea Level Rise Scenarios Standard

Minimum Categories and Assets Standard

Equity Assessment Standard

Adaptation Strategy Standards

Plan Submission, Approval, and Update Process: Describes the process for submitting Subregional Plans to BCDC for review and approval, and the Subregional Plan update schedule.



Section 1

Introduction

1.1 The Importance of Addressing Sea Level Rise in The Bay Area

The accelerating rate of global sea level rise due to climate change requires coordinated local, regional, and state-sponsored action.

In the nine-county San Francisco Bay Area (Bay Area), home to nearly 8 million people, the impacts of a rising Bay and related coastal flooding hazards have already disrupted daily life and will continue to worsen without effective local and regional responses.[1] Flooding from high tides, storm surge, and heavy rainfall have damaged the region's built environment, including homes and businesses, and shut down freeways, roads, and mass transit stations.[2] These events also threaten the ecological health of the Baylands, reduce access to public trails and parks, and send untreated wastewater into the Bay.[3] Vulnerable communities along the Bay shoreline face even greater risks due to existing burdens and inequities that limit their ability to respond to and recover from flooding. As sea levels continue to rise in the near and long term, the need for cohesive sea level rise adaptation along the Bay shoreline becomes more important than ever. **How the Bay Area chooses to address the interconnected flooding risks across the region has the potential to collectively improve the region's shared future.**

Recognizing the risks associated with rising sea levels, in 2023 the state of California enacted SB 272, which requires local governments located within the state's coastal zone to create adaptation plans to address sea level rise and for the San Francisco Bay Conservation and Development Commission (BCDC) (on the Bay shoreline) and the California Coastal Commission (on the outer coast) to review and approve or deny the plans. This review and approval is based upon guidelines that each agency is to develop by the end of 2024. This document contains BCDC's Guidelines.

1 Vital Signs, "Population," Metropolitan Transportation Commission, published February 2023, https://vitalsigns.mtc.ca.gov/indicators/population.

2 U.S. Army Corps of Engineers, Southwestern Division, Coastal Extreme Water Levels and High Tide Flooding (Appendix B), January 2024, https://www.swt.usace.army.mil/Portals/41/SFWCFS_DIFR_EIS_Appendix_B_1_1%20Coastal%20Extreme%20Water%20Levels%20and%20High%20Tide%20Flooding.pdf.

3 California Energy Commission, San Francisco Bay Area Climate Change and Adaptation Report (Report No. CCCA4-2018005), 2018, https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-005_SanFranciscoBayArea_ADA.pdf.

The San Francisco Bay shoreline accounts for 1/3 of California's coastline, yet the Bay Area is expected to experience 2/3 of the state's total economic damage from sea level rise.[4] With four feet of sea level rise, and in the absence of adaptation, the region could see:

- Nearly 104,000 existing job spaces that will either need to relocate or be lost;
- Over 85,000 new, planned job spaces (projected by 2040) that either won't be created, or will be created elsewhere in the region or even outside the region;
- Nearly 13,000 existing housing units that will no longer be habitable, insurable, or desirable places to live;
- Over 70,000 new and necessary planned housing units (projected by 2040) that either won't be built, or will be built elsewhere in the region or even outside the region;
- Nearly 28,000 socially vulnerable residents living near the shoreline who will become more vulnerable due to increased flooding in their homes and neighborhoods;
- Over 5 million highway vehicle trips daily that will need to be rerouted to surface streets, other highways, or transit, or not taken;
- Over 60,000 daily commuters who won't be able to board their commuter rail lines at their usual station; and
- Over 20,000 acres of habitats for depressional wetlands, lagoons, and tidal marshes that will no longer be able to support the same diversity of wildlife, provide habitat for endangered species, support recreation and tourism, clean the air and water, support commercial fisheries, and provide climate resilience, among other ecosystem services.[5]

DEFINING LANGUAGE IN THE RSAP

Bay Area refers to the nine-county San Francisco Bay Area. The term Bay Area is used interchangeably with the word region and regional.

Bay shoreline and **Bayside** refer to areas along the shoreline that touch the San Francisco Bay and are used when referring to jurisdictions that are within BCDC's jurisdiction.

Local governments and **jurisdictions** are used interchangeably and refer to towns, cities, and counties subject to SB 272. The term "local" is used to refer to actions taken at a scale smaller than the nine-county Bay Area.

Sea level rise is the worldwide increase in ocean water levels due to climate change. Sea level rise and rising sea levels are used interchangeably in this document.

Climate adaptation planning allows communities to identify ways that they might be harmed by future conditions, including those unique to their communities, and to prepare for these conditions before they happen. Sea level rise adaptation planning includes specific actions to reduce flood risk from coastal hazards affected by sea level rise.

4 Patrick Barnard et al., "Dynamic Flood Modeling Essential to Assess the Coastal Impacts of Climate Change," Scientific Reports 9 (2019): 4309, https://doi.org/10.1038/s41598-019-40742-z.;

5 Bay Conservation and Development Commission (BCDC) and Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG), Adapting to Rising Tides Bay Area: Short Report Summary of Regional Sea Level Rise Vulnerability and Adaptation Study (March 2020).

While many Bay shoreline cities and counties have begun preparing for sea level rise, many more have not begun or need additional support to reach their goals.[6] While different communities may face different risks or have different resources to respond, flooding ignores jurisdictional boundaries. As sea levels rise, the Bay shoreline will become more hydraulically interconnected and neighboring jurisdictions will become increasingly dependent on one another to successfully manage and reduce flood risk.[7] Local governments and communities must prepare now to avoid catastrophic flooding impacts to their residents—particularly those who are most vulnerable—the natural habitats that provide invaluable benefits and services to people and wildlife, and the built environment and infrastructure that forms the basis of the region's thriving economy.

Preparing for and actively preventing such damage will be expensive, therefore strategic planning and wise investments in adaptation are essential. A 2023 study found that new flood protection to defend the Bay shoreline in place from sea level rise and storm surge by 2050 would cost at least $110 billion.[8] However, the cost will be much higher if the region fails to prepare for these challenges strategically and prioritize investments based on a strong set of values with a vision of what the Bay Area could become. Every $1 spent on hazard mitigation saves $6 in avoided costs of damages.[9]

The region is fortunate to have a significant ally in building long-term resilience to climate change through protecting and sustaining the San Francisco Bay's immense diversity of natural Baylands habitats. From subtidal habitats like eelgrass and oyster beds, to tidal marshes, mudflats, beaches, and upland transition areas, these habitats are vital—culturally and economically—for sustaining the quality of life that the Bay Area's communities and economies depend upon. Healthy and thriving Baylands habitats provide a host of benefits. The region's wetlands alone provide over $4,600 per acre in natural flood control and reduced dredging costs compared to building traditionally engineered dams, reservoirs, and channels.[10] These habitats also draw down carbon dioxide from the atmosphere—a main contributor of climate change and sea level rise. Improving Baylands habitats now will provide numerous benefits for generations of Bay Area residents to come.

Local governments and communities along the Bay shoreline must seize this opportunity to integrate sound adaptation policies and investments to address local and regional needs for current and future generations. The Regional Shoreline Adaptation Plan sets the values, standards, and framework for coordinated adaptation planning, driving the region to achieve equitable, cohesive, and shared benefits that lead the Bay Area into a brighter, more resilient future.

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6 Bay Conservation and Development Commission (BCDC), Bay Area Climate Adaptation Network (BayCAN), Metropolitan Transportation Commission - Association of Bay Area Governments (MTC-ABAG), Bay Area Regional Collaborative (BARC), San Francisco Estuary Institute (SFEI), and San Francisco Estuary Partnership (SFEP), Sea Level Rise Adaptation Progress, Gaps, and Needs Survey.

7 CHARG, Sea Level Rise (SLR) Flood Connectivity Between Bay Area Jurisdictions (2020), https://sfbaycharg.org/our-work/jurisdiction-connectivity/.

8 Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG) and Bay Conservation and Development Commission (BCDC), Sea Level Rise Adaptation Funding and Investment Framework Final Report (July 2023), https://mtc.ca.gov/sites/default/files/documents/2023-07/SLR_Framework_Final_Report.pdf.

9 Federal Emergency Management Agency (FEMA), Natural Hazard Mitigation Saves Interim Report (June 2018), https://www.fema.gov/sites/default/files/2020-07/fema_mitsaves-factsheet_2018.pdf.

10 San Francisco Bay Restoration Authority, Greening the Bay: A Proposal for a Regional Ecological Restoration Strategy, April 22, 2009, https://www.sfbayrestore.org/sites/default/files/2019-07/2009-04-22-gb-item_2_greening_the_bay.pdf.

Palo Alto Baylands Nature Preserve. Photo by Stanislav Sedov, CC BY 2.0

1.2 The Regional Shoreline Adaptation Plan and Subregional Shoreline Adaptation Plans

1.2.1 Regional Shoreline Adaptation Plan Purpose

The Regional Shoreline Adaptation Plan (RSAP) is a region-wide plan for the built and natural environments of the Bay shoreline that guides the creation of coordinated, locally planned sea level rise adaptation actions that work together to achieve a regional One Bay Vision.

The RSAP supports the Bay Area's local governments and communities in addressing the risks of coastal flood hazards through coordinated and consistent adaptation planning and implementation. This document includes a One Bay Vision for future Bay shoreline adaptation, Strategic Regional Priorities that must be prioritized locally, and Guidelines and Minimum Standards that local governments must use as they develop Subregional Shoreline Adaptation Plans.

The purpose of this document is to achieve the following objectives:

- **Establish a regional vision for successful sea level rise adaptation.** The One Bay Vision describes how local adaptation actions can "add up" towards successful regional outcomes for people and the natural and built environment.
- **Align local and regional priorities**. The Strategic Regional Priorities identify regionally significant issues within topic areas of the One Bay Vision that must be incorporated into local planning and contribute to cumulative benefits for the region.
- **Reduce flood risk through improved multi-jurisdictional coordination.** The Guidelines require local governments to work together to reach adaptation goals through multi-jurisdictional adaptation planning. This is especially critical for jurisdictions whose shorelines will become increasingly hydraulically connected due to sea level rise.
- **Standardize and simplify adaptation methods and data.** The Guidelines describe what Subregional Shoreline Adaptation Plans must contain, including meeting minimum adaptation standards, to provide consistency and transparency across plans. BCDC provides regionally available datasets that should be used to meet the Guidelines, unless local data is more appropriate and meets the best available data criteria.
- **Drive regionally coordinated project implementation.** The Guidelines require local governments to establish plans for project implementation, identify land use and policy changes, and develop priority projects. Detailed project information will link plans to implementation, which can support a region-wide funding strategy.

1.2.2 Subregional Shoreline Adaptation Plans

Subregional Shoreline Adaptation Plans (Subregional Plans) are locally created sea level rise adaptation plans that are coordinated across jurisdictions and identify adaptation strategies that meet the RSAP Guidelines and standards to achieve cohesive local and regional outcomes.

Any local government within BCDC's jurisdiction is required to prepare a sea level rise plan as part of a Subregional Plan as required by California state law, SB 272.[11] "Local government" is defined as "any chartered or general law city, chartered or general law county, or any city and county."[12] For a list of which local governments are subject to this requirement, see What is a Subregional Shoreline Adaptation Plan? (Section 3.1.1).

A Subregional Plan may consist of a single city or county sea level rise plan or a multi-jurisdictional sea level rise plan. BCDC encourages collaborative shoreline planning among local governments and in coordination with their respective stakeholders, special districts, and public and private landowners and asset managers. While local governments are required to develop the Subregional Plans, collaboration and partnership with broader stakeholders will be essential in the creation of comprehensive adaptation planning.

The state of adaptation planning around the Bay is as varied as its shoreline. Some cities and counties have already completed vulnerability assessments or adaptation plans, while others need support to just get started.

Therefore, the Guidelines for local governments are designed to meet cities and counties where they are, with the goal of being:

- **Flexible** – providing multiple paths to compliance, based on work that has already been done.
- **Aligned** – fulfilling multiple plan requirements and coordinating planning processes when possible.
- **Right-Sized** – targeting key outcomes that lead to change without being overly burdensome.
- **Building on Existing Efforts** – leveraging and expanding on existing work when possible.
- **Impactful** – providing the right level of information to catalyze implementation of policies and projects for sea level rise adaptation.

The One Bay Vision, Strategic Regional Priorities, and Subregional Shoreline Adaptation Plan Guidelines in this document are intended to drive the creation of Subregional Plans to ensure that the entire Bay shoreline has a cohesive and consistent set of plans for shoreline adaptation that, together, contribute towards achieving region-wide goals and targets for adaptation.

11 California Public Resources Code, § 30985.2.
12 California Public Resources Code, § 30109.

1.3 Background and Context

The San Francisco Bay Conservation and Development Commission (BCDC) is an independent state commission that administers both planning and permitting functions for the Bay and its shoreline. Both BCDC and the state of California have taken significant strides in creating and supporting climate adaptation for regions across the state. These actions drive the RSAP and, in turn, how the Bay Area adapts to sea level rise.

1.3.1 California Senate Bill (SB) 272: Sea Level Rise Planning and Adaptation

California Senate Bill (SB) 272 (Laird 2023): Sea Level Rise Planning and Adaptation was signed into law October 7, 2023, and requires all local governments in the state's coastal zone or jurisdiction of BCDC to address sea level rise through either "San Francisco Bay Shoreline Resiliency Subregional Plans" within the San Francisco Bay or Local Coastal Programs on the outer coast by January 1, 2034.[13,14] SB 272 further names BCDC as the agency responsible for developing "guidelines for the preparation of these plans" within the San Francisco Bay Area.[15] BCDC has the authority to approve or deny plans based on consistency with the Guidelines.

DEFINING LANGUAGE IN THE RSAP

Subregional Shoreline Adaptation Plan is the term used by BCDC and refers to "San Francisco Bay Shoreline Resiliency Plans" as listed in SB 272. The shorthand for this plan is "Subregional Plan."

Subregion is any area smaller than the nine-county Bay Area. The RSAP provides flexibility for the scale of Subregional Shoreline Adaptation Plans. It can refer to a multi-jurisdictional plan with multiple cities and a county working together on a plan, multiple counties working together, or a single jurisdiction plan that demonstrates coordination with neighboring jurisdictions.

Local governments that receive approval from BCDC or the Coastal Commission, respectively, will be prioritized for funding for the implementation of sea level rise adaptation strategies and recommended projects in the approved plan.[16] For the purpose of this document, "San Francisco Bay Shoreline Resiliency Subregional Plans" are called Subregional Shoreline Adaptation Plans.

13 Laird, California Senate Bill 272, 2023.

14 Note that Section 30985.6 of SB 272 states that "the operation of this division is contingent upon an appropriation for its purposes by the Legislature in the annual Budget Act or another statute." Currently, OPC SB 1 grant funds, appropriated by the Legislature in 2021, are available to support this planning work. BCDC will continue to coordinate with state agencies and local governments to support additional funding opportunities.

15 California Public Resources Code, § 30985.2.

16 California Public Resources Code, § 30985.5.

Bay Adapt Guiding Principles

SB 272 specifically calls for sea level rise adaptation in the Bay Area to be based on the Bay Adapt Guiding Principles. The RSAP builds upon and applies the Bay Adapt Guiding Principles.

Support socially vulnerable communities
Actively ensure that socially vulnerable communities do not simply "bounce back" in the face of sea level rise, but "bounce forward" by providing additional resources and support to areas where socially vulnerable communities live, work, and play and by reducing negative impacts to those communities. Climate change will disproportionately impact marginalized communities with fewer resources.

Practice inclusive, community-led governance and decision-making
Remove barriers and enhance capacity to increase transparent and coordinated decision-making among community members, organizations, and local, regional, state, and federal governments that acknowledges and leverages the unique roles, responsibilities, and authorities at each scale. Adaptation outcomes will better protect the entire region when all interests, including those who know their neighborhoods and communities best, contribute and collaborate in reducing risk.

Put nature first whenever possible
Prioritize natural infrastructure solutions that benefit ecosystems and the health of the Bay as well as people, especially in the near-term. Adapting to rising sea level will require a mix of green and gray infrastructure. Working with nature, instead of against it, can produce better results for both people and wildlife.

Support existing efforts but plan for the long term
Support, encourage, and learn from early innovators charting a new course for the region, especially for wetland restoration, while maintaining a long-term vision for more complex planning and investments. Early action is important for regional learning, setting precedents, and shorter-term flood control, and widespread or significant capital investments require careful and collaborative planning.

Solve interconnected problems at the same time
Prioritize adaptation actions that maximize regional risk reduction to flooding and sea level rise and minimize trade offs within the context of other regional priorities such as housing, economy, social equity, habitat protection, and other climate risks. Sea level rise and flooding is just one of several regionally interconnected crises facing the Bay Area.

Pick the right strategy for the right place at the right time
Ensure that local and regional investment strategies to address flooding and sea level rise are grounded in local needs, conditions, and plans, and are phased to allow for uncertainty, flexibility, and iteration. The Bay is a collection of distinct places with unique physical and social conditions and there is no "one size fits all" solution or timeline to address climate-related impacts.

1.3.2 Sea Level Rise Adaptation at BCDC

The San Francisco Bay Plan (Bay Plan) is BCDC's guiding policy document for implementing the laws outlined in the McAteer-Petris Act of 1965.[17] In 2011, BCDC updated the Bay Plan to include Climate Change Policies. Climate Change Policy 6 establishes the original framework for the RSAP, which calls for "a regional sea level rise adaptation strategy for protecting critical developed shoreline areas and natural ecosystems, enhancing the resiliency of Bay and shoreline systems and increasing their adaptive capacity."[18] It further names specific strategies and goals, which have been incorporated into the development of the RSAP where possible.

BCDC has long been a pioneer in the realm of sea level rise planning, both within the Bay Area and nationally. BCDC began considering sea level rise in its coastal planning efforts as early as 1982. Over the past decade, the Commission's rising sea level emphasis has expanded from being primarily regulatory in nature to also leading and collaborating with diverse stakeholders to provide more direct adaptation services to communities, local governments, and the region. BCDC has earned the reputation of being a trusted partner in adaptation and a strategic convener and facilitator to catalyze local and regional action.

17 California Government Code, McAteer-Petris Act, § 66600.

18 San Francisco Bay Conservation and Development Commission, San Francisco Bay Plan, 38.

In addition to the adoption of the Climate Change Policies in 2011, major milestones and accomplishments related to adapting to rising sea level include:

- In 2008, SB 2094 authorized BCDC to develop Bay Area regional strategies to address the impacts of rising sea level and other impacts of global climate change on the Bay and affected shoreline areas, in coordination with local governments, regional councils of governments, and other agencies and interested parties.
- In 2008, BCDC became a founding member of the San Francisco Bay Restoration Regulatory Integration Team (BRRIT), a multi-agency permitting team that collaborates to reduce permitting times for nature-based projects and advances the California Natural Resources Agency's Cutting Green Tape initiative within the Bay Area region.
- In 2011, BCDC launched its award-winning Adapting to Rising Tides Program that continues to work with local jurisdictions around the Bay to develop multi-sector, cross-jurisdictional projects to understand what is at risk and assess adaptation responses.
- In 2016, following a series of public workshops on rising sea levels, the Commission adopted a set of sea level rise policy recommendations, including the need to develop a regional sea level rise adaptation plan, to modify a series of other BCDC policies, and to create several public-facing Commissioner Working Groups on various rising sea level issues.
- In 2019, following robust public and Commissioner engagement, the Commission adopted two groundbreaking Bay Plan policy changes that (1) enable larger amounts of Bay fill to be placed in the Bay to protect and enhance natural habitat and (2) create policies to promote and enforce environmental justice and social equity.
- In 2020, the Adapting to Rising Tides Program, with MTC/ABAG and BARC, released Adapting to Rising Tides Bay Area – the first major comprehensive analysis of the risks and consequences facing the Bay Area's transportation network, people, built environment, and natural areas due to projected sea level rise.
- In 2019, BCDC began its Bay Adapt initiative to develop a "Regional Strategy for a Rising Bay." The consensus-driven Bay Adapt Joint Platform, published in 2021, lays out nine actions and 21 tasks the region should take to protect people and the natural and built environment from rising sea levels. The Bay Adapt Joint Platform included six Guiding Principles for regional adaptation (see callout box on page 17) describing specific tasks that the RSAP is now implementing. These tasks include:
    - Task 1.1: Create a long-term vision rooted in communities, Bay habitats, and the economy.
    - Task 5.1: Provide incentives for robust, coordinated local adaptation plans.
    - Task 8.1: Incentivize projects that meet regional guidelines.
    - Task 9.1: Measure regional progress using metrics and share results.

With the assistance and influence of BCDC, significant progress has been made in the Bay Area by cities and counties to plan for a changing shoreline and implement Baylands habitat restoration and flood risk reduction projects. BCDC has made shoreline adaptation a priority in the region and set the foundation for the RSAP through its many studies, engagement, policies, and leadership.

1.3.3 Related California Laws and Policies

The state of California has enacted multiple laws that relate to and support climate adaptation planning. The RSAP Guidelines seek to align with and advance many of the mandates and requirements included in these laws. Relevant laws considered in the development of the Guidelines include:

McAteer-Petris Act (1965)
This state law created BCDC and gives BCDC the power and responsibility to limit fill of the Bay, promote public access to the Bay, prepare for rising sea levels, conduct comprehensive planning through the San Francisco Bay Plan, and issue and deny permits within its jurisdiction. This act defines BCDC's legal jurisdiction, guides BCDC's approach to both planning and permitting, and underpins the Guidelines in this document.

SB 375: Sustainable Communities and Climate Protection Act (Steinberg, 2008)
This bill instructs the California Air Resources Board (CARB) to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region develops a "Sustainable Communities Strategy" (SCS) that integrates transportation, land use, and housing policies to achieve the emissions target for their region. In the Bay Area, the Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG) update Plan Bay Area on a 4-year cycle in response to SB 375. BCDC has worked closely with MTC/ABAG to integrate sea level rise in Plan Bay Area 2050 (2021) and 2050+ (2025). In addition, BCDC's Bay Plan Climate Change Policy 6 recommends that the regional sea level rise adaptation strategy be consistent with the goals of SB 375.

SB 379: Land use: general plan: safety element (Jackson, 2015)
This bill requires all cities and counties to include climate adaptation and resiliency strategies in the Safety Elements of their General Plans upon the next revision beginning January 1, 2017. The bill requires the climate adaptation update to include a set of goals, policies, and objectives for their communities based on a vulnerability assessment, as well as implementation measures, including the conservation and implementation of natural infrastructure that may be used in adaptation projects.

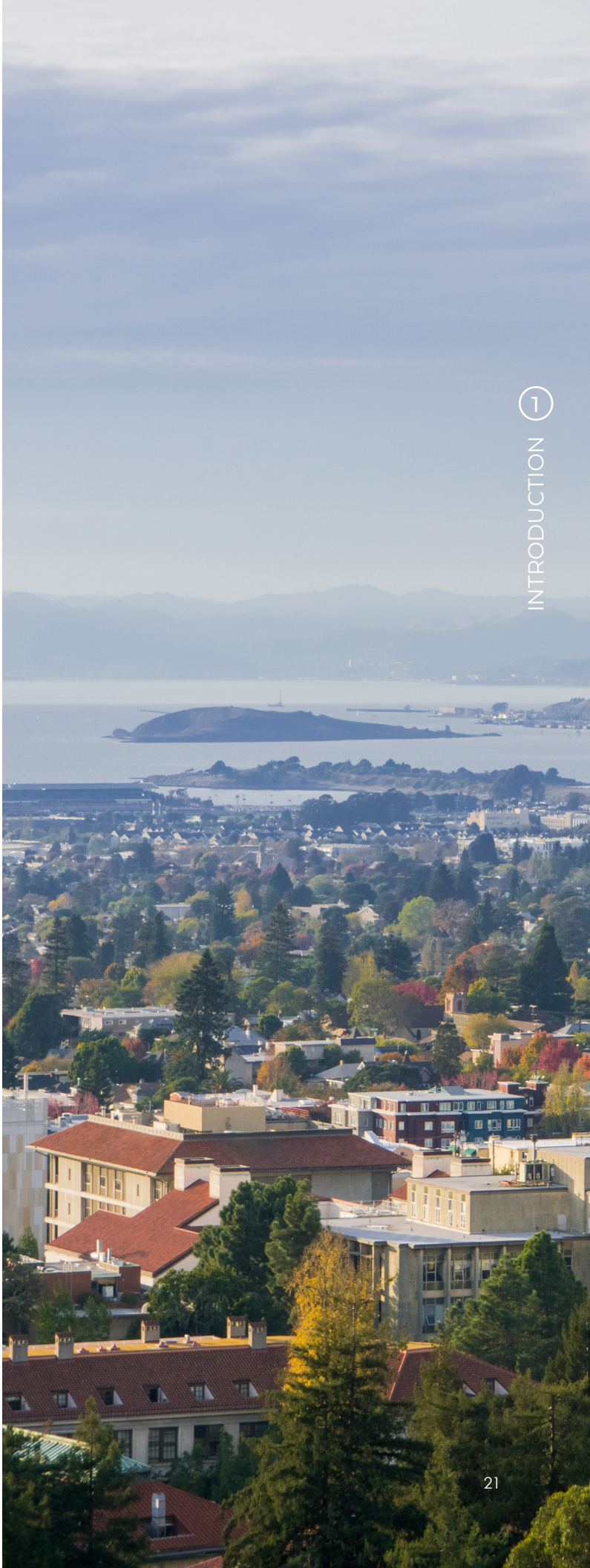
SB 1: Sea Level Rise Mitigation and Adaption Act (Atkins, 2021)
This bill establishes the California Sea Level Rise Mitigation and Adaptation Act of 2021 and creates the California Sea Level Rise State and Regional Support Collaborative (Collaborative) at the California Ocean Protection Council (OPC) to help coordinate and fund state efforts to prepare for sea level rise associated with climate change, among other things. It also directs the state to provide funding to local and regional governments to develop sea level rise adaptation plans and implementation projects. OPC established an SB1 grant program in 2023 which disperses funds as outlined in the bill.

Strategic Plan to Protect California's Coast and Ocean 2020–2025 (Ocean Protection Council, 2020)

This plan provides four statewide goals to align and coordinate protection from climate change along the coast and ocean among state agencies. The California Ocean Protection Council (OPC) developed this strategic plan to advance focused, high-value interagency collaboration that is needed to meet these goals and achieve a collective vision.

California Climate Adaptation Strategy (California Natural Resource Agency, 2021)

The California Climate Adaptation Strategy, mandated by Assembly Bill 1482 (Gordon, 2015), links together the state's existing and planned climate adaptation efforts, showing how they fit together to achieve California's six climate resilience priorities. The strategy is organized around outcome-based priorities, enabling a coordinated, integrated approach to building climate resilience. BCDC's Bay Plan Climate Change Policy 6 recommends that the regional sea level rise adaptation strategy be consistent with the California Climate Adaptation Strategy.



1.4 Sea Level Rise Risks and Opportunities in the Bay

1.4.1 The Science of Sea Level Rise and Coastal Flood Hazards

The Bay Area is no stranger to hazards — earthquakes, wildfire, and flooding are a natural part of life along the Northern California coastline. Yet as global climate change further disrupts local weather patterns, flood hazards are becoming more common, widespread, and severe.[19] These hazards put communities, infrastructure, and Bay ecosystems at risk.

Unlike temporary flooding from King Tides or storms, sea level rise is a gradual and sustained expansion of Bay waters landward. Sea level rise poses risks not only to those living near the water's edge, but will also disrupt regional transportation systems, critical and emergency services, housing markets, economies, recreation spaces, and Baylands ecosystems, including the essential functions and services they provide.

Coastal flood hazards exacerbated by sea level rise are the focus of the RSAP. Subregional Plans are required to address tidal inundation, storm surge, shallow groundwater, and groundwater emergence/flooding driven by sea level rise. Other types of climate-driven flooding that affects inland areas, such as increased precipitation, atmospheric rivers, fluvial (riverine) and pluvial (extreme rainfall) flooding, and other climate hazards are encouraged to be incorporated into Subregional Plans where possible.

Climate Change is Causing Sea Levels to Rise — and Rise Faster in the Future

While sea levels experience natural oscillations, these changes have historically occurred over long spans of time and were precipitated by significant changes in Earth's climate from natural sources. Human-caused climate change is at the center of the current and accelerating sea level rise crisis. This is due to humans releasing greenhouse gas (GHG) emissions into the atmosphere at an unsustainable rate for the last 150 years. These emissions come largely from the use of fossil fuels as an energy source for electricity, transportation, and industry, as well as land use practices for agriculture and development.[20]

The high amount of greenhouse gases in the atmosphere have increased the temperatures of the atmosphere and ocean. This has led to sea waters expanding, called thermal expansion, and to a greater volume of ocean water through melting ice sheets and glaciers. While adaptation actions can help reduce the impacts of flooding caused by sea level rise, **decreasing global emissions is the only reliable way to slow the rate and extent of future sea level rise.**

19 X. Huang, I. F. C. Brown, R. D. C. Goff, and F. J. P. Ramirez, "Future Precipitation Increase from Very High Resolution Ensemble Downscaling of Extreme Atmospheric River Storms in California," Science Advances 6, no. 29 (2020): eabb6076, https://doi.org/10.1126/sciadv.abb6076.

20 Intergovernmental Panel on Climate Change, "Emissions Trends and Drivers," in Climate Change 2022: Mitigation of Climate Change, Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, 2022), https://doi.org/10.1017/9781009157926.004.

Over the last century, the San Francisco Bay has experienced 8 inches of sea level rise. Today, sea levels are rising at a rate faster than has ever been experienced in modern human history, and the Bay is projected to experience an additional 10 inches of rise by 2050 (Figure 1–2).[21] As of 2024, the best available science agrees that between 2 to 7 feet of sea level rise are expected by 2100.[22] Beyond 2100, the oceans will continue to rise for hundreds to thousands of years due to the heat already accumulated in the atmosphere and oceans.[23]

There is greater confidence in the amount of sea level rise expected in the near-term due to the measurement of greenhouse gases in the atmosphere today and current models on glacial and ocean dynamics. However, as projections extend into the future, the timing for when higher levels of sea level rise are expected to occur is less certain. Future societal choices, such as the rate and extent of future greenhouse gas emissions, and well as increasing understanding about the earth-climate system, will provide more certainty about future flooding. Numerous scientific studies demonstrate consensus on the expected future projections of sea level rise.[24]

State of California Sea Level Scenarios from 2020 to 2150

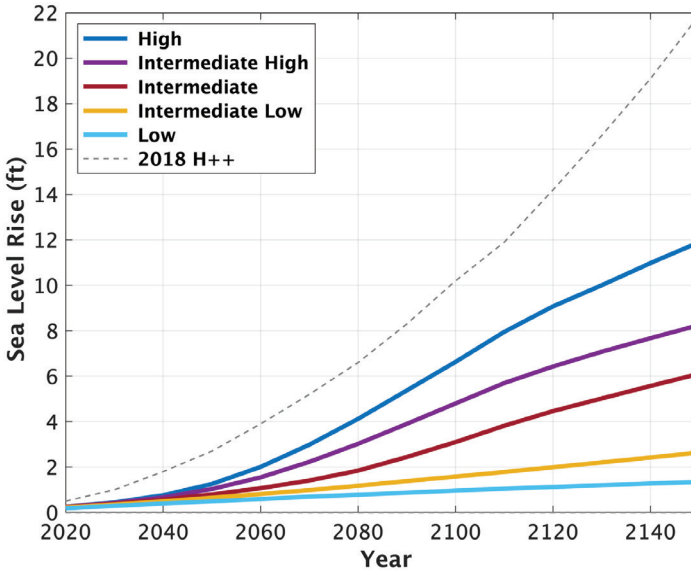


Figure 1–2. Sea Level Scenarios from 2020 to 2150, in feet, with a baseline of 2000. Source: California Sea Level Rise Guidance (2024). Note, the 2018++ scenario was identified in the previous version of the State Guidance and in the newest version is not considered plausible to occur by 2100.

The RSAP uses the California Sea Level Rise Guidance (2024) to inform the sea level rise scenarios in the Minimum Standards for Coastal Flood Hazards and Sea Level Rise Scenarios required to be used in Subregional Plans.

21 NASA, "How Long Have Sea Levels Been Rising? How Does Recent Sea-Level Rise Compare to That Over the Previous Centuries?" NASA Sea Level Change Portal, accessed August 9, 2024, https://sealevel.nasa.gov/faq/13/how-long-have-sea-levels-been-rising-how-does-recent-sea-level-rise-compare-to-that-over-the-previous/.; Ocean Protection Council, State of California Sea Level Rise Guidance (2024), https://opc.ca.gov/wp-content/uploads/2024/05/Item-4-Exhibit-A-Final-Draft-Sea-Level-Rise-Guidance-Update-2024-508.pdf.

22 Benjamin Fox-Kemper et al., "Ocean, Cryosphere and Sea Level Change," in Climate Change 2021: The Physical Science Basis, Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, ed. Valérie Masson-Delmotte et al. (Cambridge University Press, 2021), 1211–1362, https://doi.org/10.1017/9781009157896.011.;

23 NASA, "How Long Have Sea Levels Been Rising?"

24 California Sea Level Rise Science Task Force, California Ocean Protection Council, and California Ocean Science Trust, California Sea Level Rise Guidance: 2024 Science and Policy Update (2024).; Ocean Protection Council, State of California Sea Level Rise Guidance (2024).; Intergovernmental Panel on Climate Change (IPCC), Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, ed. H. Lee and J. Romero (Geneva: IPCC, 2023), 35-115, https://doi.org/10.59327/IPCC/AR6-9789291691647.; W.V. Sweet et al., Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines, NOAA Technical Report NOS 01 (Silver Spring, MD: National Oceanic and Atmospheric Administration, National Ocean Service, 2022), 111 pp., https://oceanservice.noaa.gov/hazards/sealevelrise/noaa-nostechrpt01-global-regional-SLR-scenarios-US.pdf.

Sea Level Rise as a "Threat Multiplier"

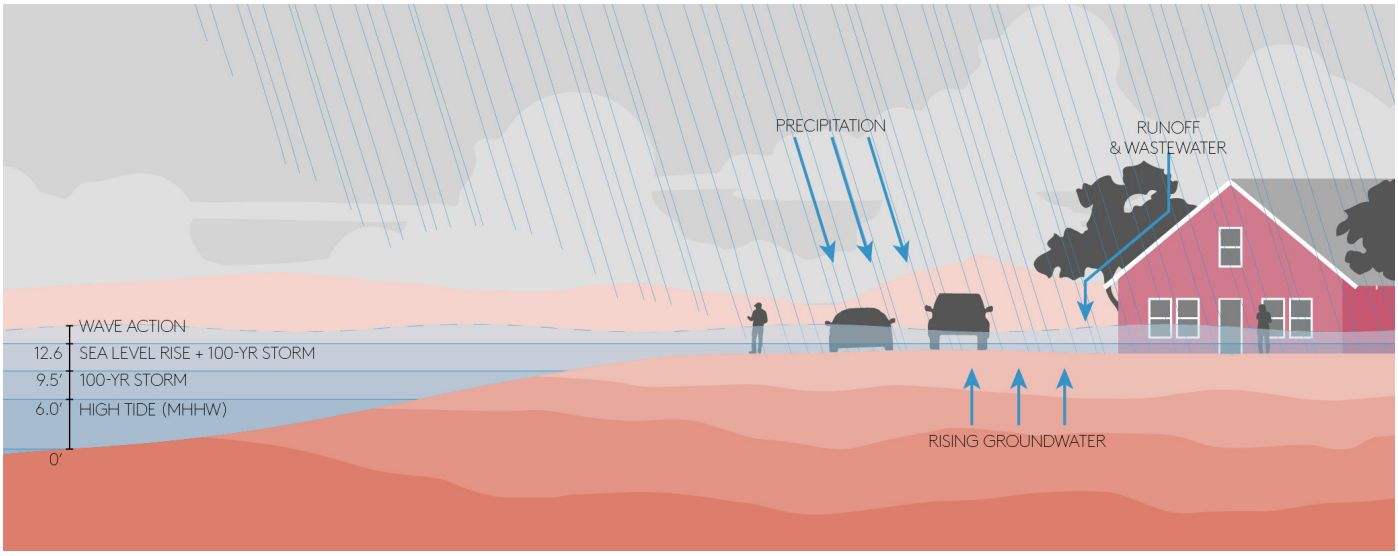


Figure 1–3. Sea level rise leads to increases in other coastal flood hazards, including increasing the extent of tidal inundation on the shoreline, worsening storm surge, and emergent groundwater and shallow groundwater. Other sources of flooding that may interact with these coastal flood hazards includes precipitation and runoff.

Sea Level Rise Worsens Existing Coastal Flooding Hazards

Sea level rise can be considered a "threat multiplier" because it worsens existing flood hazards, including tidal inundation and extreme high tides (known as King Tides), storm surge, and emergent groundwater and shallow groundwater rise (Figure 1–3). It exacerbates existing social inequities such as exposure to shoreline contamination, housing displacement, and limited shoreline access, while increasing stress on Baylands habitats and facilities and uses that require a shoreline location.

These multiple coastal flood hazards can occur separately or in combination with one another. Figure 1–4 and Figure 1–5 provide a simplified view of the four coastal flood hazards at the 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios. These maps include tidal inundation at mean higher high water (MHHW), emergent groundwater, storm surge, and groundwater that has been influenced by sea level rise and is within 9 ft of the surface. To see more detailed maps where multiple hazards overlap to support for adaptation planning, visit full spread maps in Section 3.3.1.

Adaptation responses to address sea level rise need to consider compound coastal flooding hazards and ensure that adaptation strategies do not inadvertently worsen these related types of flooding, increase social inequities, or increase the threat of habitat loss or degradation of the ecological health of the Bay.

Tidal Inundation

As sea levels rise, the tidal extent of the shoreline will move inland—in the absence of an adaptation intervention. Normally occurring episodic flood events such as King Tides, which can result in temporary flooding impacts today, will increase in extent, depth, and duration. As sea levels rise, these areas will experience permanent flooding.

Storm Surge

Climate change will also alter key factors that contribute to shoreline flooding such as storm frequency and intensity. Storms, including atmospheric rivers that release large amount of rainfall over a relatively short period of time, can lead to coastal flooding in parts of the region through storm water inundation and inflow from

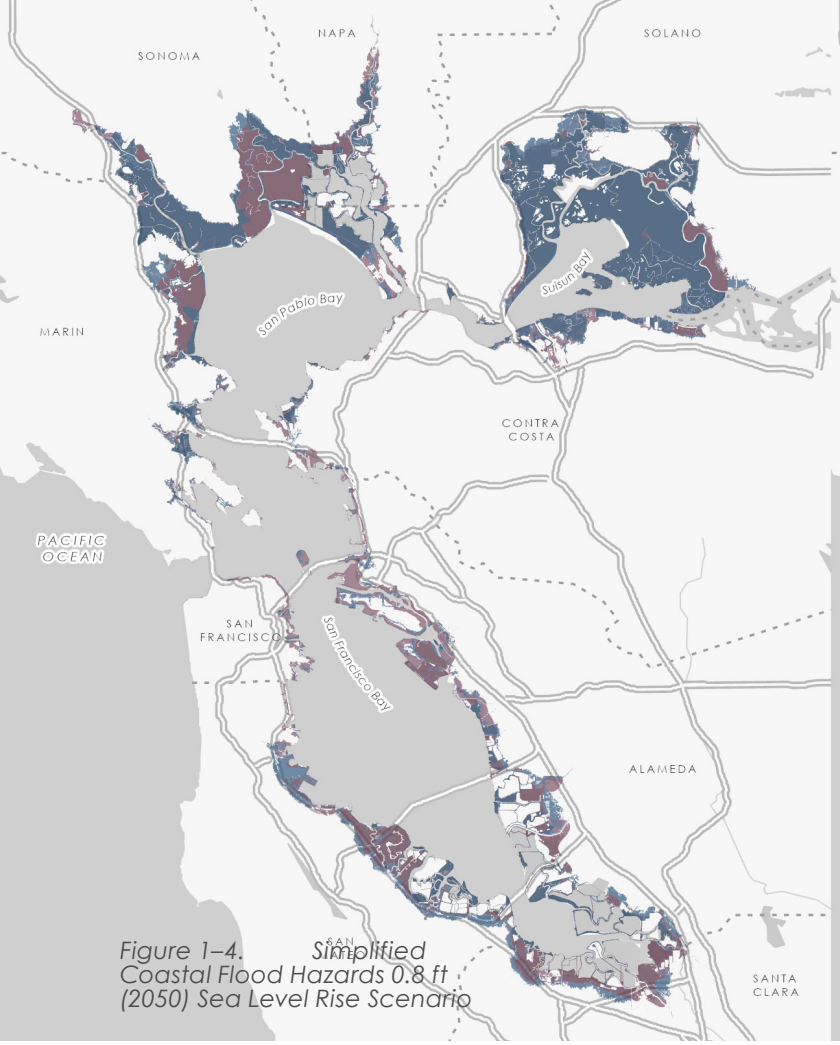


Figure 1–4. Simplified Coastal Flood Hazards 0.8 ft (2050) Sea Level Rise Scenario

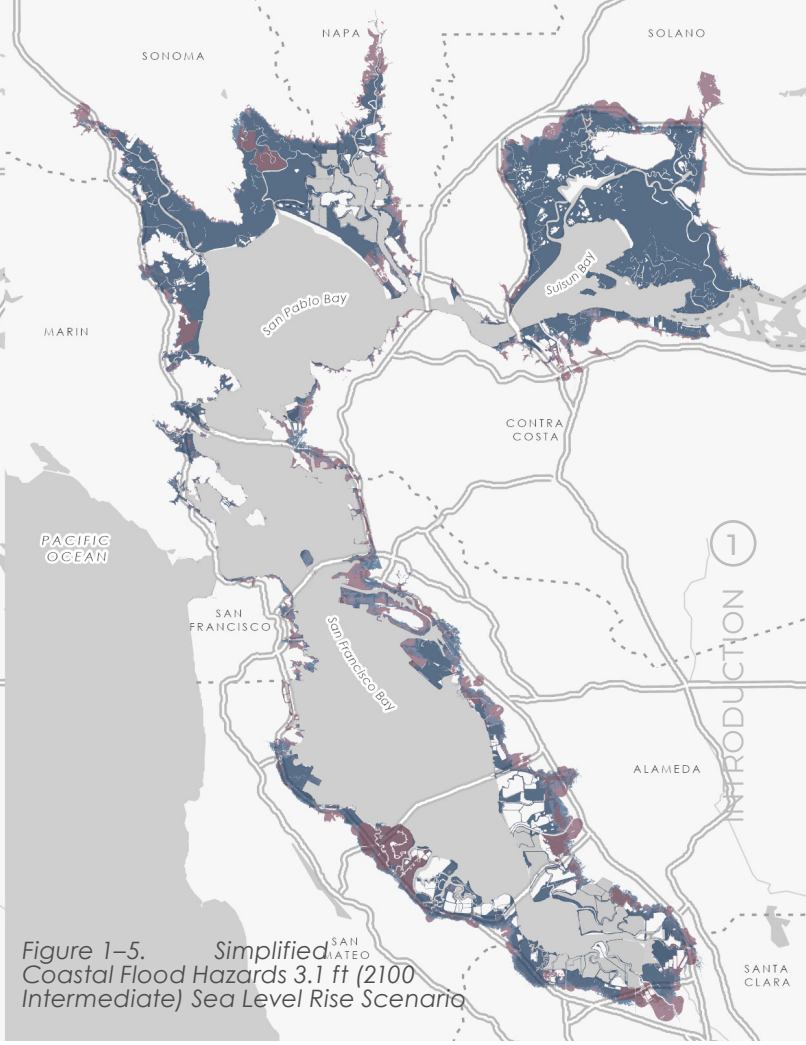


Figure 1–5. Simplified Coastal Flood Hazards 3.1 ft (2100 Intermediate) Sea Level Rise Scenario

Coastal Flood Hazard Impacted by Sea Level Rise

- Tidal Inundation (MHHW)
- Storm Surge (100-year)
- Emergent Groundwater
- Shallow Groundwater Rise

Sources: Figure 1-4 Tidal Inundation/Storm Surge (BCDC 2017 (MHHW, 12in SLR)); Groundwater (USGS CoSMoS-GW 2021 (Moderately Permeable, 0.25m SLR)); Figure 1-5 Source: Tidal Inundation/Storm Surge (BCDC 2017 (MHHW, 36in SLR)); Groundwater (USGS CoSMoS-GW 2021 (Moderately Permeable, 1.0m SLR))

the watershed and surface runoff. During a storm, low air pressure can temporarily raise water levels and increase both wind and wave activity, causing higher levels of wave runup, which will be higher still as sea levels rise.[25] In coastal planning, a 100-year storm (also considered as having a 1% chance of occurring in any given year) is often used as an engineering standard for a "worst-case" event. As the climate changes, the frequency of these events is expected to increase—a 100-year storm event is likely to look different in the future.[26] These storm events can be further intensified during El Niño events. The confluence of intense winter storms, extreme high tides, and high runoff, in combination with rising sea levels, will increase the frequency and duration of shoreline flooding long before areas are permanently inundated by sea level rise alone.

Emergent and Shallow Groundwater

Additionally, sea level rise will exacerbate the hazard of groundwater rise. Adjacent to the Bay are underground zones of naturally occurring groundwater, known as the groundwater table. The amount of groundwater and distance to the surface depends on differences in soil composition, geology, and annual precipitation cycles.

25 S. Mukhopadhyay et al., "Understanding the Natural Variability of Still Water Levels in the San Francisco Bay Over the Past 500 Years: Implications for Future Coastal Flood Risk," Journal of Geophysical Research: Oceans 128, no. 2 (2023).

26 X. Huang et al., "Future Precipitation Increase from Very High Resolution Ensemble Downscaling of Extreme Atmospheric River Storms in California," Science Advances 6, no. 29 (2020).

As sea levels rise so will groundwater, with areas closest to the Bayshore generally experiencing the greatest increase in the groundwater table. In some low-lying areas, the groundwater table may reach the surface and create issues of emergent groundwater, flooding the land from below.[27] Additionally, hydrostatic pressure will increase, and without intervention, lead to saltwater intrusion in coastal aquifers.

Each of these four coastal flood hazards pose different considerations for developing adaptation responses (Figure 1–6). Permanent flooding from tidal inundation warrants different types of adaptation strategies than strategies to address temporary storm surge. At the same time, emergent and shallow groundwater also introduce new and significant challenges. Certain types of approaches to reduce flood risk from tidal inundation caused by sea level rise, such as a levee, may not be effective in limiting shallow groundwater flooding. Additionally, approaches to limit shallow groundwater from the Bayside may inadvertently lead to increased flooding inland if flooding caused by rainfall events can no longer drain to the Bay.[28] Groundwater rise also poses unique challenges for infrastructure, especially underground or aging infrastructure, and may risk mobilizing contaminants from toxic sites in the region.[29]

SETTING CONSISTENT STANDARDS FOR CURRENT AND FUTURE FLOODING

The RSAP includes a **Coastal Flood Hazards and Sea Level Rise Scenarios Standard** that describes the coastal flood hazards and sea level rise projections that must be considered in Subregional Plans based on the California Sea Level Rise Guidance (2024). These standards are referred to in the Subregional Shoreline Adaptation Plan Guidelines in Element C: Vulnerability Assessment and Element D: Adaptation Strategies and Pathways.

Four Types of Coastal Flood Hazards

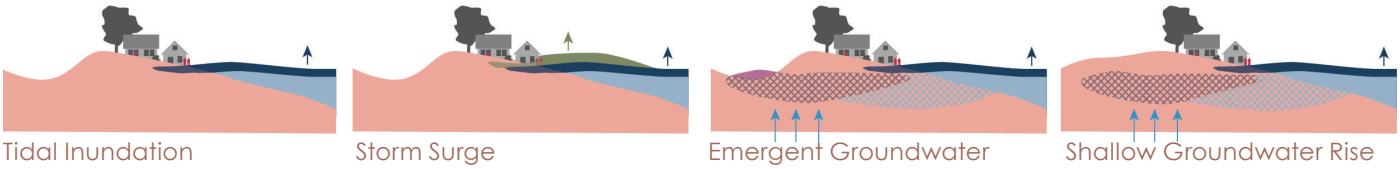


Figure 1–6. Each type of coastal flood hazard requires a different approach for reducing flood risk. Sea level rise worsens each of these risks, from tidal inundation, to storm surge, and emergent groundwater and shallow groundwater. As sea levels rise, the impacts of these coastal hazards will also increase.

27 C. L. May et al., Shallow Groundwater Response to Sea-Level Rise: Alameda, Marin, San Francisco, and San Mateo Counties (Pathways Climate Institute and San Francisco Estuary Institute, 2022), https://www.sfei.org/documents/shallow-groundwater-response-sea-level-rise-alameda-marin-san-francisco-and-san-mateo.

28 R. Rahimi et al., "Compound Inundation Impacts of Coastal Climate Change: Sea-Level Rise, Groundwater Rise, and Coastal Precipitation," Water 12, no. 10 (2020): 2776, https://www.researchgate.net/publication/344753313_Compound_Inundation_Impacts_of_Coastal_Climate_Change_Sea-Level_Rise_Groundwater_Rise_and_Coastal_Precipitation.

29 X. Su, P. Belvedere, T. Tosco, and V. Prigiobbe, "Studying the Effect of Sea Level Rise on Nuisance Flooding Due to Groundwater in a Coastal Urban Area with Aging Infrastructure," Urban Climate 43 (2022): 101164.; K. Hill, D. Hirschfeld, C. Lindquist, F. Cook, and S. Warner, "Rising Coastal Groundwater as a Result of Sea-Level Rise Will Influence Contaminated Coastal Sites and Underground Infrastructure," Earth's Future 11, no. 9 (2023): e2023EF003825.

Bothin Marsh in Mill Valley/Sausalito. Photo by Steve Disenhof and courtesy of the California King Tides Project.

1.4.2 Adaptation Strategies and Benefits

Developing adaptation plans and implementing projects that respond to coastal flood hazards is an exercise in balancing risk, costs, feasibility, and the values of communities along and inland of the Bay shoreline. This document provides guidance to decision-makers on how to weigh the most suitable options for adaptation that consider regional and local goals and different existing conditions, vulnerabilities, opportunities, and varying tolerances to risk.

What is Sea level Rise Adaptation?
In the simplest terms, to adapt means to change in response to environmental conditions. The RSAP focuses on adaptation to sea level rise and related coastal flood hazards to reduce flood risk. Choosing *how* to change in response to sea level rise is often the most challenging aspect of adaptation because there are trade offs—different benefits, costs, and opportunities both in the short and long term—depending on the choices.

For the purpose of the RSAP, an adaptation "strategy" refers to a specific action, or set of inter-dependent actions, that achieve a particular outcome. Strategies can be at a conceptual level for adaptation, while an adaptation "project" in the RSAP refers to a specific and detailed action that has advanced into a greater level of design and/or implementation beyond the conceptual phase.

Adaptation can include physical adaptation strategies that affect the natural and built landscapes of the shoreline, including aquatic and nearshore areas. These can occur across a spectrum of conventional adaptation to natural and nature-based adaptation and include hybrid elements of both (Figure 1–7).

Hybrid adaptation can include, for example, constructing an ecotone levee, combined with marsh restoration and nearshore reefs with eelgrass plantings, or augmenting mudflats. Conventional adaptation can include elevating land, building seawalls and flood walls, or creating levees or dikes that reduce flood risk.[30] The RSAP requires that all adaptation strategies prioritize natural and nature-based adaptation solutions wherever feasible.

Spectrum of adaptation from natural and nature-based to conventional

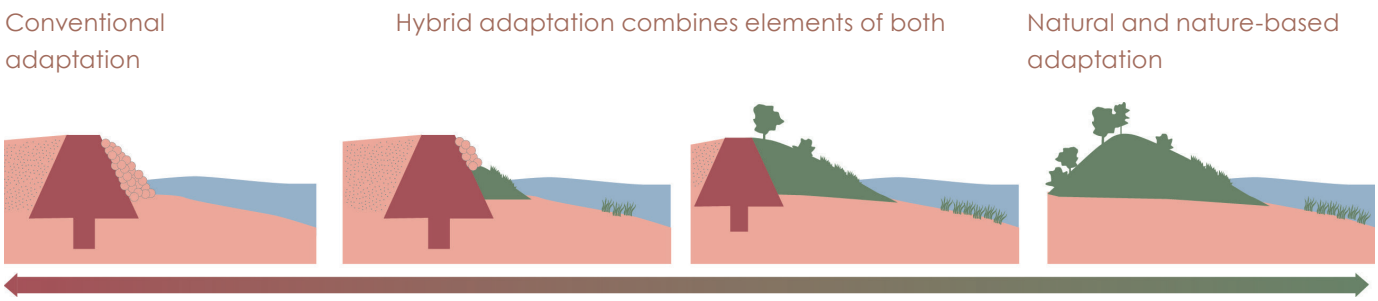
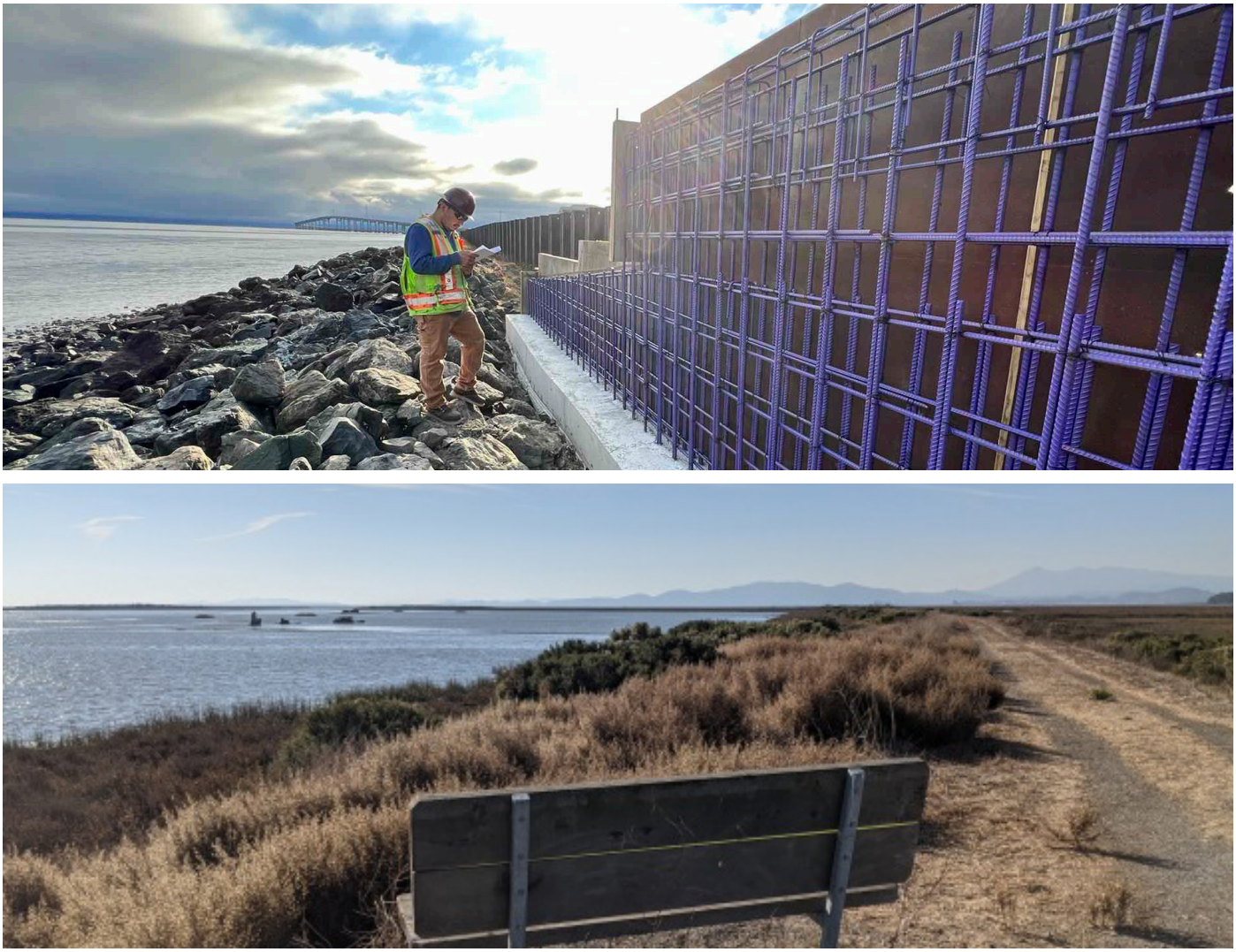


Figure 1–7. Natural and nature-based adaptation includes natural ecological processes and/or integrate natural features such as habitat enhancements, while conventional adaptation relies on human-engineered approaches.

30 SFEI and SPUR. 2019. San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units. Publication #915, San Francisco Estuary Institute, Richmond, CA.



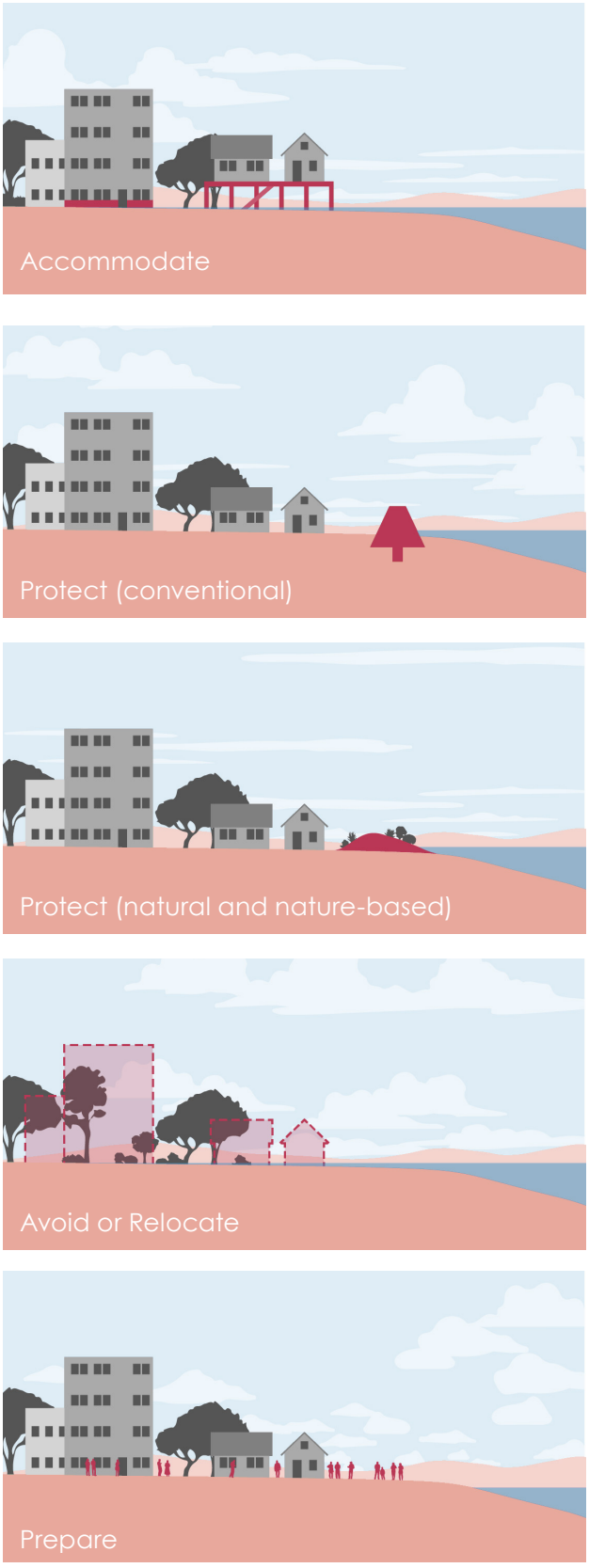
Top photo: Construction of a raised conventional levee in Foster City, CA, that was completed in 2024. Photo by the Foster City levee project. Bottom photo: Sonoma Creek Baylands restoration includes a nature-based adaptation in which the wetlands provide flood reduction benefits in front of a sloped levee. Photo by BAHiker.

Adaptation strategies can also be non-physical and include policy and regulatory actions such as zoning changes including overlay zones, revising building codes and redevelopment standards, as well as financial strategies such as conservation easements, tax incentives, and climate resilience districts, among others.[31]

A comprehensive approach to reducing flood risk along a shoreline will likely include multiple strategies that work together across a shoreline and function effectively as phased strategies over time as flood risks increase.

31 SFEI and SPUR. 2019. San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units. Publication #915, San Francisco Estuary Institute, Richmond, CA.

Categories of adaptation types



Strategic Adaptation Approaches

Adaptation can also be thought about through the lens of five strategic approaches: accommodate, protect, avoid, relocate, and prepare (Figure 1–8). A strategic approach does not refer to a single strategy, but instead a grouping of like strategies that achieve specific outcomes related to flood risk reduction. It is important to note that strategic approaches can include both physical and nonphysical strategies, be used in tandem along different parts of a shoreline, and change and phase over time in response to changing local conditions and risk. There are many components of risk and different ways to reduce those risks. Developing effective adaptation strategies and pathways along a shoreline will likely require actions within multiple strategic approaches.

Accommodate approaches allow assets to flood but reduce the sensitivity or consequences of exposure. This can include modifying existing developments or designing new developments to tolerate flood events, such as through elevating structures, using floodable materials, or designing assets to be more easily moved when necessary. Strategies can include floodable designs, such as a wetland restoration that removes a dike and allows water to expand into a previously dry area. Accommodate strategies can be used alongside other strategies and may be particularly useful in areas of low or medium density that contain critical assets that cannot be moved or phased out by the time flooding is anticipated to occur. This can also be useful for creating dynamic shoreline areas that maintain close connection to the waterfront and provide educational value about Baylands habitats but are designed to handle more extreme, infrequent flood events, and shift with rising sea levels.

Figure 1–8. Strategic adaptation approaches (left) categorize types of similar actions and strategies.

Protect approaches create barriers to defend assets in place and/or reduce exposure to the hazard. This can include physical adaptation strategies across a spectrum from natural and nature-based to conventional and hybrid approaches. Protect strategies can include barriers to prevent water from getting to an area where it is not wanted, redirecting water to an area designed for flooding, or slowing the movement of water and waves—such as through tidal marshes—to reduce impacts in a certain area. This could also include actions such as groundwater pumping that reduces the exposure of flooding in an area, although that is dependent on continuous upkeep and energy costs. Protect strategies may be particularly useful in areas with a high density of existing, high-consequence assets that are anticipated to be flooded in the near or medium-term, or major water-dependent infrastructure, such as ports, marinas, and industrial facilities that require a shoreline location to function. Strategies that rely on protection approaches for adaptation should ensure that they are economically and physically feasible and consider how the strategies themselves would have to adapt to respond to increasing coastal flood hazards due to sea level rise.

Avoid approaches preserve undeveloped spaces and/or limit future development to prevent exposure to the hazard. This can include strategies that limit, restrict, or de-incentivize development within areas at risk of future flooding. For areas that do not currently contain critical assets, avoid strategies would mean ensuring that critical assets are not allowed to be developed in those locations now or in the future. This could be done through easements, land buyouts, changing allowable uses through zoning, or refocusing development in safer areas. Avoid strategies may be particularly useful for areas that are not anticipated to have high development pressure in the future, have such high risk that development would not be financially feasible, and/or areas well suited to be wetlands migration space and upland transition space.

Relocate approaches implement equitable removal of existing assets or development out of hazard areas to increase adaptive capacity and prevent future exposure to the hazard**.** This can include phasing development out of certain areas at the end of life cycle, buyout programs, or rerouting critical services to different areas. Relocate strategies may be appropriate in areas with low density of assets, low consequence assets, or areas that are not anticipated to have significant development pressure in the future. Over the long term, this may become a more viable option and would need to be discussed in greater detail with communities and affected parties. This can also be considered managed or planned retreat.

Prepare approaches increase the adaptive capacity of communities, governments, and affected parties to respond to flooding challenges over time**.** This can include sea level rise and shallow groundwater rise overlay zones that add conditions for building codes, design, and/or development and can support phased adaptation as flood hazards and social and economic factors change. Prepare strategies can also include monitoring, increasing community capacity and engagement in the iterative process of adaptation planning, and increasing scientific and engineering capacity. This can also include initiating adaptation strategies that enable future options, such as beginning natural and nature-based adaptation to ensure it can be resilient and effective at higher water levels. Prepare is always followed by another strategic approach outlined above, and can be implemented in tandem with other strategic approaches to allow for adaptation strategy changes to occur when triggers, thresholds, or decision points are met.

Responding to Different Components of Flood Risk in Adaptation

Flood Risk = Hazard x Exposure x Vulnerability

Hazard	Exposure	Vulnerability
• Tidal inundation • Storm surge • Groundwater emergence • Shallow groundwater rise	• 0.8 ft (2050) • 3.1 ft (2100 Intermediate) • 4.9 ft (2100 Intermediate High) • 6.6 ft (2100 High)	• Sensitivity • Adaptive capacity • Consequence

Figure 1–9. A description of flood risk for the RSAP. This includes the minimum coastal flood hazards, exposure due to minimum sea level rise scenarios, and components of vulnerability. For more information on types of flood hazards, see Coastal Flood Hazards and Sea Level Rise Scenarios Standard (Section 3.3.1).

Grounding Adaptation in Local Needs

Developing effective adaptation strategies requires responding to varying risks and balancing multiple trade offs. The RSAP defines risk as a function of a hazard (e.g., coastal flood hazards), exposure to those hazards (which is increasing as sea levels rise), and the vulnerability of assets exposed (e.g., sensitivity, adaptive capacity, and consequence) (Figure 1–9). Different types of strategic adaptation approaches work to reduce flood risk in different ways. The goal of adaptation is to reduce the risk of flooding for assets and areas that are locally and regionally important along a shoreline. An asset refers to anything of value, which can include people, property, natural habitats, development, or other aspects important to a community.

There are multiple facets involved in determining what adaptation strategies are most appropriate for any given community and shoreline. These include cost, including the capital costs of infrastructure and ongoing maintenance and operational needs, community values and priorities, and the physical and engineering feasibility of adaptation. Different adaptation strategies also differ in what opportunities they "lock in" (by precluding future options) or "unlock" (by opening up future options and pathways).

For example, a conventional engineered protection strategy, such as a seawall, can reduce flood risk in the short term but harm the health of Baylands habitats and diminish their ability to survive in the future or provide long-term ecosystem benefits, therefore limiting future options of healthy habitats.

Adaptation strategies can also inadvertently worsen other flood risks. For example, strategies such as a levee designed to reduce tidal inundation and shallow groundwater rise could worsen inland flooding if stormwater drainage is not incorporated into the strategy. Other examples include the removal of sediment that in certain locations can exacerbate saltwater intrusion in underground aquifers, or the disruption of contaminated sites that could worsen contamination risks.

Adaptation strategies need to consider not only the protection of property, but also human safety and potential loss of life. This includes a consideration of the risk of failure of flood protection strategies and how local actions such as changes in zoning can increase, or decrease, the consequences in the event of failure. Sea level rise and coastal flooding is especially challenging as the hazards will continue to increase—even with adaptation—because sea level rise is driven by greenhouse gas emissions in the atmosphere. A rising Bay will require an ever-greater increase in flood protection until emissions are reduced. At the same time, communities will have to balance coastal flood risk alongside other hazards, such as wildfires, landslides, atmospheric rivers, and earthquakes.

The RSAP provides Guidelines for how local jurisdictions should create Subregional Shoreline Adaptation Plans to respond to local risks. The Guidelines encourage local choices and flexibility in developing specific adaptation strategies, while providing Adaptation Strategy Standards that support and guide the outcomes for local and regional benefit.

Adaptation Pathways

A promising approach to the challenge of making adaptation decisions today that supports flexibility for future adaptation options is known as "adaptation pathways." It provides a useful structure for considering different options (or pathways) to respond to increasing flood risk over time and helps communities understand what actions taken in the short term can enable options for the long term.[32] Pathways rely on developing triggers and decision points based upon monitoring the effectiveness of strategies, lifespan of adaptation actions, and evaluating the changing physical and social conditions that signal when changes to the pathways need to occur (Figure 1–10).

One of the main benefits of this approach is that it acknowledges that not all decisions can or should be made today. However, because this approach relies on taking actions in discrete, manageable steps, it is essential that strategies in the short term recognize and incorporate actions necessary to facilitate long-term strategies, such as considering land requirements, reserving rights-of-way, and even changing rules or policies to enable future options. This approach is utilized in the RSAP in the Subregional Shoreline Adaptation Plan Guidelines (Section 3).

Simplified Example of Adaptation Pathways

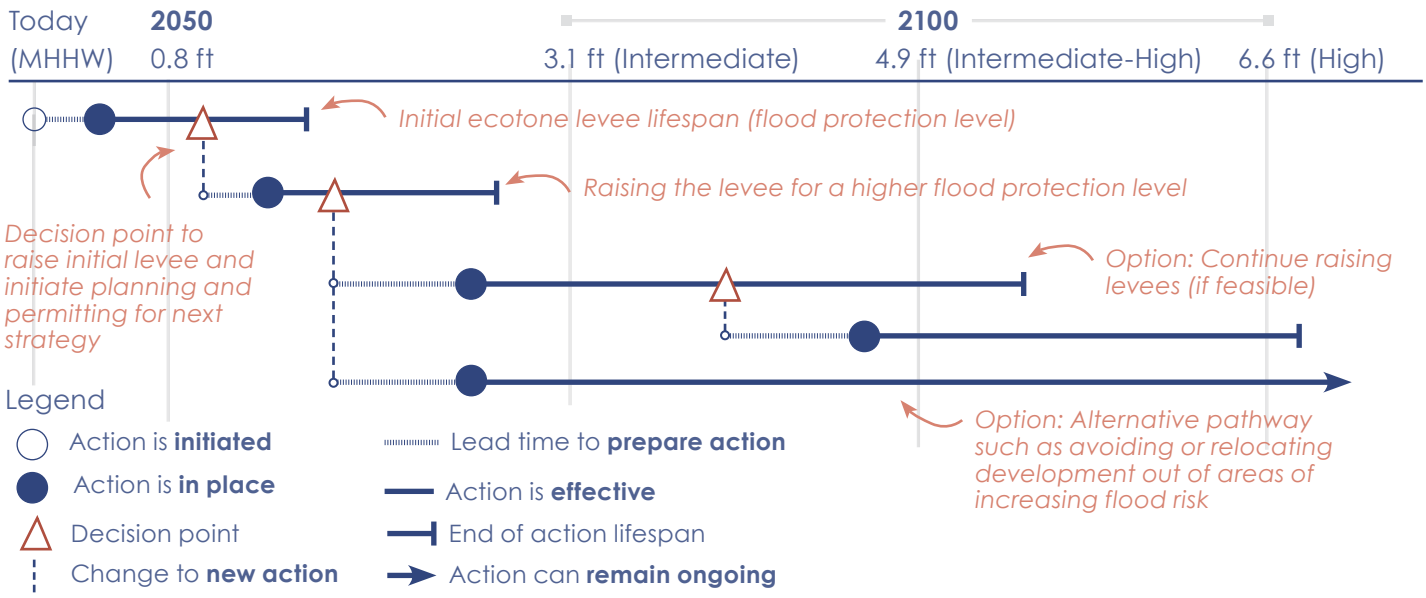


Figure 1–10. An illustrative example of adaptation pathways. Each line represents an adaptation action. Each action consists of: a point in which it is initiated, a period of time ("lead time") necessary for planning, permitting, and construction, a point in which the action is in place and providing flood protection, and either an end to an action's effective lifespan (such as for protection approaches), or the ability of the action to provide ongoing flood risk reduction (such as relocate or avoid approaches). Decision points represent the point at which a change in strategy or new strategy initiation should begin that provides enough lead time for the new action to be effective. Triggers serve as indicators that can inform decision points.

32 Saskia E. Werners, Russell M. Wise, James R.A. Butler, Edmond Totin, and Katharine Vincent, "Adaptation Pathways: A Review of Approaches and a Learning Framework," Environmental Science & Policy 116 (2021): 266–275.

Benefits of Adaptation Beyond Flood Risk Reduction

Adaptation solutions can provide more benefits than just reducing flood risk along shorelines. They can increase the quality of life for residents, help correct past harms, advance economies, and improve habitats. Understanding potential co-benefits and weighing trade offs between different adaptation solutions is a critical part of deciding how communities should approach shoreline adaptation. The following section provides a conceptual framework for developing adaptation strategies along the Bay shoreline.

Maximize the Benefits of Shoreline Uses and Baylands Habitats That Depend on Their Proximity and Relationship to the Bay

The San Francisco Bay shoreline is a remarkable place to be. Many uses along the Bay shoreline depend on their proximity to the water. One of BCDC's primary functions as a coastal zone management agency is to protect, preserve, and increase public access to the Bay to the maximum extent feasible.[33] This includes access to parks, trails, boat launches, marinas, and other public shoreline access points. The public trust doctrine is a common law principle that establishes that certain lands are held in trust by the state for the benefit and use of the public, and this is a fundamental underpinning of BCDC's work. Uses and interests consistent with BCDC's mandate and the public trust include water-related commerce, navigation, fishing, bathing, swimming, and boating, as well as public access, recreational uses, and land preservation in its natural state.

The shoreline contains diverse recreational uses and provides opportunities for boating, walking, jogging, biking, hiking, fishing, and swimming. The San Francisco Bay Trail is a 350-mile series of connected walking and cycling paths that ring the San Francisco and San Pablo bays with the goal of creating a 500-mile connected network running through all nine Bay Area counties, 47 cities, and across all bridges. There are also many uses and facilities that require a shoreline location to function, including the ports, refineries, water-treatment plants, ferries, commercial fisheries, and other water-related industry.

As sea levels rise, recreation and access points may be inundated—temporarily now, but permanently in the future—reducing access to the Bay shoreline. Even adaptation solutions themselves may reduce access and enjoyment of the Bay shoreline. Levees or seawalls that block views and access protect assets from getting wet but impact the quality of the shoreline. Decisions about what, where, and

33 San Francisco Bay Conservation and Development Commission, San Francisco Bay Plan, Public Access Policy 1.

how to implement shoreline adaptation need to consider how to maintain and enhance shoreline access and opportunities for shoreline recreation and how access and recreation may need to change and adapt as seas rise further.

The shoreline is also home to Baylands habitats, which are more than just beautiful to look at. These natural systems provide habitat for wildlife, endangered species, and layover stops for North America's migratory birds. They provide enormous economic benefits to the region through their ecosystem services, including sustaining the 70 percent of California's commercial fisheries that are dependent on wetlands habitat, making San Francisco Bay habitats a major economic contributor to the state.[34] They also support essential services such as recycling nutrients, improving water quality, and storing and sequestering carbon that draws greenhouse gases out of the atmosphere. Complete Baylands habitats include subtidal habitats, intertidal areas including tidal wetlands (also called marshes), and upland habitat areas.

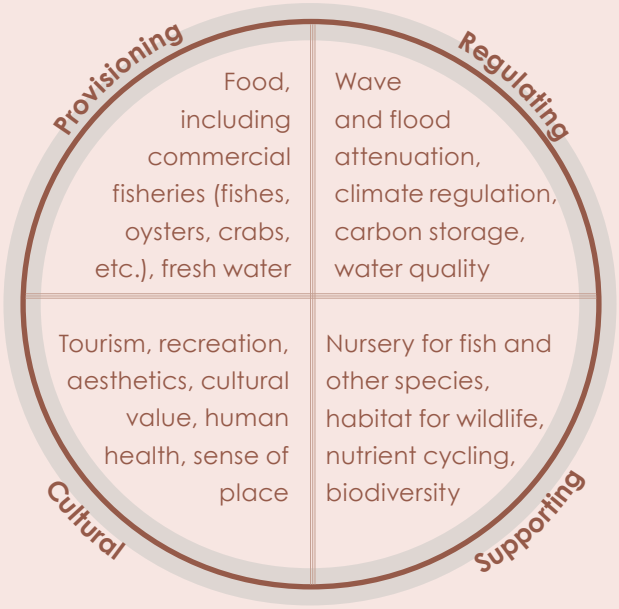
But these habitats are threatened by sea level rise. As coastal flood hazards increase, habitat types will be forced to shift—tidal wetlands will have to move to upland transition zones, and open Bay water will drown existing tidal wetlands—and critical services will change or be lost. Coastal habitats can naturally adapt to rising sea levels if they have access to sustainable sources of sediment that allow them to build up their elevation and have access to upland areas to migrate, known as wetlands migration space. In the Bay Area, some parts of the shoreline have wetlands migration space and upland transition zone available that may allow natural adaptation to happen. But in

34 Felicia Madsen, Athena Honore, and Stephen Knight, "Greening the Bay Area: Recommendations for Improving the Environmental Sustainability of Bay Area Transportation and Land Use," Save the Bay, April 22, 2009, https://www.sfbayrestore.org/sites/default/files/2019-07/2009-04-22-gb-item_2_greening_the_bay.pdf.

BENEFITS NATURE PROVIDES TO PEOPLE

The term "ecosystem services" refers to the direct and indirect economic benefits natural ecosystems provide to people.[1] These benefits support and sustain human livelihoods.

Ecosystem services include:



Using natural and nature-based adaptation to reduce flood risk while improving habitats and sustaining ecosystem services is an emerging field of study. There are differences in planning, feasibility, goals, methods, costs and other considerations that will need to be incorporated. Engineering standards and permitting criteria will also need to be refined to ensure these approaches can be used effectively.

1 Millennium Ecosystem Assessment, Ecosystems and Human Well-being: Synthesis Report (Washington, D.C.: Island Press, 2005), https://www.millenniumassessment.org/documents/document.300.aspx.pdf.

other areas, existing development limits the ability for landward migration, and at the same time the region's decreasing available sediment can further limit the Baylands natural ability to adapt.[35]

Improving Baylands not only supports habitats and ecosystem services, but it can also reduce coastal flood risk and impacts. Baylands can reduce wave energy and wave heights during storms, minimize erosion along the shoreline, and absorb and store excess floodwater that reduces catastrophic flooding.[36] These flood protection benefits are often referred to as natural and nature-based infrastructure. While adaptation can range from nature-based to conventional hard infrastructure, in many cases a hybrid approach that utilizes engineered strategies with natural elements whenever feasible can provide flood risk reduction benefits while also supporting natural habitats and other ecosystems services.

ENSURING LOCAL EFFORTS ADVANCE EQUITY OUTCOMES

The RSAP includes an **Equity Assessment Standard** that asks jurisdictions to describe what efforts have been done to incorporate equitable practices, principles, and outcomes in Subregional Plans. This standard is referred to in Subregional Shoreline Adaptation Plan Guidelines Plan elements.

Improving Community Health, Economic Development, Housing, and Infrastructure

Many areas along the Bay shoreline contain large population centers with existing housing and development, critical infrastructure, and transportation assets. Adaptation strategies to reduce flood risk can also seek to improve community health and equity and meet housing and economic development needs. Adaptation should carefully evaluate how to support the existing needs and values of communities today, while also facilitating long-term adaptation that balances development factors and risk tolerance with economic and physical feasibility.

It is essential for adaptation to center the most vulnerable communities to achieve more equitable outcomes. Equitable adaptation processes and outcomes involve intentional and sustained practices that bring socially vulnerable residents and Environmental Justice communities into decision-making processes, promote community capacity to maintain involvement, and evaluate adaptation projects, programs, policies, and investments for equity implications. Equitable adaptation outcomes maintain healthy and vibrant communities, protect people and ecosystems from contamination, increase access to the Bay shoreline, and avoid disproportionate

35 SFEI and SPUR. 2019. San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units. Publication #915, San Francisco Estuary Institute, Richmond, CA.

36 Ibid.

or cascading stressors on the most vulnerable communities.

By prioritizing the inclusion and needs of socially vulnerable communities in the planning process, equitable adaptation can work to address past harms. Addressing the legacies of environmental injustice first and foremost in the planning process can lead to fairer outcomes and an appreciation from community members that finally see their issues addressed. This can be accomplished through elevating the voices of socially vulnerable community members in the decision-making process, prioritizing the cleanup of contaminated sites in their communities, and taking steps to mitigate displacement.

Equity also extends to future generations. Making decisions that respond to the risks, needs, and values of people today should also consider what benefits, costs, and opportunities are available to future generations. Just as the current residents of the Bay Area inherited the current shoreline landscape, the next generation will inherent a new landscape shaped by the choices made today.

The Bay Area, like many other places in California, is constantly facing development pressure for new housing to increase supply and affordability. The California Department of Housing and Community Development (HCD) implements state requirements for local jurisdictions to designate areas to meet the state's housing needs via housing elements.[37] In some cases, the most logical or desirable housing sites may be along the at-risk shoreline. Highly developed urban shorelines might also be significant sources of revenue for cities through commercial and industrial uses. These factors may provide strong motivation to protect shorelines in place, and in fact future development can provide an opportunity to protect both new and existing development by funding new adaptation and resilience measures that provide benefits to cities and communities.

GUIDING ADAPTATION DECISIONS FOR LOCAL AND REGIONAL SUCCESS

The RSAP includes **Adaptation Strategy Standards** that must be met when identifying preferred options for adaptation in Subregional Shoreline Adaptation Plans. These standards are referred to in Subregional Shoreline Adaptation Plan Guidelines in Element D: Adaptation Strategies and Pathways and Element E: Land Use and Policy Plan.

While protection of these shorelines in many cases will be critical, adaptation strategies will have to continuously adapt to keep up with future sea levels. Using adaptation pathways can help plan adaptation decisions today for the shorter and mid-term time horizons while also maintaining longer-term options to help ensure that investments in adaptation today provide the greatest benefit and value.

Create Adaptation Pathways to Respond to Changing Flood Risks Over Time

The accelerating rate of sea level rise means that adaptation will be ongoing and iterative. Using adaptation pathways provides the ability to plan for and develop adaptation strategies in phases that respond to the best available science, conditions, and risk. While it may not be necessary or appropriate to build adaptation strategies for the longest-term sea level projections today, it *is* appropriate to understand how adaptation strategies along the shoreline will enable — or limit — future options. Creating pathways for ongoing adaptation can provide flexibility and options to respond to changing risks and can be an invaluable part of providing benefits to communities, the economy, and the environment beyond flood risk reduction over time.

37 California Government Code, § 65582.

DEFINING LANGUAGE IN THE RSAP

Adaptation strategy refers to a specific action, or set of interdependent actions, that are designed to achieve a particular outcome. A comprehensive approach to reducing flood risk along a shoreline will likely include multiple strategies that work together across a shoreline and function effectively as phased strategies over time as flood risks increase. These can be physical and non-physical. See a more detailed description in the Glossary.

Adaptation strategic approach is a grouping of like strategies that achieve specific outcomes related to flood risk reduction. Strategic approaches can include both physical and non-physical strategies, be used in tandem along different parts of a shoreline and can change and phase over time in response to changing local conditions and risk. Developing effective adaptation strategies and pathways along a shoreline will likely require multiple individual actions that may cross different strategic approaches.

Adaptation pathways are an approach to the challenge of making adaptation decisions today that supports flexibility for future adaptation options. It provides a useful structure for considering different options (or pathways) to respond to increasing flood risk over time and helps communities understand what actions taken in the short term can enable options for the long term[1]. Pathways rely on developing triggers and decision points based upon monitoring the effectiveness of strategies, lifespan of adaptation actions, and evaluating the changing physical and social conditions that signal when changes to the pathways need to occur.

Adaptation project refers to a specific and detailed action or strategy that has advanced into a greater level of design and/or implementation beyond the conceptual phase.

Natural and nature-based adaptation occurs when sustainable planning, design, environmental management, and engineering practices weave natural features and processes into the built environment to promote adaptation and resilience. Such solutions enlist natural features and processes in efforts to combat climate change, reduce flood risks, improve water quality, protect coastal property, restore and protect wetlands, stabilize shorelines, reduce urban heat, add recreational space, and more. Nature-based solutions offer significant benefits, monetary and otherwise, often at a lower cost than more traditional infrastructure. These benefits include economic growth, green jobs, increased property values, and improvements to public health, including better disease outcomes and reduced injuries and loss of life.[2]

1 Saskia E. Werners, Russell M. Wise, James R.A. Butler, Edmond Totin, and Katharine Vincent, "Adaptation Pathways: A Review of Approaches and a Learning Framework," Environmental Science & Policy 116 (2021): 266–275.

2 Federal Emergency Management Agency (FEMA), Risk MAP Nature-Based Solutions Guide (Washington, D.C.: FEMA, 2021), https://www.fema.gov/sites/default/files/documents/fema_riskmap-nature-based-solutions-guide_2021.pdf.

Vulnerable communities refers to areas with current and future flood risk and high concentrations of households exhibiting socio-economic and/or mental or physical conditions that may make it more difficult to prepare for, respond to, or recover from coastal flood hazards. The RSAP requires an identification of "vulnerable communities" that should include, at least, socially vulnerable and Environmental Justice communities (see individual definitions). See a more detailed description in the Glossary.

Socially vulnerable communities refers to communities that exhibit certain characteristics, such as, but not limited to, people without vehicles, people with disabilities, older adults, and people with limited English proficiency. These communities are especially at risk during public health and environmental emergencies because of factors like socioeconomic status, household characteristics, racial and ethnic minority status, or housing type and transportation. The RSAP considers this to be block groups that rank from Moderate to Highest Social Vulnerability according to BCDC's Community Vulnerability Map.

Environmental Justice communities refers to neighborhoods or communities that experience a disproportionate burden of environmental hazards and reduced quality of life compared to similar communities. The RSAP considers this to be communities receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0.

Richmond beach. Photo by Jaclyn-Perrin-Martinez

Section 2

One Bay Vision and Strategic Regional Priorities

2.1 A One Bay Vision for a Resilient Future Shoreline

The One Bay Vision paints a picture of what successful adaptation to sea level rise for the Bay Area shoreline looks like.

The vision reflects the values of residents today and acknowledges that the future Bay shoreline will look different as communities continuously adapt over time. Together, these values drive the Subregional Shoreline Adaptation Plan Guidelines to ensure that Subregional Plans enact the regional vision at the local level.

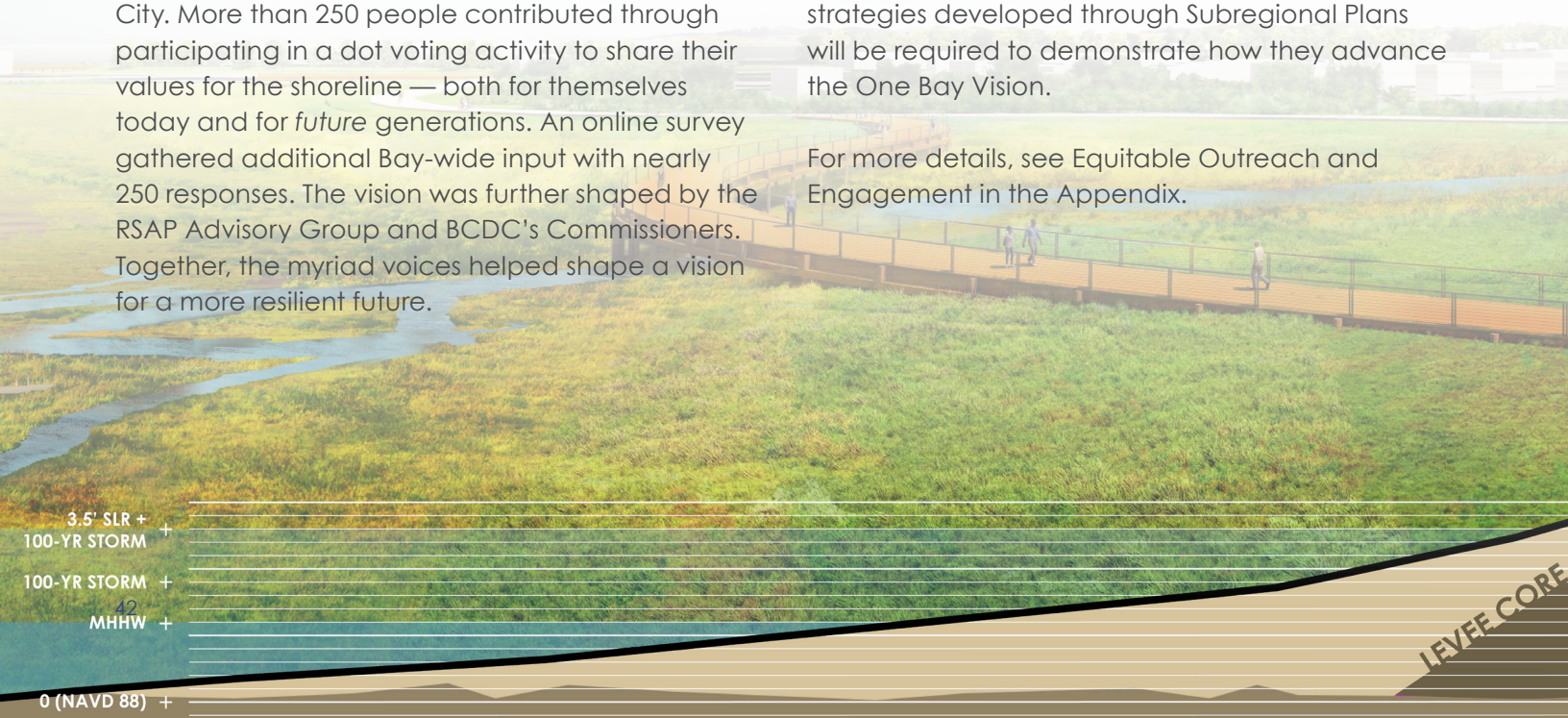
The One Bay Vision was shaped by the collective values and vision of hundreds of Bay Area residents. BCDC staff participated in ten in-person pop-up events across the Bay Area in Fall 2023 to gather input from community members on their values for the Bay Area. Pop-up events were held at community events in Richmond, San Rafael, Newark, San Francisco, Oakland, American Canyon, Palo Alto, Mountain View, and Suisun City. More than 250 people contributed through participating in a dot voting activity to share their values for the shoreline — both for themselves today and for *future* generations. An online survey gathered additional Bay-wide input with nearly 250 responses. The vision was further shaped by the RSAP Advisory Group and BCDC's Commissioners. Together, the myriad voices helped shape a vision for a more resilient future.

The One Bay Vision establishes an overarching regional vision statement and visions and goals for eight topic areas that address major issues facing the Bay Area today. Each topic area's vision is accompanied by a Strategic Regional Priority that must be implemented locally to advance the region's shared goals. The eight topic areas include:

- Community Health and Well-being
- Ecosystem Health and Resilience
- Development, Housing, and Land Use
- Critical Infrastructure and Services
- Public Access and Recreation
- Transportation and Transit
- Shoreline Contamination
- Collaborative Governance, Flood Management, and Funding

Local governments preparing Subregional Plans will use the One Bay Vision in their adaptation planning by incorporating and localizing the regional vision and goals with locally developed visions for their shorelines. The adaptation strategies developed through Subregional Plans will be required to demonstrate how they advance the One Bay Vision.

For more details, see Equitable Outreach and Engagement in the Appendix.

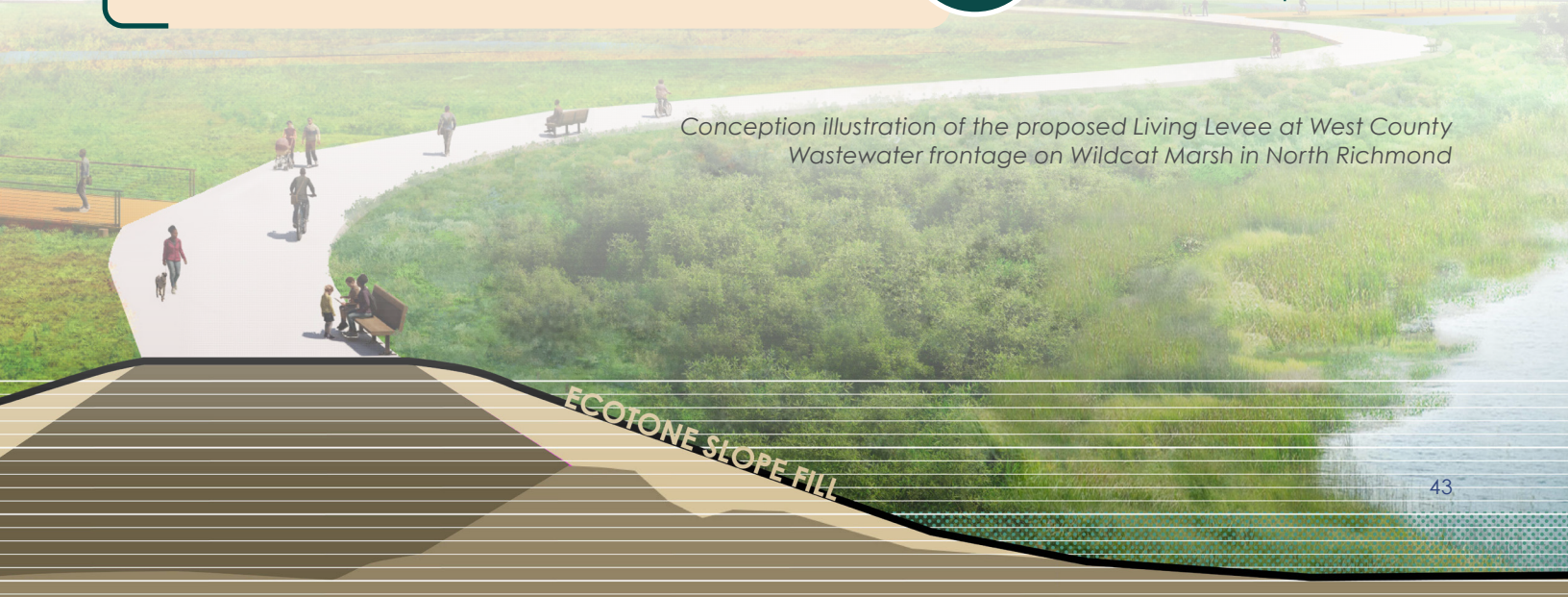


ONE BAY VISION FOR A RESILIENT FUTURE SHORELINE—

As sea levels rise, the Bay Area's diverse communities come together to transform how we live, work, plan, and adapt along our changing shorelines.

In this future, communities are healthy, safe, and have greater access to the shoreline, where they can feel connected to the Bay's edge and experience the beauty and wonder of thriving habitats we depend upon to sustain our quality of life. Our region remains connected so that networks of people and goods can move with ease and get to the places they need to go. The services we rely upon keep our communities and economies running and are designed for the long term. Achieving this future will require governments, the private sector, and communities to make a commitment to equity, address past harms, and take on complex, interrelated challenges together. A resilient future for the San Francisco Bay Area starts now and continues for generations to come.

- Communities are healthy and vibrant.
- Healthy Baylands ecosystems thrive.
- Places are designed for changing shorelines.
- Critical services are reliable.
- The Bay shoreline is accessible to all.
- Safe and reliable transportation connects the region.
- People and ecosystems are safe from contamination risks.
- Regional collaboration drives efficient and effective adaptation.



Conception illustration of the proposed Living Levee at West County Wastewater frontage on Wildcat Marsh in North Richmond

2.2 Strategic Regional Priorities for Region-Wide Action

Strategic Regional Priorities are key policies that address regionally-significant issues stemming from the One Bay Vision.

They include regional challenges and opportunities to achieve adaptation goals across region-wide systems and patterns. Subregional Plans put these regional "big moves" into action in specific locations around the Bay.

Local jurisdictions containing one or more Strategic Regional Priorities must incorporate identified assets in their Subregional Plans and develop adaptation strategies that accomplish the desired Strategic Regional Priority outcome at a local level. The Subregional Shoreline Adaptation Plan Guidelines provide more information on how to integrate Strategic Regional Priorities into Subregional Plans.

The Strategic Regional Priorities include issues that either: cross jurisdictional boundaries; would have regionally significant consequences in the absence of coordinated adaptation; and/or includes issues that need to be prioritized at the regional scale for the well-being of people, environments, and economies across the Bay Area.

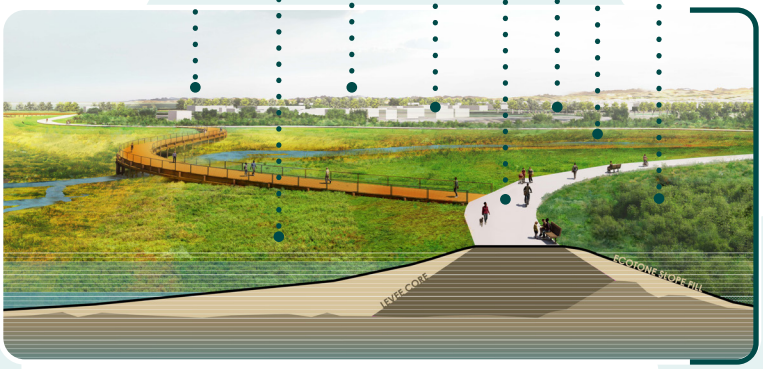
In some cases, these Strategic Regional Priorities help elevate and increase the transparency of local issues that governments are already thinking about. For example, the cleanup of contaminated sites, consideration of anti-displacement policies, and siting of new housing are likely already occurring. The Strategic Regional Priorities place them in the context of sea level rise and the region to help understand how the risks of coastal flood hazards can best shape current and future policy decisions.

The following pages include maps of assets identified for each Strategic Regional Priority and a corresponding Adaptation Strategy Standard that provides guidance for how these issues should be incorporated into Subregional Plans. The standards only apply to areas containing the Strategic Regional Priority assets.

The maps in this section represent the best available data at the time of publication. However, the data source identified under each Strategic Regional Priority is the basis for the required standard. In addition to the maps on the following pages, Strategic Regional Priorities are also listed in the Minimum Categories and Assets Standard (Section 3.3.2) and Adaptation Strategy Standards (Section 3.3.4).

Strategic Regional Priorities are integrated into local planning where they occur

- Reduced Involuntary Displacement
- Complete and Connected Ecosystems
- Safe, Sustainable, and Strategic Shoreline Growth and Density
- Reliable Critical and Emergency Services
- Connected Regional Shoreline Access
- Regional Movement of People and Goods
- Clean Communities to Improve Environmental Justice
- Cross-Jurisdictional Flood Risk Reduction



Subregional Plans will integrate both Strategic Regional Priorities (where they apply) and locally driven priorities for shoreline adaptation planning.

2.3 Topic Areas — Connecting the One Bay Vision to Strategic Regional Priorities

The RSAP includes eight topic areas that represent key aspects of society that are likely to be impacted by sea level rise.

While each topic area has its own important issues and considerations specific to sea level rise, these topics are not mutually exclusive and many are inter-related and interdependent on one another, as illustrated by the broader One Bay Vision.

As local governments and communities engage in adaptation planning in their Subregional Plans, these topic areas will come together in unique and site-specific ways. The outcomes of adaptation planning should result in adaptation strategies that preserve public trust uses of the Bay, address risks across topic areas, and identify opportunities to improve multiple benefits across Bay shoreline communities, Baylands ecosystems, and economies.

However, in order to address risks appropriately, it is important to understand each issue and how they interact with one another. The purpose of this section is to communicate each topic area, its vision and goals, and how they are connected to the Strategic Regional Priorities, which will be used and integrated across Subregional Plans.

Each topic area includes four parts:

- **One Bay Vision:** Includes the overarching vision statement and goals for each topic area.
- **Minimum Categories and Assets:** Describes specific assets that comprise the topic area. This includes the minimum assets that are required to be evaluated in adaptation planning, and includes recommended assets.
- **Strategic Regional Priority:** Describes the specific regional issue stemming from the One Bay Vision and datasets to be used.
- **Adaptation Strategy Standard:** Each Strategic Regional Priority includes a standard for how adaptation planning should address the issue in Subregional Plans.

See Figure 2-1 for an example of how these four sections show up in the following pages. It is important to note that all Minimum Categories and Assets are required to be evaluated in Subregional Plans. The Strategic Regional Priorities ensure that regionally-significant assets are incorporated into planning, while a local determination is made on local priorities.

ENSURING ADAPTATION PLANNING CONSIDERS KEY ISSUES AND ASSETS

The RSAP includes a **Minimum Categories and Assets Standard** that outlines specific datasets that should be considered in adaptation planning. These standards are referred to in Subregional Shoreline Adaptation Plan Guidelines Element B: Existing Conditions and Element C: Vulnerability Assessment.

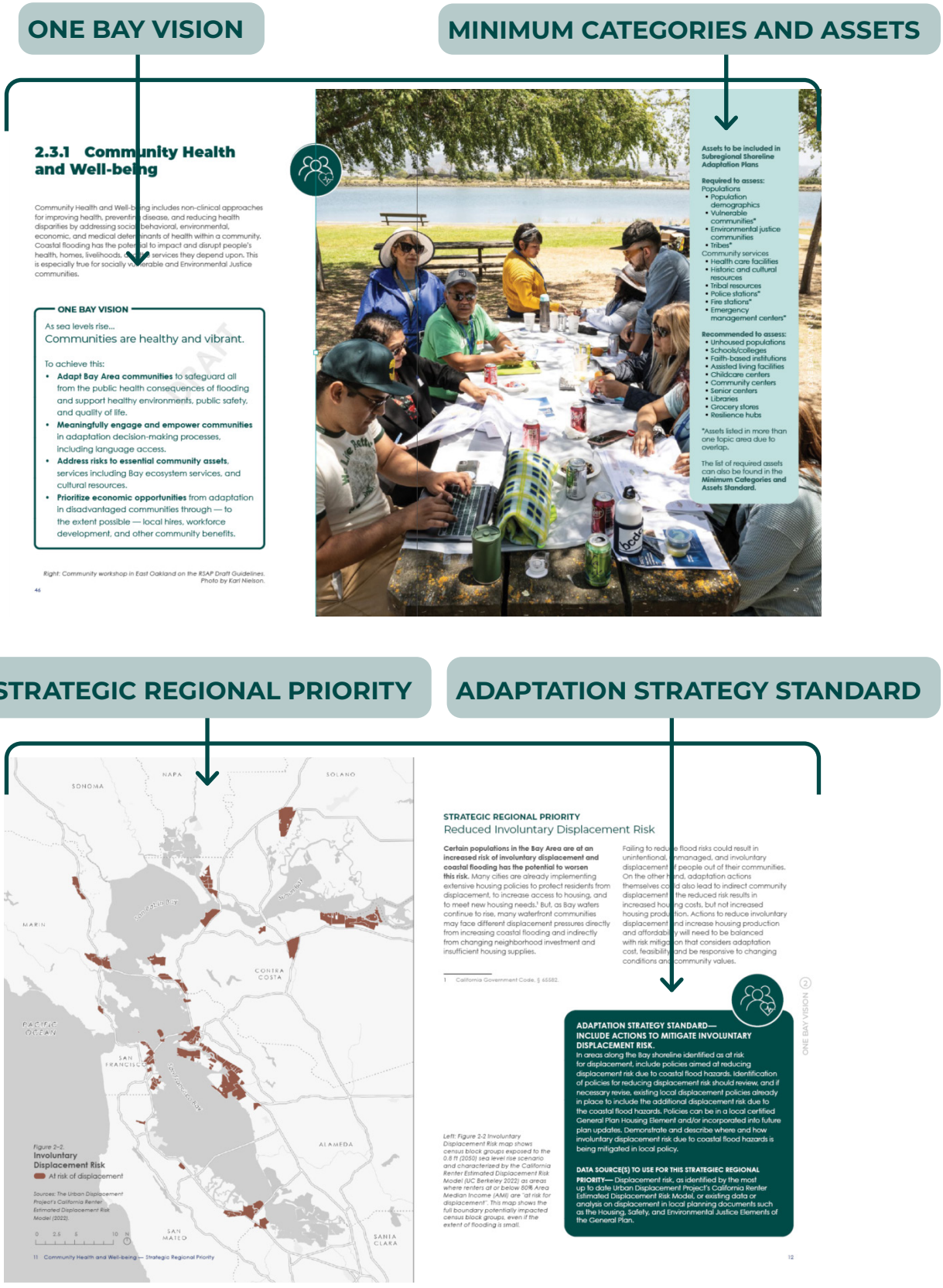


Figure 2–1. Understanding the Vision and Strategic Regional Priority for each Topic Area

2.3.1 Community Health and Well-being

Community Health and Well-being includes non-clinical approaches for improving health, preventing disease, and reducing health disparities by addressing social, behavioral, environmental, economic, and medical determinants of health within a community. Coastal flooding has the potential to impact and disrupt people's health, homes, livelihoods, and the services they depend upon. This is especially true for socially vulnerable and Environmental Justice communities.

ONE BAY VISION

As sea levels rise...

Communities are healthy and vibrant.

To achieve this:

- **Adapt Bay Area communities** to safeguard all from the public health consequences of flooding and support healthy environments, public safety, and quality of life.
- **Meaningfully engage and empower communities** in adaptation decision-making processes, including language access.
- **Address risks to essential community assets**, services including Bay ecosystem services, and cultural resources.
- **Prioritize economic opportunities** from adaptation in disadvantaged communities through — to the extent possible — local hires, workforce development, and other community benefits.

Right: Community workshop in East Oakland on the RSAP Draft Guidelines. Photo by Karl Nielson.

Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:
Populations
- Population demographics
- Vulnerable communities
- Environmental Justice communities*
- Tribes*

Community services
- Healthcare facilities
- Historic and cultural resources
- Tribal resources
- Police stations*
- Fire stations*
- Emergency operations centers*

Recommended to assess:
- Unhoused populations
- Schools/colleges
- Faith-based institutions
- Assisted living facilities
- Childcare centers
- Community centers
- Senior centers
- Libraries
- Grocery stores
- Resilience hubs

*Assets listed in more than one topic area due to overlap.

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

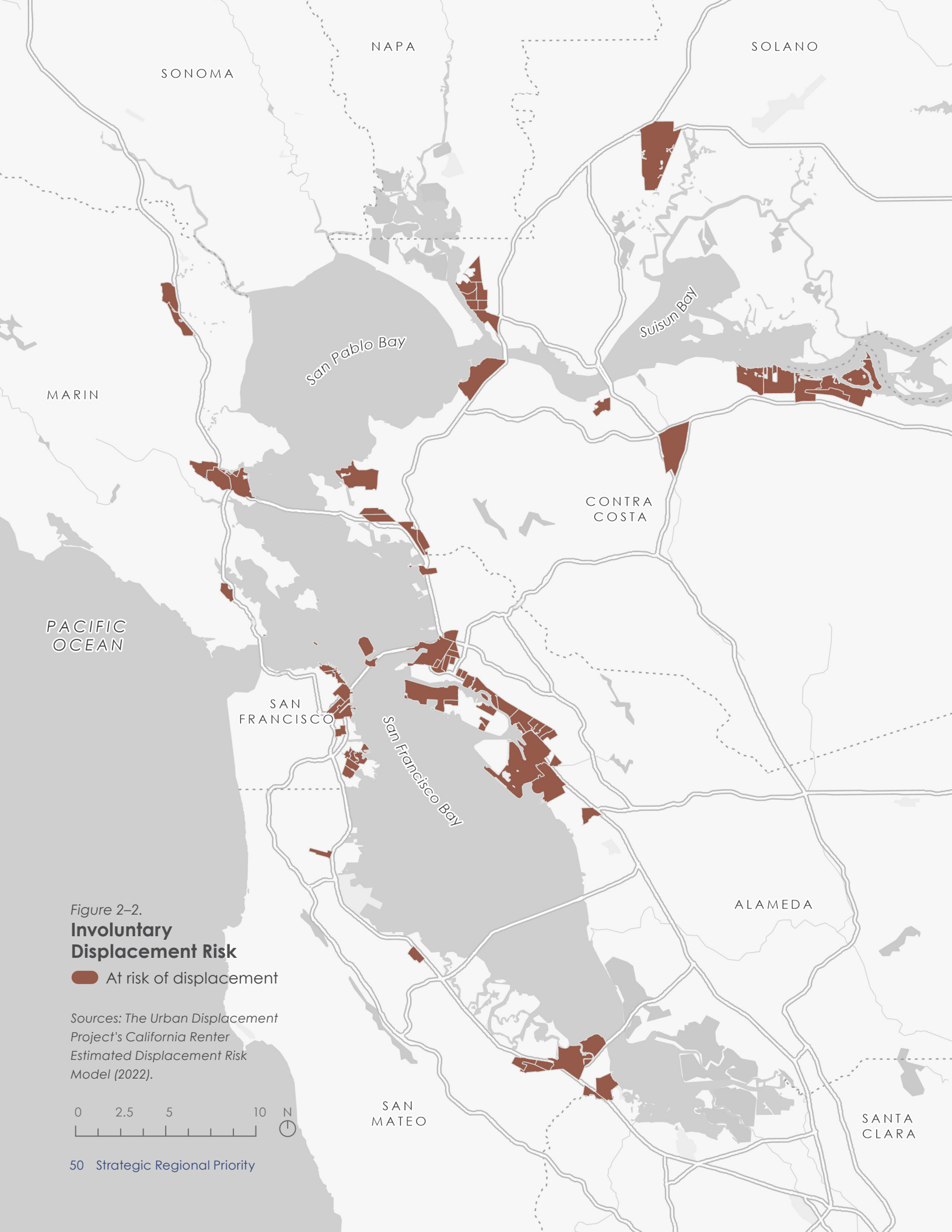


Figure 2–2.

Involuntary Displacement Risk

At risk of displacement

Sources: The Urban Displacement Project's California Renter Estimated Displacement Risk Model (2022).

STRATEGIC REGIONAL PRIORITY

Reduced Involuntary Displacement Risk

Certain populations in the Bay Area are at an increased risk of involuntary displacement and coastal flooding has the potential to worsen this risk. Many cities are already implementing extensive housing policies to protect residents from displacement, to increase access to housing, and to meet new housing needs.[1] But as Bay waters continue to rise, many waterfront communities may face different displacement pressures directly from increasing coastal flooding and indirectly from changing neighborhood investment and insufficient housing supplies.

Failing to reduce flood risks could result in unintentional, unmanaged, and involuntary displacement of people out of their communities. On the other hand, adaptation actions themselves could also lead to indirect community displacement if the reduced risk results in increased housing costs, but not increased housing production. Actions to reduce involuntary displacement and increase housing production and affordability will need to be balanced with risk mitigation that considers adaptation cost and feasibility and be responsive to changing conditions and community values.

1 California Government Code, § 65582.

Figure 2-2 Involuntary Displacement Risk map (page 50) shows census block groups exposed to the 0.8 ft (2050) sea level rise scenario and characterized by the California Renter Estimated Displacement Risk Model (UC Berkeley 2022) as areas where renters at or below 80% Area Median Income (AMI) are "at risk for displacement". This map shows the full boundary of potentially impacted census block groups, even if the extent of flooding is small.

ADAPTATION STRATEGY STANDARD—INCLUDE ACTIONS TO MITIGATE INVOLUNTARY DISPLACEMENT RISK.

In areas along the Bay shoreline identified as at risk for displacement, include policies aimed at reducing displacement risk due to coastal flood hazards. Identification of policies for reducing displacement risk should review, and if necessary revise, existing local displacement policies already in place to include the additional displacement risk due to coastal flood hazards. Policies can be in a local certified general plan housing element and/or incorporated into future plan updates.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— Displacement risk, as identified by the most up-to-date Urban Displacement Project's California Renter Estimated Displacement Risk Model, or existing data or analysis on displacement in local planning documents such as the Housing, Safety, and Environmental Justice Elements of the General Plan.

2.3.2 Ecosystem Health and Resilience

Ecosystem Health and Resilience includes supporting an overall healthy Bay and Baylands ecosystems. The Baylands ecosystem includes the Baylands, which consist of the shallow water habitats around the San Francisco Bay between the minimum and maximum tidal elevations, subtidal habitats, transition zones, and adjacent uplands and their associated plants, animals, and other organisms.[2] These habitats provide essential ecosystem services that support environmental, social, and economic well-being. Coastal flooding has the potential to alter Baylands ecosystems and drown certain habitats in the absence of effective adaptation responses, while natural and nature-based adaptation can support flood risk reduction and provide ecosystem benefits.

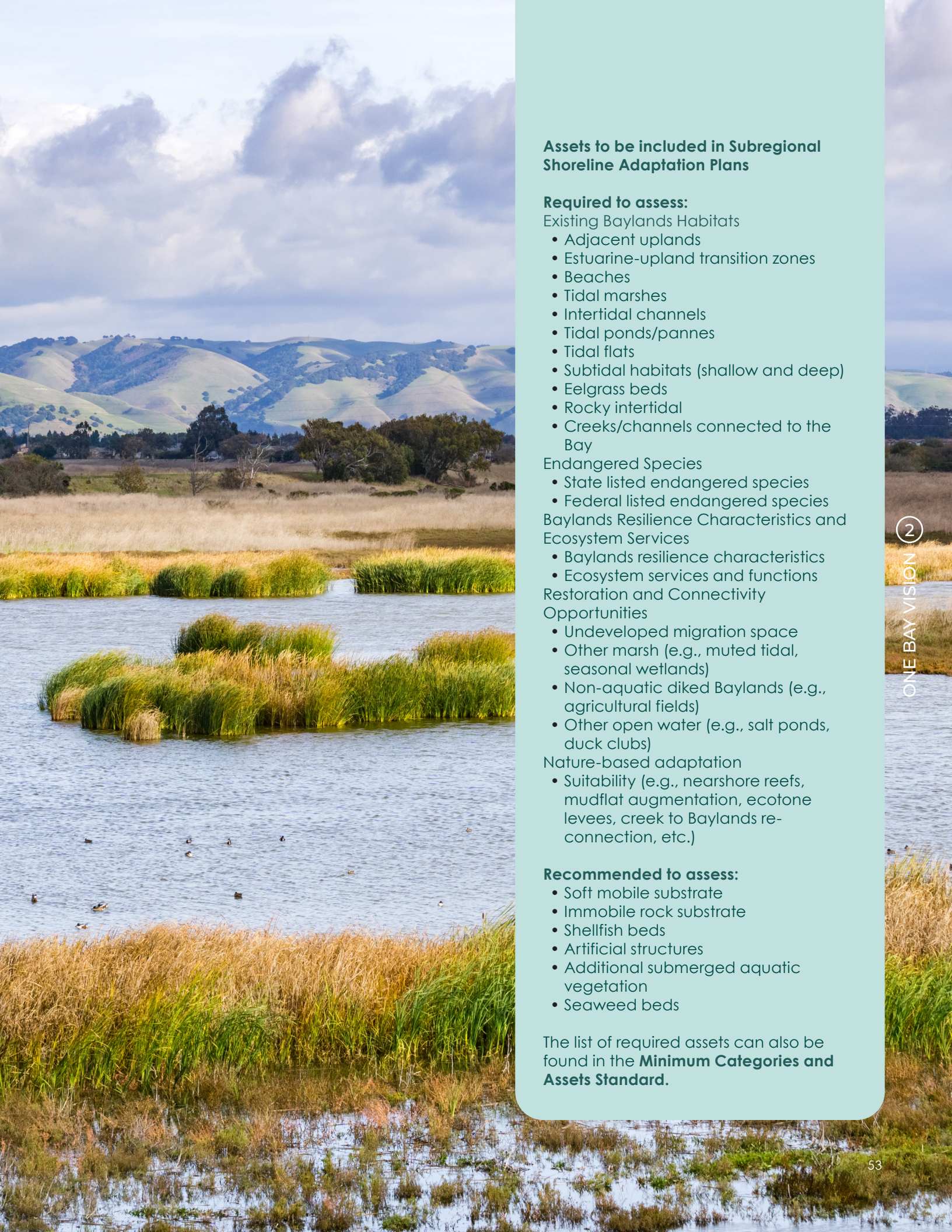
2 San Francisco Estuary Partnership, *Habitat Goals: A Framework for a Sustainable Bay-Delta Ecosystem* (San Francisco Estuary Partnership, December 2012).

ONE BAY VISION

As sea levels rise...
Healthy Baylands ecosystems thrive.

To achieve this:

- **Protect, restore, and enhance** Baylands ecosystems to improve their function, scale, biodiversity, and services, and meet regional habitat goals.
- **Prioritize nature-based solutions where possible** and incorporate habitat connectivity, sediment management, and whole watershed approaches into shoreline planning and projects.
- Identify and facilitate **opportunities for ecosystems to migrate landward** to support and enhance natural adaptation processes.



Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Existing Baylands Habitats

- Adjacent uplands
- Estuarine-upland transition zones
- Beaches
- Tidal marshes
- Intertidal channels
- Tidal ponds/pannes
- Tidal flats
- Subtidal habitats (shallow and deep)
- Eelgrass beds
- Rocky intertidal
- Creeks/channels connected to the Bay

Endangered Species

- State listed endangered species
- Federal listed endangered species

Baylands Resilience Characteristics and Ecosystem Services

- Baylands resilience characteristics
- Ecosystem services and functions

Restoration and Connectivity Opportunities

- Undeveloped migration space
- Other marsh (e.g., muted tidal, seasonal wetlands)
- Non-aquatic diked Baylands (e.g., agricultural fields)
- Other open water (e.g., salt ponds, duck clubs)

Nature-based adaptation

- Suitability (e.g., nearshore reefs, mudflat augmentation, ecotone levees, creek to Baylands re-connection, etc.)

Recommended to assess:

- Soft mobile substrate
- Immobile rock substrate
- Shellfish beds
- Artificial structures
- Additional submerged aquatic vegetation
- Seaweed beds

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

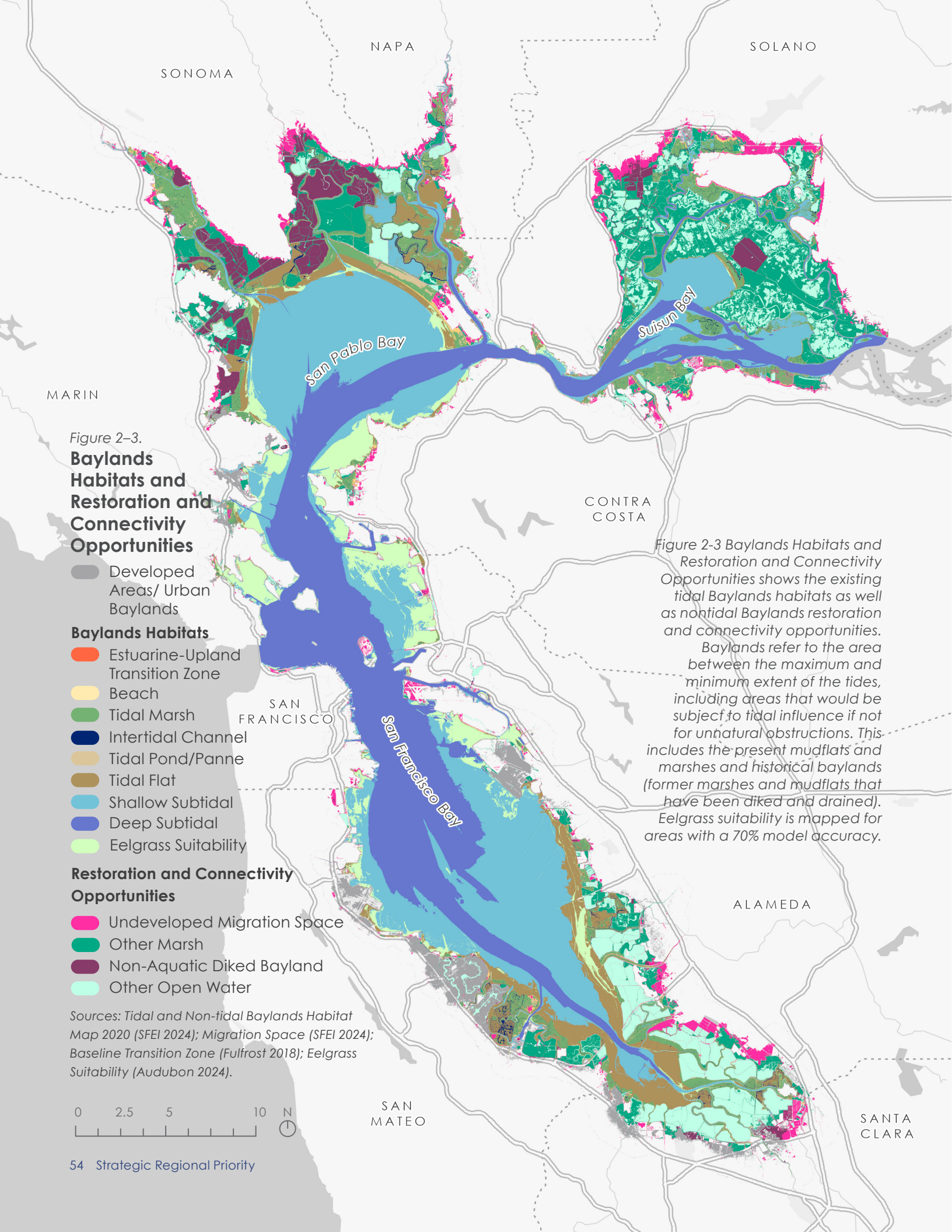


Figure 2–3.

Baylands Habitats and Restoration and Connectivity Opportunities

Sources: Tidal and Non-tidal Baylands Habitat Map 2020 (SFEI 2024); Migration Space (SFEI 2024); Baseline Transition Zone (Fulfrost 2018); Eelgrass Suitability (Audubon 2024).

Figure 2-3 Baylands Habitats and Restoration and Connectivity Opportunities shows the existing tidal Baylands habitats as well as nontidal Baylands restoration and connectivity opportunities. Baylands refer to the area between the maximum and minimum extent of the tides, including areas that would be subject to tidal influence if not for unnatural obstructions. This includes the present mudflats and marshes and historical baylands (former marshes and mudflats that have been diked and drained). Eelgrass suitability is mapped for areas with a 70% model accuracy.

STRATEGIC REGIONAL PRIORITY
Complete and Connected Ecosystems

Healthy Baylands depend on a diversity of habitats connected to one another across the region. Historically, the Bay Area was home to extensive and connected ecosystems, from subtidal vegetation to tidal wetlands, inland meadows, creeks that carried sediments and nutrients to Baylands habitats, and more. As the Bay Area's population grew throughout the 19th century, many habitats were destroyed, filled to create new land, diked to become managed wetlands or salt ponds, or disconnected from natural processes and degraded. Of the habitats remaining today, it is essential to preserve and restore fragmented habitats into complete ecosystems that are healthy and connected across landscapes, from the Bay waters to upland areas, and across the Bay shoreline, to meet regional habitat goals. Regional habitat goals include protecting or restoring over 130,000 acres of tidal and non-tidal wetlands, protecting 16,500 acres of estuarine-uplands transition zone habitat, and restoring 8,000 acres of eelgrass beds, among many other goals identified by the 2022 San Francisco Bay Joint Venture's Restoring the Estuary report (best available science at the time of publication).[3] These habitats provide essential benefits to society, including contributing to climate resilience.

3 San Francisco Bay Joint Venture. 2022. Restoring the Estuary - A Framework for the Restoration of Wetlands and Wildlife in the San Francisco Bay Area. Richmond, CA

ADAPTATION STRATEGY STANDARD— PROTECT, RESTORE, ENHANCE, AND ADAPT BAYLANDS HABITATS, ENSURE COMPLETE AND CONNECTED ECOSYSTEMS, AND FACILITATE THEIR LONG-TERM SURVIVAL.

In areas along the Bay shoreline with existing Baylands habitats, protect, restore, and/or enhance these habitats to the greatest extent feasible to meet regional habitat goals. "Protect" means continuing the functions and services the habitats provide as sea levels rise over time. "Restore" means bringing back functions and services where they once existed. "Enhance" means expanding the functions and services of habitats. Habitats do not need to be protected in place but should be able to migrate or be expanded as long as the functions are protected or enhanced. This can be achieved by ensuring that the spatial extent, distribution, abundance, characteristics, and conditions of habitat types can be protected or enhanced as sea levels rise. This includes identifying and designating marsh migration space and upland transition zones and identifying opportunities to connect Baylands habitats to one another and to sustainable sources of water and sediment supply that will support natural adaptation processes.

Ecosystems should also be planned for and connected across jurisdictions and throughout the Bay, which includes actions that improve the connections among the Bay, watersheds, and uplands. Include coordination efforts with agencies, jurisdictions, and stakeholders, as applicable, for maintaining ecosystem connectivity as part of the adaptation strategies. Adaptation strategies that would significantly adversely affect Bay resources should, to the greatest extent feasible, be avoided, including, but not limited to, strategies that result in significant harm to sensitive habitat areas, pollute the Bay, disrupt remediated sites or other legacy contamination, or reduce water surface area and circulation, such as flood barriers in the Bay.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— Baylands habitats and restoration and connectivity opportunities, as identified by the most up-to-date San Francisco Estuary Institute's (SFEI) Baylands Habitat Map and San Francisco Bay Joint Venture's Restoring the Estuary report.

2.3.3 Development, Housing, and Land Use

Development, Housing, and Land Use includes public and private property development and land uses along the Bay shoreline. This includes residential neighborhoods, businesses and job centers, industrial sites, as well as less urbanized areas, such as rural-suburban neighborhoods and vacant or undeveloped land. Future land use decisions along the shoreline will need to balance the need to increase housing production, preserve existing housing, and maintain a strong economy with managing risk—not just along the shoreline, but inland from the shoreline as well. Coastal flooding has the potential to impact and disrupt people's livelihoods, homes, jobs, and the economic services communities depend upon.

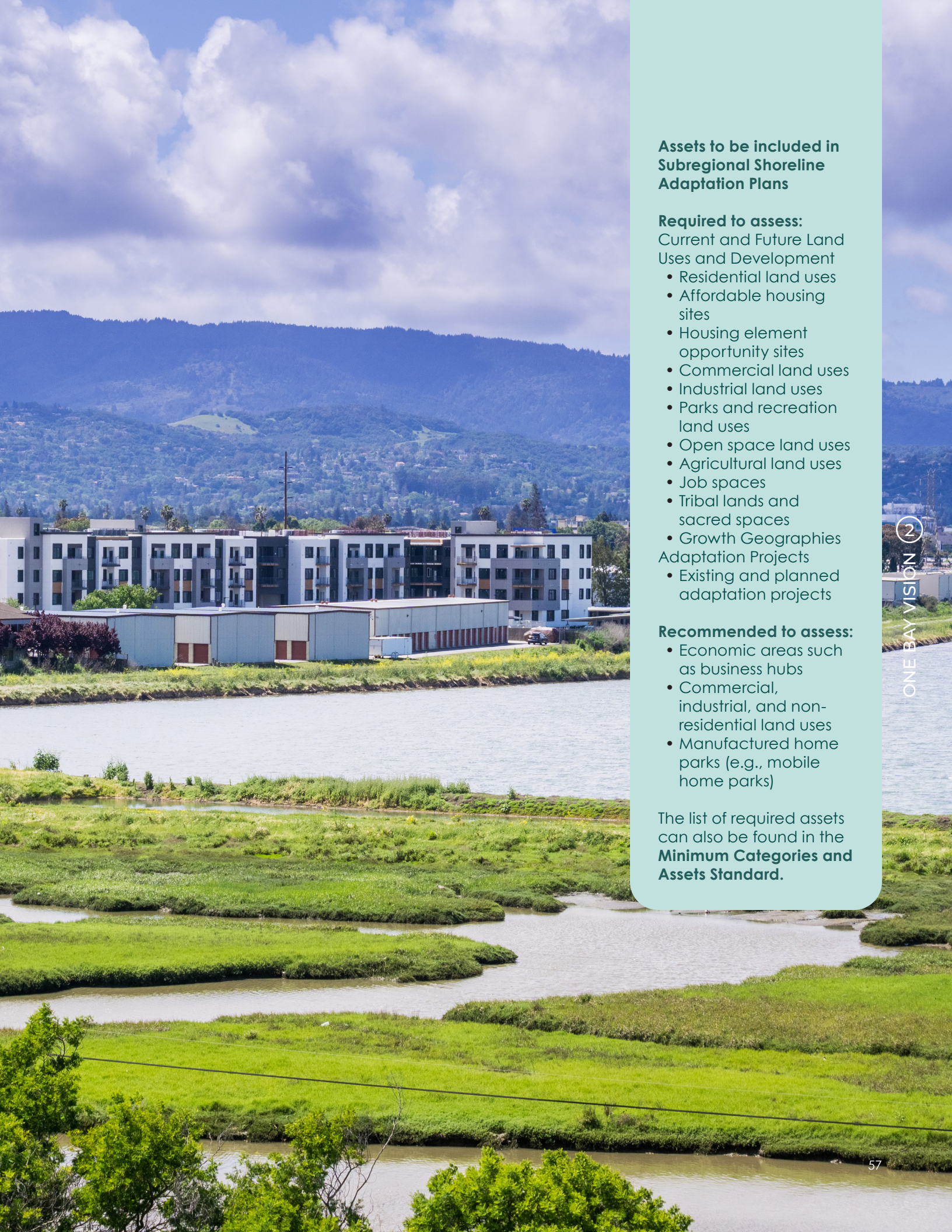
ONE BAY VISION

As sea levels rise...

Places are designed for changing shorelines.

To achieve this:

- Adapt existing development equitably and plan new and re-development projects to **ensure community safety, equity, and Bay ecological health.**
- **Align land use planning with risk mitigation** while considering long-term economic vitality for all.
- Support the region in creating affordable housing and **meeting state-mandated housing goals while preserving public trust uses of the Bay** and reducing flood risk and other hazards that may worsen with sea level rise (e.g. contaminant dispersion by rising groundwater) on future populations.



Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:
Current and Future Land Uses and Development

- Residential land uses
- Affordable housing sites
- Housing element opportunity sites
- Commercial land uses
- Industrial land uses
- Parks and recreation land uses
- Open space land uses
- Agricultural land uses
- Job spaces
- Tribal lands and sacred spaces
- Growth Geographies

Adaptation Projects

- Existing and planned adaptation projects

Recommended to assess:

- Economic areas such as business hubs
- Commercial, industrial, and non-residential land uses
- Manufactured home parks (e.g., mobile home parks)

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

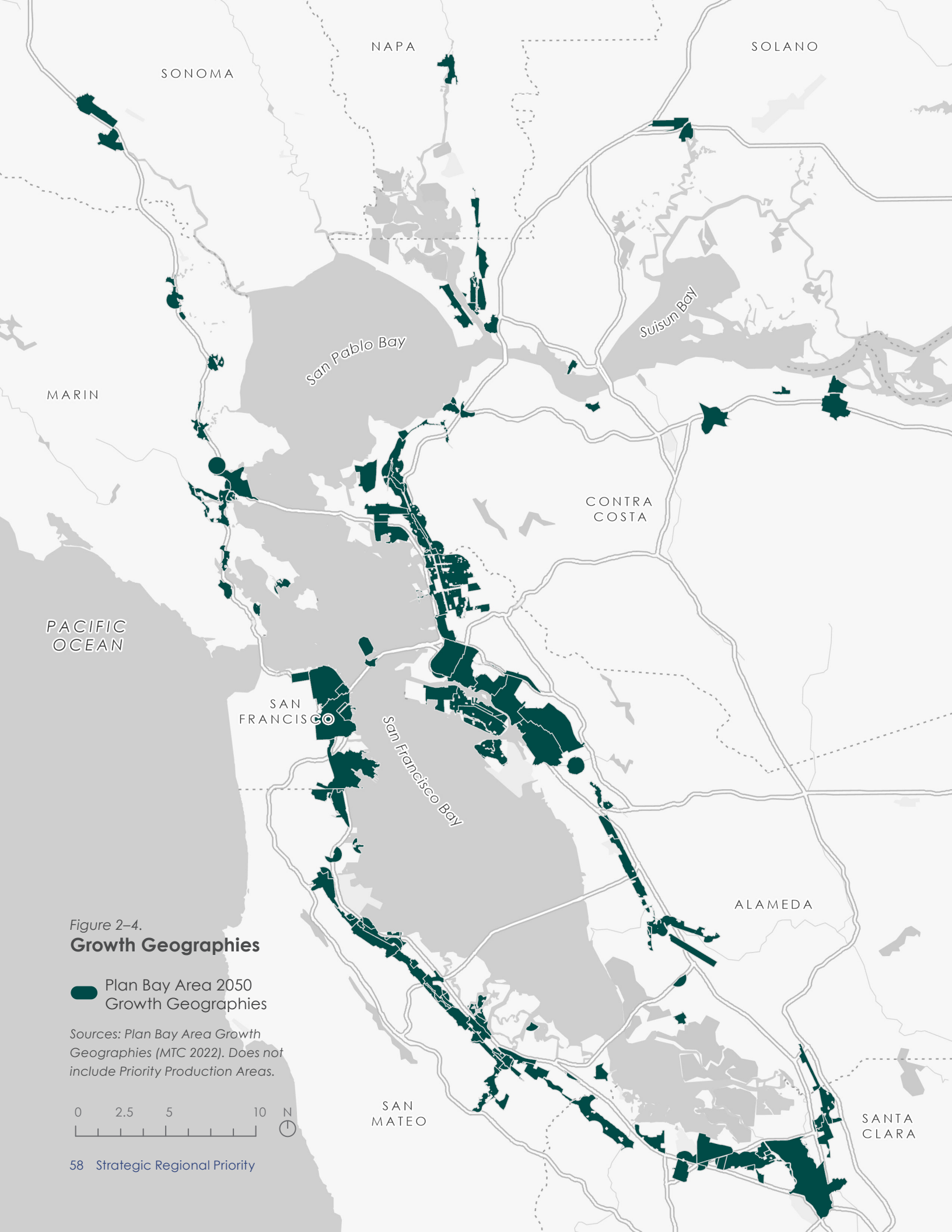


Figure 2–4.
Growth Geographies

Plan Bay Area 2050 Growth Geographies

Sources: Plan Bay Area Growth Geographies (MTC 2022). Does not include Priority Production Areas.

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STRATEGIC REGIONAL PRIORITY

Safe, Sustainable, and Strategic Shoreline Growth and Density

Housing, including affordable housing, and development near transit are essential to the region's ability to meet growth needs while reducing greenhouse gas emissions. MTC/ABAG's Plan Bay Area and Regional Housing Needs Allocation are a critical plan for meeting these regional needs. Even though the Bay Area's jobs and economic output contribute to a strong regional economy, the region is also facing a housing crisis that calls for maintaining existing housing as well as meeting the region's growing housing needs. Despite geographic and zoning constraints in urban areas, local jurisdictions have identified suitable sites for new housing and job growth and development to ease this pressure.

In some cases, areas identified as appropriate locations—such as those near transit, containing existing infrastructure, or near jobs and critical services—are along a vulnerable shoreline. Local governments will need to balance multiple goals and constraints when planning for new development, including the range of climate impacts and their cascading effects. In these locations, the choice does not have to be between adaptation or new development. Instead, careful consideration of how to integrate development with appropriate adaptation strategies can preserve the benefits of both.

ADAPTATION STRATEGY STANDARD—PROMOTE SAFE, SUSTAINABLE AND STRATEGIC GROWTH AND DENSITY.

In areas along the Bay shoreline within Plan Bay Area Growth Geographies, promote safe, sustainable, and strategic growth along the shoreline by incorporating strategies that allow the growth areas to be resilient to sea level rise now and over time. This may include protecting Growth Geographies in place and/or land use policies that minimize risk within the Growth Geography. When local conditions allow for it, consider how variations in zoning within the Growth Geography can enable greater levels of density in areas with lower risk to coastal flood hazards while still accommodating overall housing commitments and affirmatively furthering fair housing. If Growth Geographies are in or near contaminated sites, adaptation strategies should also consider how to minimize health risks associated with contaminated sites from coastal flooding hazards, including groundwater.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY—Growth geographies related to housing, as consistent with the most up-to-date Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG) Plan Bay Area.

Figure 2-4 Growth Geographies map (page 59) shows Plan Bay Area 2050 Growth Geographies, including Priority Development Areas, Transit Rich Areas and High Resource Areas exposed to 6.6 ft (2100 High) sea level rise scenario. This map shows the full boundaries of Growth Geographies potentially impacted, even if the extent of flooding is small.

Note: The Plan Bay Area Growth Geographies used for this Strategic Regional Priority include those related to housing.

2.3.4 Critical Infrastructure and Services

Critical Infrastructure and Services include the physical assets and functional services that are necessary for public health and safety, including water and power utilities, communications, hospitals, emergency response services, police and fire, and safe containment of hazardous and toxic materials. Most of these assets and services are part of integrated networks and systems that rely on one another for continued service and reliability. Disruption of these assets due to coastal flooding can result in significant local and regional impacts, and cascading consequences.

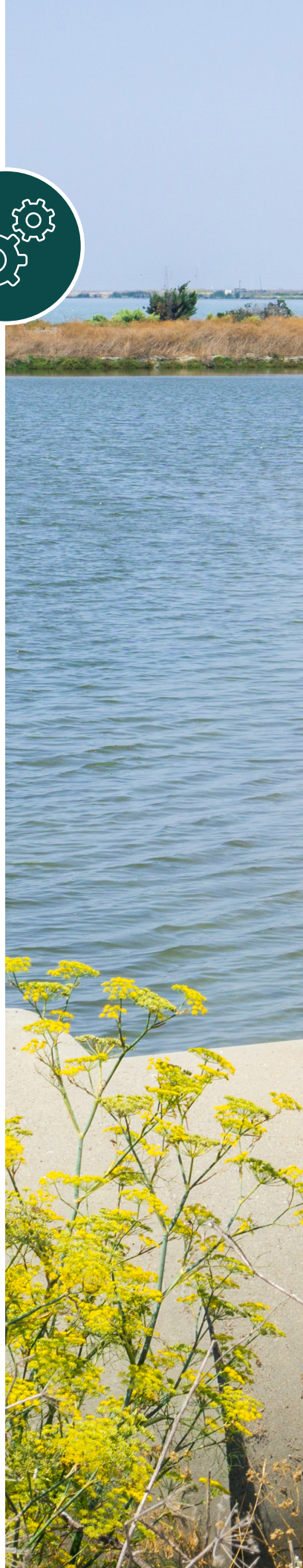
ONE BAY VISION

As sea levels rise...

Critical services are reliable.

To achieve this:

- Adapt existing local and regional critical infrastructure systems to **maintain or improve service continuity** for everyone, while minimizing vulnerabilities of new infrastructure networks to future flooding hazards and utilizing nature-based approaches where possible.
- Integrate flooding hazards into **emergency management services** planning and operations.
- Prioritize adaptations that address service **deficiencies in underserved communities**.



Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Utilities Infrastructure

- Power plants
- Substations
- Natural gas stations
- Publicly-owned wastewater treatment works and wet weather facilities
- Wastewater lifting stations
- Water supply
- Communications infrastructure
- Oil refineries

Stormwater and Flood Management Infrastructure

- Flood management infrastructure (e.g., levees, pumping stations, drains, culverts)
- Stormwater systems
- Sewer systems

Emergency Management

- Emergency operations centers
- Fire stations
- Police stations

Public Trust Lands

- Marinas, harbors, and other water-dependent infrastructure

Recommended to assess:

- Evacuation shelters
- Resilience hubs
- Electrical transmission lines
- Natural gas pipelines

Note: Transportation assets are included in the Transportation and Transit topic area.

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

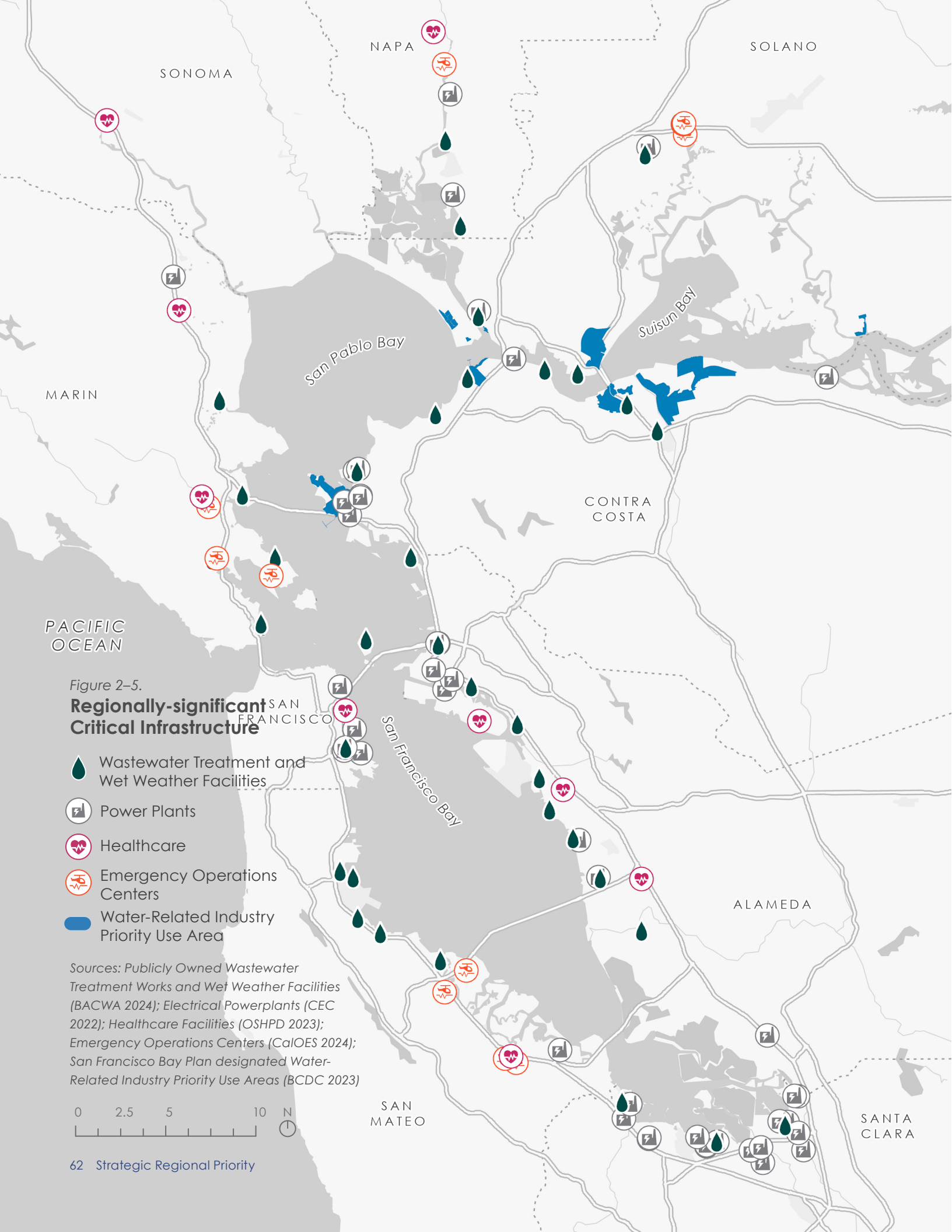


Figure 2–5.

Regionally-significant Critical Infrastructure

Sources: Publicly Owned Wastewater Treatment Works and Wet Weather Facilities (BACWA 2024); Electrical Powerplants (CEC 2022); Healthcare Facilities (OSHPD 2023); Emergency Operations Centers (CalOES 2024); San Francisco Bay Plan designated Water-Related Industry Priority Use Areas (BCDC 2023)

STRATEGIC REGIONAL PRIORITY

Reliable Critical and Emergency Services

Certain types of critical infrastructure and emergency services serve populations beyond a single jurisdiction. In an emergency event such as an earthquake, major flood, or wildfire, critical infrastructure provides services that are vital to the region's emergency response and public safety. Many regionally-significant assets are in flood-prone areas, putting their services at risk. Critical infrastructure includes or relies on other interconnected systems, including pipes, transmission lines, and more.

Impacts to these services, such as during a major flood event that disrupts power or emergency services, can further exacerbate challenges. Disruption to the services provided by regionally-significant infrastructure can have immediate impacts on the ability to provide basic services and can have cascading impacts on other services within the region and in other regions.

Figure 2-5 Critical Infrastructure map (page 63) shows publicly-owned wastewater treatment works and wet weather facilities, healthcare facilities providing emergency services, emergency operations centers, and San Francisco Bay Plan designated Water-related Industry Priority Use Areas exposed to the 6.6 ft (2100 High) sea level rise scenario. The San Francisco Bay Plan-designated Water-related Industry Priority Use Areas include waterfront land uses by industries that require access to deep water shipping.

Reminder: There are many critical infrastructure assets that are important across the region. The Strategic Regional Priority identifies specific assets as regionally-significant. Additional critical infrastructure and services including water supply and treatment facilities, as well as others as listed in the minimum assets, are required to be evaluated for exposure to coastal flood hazards. These assets can be identified as a local priority to be addressed in adaptation in Subregional Plans.

ADAPTATION STRATEGY STANDARD— MAINTAIN RELIABLE SERVICES PROVIDED BY CRITICAL INFRASTRUCTURE AND EMERGENCY FACILITIES.

In areas along the Bay shoreline containing regionally-significant and locally identified critical infrastructure, ensure the continued function of the services they provide. Continued function may be dependent upon preserving the asset or other systems the asset relies on, such as energy, water, transportation, etc., but could also consider a range of adaptation approaches to reduce flood risk, such as protection, avoidance, accommodation, relocation, and preparation. These approaches can change over time through adaptation pathways. For assets not owned or operated by a local government, describe what coordination efforts with appropriate agencies are occurring to maintain these services.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— Emergency Operations Centers, Publicly-owned wastewater treatment works, and Healthcare Facilities, as identified by the most up-to-date California state databases; and BCDC's Water-Related Industry Priority Use Area.

2.3.5 Public Access and Recreation

Public Access and Recreation includes access to the Bay that allows the public to discover, experience, and appreciate the Bay's natural resources. Public access can provide for recreational activities, educational and interpretive opportunities, subsistence fishing, and alternative modes of transportation, and can foster public support for Bay resource protection, including habitat acquisition and restoration. The Bay and its shoreline can also be a refuge from heat and noise and offer relief from crowded and often stressful urban areas. Coastal flooding has the potential to disrupt access to the shoreline and limit the wide range of uses provided, while adaptation can create opportunities to increase and enhance public access and recreation.

ONE BAY VISION

As sea levels rise...

The Bay shoreline is accessible to all.

To achieve this:

- **Expand and improve diverse public access**, such as recreation opportunities and water-dependent or culturally significant waterfront uses, through adaptation.
- Prioritize **connecting disadvantaged neighborhoods to a healthy Bay**, creating equitable access for diverse communities.
- **Balance the need** for human enjoyment, sustenance, and cultural connection to the Bay with healthy ecosystems.

Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Trail Networks

- The San Francisco Bay Trail
- Regional Active Transportation Network

Parks and Open Space

- Parks and open space areas
- Public trust lands

Water-oriented recreation

- Water-oriented recreation facilities
- San Francisco Bay Area Water Trail

Recommended to assess:

- Local trails, bicycle, and pedestrian routes*

*Assets listed in more than one topic area due to overlap.

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

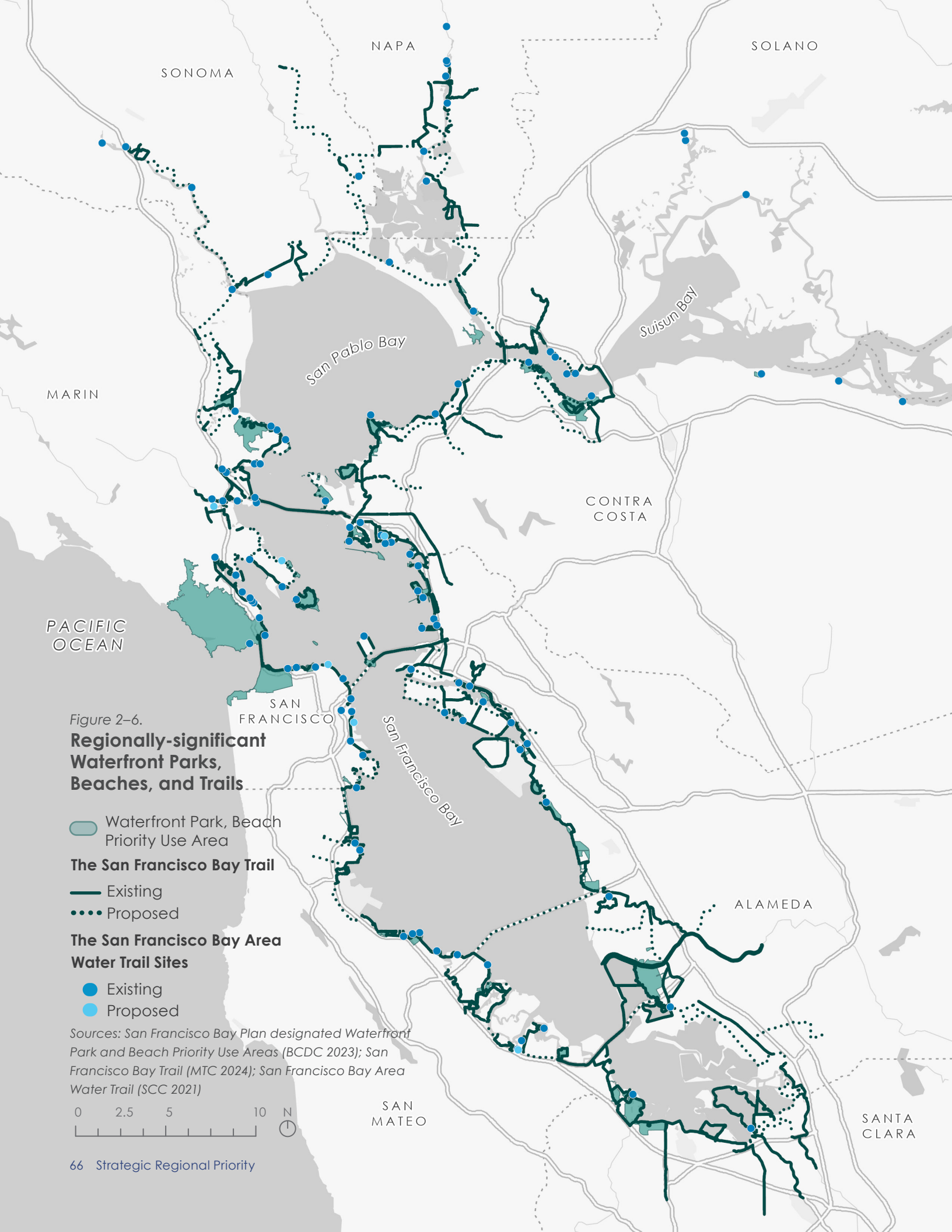


Figure 2–6.

Regionally-significant Waterfront Parks, Beaches, and Trails

Waterfront Park, Beach Priority Use Area

The San Francisco Bay Trail

Existing

Proposed

The San Francisco Bay Area Water Trail Sites

Existing

Proposed

Sources: San Francisco Bay Plan designated Waterfront Park and Beach Priority Use Areas (BCDC 2023); San Francisco Bay Trail (MTC 2024); San Francisco Bay Area Water Trail (SCC 2021)

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STRATEGIC REGIONAL PRIORITY

Connected Regional Shoreline Access

Areas along the Bay shoreline, including waterfront parks, beaches, public access sites, the Bay Trail and Water Trail provide numerous invaluable benefits to Bay Area residents but are particularly vulnerable to sea level rise and coastal flood hazards. BCDC has a core mandate to ensure public access to and along the Bay shoreline and works closely with the MTC/ABAG Bay Trail Program. The San Francisco Bay Trail is a series of connected walking and cycling paths that provide space for recreation and active transportation to work, school, and other community destinations. The San Francisco Bay Area Water Trail (Water Trail) is a growing network of designated launching and landing sites, or "trailheads," around the Bay that enable non-motorized small boat users to enjoy the historic, scenic, cultural, and environmental richness of San Francisco Bay and its nearby tributary waters. Adaptation strategies along the shoreline have the potential to disconnect shoreline public access networks unless coordinated adaptation planning occurs across jurisdictions. Investing in public access can be coupled with flood risk reduction to maintain and enhance important connections to and along the Bay shoreline and ensure access to the water as sea levels rise.

ADAPTATION STRATEGY STANDARD—IMPROVE PUBLIC ACCESS AND CONNECTION TO AND ACROSS THE SHORELINE.

Along the Bay shoreline, provide maximum feasible public access that maintains, increases, and/or enhances existing access and preserves or improves the connectivity of regionally-significant waterfront parks, beaches, and trails across jurisdictional boundaries. Plan for a continuous San Francisco Bay Trail along the shoreline, including maintaining existing trail segments and completing planned segments to expand connections to other trail networks, including Water Trail sites, and public transportation. Public access should be compatible with Baylands habitat needs. In locations that currently have limited to no shoreline access, particularly in or near socially vulnerable and/or Environmental Justice communities, expanding safe and reliable connections to public access should be prioritized. Ensure that public access will be resilient or have the capacity to adapt to changing shoreline conditions. Include how coordination with neighboring jurisdictions will occur to maintain future public access connectivity as strategies are implemented and adjusted over time.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— The San Francisco Bay Trail and San Francisco Bay Area Water Trail, as identified by the most up-to-date designations from the Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG); and BCDC's Waterfront Park, Beach Priority Use Areas.

Figure 2-6 Regionally-significant Waterfront Parks, Beaches, and Trails map (page 66) shows the San Francisco Bay Plan designated Waterfront Park and Beach Priority Use Areas, existing and planned San Francisco Bay Trail, and the San Francisco Bay Area Water Trail existing and proposed sites.

2.3.6 Transportation and Transit

Transportation and Transit includes the mobility and service needs for trips serving both people and goods. Transportation and transit include a range of modes, including highways and roads, rail, airports, seaports, transit operations, and bicycle and pedestrian infrastructure. While certain modes of transportation are dependent on being near water, such as ferries and ports, other assets may have greater opportunities to be sited, planned, and designed to reduce and avoid flood risk. Coastal flooding has the potential to cause significant local and regional cascading impacts due to linear and often non-redundant transportation systems—such as limited points of entry, or transit-limited communities.

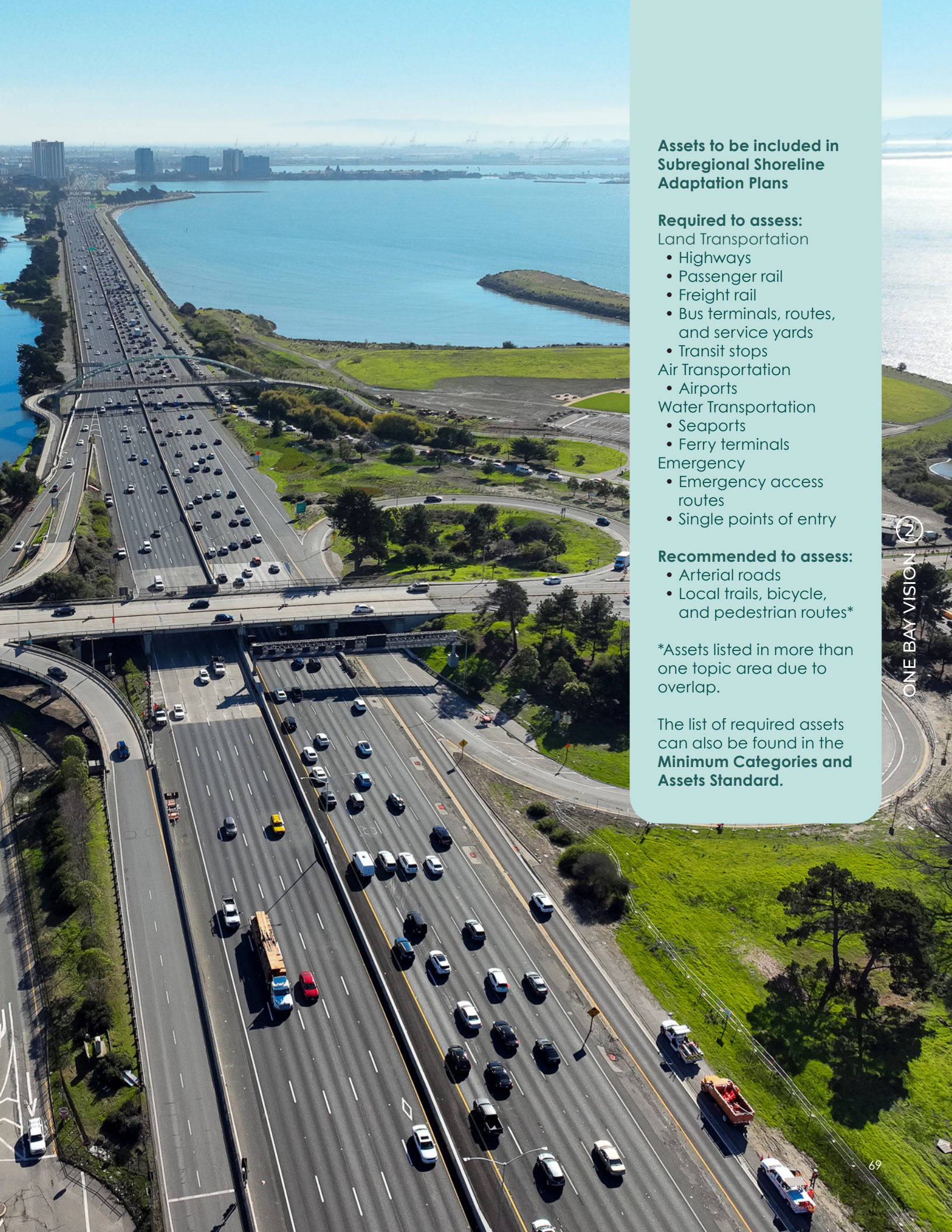
ONE BAY VISION

As sea levels rise...

Safe and reliable transportation connects the region.

To achieve this:

- Adapt local and regional transportation systems to ensure **safe and reliable connectivity** by air, land, and water.
- Ensure **continuity and equitable service** in transit-dependent communities.
- Identify and **integrate multi-benefit opportunities,** such as improving ecological health, utilizing green infrastructure, and expanding public access, with transportation projects.
- Promote active, **low emissions mobility** options for environmental and economic benefit.



Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Land Transportation
- Highways
- Passenger rail
- Freight rail
- Bus terminals, routes, and service yards
- Transit stops

Air Transportation
- Airports

Water Transportation
- Seaports
- Ferry terminals

Emergency
- Emergency access routes
- Single points of entry

Recommended to assess:
- Arterial roads
- Local trails, bicycle, and pedestrian routes*

*Assets listed in more than one topic area due to overlap.

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

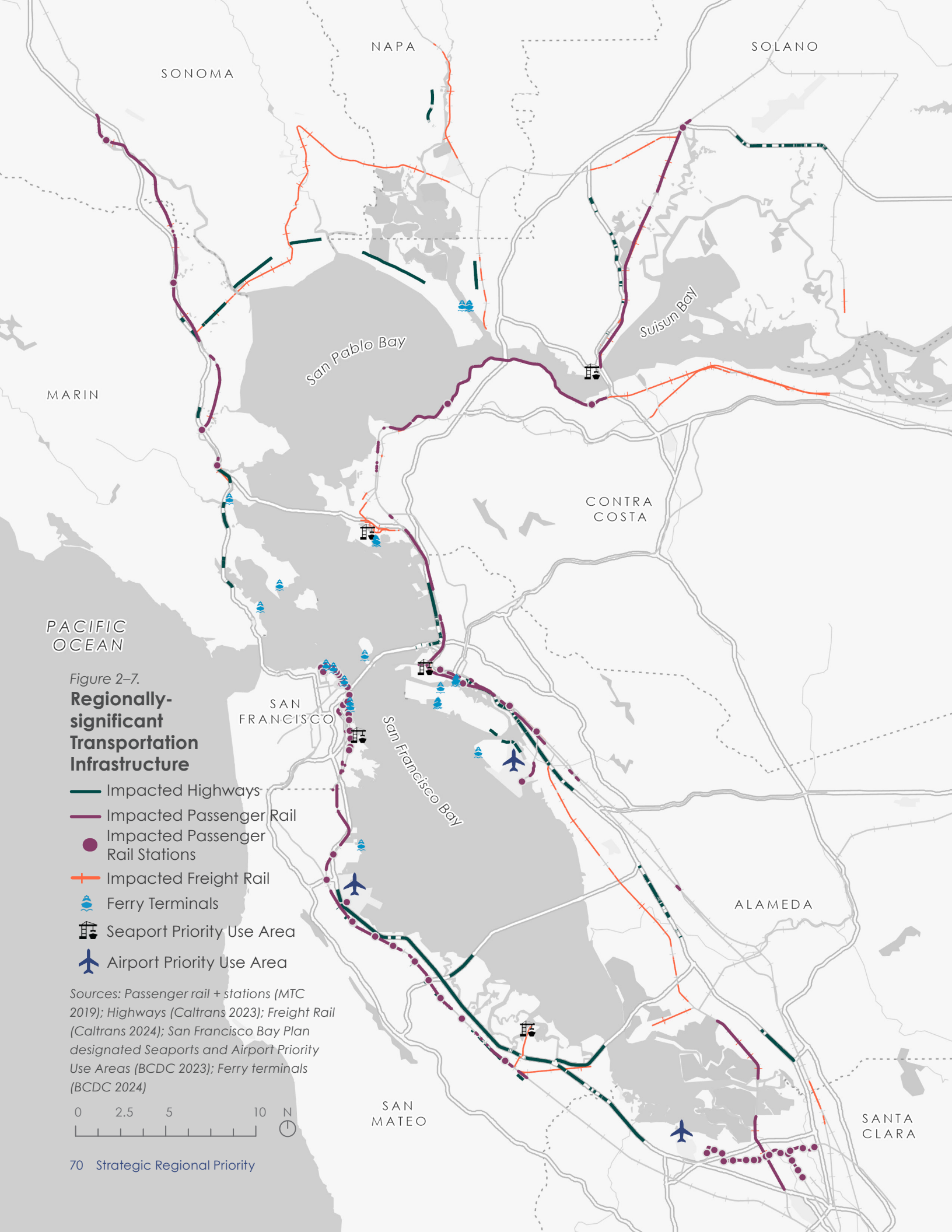


Figure 2–7.

Regionally-significant Transportation Infrastructure

Sources: Passenger rail + stations (MTC 2019); Highways (Caltrans 2023); Freight Rail (Caltrans 2024); San Francisco Bay Plan designated Seaports and Airport Priority Use Areas (BCDC 2023); Ferry terminals (BCDC 2024)

STRATEGIC REGIONAL PRIORITY

Regional Movement of People and Goods

Communities and economies across the Bay Area depend upon a functioning regional transportation network, and coastal flooding impacts have the potential to cause significant disruptions and delays even in areas far from the source of flooding. A complex multimodal transportation network links people, goods, and services within Bay Area and beyond. This movement of people and goods is essential to sustain the region's economic growth. However, many transportation assets that are critical to a functioning network are located in shoreline areas that are vulnerable to flooding. In many cases, these assets lack redundancy and are linear, meaning that if one section of the asset is flooded the entire asset is compromised. The loss of function of an asset or segment of the system would cause significant regional impacts to commuters, access to recreation and services, and movement of goods.

Figure 2-7 Regionally-significant Transportation Infrastructure map (page 70) shows highways, passenger rail and stations, freight rail, ferry terminals, and the San Francisco Bay Plan designated Seaport and Airport Priority Use Areas exposed to the 6.6 ft (2100 High) sea level rise scenario.

ADAPTATION STRATEGY STANDARD— MAINTAIN REGIONAL NETWORKS THAT FACILITATE THE RELIABLE MOVEMENT OF PEOPLE AND GOODS.

In areas along the Bay shoreline that contain regionally-significant transportation infrastructure, ensure the continued function of the services they provide. Continued functioning could be achieved through a range of adaptation approaches to reduce flood risk, such as protection, avoidance, accommodation, relocation, and preparation, and these approaches can change over time through adaptation pathways. For assets not owned or operated by a local government, describe what coordination efforts are occurring with appropriate agencies to maintain these services, such as the California Department of Transportation (Caltrans), Bay Area Rapid Transit (BART), ports, airports, Water Emergency Transportation Authority (WETA) and other agencies.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— Passenger rail station and lines and highways, as identified by the most up-to-date designations by the Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG); freight rail as identified by Caltrans; and BCDC's Seaport and Airport Priority Use Areas, and ferry terminals as identified by BCDC.

2.3.7 Shoreline Contamination

Shoreline Contamination includes sites or land uses that utilize or store hazardous materials and contain substances known to have impacts from hazardous waste that may pose a potential future risk to people, the environment, and water quality. As sea levels rise, coastal flooding and coastal and inland groundwater rise, as well as earthquake, liquefaction, erosion, and landslide hazards may increase the potential for known site contaminants to be released to surface waters, groundwater, air, soil, sediment, human developments, and habitats. Different site conditions and types of contaminants or hazardous materials present will affect the risks, severity, and consequences of flood exposure to people and the environment. Sites that have previously undergone remediation or mitigative measures (such as capped sites) may need to be re-evaluated to determine if they can continue to provide protection against contamination mobilization as sea levels rise.

ONE BAY VISION

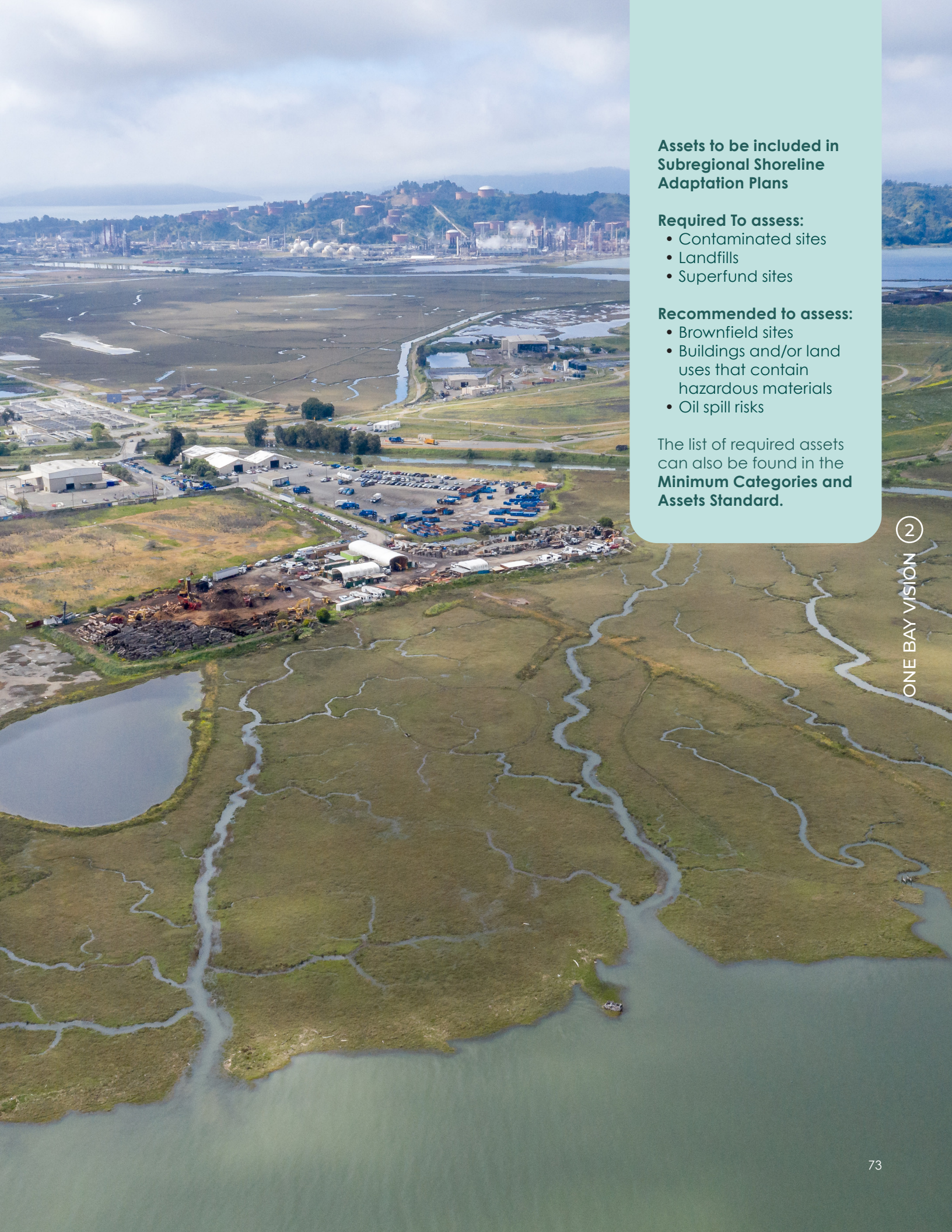
As sea levels rise...

People and ecosystems are safe from contamination.

To achieve this:

- Collaborate with communities, Tribes, scientists, industries, and government agencies to **identify, mitigate, adapt, and remediate contaminated shoreline sites**.
- **Prioritize remediation of contaminated sites in Environmental Justice communities**, while minimizing transferring contamination burden.
- **Integrate emerging science on shallow groundwater rise,** including Indigenous Traditional Ecological Knowledge (ITEK), into planning and adaptation decisions and identify innovative solutions.

Right: San Pablo Bay shoreline in North Richmond. Photo by Tom Fitzgerald.



Assets to be included in Subregional Shoreline Adaptation Plans

Required To assess:
- Contaminated sites
- Landfills
- Superfund sites

Recommended to assess:
- Brownfield sites
- Buildings and/or land uses that contain hazardous materials
- Oil spill risks

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

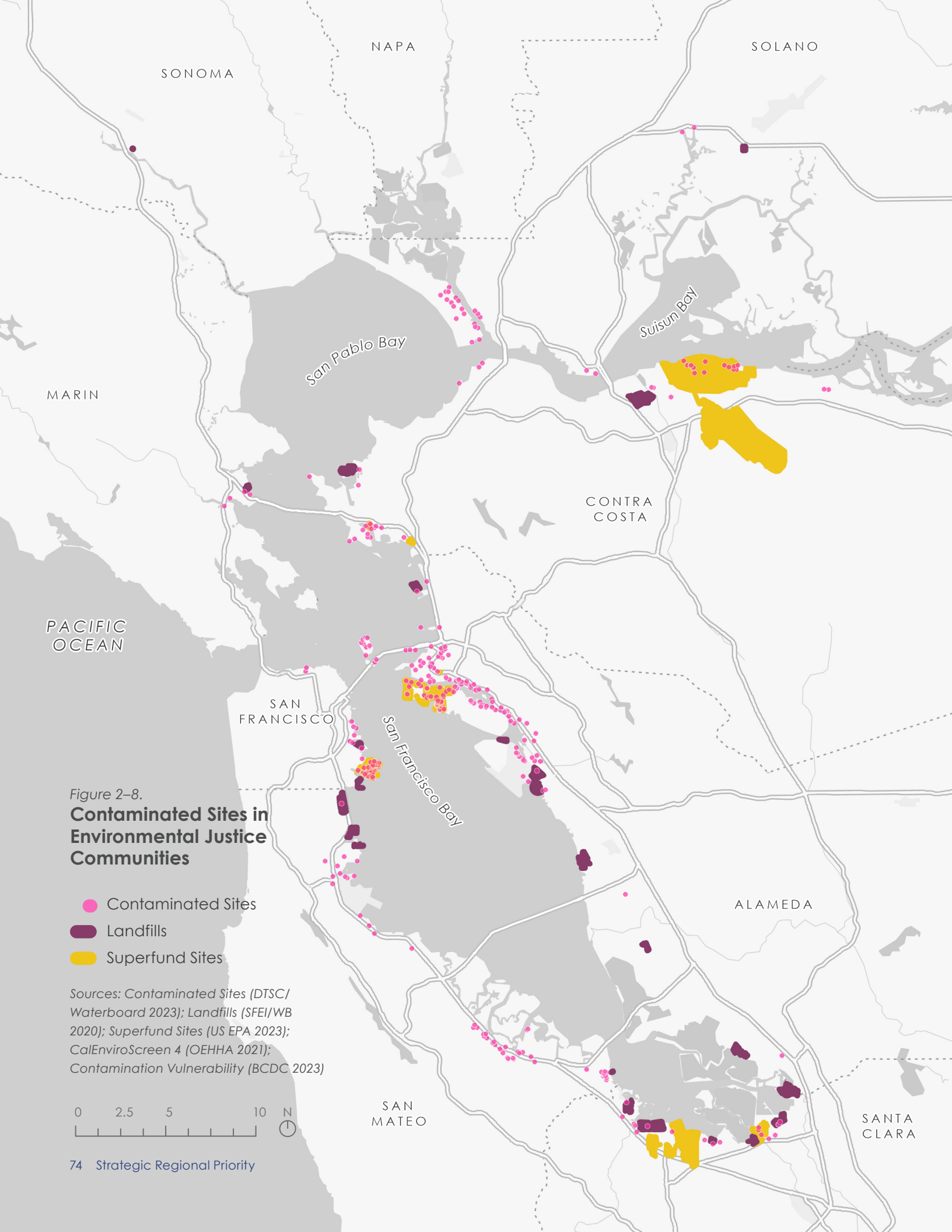


Figure 2–8.

Contaminated Sites in Environmental Justice Communities

Sources: Contaminated Sites (DTSC/ Waterboard 2023); Landfills (SFEI/WB 2020); Superfund Sites (US EPA 2023); CalEnviroScreen 4 (OEHHA 2021); Contamination Vulnerability (BCDC 2023)

STRATEGIC REGIONAL PRIORITY

Clean Communities to Improve Environmental Justice

Environmental Justice communities have already experienced disproportionate harms from contamination and these impacts are only expected to worsen with sea level rise and the related impacts of shallow groundwater rise unless this issue is prioritized in these communities. Many socioeconomically vulnerable communities live adjacent to or even on contaminated sites. These sites are often located on or near former shoreline industrial sites that have a legacy of contamination, and many are vulnerable to current and future flooding. In many cases, contaminated sites have been closed and remediated. Yet many also remain open, are currently undergoing cleanup and monitoring, have residual contamination or remedies that contained or encapsulated hazardous substances onsite, or their status is unknown. There is significant uncertainty about how flooding and rising groundwater will exacerbate contamination and increase public health and Bay water quality concerns if contaminants are mobilized, or how dry land cleanup standards will perform if lands become submerged.

Figure 2-8 Contamination Sites in Environmental Justice Communities map (page 74) shows contaminated sites, landfills, and superfund sites exposed to the 0.8 ft (2050) sea level rise scenario that are located in census tracts with a CalEnviroScreen score percentile above 75 or pollution burden score percentile above 95, or identified as contamination vulnerable in BCDC's Community Vulnerability Mapping. This map does not include the coastal flood hazard for shallow groundwater rise deeper than 6 ft, with open-active status (contaminated sites only).

Reminder: Contaminated sites outside Environmental Justice communities are required to be evaluated for exposure to coastal flood hazards and may be identified as a local priority to be addressed in adaptation in Subregional Plans. An additional Adaptation Strategy Standard to "Reduce contamination risks across communities and ecosystems" can be found in Section 3.3.4.

ADAPTATION STRATEGY STANDARD— PRIORITIZE CONTAMINATION REMEDIATION IN ENVIRONMENTAL JUSTICE COMMUNITIES.

In areas along the Bay shoreline containing contaminated sites in Environmental Justice communities, disclose information about contaminated site status, hazard types and risk, and advance remediation to reduce the risks of toxic materials mobilization and vaporization in communities due to flooding, including rising groundwater. Remediation efforts should be conducted transparently and in coordination with impacted communities. Evaluate how planned adaptation will prevent the mobilization of contaminants, not worsen contamination risks, and demonstrate how coordination with a lead regulatory agency is being conducted for prevention purposes (where appropriate). Many different agencies or individuals may be involved in remediation efforts of specific sites, which may include the U.S. EPA Region IX, the California Environmental Protection Agency's (Cal EPA's) State Water Resources Control Board and/or Regional Boards, Cal EPA's Department of Toxic Substances Control, and/or a county's department of environmental health, or the Local Oversight Program (LOP).

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— Contamination in communities identified by the most up-to-date CalEnviroScreen and BCDC's Contamination Vulnerability, including Contaminated sites, as identified by the California Water Quality Control Board (WB) and California Department of Toxic Substances Control (DTSC); Landfills, as identified by SFEI and WB; Superfund sites as identified by US EPA.

2.3.8 Collaborative Governance, Flood Management, and Funding

Collaborative Governance, Flood Management, and Funding includes the structures and processes for decision-making and the roles that individuals, communities, and organizations in the public, private, and nonprofit sectors play in setting priorities and selecting and implementing adaptation actions that provide the most beneficial outcomes. Effectively managing the complex and long-term challenge of sea level rise risks will require formal and informal collaboration, equitable allocation of funding, and improvements to regulatory processes. This includes building relationships with Indigenous communities and Tribal governments to contribute to adaptation decision-making processes.

ONE BAY VISION

As sea levels rise...

Collaboration drives efficient and effective adaptation.

To achieve this:

- Ensure local and regional governments **collaborate among themselves and with others to address shared flooding risk, identify multi-benefit adaptation opportunities,** including nature-based solutions, and avoid adverse flooding impacts to other jurisdictions.
- Identify and **engage in early, often, and meaningful government-to-government Tribal consultation with Indigenous partners** when planning, implementing, and managing shoreline adaptation projects.
- **Promote formal and informal collaborations** equipped to effectively plan, fund, implement, maintain, and adaptively manage adaptation strategies over time.
- **Improve funding and regulatory processes** to expedite innovative and transformative adaptation projects with regional benefits.

Assets to be included in Subregional Shoreline Adaptation Plans

Required To assess:

- Jurisdiction boundary
- Operational Landscape Unit (OLU)[1] boundary
- Community-based organization partners
- Tribal governments
- Special districts

The list of required assets can also be found in the **Minimum Categories and Assets Standard.**

1 Operational Landscape Units (OLUs) represent a planning unit developed by the San Francisco Estuary Institute (SFEI) and SPUR that support the identification of suitable nature-based adaptation approaches along a shoreline. More information can be found in the San Francisco Bay Shoreline Adaptation Atlas.

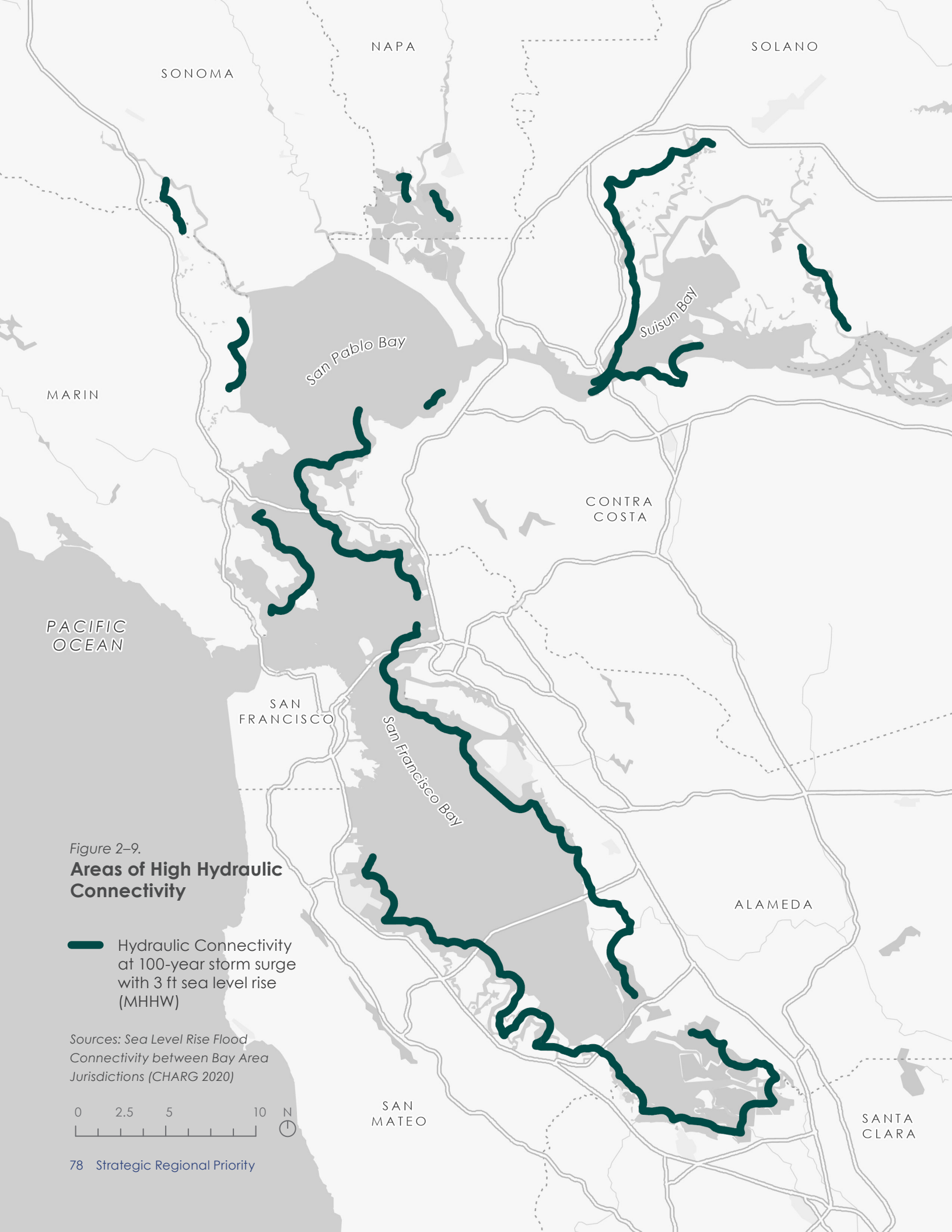


Figure 2–9.
Areas of High Hydraulic Connectivity

Sources: Sea Level Rise Flood Connectivity between Bay Area Jurisdictions (CHARG 2020)

STRATEGIC REGIONAL PRIORITY

Cross-Jurisdictional Flood Risk Reduction

Along hydraulically connected areas of the Bay shoreline, flood risk reduction strategies in one jurisdiction may not provide necessary flood protection if adjacent shoreline jurisdictions have not integrated their adaptation strategies or hydraulically disconnected the shorelines. Different parts of the Bay shoreline face varying risks and have differing levels of resources to respond. But flooding does not respect jurisdictional boundaries. In areas that are hydraulically connected along a shoreline, adaptation decisions can potentially create negative and worsening flood impacts for jurisdictions on adjacent shorelines as well as in other parts of the Bay. Understanding and coordinating adaptation with neighboring jurisdictions is increasingly essential. As parts of the shoreline become an interconnected basin, flood water in one jurisdiction will quickly spread across the basin. Successful adaptation will demand coordination across interconnected jurisdictions.

Figure 2-9 Areas of High Hydraulic Connectivity map (page 78) shows bands on the shoreline that will be hydraulically connected under a 100 year storm + 3 ft sea level rise (MHHW) scenario. This was chosen to be consistent with the CA State SLR Guidance (2024) 2100 Intermediate sea level rise scenario.

ADAPTATION STRATEGY STANDARD— DEVELOP AND MAINTAIN CROSS-JURISDICTIONAL FLOOD RISK REDUCTION.

In areas along the Bay shoreline containing high hydraulic connectivity across jurisdictional boundaries, include measures to develop adaptation strategies that result in cross-jurisdictional flood risk reduction, and plan for ongoing coordination and governance to maintain reduced flood risk. This may include enhancing shared by understanding evaluating the hydrological impacts of major shoreline changes, coordinating to hydraulically disconnect portions of the shoreline that are currently connected to prevent flooding from spreading, creating redundant flood protection to reduce the likelihood of flooding originating from neighboring jurisdictions, and/or creating flood risk reduction strategies that cross jurisdictional boundaries.

DATA SOURCE(S) TO USE FOR THIS STRATEGIC REGIONAL PRIORITY— Hydraulically connected shorelines, as identified by the San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group (CHARG).

Section 3

Subregional Shoreline Adaptation Plan Guidelines

The Subregional Shoreline Adaptation Plan Guidelines (Guidelines) include all the required components for the preparation of a Subregional Shoreline Adaptation Plan (Subregional Plan) as mandated by SB 272.[1] This section includes a description of a Subregional Shoreline Adaptation Plan, Subregional Plan Elements, Minimum Standards, Complete Plan Checklist, and Plan Development, Submission, and Approval Process. This section includes requirements to incorporate the One Bay Vision and Strategic Regional Priorities into Subregional Plans.

1 California Public Resources Code, § 30985.2.

3.1 Subregional Shoreline Adaptation Plans

3.1.1 What is a Subregional Shoreline Adaptation Plan?

Subregional Shoreline Adaptation Plans (Subregional Plans) are locally created sea level rise adaptation plans along San Francisco Bay shoreline that are coordinated across jurisdictions and around the region.

As required by SB 272, Subregional Plans are based on best available science, contain a vulnerability assessment that include efforts to ensure equity for at-risk communities, include sea level rise adaptation strategies and recommended projects, identify lead planning and implementation agencies, and include a timeline for updates, among other requirements. The Guidelines contained within this chapter provide details for how cities and counties can meet the requirements of SB 272 and achieve cohesive, equitable and forward-thinking local and regional outcomes.

Subregional Plans can be developed at various scales, at the discretion of the local government. A Subregional Plan may be at the scale of a single city or town, a county, multiple jurisdictions, or any combination thereof. BCDC strongly encourages collaborative shoreline planning among local governments and in coordination with stakeholders, special districts, public and private landowners, and asset managers. While only local governments are required to develop Subregional Plans, collaboration and partnership with broader stakeholders will be essential in creating of comprehensive adaptation planning.

Who is Required to Develop a Plan?
Any local government within BCDC's jurisdiction must develop a Subregional Plan as required by California state law SB 272. "Local government" is defined as "any chartered or general law city, chartered or general law county, or any city and county."[2]

2 California Public Resources Code, § 30109.

Table Table 3–1 lists local governments that are required by SB 272 to develop Subregional Plans. Local governments labeled with an asterisk will also be directly affected by sea level rise and other coastal hazards but are not within BCDC's jurisdiction. These cities are therefore not required to develop a Subregional Plan but may choose to. Information about BCDC's jurisdiction can be found on BCDC's website and in the McAteer-Petris Act, codified at Government Code Section 66610.

Local governments not within BCDC's jurisdiction may contain assets subject to sea level rise inundation, experience or are projected to experience stormwater or riverine flooding due to the combined risk of a higher bay and extreme precipitation events, or may be identified as key implementers or partners in a multi-jurisdictional adaptation project. Additionally, in many cases, special districts or other land managers may have primary management or planning responsibilities for the shoreline but are not subject to SB 272.

Counties with BCDC Jurisdiction	Cities with BCDC Jurisdiction or impacted by short-term coastal hazards	
Alameda	Alameda Albany Berkeley Emeryville Fremont	Hayward Newark Oakland San Leandro Union City
Contra Costa	Concord* El Cerrito* Hercules Martinez	Pinole Pittsburg* Pleasant Hill* Richmond
Marin	Belvedere Corte Madera Larkspur Mill Valley Novato	Ross* San Rafael Sausalito Tiburon
Napa	American Canyon	Napa*
San Francisco	San Francisco	
San Mateo	Belmont Brisbane Burlingame East Palo Alto Foster City Menlo Park	Millbrae Redwood City San Bruno* San Carlos San Mateo South San Francisco
Santa Clara	Milpitas* Mountain View Palo Alto	San Jose Santa Clara* Sunnyvale
Solano	Benicia Fairfield*	Suisun City Vallejo
Sonoma	Petaluma	

Table 3–1. Local governments within BCDC jurisdiction and others impacted by short-term coastal hazards (as indicated by an asterisk).
**Jurisdictions not in BCDC jurisdiction but impacted by short-term coastal flood hazards and therefore likely planning partners.*

In these cases, these entities are encouraged to engage in local planning processes where logical connections exist, such as shared ownership, management, or decision-making of a certain area.

However, it should be noted that all jurisdictions within the Bay Area's nine counties will be affected by sea level rise and other coastal hazards either directly due to flooding or indirectly due to impacts from flooding on networked assets such as transportation, economic systems, critical infrastructure, or other impacts.

Role of Counties

Counties that lie, in whole or part, within BCDC's jurisdiction may either prepare a plan that covers only the jurisdiction of the county (i.e., unincorporated parts of the county or portions of the county not under the jurisdiction of a city) or participate in a multi-jurisdictional plan with their cities. In either case, counties are encouraged to coordinate the planning process for all cities within the county subject to SB 272 to ensure collaboration among all plans within the county. Required roles for the county include:

- Developing a Subregional Plan that covers the jurisdiction of the county.
- Adoption of the Subregional Plan by the County Board of Supervisors prior to submittal of the plan.

Suggested coordinating roles for the county include:

- Leading a countywide, multi-jurisdictional plan that serves all or most of the jurisdictions within the county.
- Helping to identify and set up multi-jurisdictional plans to ensure that beneficial partnerships based on shared resources or priorities can be supported and established within the county.
- Providing forums for coordination and identifying synergies throughout the county.
- Facilitating coordination with large landowners or asset owners, business owners and industry representatives, special districts, or other entities that should be engaging with multiple plans within the county.
- Identifying large, multi-jurisdictional projects that may fall outside the jurisdiction of a single or multi-jurisdictional plan.
- Elevating county-wide or region-wide priorities for prioritizing projects, protection of assets, or other criteria.
- Identifying support roles for the county in the implementation of projects or policies outlined in plans.

Managed ponds in the south Bay. Photo by SF Baykeeper photographer Robb Most and LightHawk.

Role of Cities

Cities or towns that lie, in whole or part, within BCDC's jurisdiction may either prepare a plan that covers only their jurisdiction or participate in a multi-jurisdictional plan. In either case, cities must comply with plan requirements around coordination with their county as well as other cities. Required roles for cities include:

- Developing a Subregional Plan that covers the jurisdiction of the city or town.
- Adoption of the Subregional Plan by the local council prior to submittal of the plan.

Multi-jurisdictional Plans

Local governments are encouraged to partner among cities and counties to develop multi-jurisdictional plans. Multi-jurisdictional plan teams should designate a lead to coordinate participating jurisdictions, ensure the completeness of the plan, manage the submittal and approval process, and act as the point of contact for coordination with BCDC. Counties are encouraged to take on this role. Multi-jurisdictional plans may wish to establish a formal agreement (Memorandum of Understanding (MOU), Joint Powers Authority (JPA), etc.) to codify decision-making protocols and generate buy-in from all parties involved. Please note that entities such as special districts, regional or state agencies, flood control agencies, parks districts, etc. that are not required to comply with SB 272 may play a critical role as owners or managers of land and assets within a jurisdiction and are encouraged to participate in a multi-jurisdictional plan. Requirements for multi-jurisdictional plans include:

- All participating local governments must coordinate to develop a single, multi-jurisdictional plan (Subregional Plan) that meets all Guidelines and standards for all participating jurisdictions in the planning area.
- Designation of a plan lead.
- Adoption of the plan by each participating local government's board, council, or other governing body with the authority to adopt resolutions.

DECISIONS AND RESPONSIBILITIES OUTSIDE A LOCAL JURISDICTION'S CONTROL

Many aspects of planning and implementing sea level rise adaptation are outside the control or authority of a local government. While comprehensive shoreline adaptation planning ideally involves all affected parties, such cooperation may not be realistic or achievable in the planning timeframe of a Subregional Plan. BCDC expects jurisdictions to make their best efforts to involve all affected parties. However, in the case of absent or non-cooperative parties, privately held data, or other limitations, local governments should indicate these barriers, their attempts to remedy them, and what may be needed to overcome them in the future.

In addition to ensuring a coordinated approach across multiple local governments, multi-jurisdictional plans may benefit by:

- Leveraging or pooling individual jurisdiction's capacities.
- Efficiently collaborating with a special district, federal or state resource management agency, or any other party with assets within or adjacent to multiple jurisdictions.
- Planning at a landscape scale or a scale larger than a single jurisdiction, such as:
  - An existing JPA or special district.
  - An Operational Landscape Unit (OLU) that encompasses multiple jurisdictions.[3]
  - A logical shoreline section or landscape-scale feature (such as a watershed) or infrastructure or utility system or network that encompasses multiple jurisdictions.

3 SFEI and SPUR. 2019. San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units. Publication #915, San Francisco Estuary Institute, Richmond, CA.

3.1.2 Flexibility in Meeting Plan Requirements

The state of adaptation planning around the Bay is as varied as its shoreline. Some cities and counties have already completed vulnerability assessments or adaptation plans, while others need support to just get started. Therefore, the Guidelines for local governments are designed to meet cities and counties where they are, with the goal of being:

- **Flexible** – providing multiple paths to compliance, based on work that has already been done.
- **Aligned** – fulfilling multiple plan requirements and coordinating planning processes when possible.
- **Right-Sized** – targeting key outcomes that lead to change without being overly burdensome.
- **Building on Existing Efforts** – leveraging and expanding on existing work when possible.
- **Impactful** – providing the right level of information to catalyze implementation of policies and projects for sea level rise adaptation.

Using Existing Content

Many jurisdictions already have created much of the content required to be submitted for compliance with these Subregional Plan Guidelines either through existing adaptation plans, local hazard mitigation plans, general plan elements, climate action plans, or other local plans or studies. BCDC encourages the use of existing material when feasible. If jurisdictions submit existing materials to meet the requirements of the RSAP, they must ensure prior to final submittal that all material that is submitted is compliant with the Guidelines. BCDC staff can provide early consultations to assist with evaluating existing materials and developing a manageable path to compliance.

Incorporating existing materials by copying and citing the original source is the preferred approach of utilizing existing content. This helps ensure that the Plan reads cohesively. However, if large

BALANCING PLAN REQUIREMENTS AND DIFFERING MANDATES

Local governments already operate in the context of land use plans and policies that meet standards and requirements that may differ from the Guidelines set forth in the RSAP, which could include state and federal laws pertaining to general plans, housing elements, local hazard mitigation plans, seaport plans, and more. The intent of the RSAP Guidelines is not to dictate or otherwise establish regulatory oversight or approval of local land use or policy decisions that supersede decisions made in alignment with other planning requirements nor to compel local governments to make any particular land use or policy decisions. However, the Guidelines do intend to facilitate a local government's ability to achieve the purposes of SB 272, which declares that the Bay Area would be significantly affected by sea level rise without efforts and investments to adapt. To achieve these purposes, local governments will need to consider actions that effectively implement adaptation strategies as identified in Subregional Plans, which may include the need to make land use and policy changes at the local level and that require amending or updating existing plans and policies.

Requiring local governments to locally adopt Subregional Plans and submit them to BCDC for approval under SB 272 ensures that the development of the plans has gone through the appropriate local public process and reflects the final decision-making of the local government body. BCDC staff is committed to working with local governments to identify a path to plan approval that balances competing priorities while meeting the state-identified purposes of SB 272.

portions of existing documents are applicable to the Subregional Plan (i.e., descriptions of adaptation pathways, complete vulnerability assessments, etc.), these sections may be summarized in the document and incorporated by reference.

Additionally, local governments may consider combining required plans to develop a single plan that addresses multiple requirements. For example, upon the next update of a local hazard mitigation plan or general plan, consider incorporating the required elements for Subregional Plans into these planning efforts. Combining plans may also allow for a more comprehensive approach to planning for multiple hazards at once and/or considering the impacts of adaptation on other topics addressed in general plans, such as housing, transportation, or environmental justice.

Flexibility in Achieving Outcomes

The RSAP Guidelines provide a comprehensive approach to sea level rise adaptation planning, including best practices for conducting equitable planning processes. However, certain jurisdictions may wish to shape their own planning process based on local preferences and context. The Guidelines therefore describe both a step-by-step guide as well as alternative paths to compliance to achieve the desired outcomes for each of the required Plan Elements. Local governments that have never done any adaptation planning are highly recommended to follow the process laid out in the Plan requirements. If an alternative methodology or process is desired, consult with BCDC staff to come up with a satisfactory approach to meeting the Plan requirements.

Best Available Data and Alternative Data Sources

BCDC provides access to regional data on existing conditions, hazards, Strategic Regional Priorities, exposure, and adaptation to help local governments develop Subregional Plans using consistent data. The data made available by BCDC is considered the "best available data" for the purpose of complying with these Guidelines and Minimum Standards and will be updated as new data and science is made available.

However, in some cases local jurisdictions may have more locally refined or up-to-date data on coastal hazards, assets, or other data that should be used when developing Subregional Plans. The Guidelines encourage that more locally refined data be considered and used in place of BCDC's regional data when available and appropriate. Any local data used in place of data provided by BCDC will be evaluated against the best available data criteria.

For the purposes of the RSAP, the "best available data" reflects criteria adapted from the Delta Stewardship Council's Delta Plan,[4] including:

- **Relevance**: Scientific information used should be relevant to the Guidelines, One Bay Vision and Bay biological, social, or physical components (and/or process) affected by the proposed plans.
- **Inclusiveness**: Scientific information used must incorporate a thorough review of relevant information and analyses across relevant disciplines including traditional knowledge. Many analysis tools are available to the scientific community (e.g., search engines and citation indices).
- **Objectivity**: Data collection and analyses considered must use rigorous and documented methods and minimize bias.

4 Delta Stewardship Council (DSC). (2015). Delta Plan Appendix 1A Best Available Science. https://deltacouncil.ca.gov/pdf/delta-plan/2015-appendix-1a.pdf

- **Transparency**: The sources and methods used for creating or analyzing the science (including scientific and engineering models) used must be clearly identified.
- **Accessibility**: Data should be freely and publicly accessible, unless safety and security issues are identified.
- **Timeliness**: Data is recently created (<5 years) or updated regularly in a manner sufficient for adequate analyses before adaptation decisions are needed. Timeliness also means that results from scientific studies and monitoring may be brought forward before the study is complete to address management needs. In these instances, it is necessary that the uncertainties, limitations, and risks associated with preliminary results are clearly documented.
- **Peer Review**: The quality of the science used will be measured by the extent and quality of the review process. Independent external scientific review of the science is most important because it ensures scientific objectivity and validity.[5]
- **Regional**: Includes data for all nine Bay Area counties.[6]

Additionally, Indigenous Traditional Ecological Knowledge (ITEK) is a body of observations, oral and written knowledge, practices, and beliefs that promote environmental sustainability and the responsible stewardship of natural resources through relationships between humans and environmental systems. ITEK includes insights based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation. There is currently a lack of recognition that ITEK is one of the primary sources of scientific information. The RSAP also encourages the consideration of an additional criteria for best available data:

- **Embrace More Ways of Knowing.** Facilitate dialogue among Tribes, agencies, and other partners (e.g., NGOs, academics, consultants) to increase the interweaving of ITEK with Western science.[7]

HABITAT INFORMATION IN EXISTING PLANS

When using existing plans, it is important to carefully review and consider how information about specific Baylands habitats and species, especially along the gradient of subtidal, intertidal, and uplands, is characterized and incorporated. This information may not be available and/or adequate in existing plans and additional evaluation may be necessary to supplement this information for compliance with the Guidelines. Understanding the conditions of the Baylands habitats can provide stronger physical and ecological resilience if incorporated across multi-objective adaptation plans. Existing plans related to this issue should ensure that information is provided on habitats' current conditions and ecological functions and how ecosystem health and functions will be improved as part of the adaptation strategies.

5 Differences exist among the accepted standards of peer review for various fields of study and professional communities. BCDC recognizes that when applying the criteria for best available science the level of peer review for supporting materials and technical information (such as scientific studies, model results, and documents) is variable and relative to the scale, scope, and nature of the science or data. BCDC understands that varying levels of peer review may be commonly accepted in various fields of study and professional communities.

6 Locally refined data that meet best available data criteria may not need to cover the full nine-county Bay Area.

7 Delta Stewardship Council, Tribal and Environmental Justice Issue Paper: Public Review Draft (Sacramento, CA: Delta Stewardship Council, August 29, 2024), https://deltacouncil.ca.gov/pdf/public-reviews/2024-08-29-dsc-tribal-ej-issue-paper-public-review-draft.pdf.

Richmond wetlands. Photo by Jaclyn Perrin-Martinez.

3.2 Subregional Plan Elements

This section contains Plan requirements that local governments within BCDC's jurisdiction must meet when submitting Subregional Plans.[8]

The Plan requirements are a core component of the Subregional Plan Guidelines and organized into seven elements. This section outlines key planning steps and outcomes for developing a Subregional Plan that addresses local risks while contributing to regional goals. In order to ensure consistency in planning across Bay shoreline jurisdictions, the Plan requirements also include four Minimum Standards (Section 3.3) that are integrated into the planning effort. These are designed to be minimum requirements and local jurisdictions can include additional hazards, assets, and/or other components of planning beyond the standards.

Local governments must either submit a Subregional Plan that follows the requirements laid out in this section or consult with BCDC staff on an alternative compliance method that meets the outcomes described. For local governments that have completed adaptation plans and/or similar planning efforts that can be integrated into or built upon this effort, see Flexibility in Meeting Plan Requirements (Section 3.1.2). Additional requirements related to plan consultations, submission, and approval can be found in later sections of the document (Section 3.5). Lastly, BCDC provides regionally available datasets that should be used to meet the Guidelines, unless local data is more appropriate and meets the best available data criteria in this document (Section 3.3.2).

Planning for sea level rise adaptation is a complicated process that requires significant community and stakeholder engagement, balancing complex information ranging from technical and detailed data and science to a deep understanding of community values and risk tolerances, and making sometimes difficult decisions about the future. Each Plan Element builds upon one another, where information gathered in one element is used to inform another. Adaptation planning is likely to be a highly iterative process, and thus the development of each element may be non-linear. Figure 3–1 provides an illustrative example of how the seven Plan Elements and Minimum Standards flow together.

8 California Public Resources Code, § 30985(a)(2).

Flow of Plan Elements

Figure 3–1. Flow of the Plan Elements and integration of Minimum Standards to demonstrate how each element of adaptation planning builds upon one another to achieve adaptation outcomes.

3.2.1 Element A: Planning Process

Intended Element Outcome

A meaningful and robust planning process that engages a mix of government departments, community members, and local interested and affected parties. Identification of the planning boundaries for the Subregional Plan and local governments involved in the planning process.

This element provides documentation on how the plan was developed. This includes identifying which jurisdictions were involved and how participating jurisdictions coordinated throughout the process, the type and scale of the plan, and how the plan incorporates equity and engages a broad range of affected parties throughout the process.

Addressing the complex, interrelated, and multi-sector challenges of sea level rise and coastal flood hazards necessitates a collaborative planning effort. It should bring together multiple diverse perspectives and areas of expertise to ensure there is a deep understanding of issues and assets. This happens through broad representation on project teams and advisory groups as well as extensive community engagement throughout the planning process.

Incorporating equity into planning requires intentional and explicit efforts to bring members of socially vulnerable communities, Environmental Justice communities, Tribes, disabled populations, and other communities that have been historically underrepresented into the planning process. Community members have lived experiences and hold valuable knowledge and expertise about their shorelines and must be included in decisions that will affect their lives.

For local governments that have already completed adaptation plans prior to the publication of these Guidelines, this element should document the stakeholders involved in that process and outreach that was previously conducted. Please review the Plan and submittal requirements in this section and discuss with BCDC staff to come up with an alternative submittal for this element where existing resources exist.

Local workshop on the RSAP in East Oakland. Photo by Karl Nielson.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT A

Coastal Flood Hazards and Sea Level Rise Scenarios Standard: The landward boundary of the planning area must include, at least, the extent of the 6.6 ft (2100 High) sea level rise scenario as outlined in this standard.

Equity Assessment Standard: Complete assessment sections related to equitable participation on the project team and in the preparation and implementation of equitable outreach and engagement throughout the process.

Element A — Plan Requirements

A1 List Subregional Plan partners, including jurisdictions, planning project team members, and affected parties.

a. **Plan type.** Describe if the plan is a county, single jurisdiction, or multi-jurisdictional plan and describe included jurisdiction(s). *See 3.1.1 What is a Subregional Shoreline Adaptation Plan? for information on plan types and the roles of counties and cities.*

DATA SUPPORT
Mapped data provided by BCDC.

b. **Planning project team.** Describe who is involved in the planning team, including what areas of government and sectors are represented, how the project team includes diverse viewpoints that can help advance equity in the process and plan results, and the roles of advisory groups or key partners to support the project team, where applicable. Participation should include representatives from the following areas of expertise: local planning, public works, emergency management, engineering, geology, flood and groundwater management, water districts, transportation, public health, parks and recreation, environment and sustainability, and Baylands ecology. Complete the **Equity Assessment Standard** to describe efforts towards equitable representation.

PLANNING TIP
As part of the process to set up the planning effort, it can be useful to describe current resources for sea level rise adaptation and/or flood hazard mitigation, such as current staffing, including roles and departments; budgets, including funding allocated to support community engagement; and/or consultant support. This may include internal and external (public or private) resources.

c. **Affected parties.** Describe affected and interested parties in the planning area who should be incorporated into outreach and engagement efforts, including, at a minimum: special districts, including transit and open space; asset owners, operators, and managers; major landowners, industries, or businesses; Tribes, both federally recognized and non-federally recognized; neighborhoods, communities, and/or community groups or community-based organizations; and environmental organizations, as applicable.

d. **Tribal consultation.** Describe how government-to-government consultation was conducted by means of early, often, and meaningful process with affected Tribes in the region. Refer to the processes in SB-18 and Executive Order B-10-11 as a guide.

A2 Include a map of the Subregional Shoreline Adaptation Plan area ("planning area").

a. **Planning area.** Provide a map of the planning area covered by the plan, including all participating jurisdictions' boundaries. It must extend Bayward into relevant subtidal areas and landward from the shoreline by at least the maximum coastal flood hazard area extent as identified at the 6.6 ft (2100 High) sea level rise scenario in the **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

ALTERNATIVE PATHS TO COMPLY
Boundaries of Operational Landscape Units (OLUs) can also be used to define the planning area.

A3 Describe the multi-jurisdictional coordination process.

a. **Multi-jurisdictional coordination.** Describe the planning project team's coordination with neighboring jurisdictions, Tribal governments, special districts, and the county to align planning processes to the maximum extent possible. This should include a summary of major points of coordination (i.e., shared landscape features, cross-jurisdictional projects), how these points were addressed, and how considerations from other jurisdictions were incorporated into the plan. Coordination is required for all plans, not just multi-jurisdictional plans.

PLANNING TIP
State, federal, regional agencies and special districts can often provide support for local planning. Consider reaching out early to engage them in the process.

A4 Summarize equitable engagement efforts throughout the planning process.

a. **Vulnerable community identification.** Define and identify socially vulnerable populations,[9] Environmental Justice communities[10], and Tribes within the planning area. Locations should be mapped, and community characteristics described. BCDC's definitions for these communities should be used, or alternative data should be reviewed and approved by BCDC. Throughout the plan element requirements, the term "vulnerable communities" will be used to refer to populations identified in this section.

ALTERNATIVE PATHS TO COMPLY
Communities identified in a Environmental Justice general plan element per SB 1000 or other plans can be used by reference.

9 Socially vulnerable communities refers to communities that exhibit certain characteristics, such as, but not limited to, people without vehicles, people with disabilities, older adults, and people with limited English proficiency. The RSAP considers this to be block groups that rank from Moderate to Highest Social Vulnerability according to BCDC's Community Vulnerability Map.

10 Environmental Justice communities refers to neighborhoods or communities that experience a disproportionate burden of environmental hazards and reduced quality of life compared to similar communities. The RSAP considers this to be communities receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0.

b. **Equitable outreach and engagement.** Include a summary of equitable outreach and engagement efforts conducted throughout the planning process. Describe how much funding was allocated to support community engagement. Outreach should occur at the following points, at a minimum, including:

- Identifying populations, assets, sectors, services, and land uses (B3)
- Identifying community assets and priority areas in the vulnerability assessment (C1 and C2)
- Creating the local vision and goals that align with the One Bay Vision (D1)
- Identifying adaptation strategy alternatives (D2)
- Evaluating adaptation alternatives (D3)

Complete the **Equity Assessment Standard** to describe efforts for the inclusion of vulnerable communities and how equity was incorporated to the maximum extent possible.

DATA SUPPORT
Mapped data provided by BCDC.

EQUITY ASSESSMENT STANDARDS IN ELEMENT A

A1-b. Planning Project Team

- **Diverse perspectives.** The planning effort should strive to include a representative project planning team that matches the diversity of the planning area. This means comparing how the team reflects the makeup of the demographics of the planning area. Include the steps taken to include people from vulnerable groups such as the unhoused, disabled, Tribes, diverse linguistic communities, LQBTQIAA+, youth, and elders. Describe what efforts were taken to include diverse perspectives on the project planning team.
- **Multilingual communities.** The planning effort should take every effort to offer language services. This includes maintaining a budget for translating documents, providing a translator for meetings, and providing FAQs and informational documents in languages other than English. Describe how language services are included in the planning effort.

A4-b Equitable Outreach and Engagement

- **Equity in engagement**. The engagement process must prioritize outreach efforts in vulnerable communities. This can include hosting outreach meetings in vulnerable communities, partnering and providing fiscal support for local community-based organizations to conduct outreach, and providing accommodations to make meetings more accessible to people from vulnerable communities. These accommodations may include childcare, food, and participation stipends. Describe how the engagement process includes people from vulnerable communities.
- **Community and Tribal partnerships.** The planning effort should identify and partner with community-based organizations, community groups, and Tribes to support equitable planning and engagement, with appropriate partnership agreements. Describe efforts to engage communities and Tribes in partnerships.

Element A — Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

Element A: Planning Process				
A1.	a. Plan type	Description of plan type and included jurisdiction(s).	☐	
	b. Planning project team	List and description of planning team.	☐	
	Diverse perspectives	Description of what efforts were taken to include diverse perspectives on the project planning team.	☐	Equity Assessment
	Multilingual communities	Description of how language services were included in the planning effort.	☐	Equity Assessment
	c. Affected parties	List of affected and interested parties.	☐	
	d. Tribal consultation	Description of government-to-government consultation process.	☐	
A2.	a. Planning area	Map with boundaries of planning area.	☐	
A3.	a. Multi-jurisdictional coordination	Description of multi-jurisdictional and county coordination.	☐	
A4.	a. Vulnerable community identification	Definitions and mapped locations of Environmental Justice, socially vulnerable communities, and Tribes.	☐	
	b. Equitable outreach and engagement	Summary of equitable outreach and engagement efforts.	☐	
	Equity in engagement	Description of how the engagement process includes people from vulnerable communities.	☐	Equity Assessment
	Community and Tribal partnerships	Description of efforts to engage communities and Tribes in partnerships.	☐	Equity Assessment

Pop-up event in Richmond CA in October 2023 to help shape the RSAP One Bay Vision. Photo by Tim Mollette-Parks

3.2.2 Element B: Existing Conditions

Intended Element Outcome

Consideration of existing physical, ecological, social, and policy conditions that affect adaptation.

This element identifies and describes local existing conditions that form the context for planning. This includes identifying existing and relevant plans and policies, gathering information on the physical and ecological conditions of the landscape, including aquatic and nearshore areas, and identifying local populations, land uses, assets, and services.

The information in this section will be used in other elements to inform the vulnerability assessment in Element C and develop effective adaptation strategies and pathways in Element D. Physical and ecological conditions along the shoreline provide an essential baseline to evaluate vulnerabilities to coastal flood hazards. Understanding vulnerability and its consequences also depends on understanding existing land uses in the area, what populations are present (with particular attention to socially vulnerable, Environmental Justice communities, and Tribes), the different types of development, infrastructure, transportation systems and/or Tribal cultural resources that exist along the shoreline, and the current structure of land ownership, management, and governance.

This information also aids in the identification of adaptation strategies informed by local considerations and opportunities, such as where nature-based adaptation may be suitable, the trajectory of current and future development patterns, or other locally relevant information that can inform the selection and evaluation of adaptation alternatives in Element D: Adaptation Strategies and Pathways. Having information on existing plans and policies can support the identification and incorporation of non-physical adaptation strategies such as changes to policies, land uses, and regulatory process into existing efforts.

This is also the section where any Strategic Regional Priorities, if they exist in a given planning area, are incorporated into the planning effort. Strategic Regional Priorities are included in the Minimum Categories and Assets Standard and should be incorporated as applicable.

Much of the information in this element is likely to already exist in other city plans, including general plan elements or local hazard mitigation plans. If this is the case, local governments may utilize existing documentation by citing relevant plans where the required information can be found. If data cited in these Plan requirements is not available or not relevant, please discuss with BCDC staff to come up with a satisfactory approach to meeting the Plan requirements in this section.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT B

Minimum Categories and Assets Standard: All minimum categories and assets must be included in the existing conditions to the extent possible. Additional assets beyond the minimums in the standard should be included as identified by communities and affected parties.

Equity Assessment Standard: Complete assessment sections related to equity impacts related to existing conditions.

Element B — Plan Requirements

B1

List and describe existing plans, studies, and/or other information that may be relevant to addressing and responding to coastal flooding hazards.

a. **General and land use plans.** Include a summary of how coastal flooding hazards are currently referenced and addressed within participating jurisdictions' general plan, specific plans, community plans, and/or other applicable land use plans.

b. **Hazard and emergency plans.** Include a summary of how coastal flooding hazards are currently referenced and addressed in local hazard mitigation plans, recovery plans, emergency operation plans, flood control, capital improvement, maintenance plans, and/or other applicable hazard and emergency plans.

c. **Climate and resilience plans.** Include a summary of any existing climate action plans, climate adaptation plans, vulnerability assessments, climate resilience plans, and/or AB 691 Sea Level Rise Impact Assessments, as applicable, and how this plan relates to those plans.

PLANNING TIP

Catalogue existing regulatory codes and processes related to sea level rise, flooding, and connected topics. This may include building codes, zoning, permitting requirements, regulations, or special areas such as overlay zones, hazard zones, or flood management zones.

Helpful information related to flood hazards may also be found in sector or issue area plans. Review transportation plans, bike and pedestrian plans, trails and access plans, shoreline management plans, ecological management plans, economic development plans, hazard or contaminated sites plans, utility plans, and/or other similar applicable plans for relevant information.

Left: Local workshop on the RSAP site walk in North Richmond.
Photo by Karl Nielson.

B2 Map and describe physical and ecological characteristics of the landscape within the planning area.

a. **Physical conditions.** Map and describe the current physical landscape conditions and characteristics, including topography and bathymetry; vertical land motion, including subsidence; erosion; artificial shoreline features, the depth of Bay mud; and shallow groundwater depth to surface. Where information is available, also include geological and soil conditions, such as the depth and thickness of shallow aquifers and how interconnected aquifers are to one another.

b. **Coastal and nearshore hydrological conditions.** Map and describe the coastal and nearshore hydrological characteristics, including high tides, 100-year still water elevation, FEMA flood mapping (100-year and 500-year storms), wave climate, saline wedge, and the location of creeks and streams. Include where hydrological features such as creeks cross jurisdictional boundaries.

c. **Ecosystem Health and Resilience conditions.** Map and describe the ecological and biological conditions as listed in the **Minimum Categories and Assets** for Bay Ecosystem Health and Resilience, including Complete and Connected Ecosystems as defined in the Strategic Regional Priority. This includes the spatial extents of existing habitats: adjacent uplands, estuarine-upland transition zones, beaches, tidal marshes, intertidal channels, tidal ponds/pannes, tidal flats, subtidal habitats (shallow and deep), eelgrass beds, rocky intertidal, and creeks/channels connected to the Bay. Include descriptions of Baylands' resilience characteristics, ecosystem services and functions of these habitats, and the presence of state or federal listed endangered species. Include areas of potential marsh migration space. Describe natural and nature-based suitability for adaptation. If available and as appropriate, include Indigenous Traditional Ecological Knowledge (ITEK) to inform the assessment. Include where habitats cross jurisdictional boundaries. Complete the **Equity Assessment Standard** on ecosystem benefits for vulnerable communities.

d. **Historical conditions.** Map and describe the historical (pre-colonization) physical and ecological landscape characteristics, including historical Baylands and creeks, changes in aquatic and nearshore areas, and/or significant land use changes.

For all B2:

DATA SUPPORT
Mapped data provided by BCDC.

SUBMITTAL TIP
The mapped data required in B2 can be submitted in combined maps that show more than one condition and/or can be displayed in categories other than the ones listed in B2.

ALTERNATIVE PATHS TO COMPLY
Local jurisdictions that have already completed an existing conditions report, or gathered this information in other resources, can refer to existing resources by reference for this submittal. Consult with BCDC staff to ensure that existing resources are satisfactory to meet Plan requirements.

e. **Planned future changes.** Describe planned future shoreline changes, including adaptation, restoration, or other shoreline flood protection projects in the planning area. Identify where planned future projects cross jurisdictional boundaries.

B3 Map and describe existing populations, assets, sectors, services, and land uses within the planning area.

a. **Community Health and Well-being conditions.** Map and describe populations and community services as listed in the **Minimum Categories and Assets** for Community Health and Well-Being, including Involuntary Displacement Risk from the Strategic Regional Priority (where applicable). This includes general population demographics, vulnerable communities, Environmental Justice communities, Tribes, healthcare facilities, historical, cultural, and Tribal resources. Complete the **Equity Assessment Standard** on including community assets.

b. **Development, Housing, and Land Use conditions.** Map and describe current and future land uses, development, and projects as listed in the **Minimum Categories and Assets** for Development, Housing, and Land Use, including Plan Bay Area Growth Geographies from the Strategic Regional Priority (where applicable). This includes residential land uses, affordable housing sites, housing element opportunity sites, commercial and industrial land uses, parks, recreation, open space, and agricultural land uses, jobs, Tribal lands and resources, and planned adaptation projects. Complete the **Equity Assessment Standard** on how land use patterns have impacted vulnerable communities.

c. **Critical Infrastructure and Services conditions.** Map (when applicable) and describe utilities infrastructure, stormwater and flood management infrastructure, emergency management, and public trust lands as listed in the **Minimum Categories and Assets** for Critical Infrastructure and Services, including assets from the Strategic Regional Priority (where applicable). This includes power plants, substations, natural gas stations, publicly-owned wastewater treatment works and wet weather facilities, wastewater lifting stations, water supply, communications infrastructure, oil refineries, flood management infrastructure (including pumping stations), stormwater and sewer systems, emergency operations centers, fire stations, police stations, marinas, harbors, and other water-dependent infrastructure. Complete the **Equity Assessment Standard** on critical services most used by vulnerable communities.

For all B3:

DATA SUPPORT
Mapped data provided by BCDC.

SUBMITTAL TIP
The mapped data required in B3 can be submitted in combined maps that show more than one asset and/or can be displayed in categories other than the ones listed in B3.

ALTERNATIVE PATHS TO COMPLY
Local jurisdictions that have already completed an existing conditions report, or gathered this information in other resources, can refer to existing resources by reference for this submittal. Consult with BCDC staff to ensure that existing resources are satisfactory to meet Plan requirements.

d. **Public Access and Recreation conditions.** Map and describe trails networks, parks and open spaces, and water-oriented recreation as listed in the **Minimum Categories and Assets** for Public Access and Recreation, including assets from the Strategic Regional Priority (where applicable). This includes the regional trail network, including The San Francisco Bay Trail, Regional Active Transportation Network, parks and open space areas, public trust lands, San Francisco Bay Area Water Trail, and water-oriented recreation facilities. Complete the **Equity Assessment Standard** on vulnerable communities' access to public access and recreation.

e. **Transportation and Transit conditions.** Map and describe land, air, water, and emergency transportation and transit as listed in the **Minimum Categories and Assets** for Transportation and Transit, including assets from the Strategic Regional Priority (where applicable). This includes highways, passenger rail, freight rail, bus terminals, transit stops, routes, service yards, airports, seaports, ferry terminals, emergency access routes, and roads with single points of entry. Complete the **Equity Assessment Standard** on mobility of vulnerable community members.

f. **Shoreline Contamination conditions.** Map and describe sites as listed in the **Minimum Categories and Assets** for Shoreline Contamination, including contaminated sites in Environmental Justice communities from the Strategic Regional Priority (where applicable). This includes contaminated sites, landfills, and Superfund sites. Complete the **Equity Assessment Standard** on contaminated sites and identifying sites not currently identified in existing databases.

g. **Collaborative Governance, Flood Management, and Funding conditions.** Map and describe boundaries and partnerships as listed in the **Minimum Categories and Assets** for Collaborative Governance, Flood Management, and Funding, including cross-jurisdictional connectivity from the Strategic Regional Priority (where applicable). This includes listing shared jurisdiction boundaries, OLU boundaries, applicable partnerships with community-based organizations, Tribal government, and special districts. Identify where existing formal relationships exist around shoreline management and shared funding, such as Joint Powers Authorities, flood control districts, or Resilience Districts. If and where these relationships exist, describe who is involved and what each party's responsibilities are. Complete the **Equity Assessment Standard** on funding for community or Tribal partnerships.

For all B3:

DATA SUPPORT
Mapped data provided by BCDC.

SUBMITTAL TIP
The mapped data required in B3 can be submitted in combined maps that show more than one asset and/or can be displayed in categories other than the ones listed in B3.

ALTERNATIVE PATHS TO COMPLY
Local jurisdictions that have already completed an existing conditions report, or gathered this information in other resources, can refer to existing resources by reference for this submittal. Consult with BCDC staff to ensure that existing resources are satisfactory to meet plan requirements.

EQUITY ASSESSMENT STANDARDS IN ELEMENT B

B2-c. Ecosystem Health and Resilience conditions

- **Communities and ecosystems**. Natural habitats can provide many community benefits through a wide array of ecosystem services, including flood risk reduction. Include if and how vulnerable communities interact with the Baylands habitats and community desires, concerns, or interests in supporting ecosystem services improvements. Describe the known relationships of communities and ecosystems and values toward natural and nature-based adaptation.

B3-a. Community Health and Well-being conditions

- **Community assets.** Vulnerable communities should provide input and identify important community assets and services. Include community services identified by and serving socially vulnerable populations into the planning effort. Describe what community assets and services were identified by communities.

B3-b. Development, Housing, and Land Use conditions

- **Displacement and land use patterns.** Land use patterns are likely to affect historical and future trends of displacement risk for vulnerable communities. Include how many vulnerable community populations are at risk of displacement, and how changes in development in terms of jobs or planned or new affordable housing contribute to reduce this risk. Describe how land uses may have contributed to displacement risk.

B3-c. Critical Infrastructure and Services conditions

- **Dependency on services.** Critical services are essential for all populations, but there may be specific conditions that make vulnerable communities more susceptible to service disruptions or have a lack of redundancy in certain communities. Describe if and how vulnerable communities have specific service dependencies.

B3-d. Public Access and Recreation conditions

- **Access and safety.** In some vulnerable communities, access to trails, recreation, and public access is limited, non-existent, or is unsafe to get to. Include where this may occur and why or how access has been limited to inform how future changes can better serve these communities. Describe the state of connection to and safety of public access.

B3-e. Transportation and Transit conditions

- **Mobility and affordability.** Vulnerable communities may have limited mobility options and/or be cost-burdened by transportation and transit. Describe known challenges of transportation mobility and affordability.

B3-f. Shoreline Contamination conditions

- **Known and unknown sites.** Many vulnerable communities face contamination risks. Include the history and sources of contamination, community health concerns, status of cleanup efforts in the planning area, and concerns of unidentified contaminated sites, where known. Describe the status of contamination in communities.

B3-g. Collaborative Governance, Flood management, and Funding conditions

- **Community and Tribal capacity.** Building the leadership and capacity of community members to participate in adaptation planning is essential. Describe if and how funding was included for community partnerships in budgets.

Element B — Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

Element B: Existing Conditions					
B1.	a.	General and land use plans	Summary of how coastal flooding hazards are referenced and addressed in general and other land use plans.	☐	
	b.	Hazard and emergency plans	Summary of how coastal flooding hazards are referenced and addressed in hazard and emergency plans.	☐	
	c.	Climate and resilience plans	Summary of climate and resilience plans and how they relate to this Plan.	☐	
B2.	a.	Physical conditions	Map(s) and description of physical landscape conditions and characteristics.	☐	
	b.	Coastal and nearshore hydrological conditions	Map(s) and description of existing coastal and nearshore hydrological characteristics.	☐	
	c.	Ecosystem Health and Resilience conditions	Map(s) and description of existing ecological and biological conditions in the nearshore, shoreline, and uplands areas.	☐	
		Communities and ecosystems	Description of known relationships of communities and ecosystems and values towards natural and nature-based adaptation.	☐	Equity Assessment
	d.	Historical conditions	Map(s) and description of historical physical and ecological landscape characteristics.	☐	
	e.	Planned future changes	Description of planned future shoreline changes.	☐	
B3.	a	Community Health and Well-being conditions	Map(s) and description of populations and community services as related to Community Health and Well-being.	☐	
		Community assets	Describe what community assets and services were identified by communities.	☐	Equity Assessment
	b.	Development, Housing, and Land Use conditions	Map(s) and description of current and future land uses, development, and projects related to Development, Housing, and Land Use.	☐	
		Displacement and land use patterns	Description of how land uses may have contributed to displacement risk.	☐	Equity Assessment
	c.	Critical Infrastructure and Services conditions	Map(s) and description of utilities infrastructure, stormwater and flood management infrastructure, emergency management, and public trust lands related to Critical Infrastructure and Services.	☐	
		Dependency on services	Description of if and how vulnerable communities have specific service dependencies.	☐	Equity Assessment

B3.	d.	Public Access and Recreation conditions	Map(s) and description of trails networks, parks and open spaces, and recreation related to Public Access and Recreation.	☐	
		Access and safety	Description of the state of connection to and safety of public access.	☐	Equity Assessment
	e.	Transportation and Transit conditions	Map(s) and description of land, air, water, and emergency transportation related to Transportation and Transit.	☐	
		Mobility and affordability	Description of known challenges of transportation mobility and affordability.	☐	Equity Assessment
	f.	Shoreline Contamination conditions	Map(s) and description of sites as related to Shoreline Contamination.	☐	
		Known and unknown sites	Description of the status of contamination in communities.	☐	Equity Assessment
	g.	Collaborative Governance, Flood Management, and Funding conditions	Map(s) and description of boundaries and partnerships related to Collaborative Governance, Flood Management, and Funding.	☐	
		Community and Tribal capacity	Description of how funding was included for community partnerships in project budgets.	☐	Equity Assessment

3.2.3 Element C: Vulnerability Assessment

Intended Element Outcome

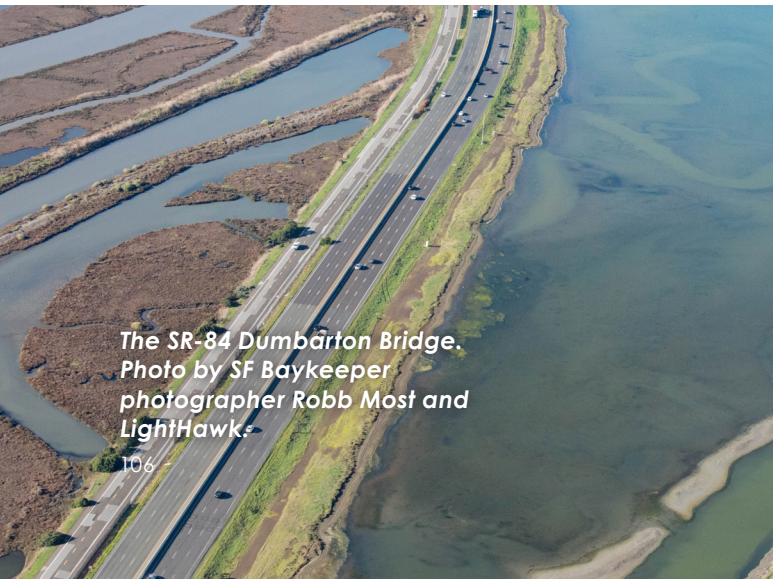
A targeted summary of shoreline exposure and vulnerability that identifies high priority areas.

This element identifies and summarizes existing and future exposure and vulnerability of populations, assets, services, ecosystems, and land uses along the shoreline to sea level rise. This includes identifying and describing the exposure of existing physical and social conditions to coastal flood hazards, selecting priority areas for more detailed vulnerability assessments, and summarizing exposure and vulnerability for the planning area.

Understanding the vulnerability of assets and land uses along the shoreline requires an analysis of exposure followed by an assessment of the sensitivity, adaptive capacity, and consequences of key assets if exposed to flooding. Local governments are only required to assess sensitivity, adaptive capacity, and consequences for priority areas to ensure that there is greater detail and responsiveness for the highest priority areas and that analysis is not overly detailed in lower priority parts of the shoreline.

Clearly and effectively summarizing vulnerability is also essential in this section as it forms the basis by which adaptation strategies are developed to respond successfully to risks identified in Element D: Adaptation Strategies and Pathways. Having a clear picture of exposure and vulnerability is a key step in understanding which adaptation strategies are most appropriate and will be most important for reducing flood risks.

Many jurisdictions may already have some degree of vulnerability assessment completed prior to the publication of these Guidelines. Those vulnerability assessments can and should be submitted, provided that they generally result in a comparable level of study even if slightly different methods were used. Please review this element, the 3.3.1 Coastal Flood Hazards and Sea Level Rise Scenarios Standard (Section 3.3.1), and Minimum Categories and Assets Standard (Section 3.3.2) and discuss with BCDC staff to come up a satisfactory approach for meeting the Plan requirements.



The SR-84 Dumbarton Bridge. Photo by SF Baykeeper photographer Robb Most and LightHawk.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT C

Coastal Flood Hazards and Sea Level Rise Scenarios Standard: Required to be used in the exposure analysis and for a more detailed vulnerability assessment of areas identified as priority areas.

Minimum Categories and Assets Standard: All minimum categories and assets must undergo an exposure analysis for all Coastal Flood Hazards and Sea Level Rise Scenarios Standard.

Equity Assessment Standard: Complete assessment sections related to equity integration into the vulnerability assessment.

Element C — Plan Requirements

C1 Map and describe the exposure of people, assets, ecosystems, and services to coastal flood hazards across minimum sea level rise scenarios.

a. **Exposure to coastal flood hazards.** Map and summarize the exposure of all **Minimum Categories and Assets** to the required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard** in the 0.8 ft (2050), 3.1 ft (2100 Intermediate), 4.9 ft (2100 Intermediate-High), and 6.6 ft (2100 High) sea level rise scenarios, at a minimum. This should include additional assets as identified by communities and affected parties in B3. Additional hazards and/or sea level rise scenarios may be included as relevant for local conditions and assets. Summary of exposure may be described at an asset category level (i.e., evaluating the asset category as a whole as opposed to individual assets). Complete the **Equity Assessment Standard** to describe how vulnerable community assets were incorporated.

ALTERNATIVE PATHS TO COMPLY
If a local government has already conducted an exposure analysis, see the Coastal Flood Hazards and Sea Level Rise Scenarios Standard section for acceptable deviations from the standards.

b. **Shoreline flood risk conditions.** Assess and describe the planning area's shoreline conditions and characteristics to identify factors that influence flood risk. This may include areas of overtopping, flood pathways, thresholds, tipping points, ad hoc flood management, hydraulically connected areas, and/or conditions that could lead to increased flood risk (e.g. low elevations/disconnected low-lying areas, subsidence, erosion, deterioration, and lack of maintenance) or other local factors.

DATA SUPPORT
The Adapting to Rising Tides Flood Explorer is an interactive and educational tool to explore shoreline overtopping, low-lying areas, and potential flood pathways.

c. **Potential cost of damages from inaction.** Describe the potential costs of damages, disruption, and losses to the economy, ecology, and community that would occur in the absence of adaptation actions. This description can be a high-level, order-of-magnitude estimate and can include quantitative, qualitative and non-financial metrics. This value can provide an important "baseline" to use when comparing the costs of different adaptation strategies to the cost of inaction.

C2

Conduct a vulnerability assessment for priority areas and summarize vulnerability to current and future hazards.

a. **Priority areas.** Map and describe priority areas within the planning area. These should be identified using the following criteria:

- Exposure to the 0.8 ft (2050) sea level rise scenario (C1).
- Applicable Strategic Regional Priorities.
- Vulnerable communities (A4).
- Baylands habitats (B2-c).
- Locally identified significant high priority populations, assets, and services, as applicable.

Complete the **Equity Assessment Standard** to describe how communities provided input to shape the identification of priority areas.

IDENTIFYING PRIORITY AREAS TO FOCUS AND TARGET ADAPTATION STRATEGIES

To conduct an effective and targeted vulnerability assessment, it can be helpful to narrow down the wide range of potential assets and areas into priority areas. These priority areas are then locations where a detailed vulnerability assessments occurs, including sensitivity, adaptive capacity, and consequence. Identifying priority areas is intended to reduce the need to create a highly detailed vulnerability assessment for low-risk or low-priority portions of the shoreline.

Priority areas can also point to locations where adaptation strategies should be developed in greater detail to reflect the greater significance of reducing flood risk in those areas. This also reduces the need to prepare highly detailed strategies for all portions of the shoreline at this time, especially if adaptation action is not required for a long time or if there are low consequences to flooding in a given area.

b. **Assess vulnerability.** Describe the vulnerability of the assets, populations, and services within priority areas identified in C2-a across the entire planning area. Vulnerability descriptions must include the sensitivity and adaptive capacity of the assets, populations, and services, and consequences of exposure. Descriptions of vulnerability may be described at an asset category level (i.e., evaluating the asset category in the priority area as a whole as opposed to individual assets). Jurisdictions may utilize their own methodologies to evaluate sensitivity, adaptive capacity and consequence. However, BCDC recommends the following definitions:

- Sensitivity is the degree to which the conditions, functions, and/or performance of an asset are adversely affected due to exposure.
- Adaptive capacity is the ability of an asset to adjust to exposure or effectively manage and cope with the consequences.
- Consequence is the harm or disruption that may result from exposure to the asset.

c. **Summarize vulnerability.** Include a summary of exposure and vulnerability at the required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard** in the 0.8 ft (2050), 3.1 ft (2100 Intermediate), 4.9 ft (2100 Intermediate-High), and 6.6 ft (2100 High) sea level rise scenarios, at a minimum. This summary must include exposure and vulnerability of priority areas (C2-a), relevant shoreline flood risk conditions (C1-b), and clearly identify applicable Strategic Regional Priorities. Include assets exposed (C1-a), even if they did not undergo a detailed vulnerability assessment.

d. **Timing and phasing.** For each priority area, summarize the anticipated timing of exposure of assets to identify when critical action will need to be taken to address vulnerabilities over time. This timing must be based upon the **Coastal Flood Hazards and Sea Level Rise Scenarios Standard** in the 0.8 ft (2050), 3.1 ft (2100 Intermediate), 4.9 ft (2100 Intermediate-High), and 6.6 ft (2100 High) sea level rise scenarios, at a minimum. In addition to timing, this should include identifying appropriate triggers or decision points based on local conditions and risks that can help identify when changes in conditions prompt changes in vulnerability.

PLANNING TIP

Many adaptation plans utilize the concept of a shoreline "reach" to identify manageable segments of shoreline that may share similar characteristics and conditions, such as large natural features or land uses, segments containing hydraulically connected areas, and/or areas that are overtopped at the same time.

Reaches may also be defined by significant infrastructure or clustered priority assets or other features. Reaches can be helpful for organizing exposure and vulnerability summaries and creating manageable sizes of adaptation strategies. Identifying reaches is not required but may be a useful organizing tool for your plan.

EQUITY ASSESSMENT STANDARDS IN ELEMENT C

C1-a. Exposure to coastal flood hazards

- **Community assets and services.** Community priorities identified in Element B: Existing Conditions should be incorporated. Describe what community assets and services were incorporated into the exposure analysis.

C2-a Priority areas.

- **Community input on priority areas**. Communities should help shape what assets and services are included for a more detailed vulnerability assessment. Include what characteristics, conditions, or information on vulnerable communities is being used to inform the vulnerability assessment. Describe how communities provided input to shape the identification of priority areas.

Element C — Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

Element C: Vulnerability Assessment					
C1.	a.	Exposure to coastal flood hazards	Exposure maps and summary tables for each required Coastal Flood Hazard and Sea Level Rise Scenarios Standard and assets for each Minimum Categories and Assets Standard.	☐	
		Community assets and services	Description of what community assets and services were incorporated into the exposure analysis.	☐	Equity Assessment
	b.	Shoreline flood risk conditions	Description of shoreline conditions and characteristics that contribute to flood risk.	☐	
	c.	Potential costs of damages from inaction	Description of potential costs of damage, disruption, and/or losses in the absence of adaptation.	☐	
C2.	a.	Priority areas	Map and description of priority areas.	☐	
		Community input on priority areas	Description of how communities provided input to shape the identification of priority areas.	☐	Equity Assessment
	b.	Assess vulnerability	Description of vulnerability (sensitivity, adaptive capacity, and consequence) within priority areas.	☐	
	c.	Summarize vulnerability	Summary of vulnerability at each scenario as outlined in the Coastal Flood Hazards and Sea Level Rise Scenarios Standard.	☐	
	d.	Timing and phasing	Summary of timing of exposure for each priority area.	☐	

Flooding of trails near Baylands habitats during King Tides in January 2020. Photo courtesy of California King Tides Project.

3.2.4 Element D: Adaptation Strategies and Pathways

Intended Element Outcome

The development of selected physical and non-physical adaptation strategies that are responsive to vulnerabilities, prioritize natural and nature-based strategies where possible, and provide flood risk reduction while advancing local benefits and the One Bay Vision.

This element identifies selected adaptation strategies and pathways that respond to identified vulnerabilities from Element C: Vulnerability Assessment. This includes defining a local vision through equitable engagement that aligns with the One Bay Vision, evaluating adaptation strategy alternatives, and selecting physical and non-physical adaptation strategies that meet the **Adaptation Strategy Standards** (Section 3.3.4).

An overview of adaptation strategies and strategic approaches can be found in the Introduction (Section 1.4.2). Strategies can include physical actions (e.g., ecotone levee, flood wall, ecosystem restoration) and/or non-physical actions (land use change, policy development, community capacity building) that reduce flood risk to communities, ecosystems, and development along the shoreline. Meaningful and robust adaptation planning should include both physical and non-physical actions.

While there are many different adaptation alternatives communities can take, they vary in levels of protection, cost, local and regional benefits, and consequences for the long-term health and well-being of people, the economy, and natural ecosystems. Where possible, adaptation planning should consider multiple alternatives to ensure that different viable approaches are considered, and their trade offs are appropriately evaluated.

Responding to the dynamic challenges that rising sea levels bring will require phased adaptation responses that will continue far into the future.

Creating adaptation pathways is an approach to addressing this long-term challenge that describes adaptation strategies in discrete, manageable steps that are sequenced and adjusted as sea levels rise over time. This approach allows for a range of possible options that may be implemented in the future based on the conditions present when those actions need to be taken. See the Introduction (Section 1.4.2) for more details.

For local governments who have already identified adaptation strategies or projects, describe what those are and how they align with the **Adaptation Strategy Standards**. If existing strategies follow different state and federal guidelines, consult BCDC staff to come up with a satisfactory approach to meeting the Plan requirements.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT D

Coastal Flood Hazards and Sea Level Rise Scenarios Standard: Required to be used in the development of adaptation alternatives and selected adaptation strategies.

Equity Assessment Standard: Complete assessment sections related to equity integration into the local vision and development of adaptation strategies.

Adaptation Strategy Standards: Outcomes that adaptation strategies must strive to achieve for compliance with the Guidelines.

Element D — Plan Requirements

D1 Include a local vision and goals for the planning area that incorporates and localizes the One Bay Vision.

a. **Local vision.** Include localized vision and goals statements that reflect the unique local conditions and opportunities for the planning area. The local vision must enact the One Bay Vision at the local level to the maximum extent possible and must not conflict with the One Bay Vision or Strategic Regional Priorities. The local vision and goals should cover the entire planning area but may also include specific visions and/or goals for different sections of the shoreline. The vision should consider existing conditions from Element B and vulnerability assessment outcomes and priority areas from Element C. Complete the **Equity Assessment Standard** to describe incorporation of equity into the local vision.

PLANNING TIP

Consider creating planning assumptions that underlie the expectations, priorities, values, objectives, and feedback from the community. These can be a useful way to set expectations in the adaptation process.

Planning assumptions may include concepts such as protecting assets in place until the end of their useful life, prioritizing habitats or housing, or other "must haves" that should be reflected in the local vision and adaptation strategies.

Left: Local workshop on the RSAP in North Richmond. Photo by Karl Nielson.

D2

Identify adaptation strategy alternatives for priority areas and consider flood risks across the entire planning area.

a. **Adaptation strategy alternatives for 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios.** Map and describe at least two adaptation alternatives containing adaptation strategies responsive to identified vulnerabilities (C2), advance the local and One Bay Vision (D1), and consider initial alignment with the **Adaptation Strategy Standards.** Include maps of conceptual designs[11] of strategies (physical strategies) and descriptions (physical and non-physical strategies) that contribute to flood risk reduction at the required 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios, with a narrative description of adaptation strategy efficacy and/or options for potential strategy adjustments at the 6.6 ft (2100 High) sea level rise, as identified in the **Coastal Flood Hazards and Sea Level Rise Scenarios Standard**, at a minimum.

Adaptation strategy alternatives within priority areas should:

- Be detailed enough to demonstrate feasible flood risk reduction for priority areas (C2-a), at a minimum.
- Consider and incorporate how strategies in the 0.8 ft (2050) sea level rise scenario enable adaptation options in the 3.1 ft (2100 Intermediate) sea level rise scenario.
- Be responsive to shoreline flood risk conditions (C1-b) and timing and phasing identified (C2-d).
- Incorporate existing or planned adaptation projects (B2-e) and their lifespan and protection level, if known.

Adaptation strategies outside priority areas should include:

- A narrative description of what adaptation strategies may become necessary as coastal flood hazards increase and include information related to thresholds, triggers, decision points, and/or other conditions that would change the level of priority and prompt assessment and development of adaptation strategies.

If the adaptation strategy alternatives include multiple reaches or shoreline areas, ensure adaptation strategies work together across the planning area as a whole.

PLANNING TIP

Each sea level rise scenario in the **Coastal Flood Hazards and Sea Level Rise Scenarios Standard** include four flood hazard types: tidal inundation, storm surge, emergent groundwater, and shallow groundwater. Planning for and addressing these different flood hazards may require different types of adaptation strategies.

Certain adaptation strategies may be suitable for temporary flooding, such as storm surge, while other strategies are necessary to respond to permanent flooding due to tidal inundation from sea level rise.

Additionally, some adaptation strategies may be effective at dealing with one type of flood risk, but can inadvertently worsen other flood risks if appropriate mitigations actions are not taken. Adaptation strategies require a holistic look at flood risk reduction.

11 Conceptual design refers to the early stage of the design process where the approximate physical footprints and broad outlines of adaptation strategy functions are shown. More detailed planning and project designs can be included, when available.

Using the RSAP Adaptation Strategy Standards

The **Adaptation Strategy Standards** guide the development of adaptation strategies to help ensure they achieve outcomes that support both local and regional goals. Plan requirement D2 calls for the development of initial adaptation alternatives, which should consider the **Adaptation Strategy Standards**, while D4 requires the selection of adaptation strategies and description of how they meet the standards. See **Adaptation Strategy Standards** (Section 3.3.4) for a full description of the standards. The title of each standard is described below for quick reference. Standards that include a green icon are those that are part of the Strategic Regional Priorities.

Overview of Adaptation Strategy Standards

Maximize the benefits of shoreline uses and Baylands habitats that depend on their proximity and relationship to the Bay.

1. Improve public access and connection to and across the shoreline.
2. Prioritize uses that require a location along the shoreline.
3. Protect, restore, enhance, and adapt Baylands habitats, ensure complete and connected ecosystems, and facilitate their long-term survival.
4. Prioritize natural and nature-based adaptation where feasible.
5. Preserve natural and undeveloped lands for shoreline resilience.

Improve community health, economic development, infrastructure, and housing needs.

6. Minimize flood risk to existing and planned development.
7. Include actions to mitigate involuntary displacement risk.
8. Promote safe, sustainable and strategic growth and density.
9. Maintain reliable critical and emergency services.
10. Maintain regional networks that facilitate the reliable movement of people and goods.
11. Prioritize contamination remediation in Environmental Justice communities.
12. Reduce contamination risks to all communities and ecosystems.
13. Appropriately utilize Bay fill for shoreline protection.
14. Integrate multiple benefits into adaptation.

Create pathways to respond to changing flood risks over time.

15. Incorporate climate-responsive standards, codes, and zoning for adaptive design.
16. Plan for changes in land use, removal of assets, and/or equitable relocation.
17. Identify actions necessary to enable future adaptation decisions, if currently not available.
18. Develop and maintain cross-jurisdictional flood risk reduction.
19. Integrate coastal flood protection with stormwater and riverine flood management.
20. Evaluate and minimize consequences of failure.

D3

Evaluate adaptation alternatives to determine selected adaptation strategies.

a. **Evaluation criteria.** Include evaluation criteria that reflects the local vision and One Bay Vision (D2) and any other known trade offs and challenges identified from affected parties and communities. Evaluation criteria should include physical and economic feasibility, consider capital and long-term maintenance and operational costs, and support outcomes of the **Adaptation Strategy Standards**. The evaluation criteria should include a scoring system or some means of evaluating strategies against each other. Preference should be given to strategies that help achieve local and regional goals and enable adaptation pathways.

PLANNING TIP
Different strategies require different costs. Natural and nature-based adaptation can be self-sustaining, provide benefits to people and wildlife, and reduce the long-term maintenance costs of adaptation.

D4

Provide conceptual plans and descriptions of selected adaptation strategies and adaptation pathways that include physical and non-physical strategies.

a. **Selected adaptation strategies for the 0.8 ft (2050) sea level rise scenario.** Map and describe the selected adaptation strategies for the 0.8 ft (2050) sea level rise scenario based upon the evaluation criteria of alternatives and community input. Selected strategies should responsive to identified vulnerabilities (C2), advance the local and One Bay Vision (D1), and meet the **Adaptation Strategy Standards**. Include maps of conceptual designs[12] of strategies (physical strategies) and descriptions (physical and non-physical strategies) that contribute to flood risk reduction to, at least, the required 0.8 ft (2050) as identified in the **Coastal Flood Hazards and Sea Level Rise Scenarios Standard**.

Selected adaptation strategies within priority areas should:

- Be detailed enough to demonstrate feasible flood risk reduction for priority areas (C2-a), at a minimum;
- Enable and not preclude adaptation strategy options identified in the 3.1 ft (2100 Intermediate) sea level rise scenario and support adaptation pathways (D4-b).
- Incorporate existing or planned adaptation projects (B2-e), and their lifespan and protection level, if known.

PLANNING TIP
Adaptation strategies identified as providing feasible flood risk reduction should be developed and/or evaluated by a certified civil or structural engineer or other related qualified professional. Strategies need to consider geotechnical constraints such soil type, land settlement, and subsidence that may affect adaptation structures, such as slope stability.

While not required, strategies should consider earthquake and liquefaction risks.

12 Conceptual design refers to the early stage of the design process where the approximate physical footprints and broad outlines of adaptation strategy functions are shown. More detailed planning and project designs can be included, when available.

- Include non-physical strategies that may guide the overarching strategy, such as those that apply to large areas (such as a city-wide scale). These may include policies, programs, and/or other changes.

Adaptation strategies outside priority areas should include:

- A narrative description of what adaptation strategies may become necessary as coastal flood hazards increase and include information related to thresholds, triggers, decision points, and/or other conditions that would change the level of priority and prompt assessment and development of adaptation strategies.

If the selected adaptation strategies include multiple reaches or shoreline areas, ensure adaptation strategies work together across the planning area as a whole.

Demonstrate and describe how selected adaptation strategies meet the **Adaptation Strategy Standards.** Complete the **Equity Assessment Standard** to ensure selected adaptation strategies incorporate community benefits, build capacity, and reduce unintended consequences.

ALTERNATIVE PATHS TO COMPLY

If a local government has already identified adaptation strategies in previous efforts, describe what those strategies (or projects) are and how they align with the **Adaptation Strategy Standards**. If existing strategies follow different state or federal requirements, consult BCDC staff to come up with a satisfactory approach to meeting the Plan requirements.

b. **Adaptation pathways for 2100 and beyond.** Describe options for adaptation strategies in the 3.1 ft (2100 Intermediate) sea level rise scenario that could occur based on selected adaptation strategies in the 0.8 ft (2050) sea level rise scenario (D4-a). These options should be based on alternatives identified for the 3.1 ft (2100 Intermediate) and 6.6 ft (2100 High) sea level rise scenarios (D2-a). Include a schematic diagram[13] on phasing of adaptation strategies (i.e. adaptation pathways), and a narrative description for how selected adaptation strategies would need to be adjusted to provide flood risk reduction for the 3.1 ft (2100 Intermediate) sea level rise scenario and options for what might need to occur in the 6.6 ft (2100 High) sea level rise scenario. The pathways should build upon the timing and phasing details from the vulnerability assessment (C2-d), and include triggers (e.g., water levels, changing land use, asset life cycle), decision points, lead times, strategy lifespan, and meet the **Adaptation Strategy Standards**.

ALTERNATIVE PATHS TO COMPLY

Local governments may submit diagrams other than a schematic, as long as the submission demonstrates how adaptation strategies would be able to build upon one another to respond to increased risks from coastal flood hazards.

13 A schematic diagram refers to a visual representation of a system or process that identifies the components (i.e., adaptation strategies) and relationships or linkages among them (i.e., adaptation pathways).

EQUITY ASSESSMENT STANDARDS IN ELEMENT D

D1-a. Local vision

- **Community input in the local vision.** Communities should help shape the local vision. Describe how the local vision takes into consideration and elevates vulnerable community needs.

D4-a Selected adaptation strategies for the 0.8 ft (2050) sea level rise scenario

- **Community benefits**. Adaptation strategies can help maximize community benefits and minimize cumulative burdens. Include who will benefit from or be burdened by the potential outcomes of adaptation strategies. Describe the community benefits from selected adaptation strategies.
- **Community and Tribal capacity**. Adaptation strategies have the potential to further improve community and Tribal capacity. Describe how the adaptation strategies build community capacity for adaptation and self-determination.
- **Unintended negative consequences**. Adaptation strategies could cause unintended negative consequences in the short term or long term for socially vulnerable communities. Evaluate if there are negative consequences to vulnerable communities, what the consequences of not taking these strategies would be, and how a change in strategies could mitigate issues. Describe potential unintended negative consequences in the short term and long term and how strategies reduce impacts.

Element D — Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

Element D: Adaptation Strategies and Pathways					
D1.	a.	Local vision	Local vision for the full planning area that aligns with the One Bay Vision.	☐	
		Community input in the local vision	Description of how the vision takes into consideration and elevates vulnerable community needs.	☐	Equity Assessment
D2.	a.	Adaptation strategy alternatives for the 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios	Map(s) and description of at least two adaptation alternatives for both the 0.8 ft (2050) 3.1 ft (2100 Intermediate) sea level rise scenarios as outlined in the Coastal Flood Hazards and Sea Level Rise Scenarios Standard.	☐	
D3.	a.	Evaluation criteria	Evaluation criteria for evaluating strategies.	☐	
D4.	a.	Selected adaptation strategies for the 0.8 ft (2050) sea level rise scenario	Map(s) and description of the selected adaptation strategies that meet the Adaptation Strategy Standards (below) and comply with the scenarios as outlined in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard.	☐	
		1. Improve public access and connection to and across the shoreline	Demonstration and description of where and how the adaptation strategies improve public access and connection to and across the shoreline.	☐	Adaptation Strategy Standard
		2. Prioritize facilities and uses that require a location along the shoreline over facilities and uses that do not	Demonstration and description of where and how uses and facilities that require shoreline location are being prioritized.	☐	Adaptation Strategy Standard
		3. Protect, restore, enhance, and adapt Baylands habitats and ecosystems and facilitate their long-term survival	Demonstration and description of where and how Baylands habitats are being protected, restored, enhanced, and adapted and how ecosystems will be facilitated to support their long-term survival.	☐	Adaptation Strategy Standard
		4. Prioritize natural and nature-based adaptation solutions where feasible	Demonstration and description of where and how natural and nature-based adaptation is being prioritized.	☐	Adaptation Strategy Standard
		5. Preserve natural and undeveloped lands and open space for shoreline resilience	Demonstration and description of where and how existing natural lands, and undeveloped lands are being preserved and designated for shoreline resilience.	☐	Adaptation Strategy Standard

	6. Minimize flood risk in areas with existing and planned development	Demonstration and description of where and how flood risk reduction is being minimized for existing and planned development at risk.	☐	Adaptation Strategy Standard
	7. Include actions to mitigate involuntary displacement risk	Demonstration and description of where and how involuntary displacement risk is being mitigated.	☐	Adaptation Strategy Standard
	8. Promote safe, sustainable and strategic growth and density	Demonstration and description of where and how safe, sustainable, and strategic Growth Geographies are being achieved.	☐	Adaptation Strategy Standard
	9. Maintain reliable services provided by critical infrastructure and emergency facilities	Demonstration and description of where and how the services from critical infrastructure and emergency facilities are being maintained over time.	☐	Adaptation Strategy Standard
	10. Maintain regional networks that facilitate the reliable movement of people and goods	Demonstration and description of where and how the regional movement of people and goods is being maintained.	☐	Adaptation Strategy Standard
	11. Prioritize contamination remediation in Environmental Justice communities	Demonstration and description of where and how cleaner communities are being prioritized in Environmental Justice communities.	☐	Adaptation Strategy Standard
D4	12. Reduce contamination risks in communities and ecosystems	Demonstrate and describe where and how contamination risks are being reduced in communities and ecosystems.	☐	Adaptation Strategy Standard
	13. Appropriately utilize Bay fill for shoreline protection	Demonstration and description of how the strategies avoid and minimize fill for the sole purpose of shoreline protection.	☐	Adaptation Strategy Standard
	14. Integrate multiple benefits into adaptation	Demonstration and description of how benefits beyond flood risk reduction were considered and incorporated.	☐	Adaptation Strategy Standard
	15. Incorporate climate-responsive standards, codes, and zoning for adaptive design	Demonstration and description of what standards, codes, or zoning for climate-responsive designs are incorporated.	☐	Adaptation Strategy Standard
	16. Plan for changes in land use, removal of assets, and/or equitable relocation	Demonstration and description of where and how changes for land use, removal of assets, and/or equitable relocation will be occurring.	☐	Adaptation Strategy Standard
	17. Identify actions necessary to enable future adaptation decisions, if currently not available	Description of what actions may be necessary to enable future adaptation decisions, if currently not available.	☐	Adaptation Strategy Standard

D4		18. Develop and maintain cross-jurisdictional flood risk reduction	Demonstration and description of adaptation coordination and approaches for reducing flood risk across jurisdictional boundaries.	☐	Adaptation Strategy Standard
		19. Integrate coastal flood protection with stormwater and riverine flood management	Demonstration and description of where and how coastal flood protection is being integrated with stormwater and riverine flood management.	☐	Adaptation Strategy Standard
		20. Evaluate and minimize consequences of failure	Demonstration and description of where and how the consequences of failure are being minimized.	☐	Adaptation Strategy Standard
		Community benefits	Description of the community benefits from selected adaptation strategies.	☐	Equity Assessment
		Community and Tribal capacity	Description of how the adaptation strategies build community capacity for adaptation and self-determination.	☐	Equity Assessment
		Unintended negative consequences	Description of potential unintended negative consequences in the short term and long term and how strategies reduce impacts.	☐	Equity Assessment
	b.	Adaptation pathways for 2100 and beyond	Description of how adaptation pathways options can build upon the selected adaptation strategies options to provide flood risk reduction at higher water levels as outlined in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard.	☐	

3.2.5 Element E: Land Use and Policy Plan

Intended Element Outcome

Proposed land use and policy changes necessary to implement adaptation strategies over time.

This element outlines land use, policy, and programmatic changes that will likely be necessary to implement adaptation strategies, including protecting, preserving, expanding, or changing certain land uses or establishing citywide or site-specific policies and programs that support a more resilient shoreline over time.

Land use decisions play a critical role in minimizing future risk. In some locations, risk can be avoided altogether through conservation easements or other tools that avoid or even phase out development in high-risk areas. Many shoreline areas with existing development, such as residential, commercial, or industrial land uses, may need to enact long-term land use changes or policies that protect the highest-risk portions of the shoreline while densifying other sites. Jurisdictions will need to balance the trade offs among equity, housing, economic prosperity, Tribal interests, and environmental goals while deciding where to focus or reduce certain land uses, and how to mitigate risk when placing new development in areas that may be at risk of hazards.

Citywide and site-specific policies or programs can dictate how decisions are made by developers, landowners, and others. Establishing and promoting practices that help advance adaptation goals can set up a future landscape that lends itself to supporting a resilient future.

The RSAP Guidelines do not compel land use or planning changes by local governments, and do not supersede existing plans, such as the land use element of general plans or local zoning ordinances. In developing and submitting Subregional Plans to BCDC for approval as consistent with the RSAP Guidelines, BCDC advises local governments to account for any such local land use/planning changes (if any) that would be appropriate and/or necessary to implement the local government's Subregional Plan and can feasibly be achieved by the local government.

However, Subregional Plans on their own carry no land use authority. All land use and policy changes identified are not effective until they are adopted via a jurisdiction's local land use approval processes.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT E

Coastal Flood Hazards and Sea Level Rise Scenarios Standard: Required to be used when describing land use adaptation strategies to facilitate adaptation for the required coastal flood hazards and sea level rise scenarios.

Equity Assessment Standard: Complete assessment sections related to equitable outcomes of land use approach and changes.

Element E — Plan Requirements

E1 Describe proposed land use and policy changes necessary to enact the adaptation strategies and pathways identified in Element D.

a. **Proposed land use approach.** Describe and map any proposed land use changes necessary to achieve the selected adaptation strategies (D4-a) and adaptation pathways (D4-b) at the required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard**. Land use changes may include changes to zoning types, shifts in density, overlay zones, easements, or other planning tools. This should build on the information on existing plans gathered in Element B. Complete the **Equity Assessment Standard** to describe potential equity implications of proposed land use approaches.

b. **Policy changes.** Summarize proposed citywide or site-specific policies or programs identified that support or supplement adaptation strategies and pathways identified in D4 and how these policies support the overall approach to shoreline resilience. Policies may include building standards, development policies, land acquisition policies, establishment of setbacks or buffers, transfer of development rights programs, strategic realignment, establishment of special tax districts, such as climate resilience districts, or other similar policies.

PLANNING TIP
The land use changes proposed in this element should be considered in the context of existing land use plans and other land use considerations.

Left: East Bay shoreline. Photo by SF Baykeeper photographer Cole Burchiel and LightHawk.

E2

Describe policy and programmatic changes necessary to enact the adaptation strategies and pathways identified in Element D.

a. **Codifying plans and policies.** Outline the planning, policy, and programmatic processes necessary to update or change land use plans and/or adopt new policies to integrate adaptation strategies into plans and policies with local authority and achieve the changes described in E1-a and E1-b. Identify and describe how and where strategies should be incorporated or codified into existing plans, policies, and practices in each participating jurisdiction. At a minimum, consider linkages to local hazard mitigation plan/safety element, other general plan elements, capital improvement plans, specific plans/special area plans, or other plans as identified in B2. Include a description of how new policies will be developed to achieve selected adaptation strategies (D4-a).

EQUITY ASSESSMENT STANDARDS IN ELEMENT E

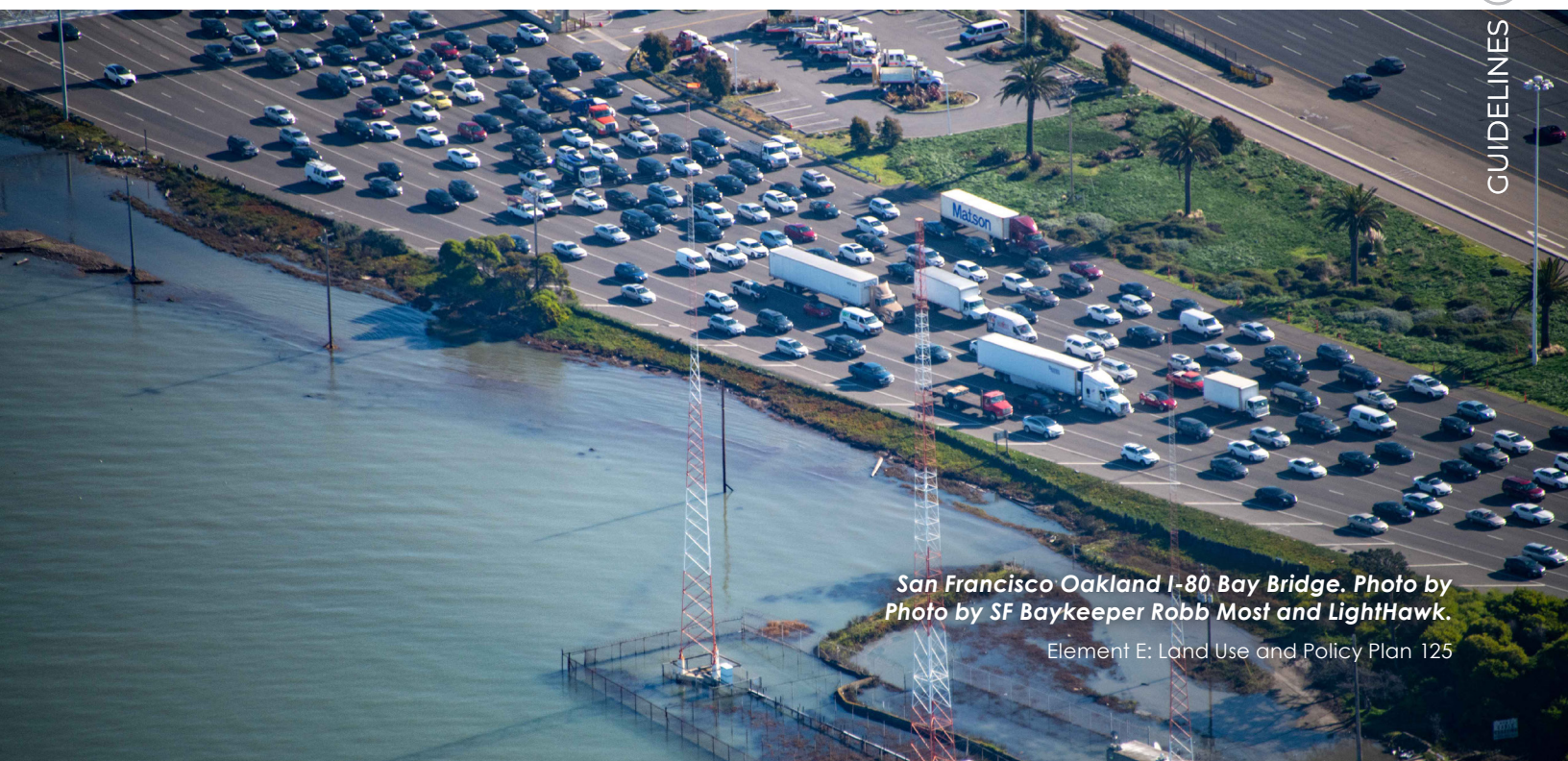
E1-a. Proposed land use approach.

- **Land use changes and benefits.** Land uses can have significant impacts on community health and well-being and affect current and future displacement risk. Include if any of these land use changes may result in the displacement of socially vulnerable communities, and benefits and co-benefits of land use plans and policies. Describe how proposed land use changes resulting from the selected adaptation strategies and adaptation pathways will affect vulnerable communities.
- **Resource displacement.** Plans and policies can affect the location and quality of resources and services, including critical infrastructure, Tribal resources, and services to vulnerable communities. Describe how proposed land use changes resulting from the selected adaptation strategies and adaptation pathways will affect resources.
- **Community benefits.** Adaptation strategies can result in a wide range of benefits. Describe if and how the strategies provide other community benefits in addition to sea level rise and flooding reduction.

Element E —Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

Element E: land use and policy plan					
E1.	a.	Proposed land use approach	Description and maps of proposed land use changes at all required time horizons necessary to achieve the selected adaptation strategies.	☐	
		Land use changes and benefits	Description of how proposed land use changes resulting from selected adaptation strategies and adaptation pathways will affect vulnerable communities.	☐	Equity Assessment
		Resource displacement	Description of how proposed land use changes resulting from the selected adaptation strategies and adaptation pathways will affect resources.	☐	Equity Assessment
		Community benefits	Description of if and how the strategies provide community benefits in addition to sea level rise and flooding reduction.	☐	Equity Assessment
	b.	Policy changes	Description of proposed policies or programs and how they support the overall approach to shoreline resilience.	☐	
E2.	a.	Codifying plans and policies	Description of processes necessary to update or change land use plans and/or adopt new policies.	☐	



San Francisco Oakland I-80 Bay Bridge. Photo by Photo by SF Baykeeper Robb Most and LightHawk.

3.2.6 Element F: Implementation Plan and Funding Strategy

Intended Element Outcome

A plan to successfully implement the adaptation strategies identified in Plan Elements D and E, including implementation steps, phasing, leads for planning and implementation, funding strategies, and a timeline for plan updates.

This element describes how adaptation strategies, pathways, projects, plans, and policy changes will be implemented and funded over time. It includes an implementation plan that assigns leads and identifies key actions toward implementing adaptation strategies, a high-level funding strategy, a monitoring plan for adaptation pathway triggers and thresholds, and a timeline and strategy for updating Subregional Shoreline Adaptation Plans.

Taking strategies from concept to design to construction is a significant lift. Effective sea level rise protection requires much work beyond existing Subregional Plans to advance project concepts as required by these Guidelines. This section is not intended to provide enough information to advance every project immediately but can help shape more robust implementation through identifying who needs to be at the table to make implementation happen, key challenges to implementation, and some early next steps.

One of the major barriers to implementation can be land ownership or asset management that is outside a jurisdiction's control such as a state park, office park, special district, or railroad. Recognizing this challenge can help local governments establish frameworks for building necessary relationships that may be critical to implementing projects that are not feasible now, but could be in the future with greater collaboration, trust, and cooperation.

Similarly, funding projects represents a major hurdle that can seem insurmountable. Describing high-level costs for projects and identifying potential means to pay for projects over time can help identify a path forward. This section is not intended to include complex cost-benefit calculations or commit to funding tools, but instead to lay out an order-of-magnitude picture that can be analyzed on a project-by-project basis over time.

Finally, as adaptation is ever evolving, it is critical to monitor the conditions that signal a need to advance more quickly, change course, or otherwise adjust an adaptation strategy or pathway to maintain the desired end results.

For local governments that have already begun implementation of strategies, this element should include the implementation steps, responsible parties, and funding sources already underway. If in-process implementation is missing Plan requirements, discuss with BCDC staff to come up a satisfactory approach to meeting the Plan requirements in this section.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT F

Equity Assessment Standard: Complete assessment related to adaptation costs and sources.

Element F — Plan Requirements

F1 Include an implementation plan that identifies next steps and responsible entities for implementing the selected adaptation strategies and pathways.

a. **Plan implementation lead.** Identify a lead to oversee overall Plan implementation, coordinate implementation leads, and track implementation progress.

b. **Implementation plan.** Identify an implementation plan for selected adaptation strategies in priority areas (D4-a) and, where appropriate, strategies in adaptation pathways (D4-b) that need to be initiated early. This should include responsible parties, key actions at each phase of the pathway, an anticipated timeline, known considerations and challenges (such as dependence on the action of private landowners), and necessary involvement from affected and interested parties.

c. **Ongoing coordination.** Identify ongoing mechanisms for engaging with neighboring jurisdictions, Tribes, private landowners, special districts, or other entities that play a large role in the implementation of projects that cross jurisdictional boundaries, are multi-benefit or multi-sector, or are not immediately controlled by the local jurisdiction.

PLANNING TIP

When moving from adaptation strategies to identifying specific projects for implementation, consult best practices for engineering and design standards, as adaptation project design and implementation require more specific considerations of flood management for sea level rise and related coastal flood hazards.

F2 Include a funding strategy that identifies potential costs and sources of funding to implementing adaptation strategies and pathways.

a. **Adaptation costs and sources.** Determine the potential high-level costs of selected adaptation strategies in priority areas (D4-a). This should include capital costs of adaptation, additional planning, design, construction, permitting, and ongoing maintenance. Identify potential funding and financing mechanisms (e.g., grants, bonds, etc.) that could be used for these costs and key actions to initiate securing funding. Complete the **Equity Assessment Standard** to describe how funding supports community benefits.

F3 Include a monitoring program that describes how adaptation strategies and triggers are being assessed to ensure adaptation pathways can be effectively implemented.

a. **Monitoring program.** Develop a monitoring program that identifies a monitoring lead (if different than lead identified in F1-a) that is linked to key triggers, thresholds, and/or decision points for adaptation pathways as identified in D4-b.

b. **Measure and communicate progress.** Identify ways to measure and communicate publicly and transparently progress of selected adaptation strategies, and/or identify and track key metrics of success. This may include using the evaluation criteria to develop performance measures and/or use of a percent completion approach for each project to indicate advancement.

PLANNING TIP
Adaptive management is a tool to support systems change, where projects are monitored, evaluated, and changed in an iterative and adaptive way. This is often used in natural resource management.

F4 Include a timeline and strategy for Plan updates.

a. **Plan update timeline.** Identify a timeline for Plan updates that includes an interim status report and a comprehensive Plan update. Comprehensive Plan updates should occur no less frequently than 10 years after approval of the initial Plan. Document an ongoing Plan lead and partners that will initiate and implement required Plan updates, coordinate updates with partners, and establish a strategy to align Plan updates with updates to other relevant plans and policies (see B1).

b. **Known gaps in capacity.** Include description or identification of known gaps in capacity that should be filled to ensure effective implementation of the Plan and/or ongoing plan maintenance.

c. **Plan update funding.** Identify potential sources of funding that could be used to support the ongoing administration, monitoring, coordination, and implementation of Subregional Plans.

PLANNING TIP
Consider aligning Subregional Plan updates with related efforts, where possible, such as with general plan housing element updates, occur every eight years, or local hazard mitigation plans, which are updated every five years.

EQUITY ASSESSMENT STANDARDS IN ELEMENT F

F2-a. Adaptation costs and sources

- **Funding prioritization.** Prioritizing economic opportunities from adaptation in vulnerable communities is part of the One Bay Vision. Describe where and how funding has been prioritized to projects that benefit vulnerable communities.
- **Community benefits agreement**. A community benefits agreement can ensure adaptation funding will go toward hiring local people or companies for monitoring, construction, public outreach, or other benefits. Describe if and how how a community benefits agreement is supporting vulnerable communities.

Element F — Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

Element F: Implementation Plan and Funding Strategy					
F1.	a.	Plan implementation lead	Identification of an overall lead for Plan implementation.	☐	
	b.	Implementation plan	Implementation plan for selected adaptation strategies in priority areas.	☐	
	c.	Ongoing coordination	Description of ongoing mechanisms for engaging with other implementation stakeholders.	☐	
F2.	a.	Adaptation costs and sources	Summary of high-level costs of priority adaptation strategies and known and potential funding sources.	☐	
		Funding prioritization	Description of where and how much funding has been prioritized to projects that benefit vulnerable communities.	☐	Equity Assessment
		Community benefits agreement	Description of if and how a community benefits agreement is supporting vulnerable communities.	☐	Equity Assessment
F3.	a.	Monitoring program	Description of monitoring program linked to triggers, thresholds, and decision points for adaptation pathways.	☐	
	b.	Measure and communicate progress	Description of strategy for measuring and monitoring progress of implementation.	☐	
F4.	a.	Plan updates	Description of strategy for implementing required Plan updates and update timeline.	☐	
	b.	Known gaps in capacity	Description of known gaps in capacity for implementing and maintaining the Plan.	☐	
	c.	Plan update funding	Summary of sources of funding for ongoing Plan updates.	☐	

3.2.7 Element G: Project List

Intended Element Outcome

A list of adaptation projects for consideration for funding prioritization and for inclusion in region-wide databases. If adaptation strategies are not advanced enough to contain individual project data, this section is not necessary to complete.

This Plan element requires the submission of project data for projects that have been developed with sufficient level of detail and are planned to be implemented in the foreseeable future. The projects on this list are a subset of the strategies in the adaptation pathways.

To protect the places that flood first, the most vulnerable communities, and the networked assets on which the region relies, jurisdictions in the region must collaborate to target limited resources where they are needed most. Collectively identifying projects in the planning, design, construction, and monitoring phases ensures that the region can evaluate the urgency and benefits of projects throughout the region and decide together the best options to advance regional goals.

BCDC and MTC/ABAG have already established a regional database of adaptation plans and projects submitted as part of Subregional Plans will continue to build out this database. Tracking adaptation projects region wide helps to identify where adaptation gaps remain along the shoreline, evaluate how projects work together, establish priorities for strategic funding, and track progress towards ecosystem and habitat goals, such as via EcoAtlas.

Project data should be inputted into the regional project database as soon as information becomes available to ensure that projects are evaluated for funding priority. Project data can be added or updated more frequently than the proposed plan update timeline.

HOW MINIMUM STANDARDS ARE USED IN ELEMENT G

Equity Assessment Standard: Complete assessment related to priority projects.

Element G — Plan Requirements

G1 Include a priority project list that summarizes priority adaptation projects.

a. **Project data.** For strategies that have identified projects ready for design, or for projects previously identified and currently in design or construction, provide a list of the identified projects and the following data for each project:

- Project name
- Short project description (one to two sentences)
- Design life
- Design condition (feet of sea level rise the project is designed to)
- Estimated year of construction

Complete the **Equity Assessment Standard** to describe how priority projects support vulnerable communities.

b. **Regional project database.** Submit relevant project data for adaptation strategies identified in G1-a via an online Regional Project Database and comply with the project checklist template provided online, which may require additional project data than G1-a.

EQUITY ASSESSMENT STANDARDS IN ELEMENT F

G1-a. Project data

- **Priority projects.** Describe which priority projects (if any) provide flood risk reduction and/or benefits to vulnerable communities.

Element G — Submittal Checklist

This checklist is meant to provide a quick glance at plan submittal requirements.

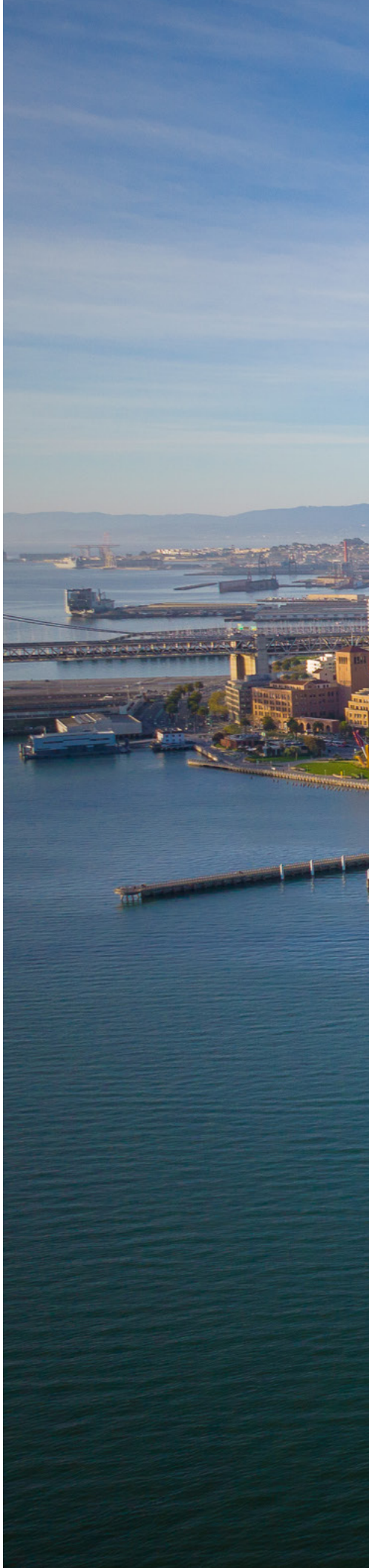
Element G: Project List				
G1	a. Project data	Project list that contains all required information for priority projects.	☐	
	Priority projects	Description of which priority projects (if any) provide flood risk reduction and/or benefits to vulnerable communities.	☐	Equity Assessment
	b. Regional project database	Submittal of relevant project data via the regional project database.	☐	

3.3 Minimum Standards

The following Minimum Standards in this section are referenced in the Subregional Plan Element requirements and must be met for compliance.

The purpose of these standards is to ensure that adaptation planning occurs based upon consistent minimum criteria and standards across the region. There are four Minimum Standards:

- Coastal Flood Hazards and Sea Level Rise Scenarios Standard
- Minimum Categories and Assets Standard
- Equity Assessment Standard
- Adaptation Strategy Standards

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3.3.1 Coastal Flood Hazards and Sea Level Rise Scenarios Standard

This section describes the required coastal flood hazards and sea level rise scenarios that must be used for assessment and adaptation planning in Subregional Plans.

This standard is used throughout the Subregional Plan Elements, including:

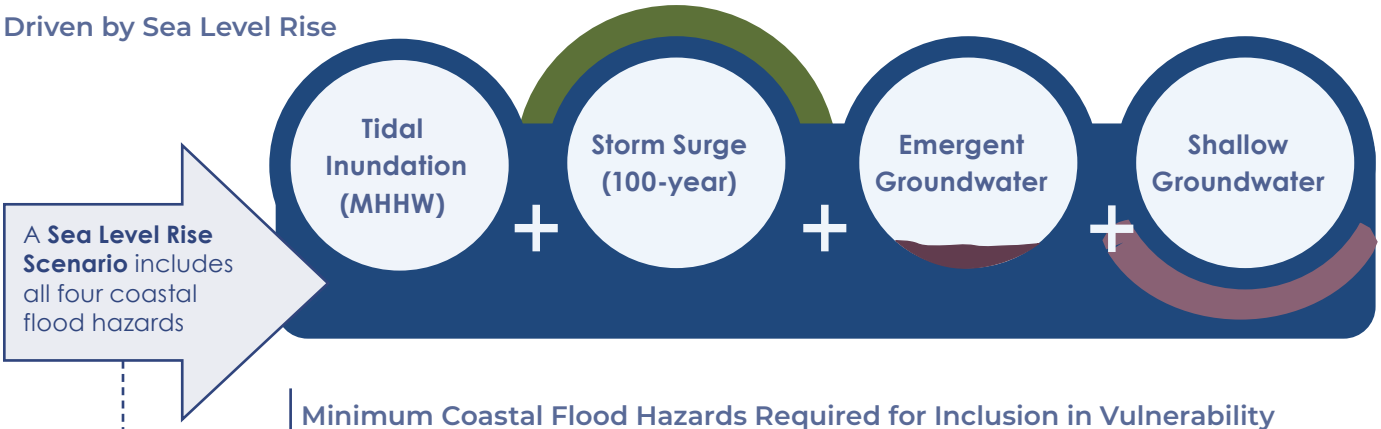
- Element A: Planning Process, to define the minimum landward boundary based on the 6.6 ft (2100 High) sea level rise scenario;
- Element C: Vulnerability Assessment, as part of an exposure analysis of the Minimum Categories and Assets;
- Element D: Adaptation Strategies and Pathways, to inform the development of adaptation strategies and pathways; and
- Element E: Land Use and Policy Plan, to provide descriptions of non-physical adaptation strategies related to land use, policy, and planning.

Table 3–2 includes the minimum hazards and sea level rise scenarios that must be included in Subregional Plans, although local jurisdictions may include additional coastal hazards and sea level rise scenarios beyond these in their plans. Maps for the coastal flood hazards and sea level rise scenarios are readily available, as separate and combined regional data layers through BCDC, and are included for reference in this section (Figure 3–2 through Figure 3–5).

The data mapped represents the **best data available at the regional scale.** Jurisdictions may substitute this data for more detailed localized data if applicable, but at a minimum, all four coastal flood hazards must be included in the Subregional Plans (Table 3–2).

The San Francisco seawall. Photo by Sergio Ruiz courtesy of California Bay King Tides Project.

Combined Coastal Flood Hazards Driven by Sea Level Rise



Minimum Coastal Flood Hazards Required for Inclusion in Vulnerability Assessments and Adaptation Strategies and Pathways*

Sea Level Rise Scenarios	Tidal Inundation (MHHW)	Storm Surge (100-year)	Emergent Groundwater	Shallow Groundwater (<9ft)
0.8 ft (2050)	MHHW + 0.8 ft	MHHW + 3.5 ft + 0.8 ft	Groundwater that has reached the surface for 0.8 ft of sea level rise	Depth to groundwater for 0.8 ft of sea level rise
3.1 ft (2100 Intermediate)	MHHW + 3.1 ft	MHHW + 3.5 ft + 3.1 ft	Groundwater that has reached the surface for 3.1 ft of sea level rise	Depth to groundwater for 3.1 ft of sea level rise
4.9 ft (2100 Intermediate -High)	MHHW + 4.9 ft	MHHW + 3.5 ft + 4.9 ft	Groundwater that has reached the surface for 4.9 ft of sea level rise	Depth to groundwater for 4.9 ft of sea level rise
6.6 ft (2100 High)	MHHW + 6.6 ft	MHHW + 3.5 ft + 6.6 ft	Groundwater that has reached the surface for 6.6 ft of sea level rise	Depth to groundwater for 6.6 ft of sea level rise

Table 3–2. Combined Coastal Flood Hazard and Sea Level Rise Scenarios Requirements.
**All Sea Level Rise Scenarios (including minimum coastal flood hazards) are required for inclusion in the vulnerability assessment. Adaptation strategies are required to be developed at a conceptual level for the 0.8 ft (2050) sea level rise scenario and a narrative description of options for adaptation pathways for the 2100 sea level rise scenarios.*

The Subregional Plan Elements require vulnerability assessments to be conducted using four sea level rise scenarios, at a minimum, based on the most up-to-date science from the California Sea Level Rise Guidance (2024). This includes the 0.8 ft (2050), and three scenarios for 2100: 3.1 ft (2100 Intermediate), 4.9 ft (Intermediate-High), and 6.6 ft (High). Additionally, the Subregional Plans Element requires adaptation strategies to respond to identified vulnerabilities at a conceptual level for the 0.8 ft (2050) sea level rise scenario and provide narrative descriptions of adaptation pathways for the 2100 sea level rise scenarios that are aligned with the concepts developed for the 0.8 ft (2050) sea level rise scenario. As emphasized in Table 3-2, all required vulnerability assessments and adaptation strategies must address all four required minimum coastal flood hazards (tidal inundation, storm surge, emergent groundwater, and shallow groundwater).

Local governments may wish to supplement these minimum requirements with additional sea level rise vulnerability assessments or adaptation strategies that include additional scenarios. Local governments are encouraged to do so when local conditions, assets, or development lifespans warrant. It is important to note that although the RSAP defines minimums for the 2050 and 2100 time horizons, sea levels will continue to rise beyond 2100.

The California Sea Level Rise Guidance (2024) includes sea level rise scenarios for 2150 including 6.1 ft (Intermediate), 8.1 ft (Intermediate-High), and 11.7 ft (High), which may be appropriate to assess for certain assets such as those with long lifespans or when considering long-term development of shoreline areas. The 2150 sea level rise scenarios are not required to be assessed in the RSAP.

The values for the combined coastal flood hazards and sea level rise scenarios were determined based upon the following information:

- **Tidal inundation:** Present day (MHHW) + sea level rise.
- **Storm Surge (100-year):** 3.5 ft + sea level rise.
- **Emergent Groundwater**: Groundwater that has reached the surface at corresponding sea level rise amount.
- **Shallow Groundwater**: Groundwater influenced by corresponding sea level rise amount that is within 9 ft of the surface.

The following sections include additional details on the selection and descriptions of the coastal flood hazards and sea level rise scenarios. For more details on the methodology, see the Data Sources and Analytical Methodology Appendix (Section 4.1) and accompanying Report.[1]

1 BCDC. 2024. Regional Shoreline Adaptation Plan: Data Sources and Analytical Methodology Report. https://bcdc.ca.gov/wp-content/uploads/sites/354/2024/11/05_Data-Sources-and-Analytical-Methodology.pdf.

Flooding from Redwood Creek impacts trails during King Tides in January 2020. Photo courtesy of California King Tides Project.

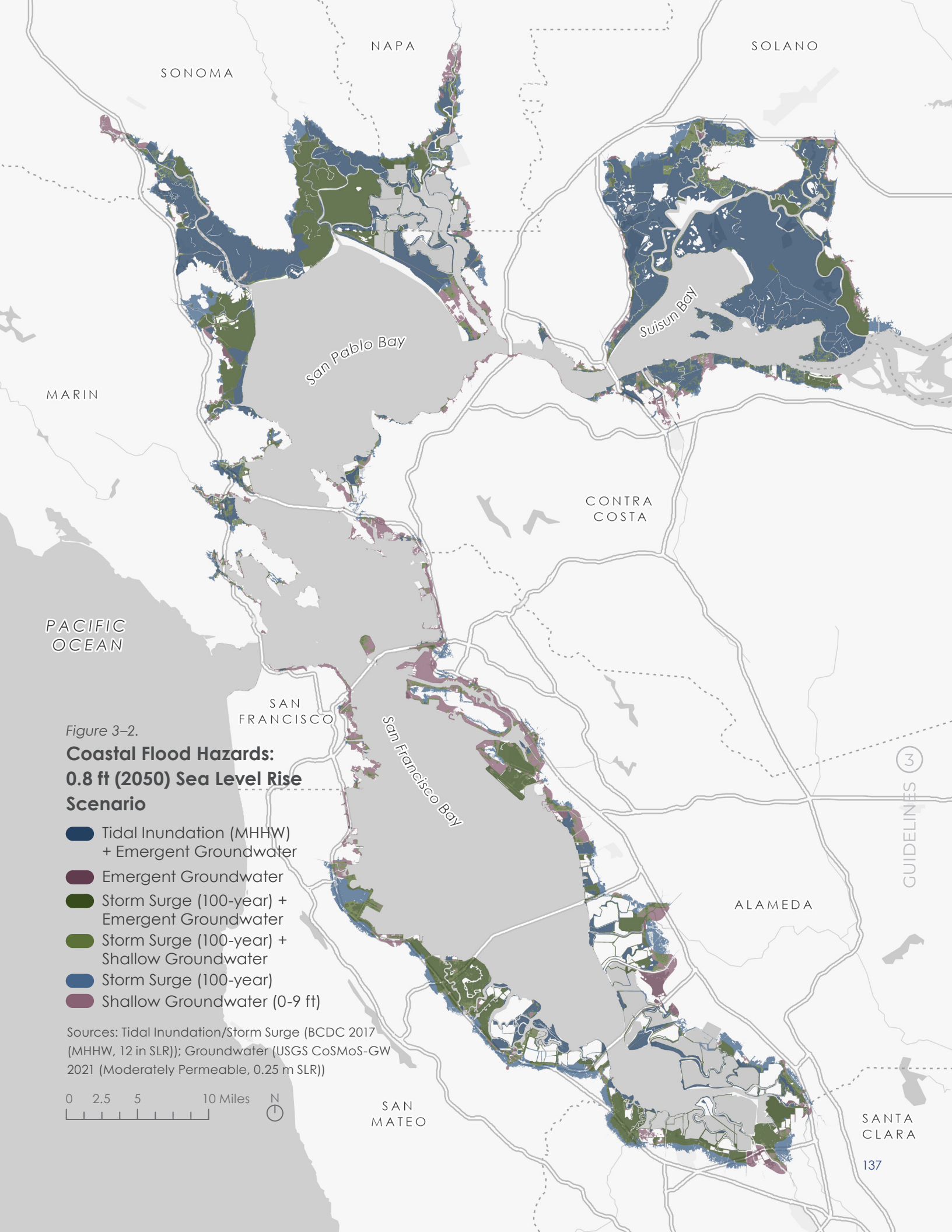


Figure 3–2.

Coastal Flood Hazards: 0.8 ft (2050) Sea Level Rise Scenario

Sources: Tidal Inundation/Storm Surge (BCDC 2017 (MHHW, 12 in SLR)); Groundwater (USGS CoSMoS-GW 2021 (Moderately Permeable, 0.25 m SLR))

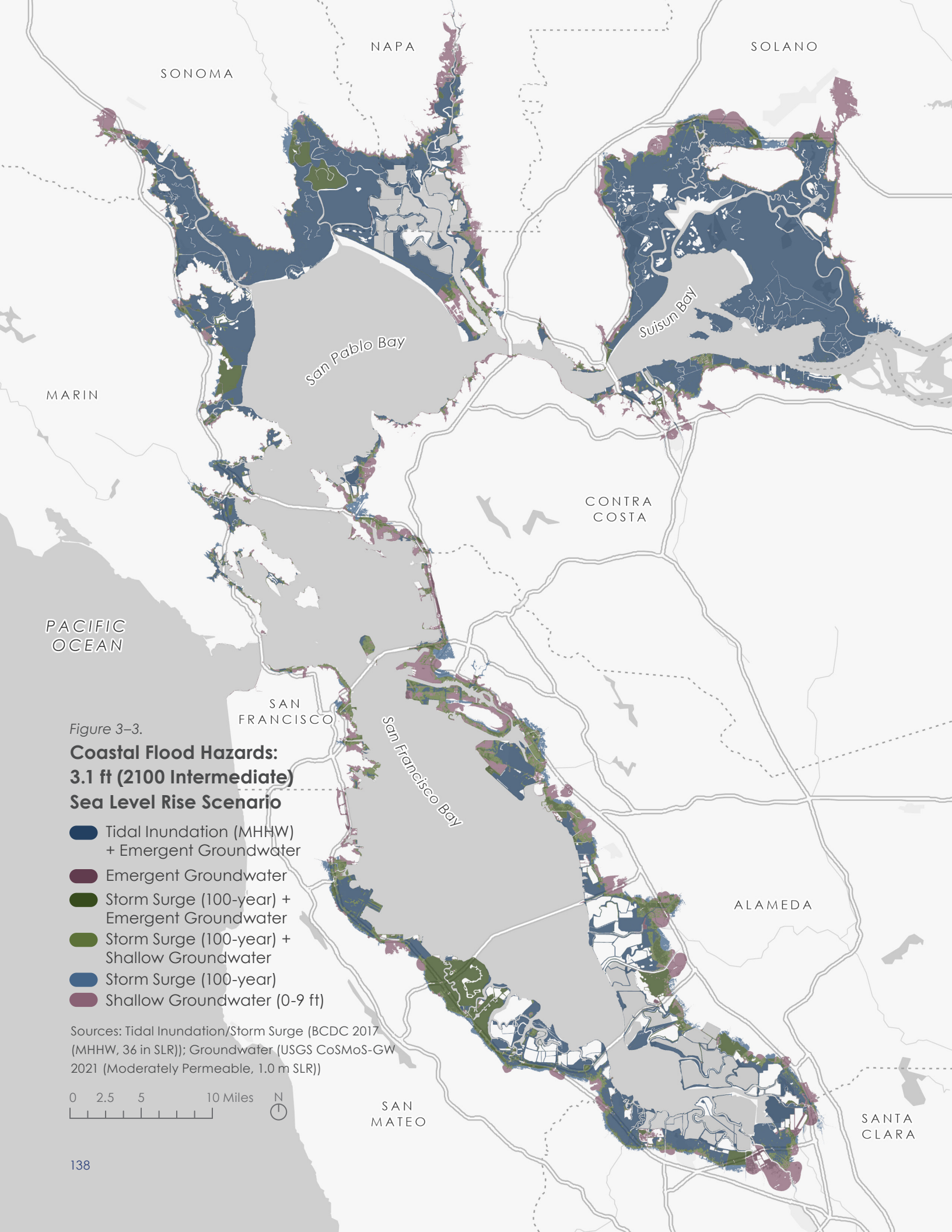


Figure 3–3.

Coastal Flood Hazards: 3.1 ft (2100 Intermediate) Sea Level Rise Scenario

- Tidal Inundation (MHHW) + Emergent Groundwater
- Emergent Groundwater
- Storm Surge (100-year) + Emergent Groundwater
- Storm Surge (100-year) + Shallow Groundwater
- Storm Surge (100-year)
- Shallow Groundwater (0-9 ft)

Sources: Tidal Inundation/Storm Surge (BCDC 2017 (MHHW, 36 in SLR)); Groundwater (USGS CoSMoS-GW 2021 (Moderately Permeable, 1.0 m SLR))

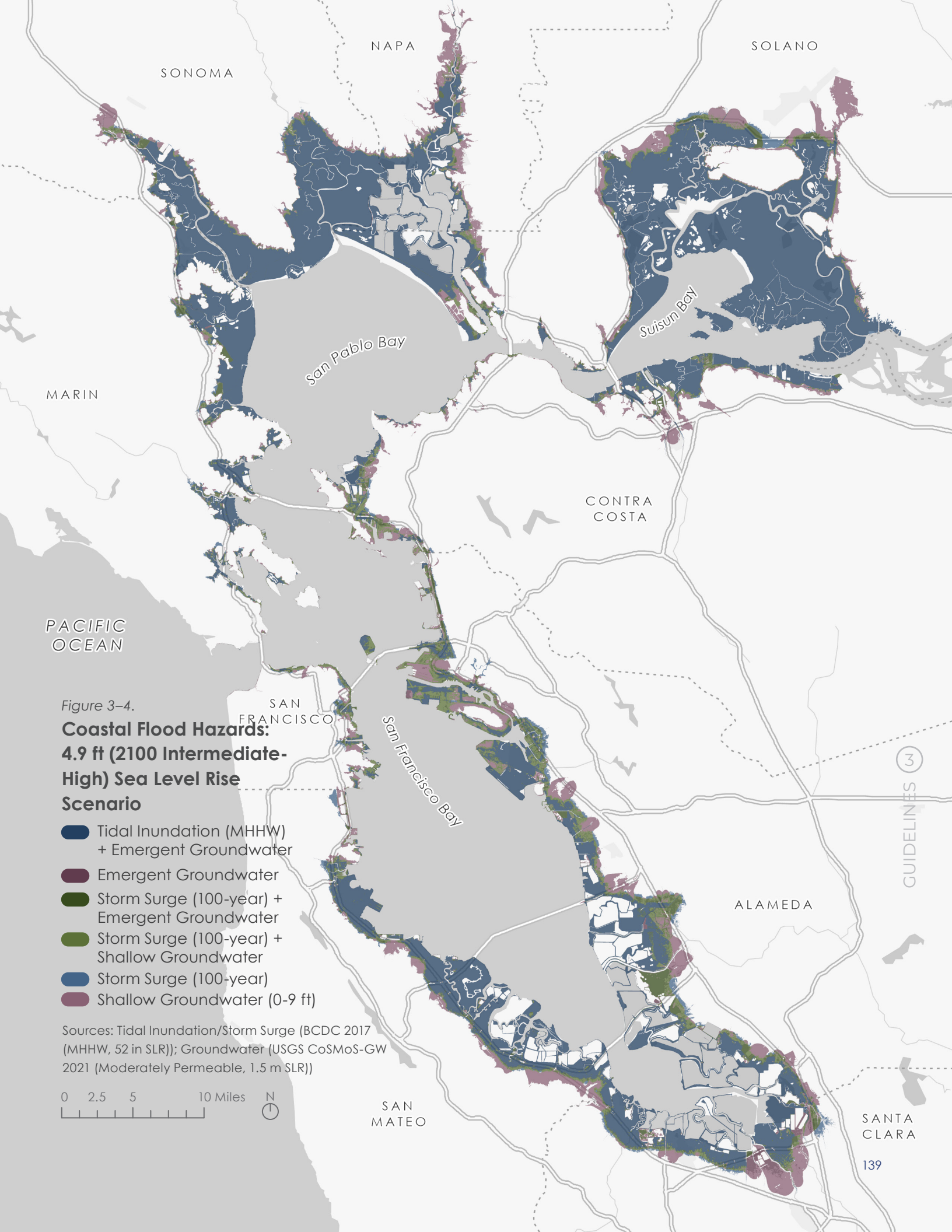


Figure 3–4.

Coastal Flood Hazards: 4.9 ft (2100 Intermediate-High) Sea Level Rise Scenario

- Tidal Inundation (MHHW) + Emergent Groundwater
- Emergent Groundwater
- Storm Surge (100-year) + Emergent Groundwater
- Storm Surge (100-year) + Shallow Groundwater
- Storm Surge (100-year)
- Shallow Groundwater (0-9 ft)

Sources: Tidal Inundation/Storm Surge (BCDC 2017 (MHHW, 52 in SLR)); Groundwater (USGS CoSMoS-GW 2021 (Moderately Permeable, 1.5 m SLR))

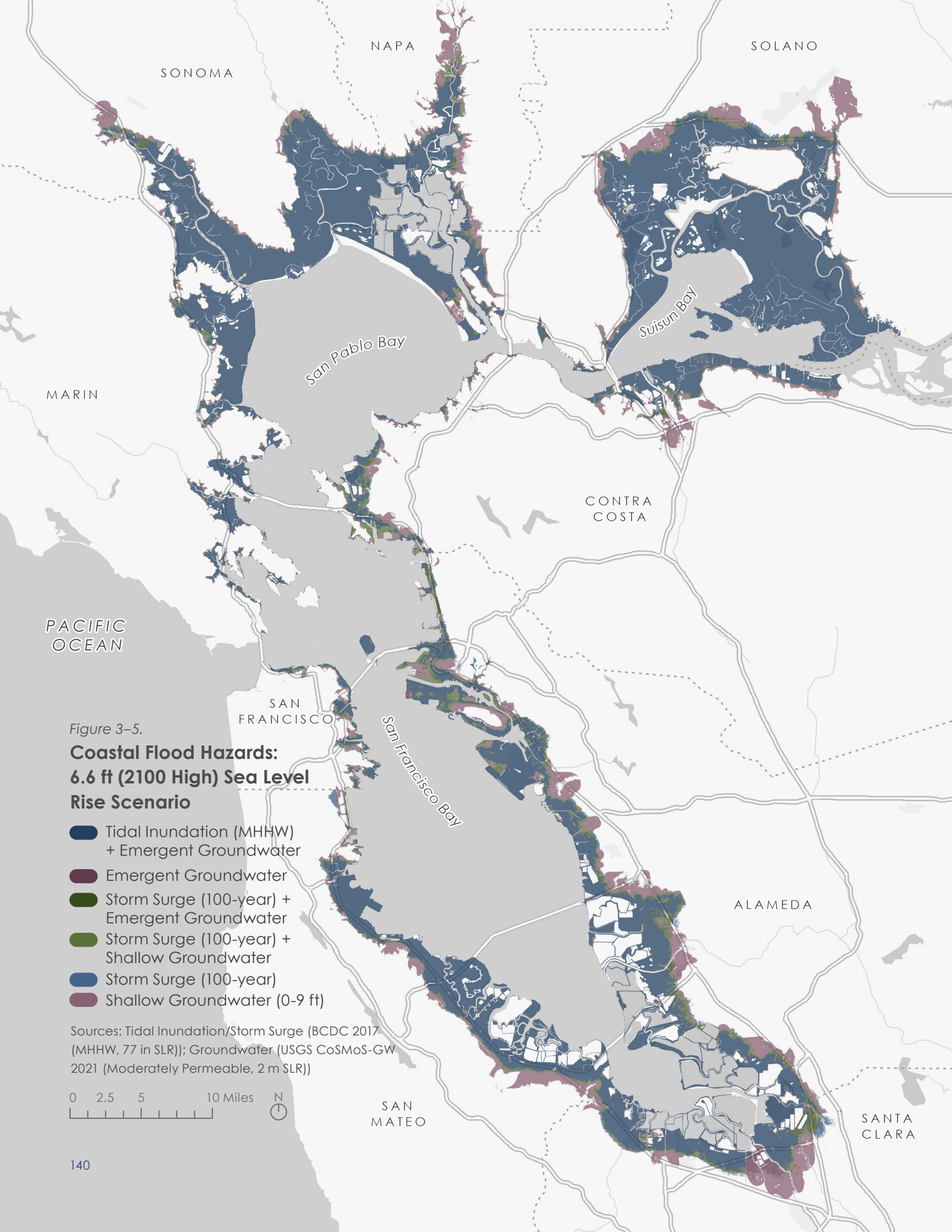


Figure 3–5.

Coastal Flood Hazards: 6.6 ft (2100 High) Sea Level Rise Scenario

Sources: Tidal Inundation/Storm Surge (BCDC 2017 (MHHW, 77 in SLR)); Groundwater (USGS CoSMoS-GW 2021 (Moderately Permeable, 2 m SLR))

Background on the Combined Coastal Flood Hazards and Sea Level Rise Scenarios

Defining the Coastal Flood Hazards

The following minimum coastal flood hazards represent existing flood hazards that are affected and influenced by sea level rise and expected to change as sea levels rise. Table 3–3 provides a list and description of the minimum coastal flood hazards required by the relevant Guideline(s). Maps for these coastal flood hazards are readily available regional data layers through BCDC.

While tidal inundation and the 100-year storm surge hazards are often used in sea level rise and adaptation planning, the RSAP includes two additional coastal flood hazards: groundwater emergent/flooding and shallow groundwater. Shallow groundwater rise is an existing hazard that will become more severe as sea levels rise. Groundwater rises as sea level rises, though the amount of groundwater rise diminishes as flooding moves inland. The depth to shallow groundwater mapped in Figure 3–2 through Figure 3–5 represents typical Bay conditions, not including storm surge. Depth to groundwater is mapped within the "groundwater rise hazard area," defined as the area with projected groundwater change greater than 4 inches due to sea level rise or where groundwater has reached the surface for the given sea level rise scenario. The groundwater data used in these maps originates from the United States Geological Survey's (USGS) Our Coast Our Future groundwater modeling (2021). Pathways Climate Institute and SFEI's "Shallow Groundwater Response to Sea Level Rise" is an alternative data source that is available for some Bay Area Counties.

Shallow groundwater is described in greater detail in the introduction and tThe Science of Sea Level Rise and Coastal Flood Hazards (Section 1.4.1), and the geologic assumptions and limitations of the data used are described in greater detail in the RSAP Data Sources and Analytical Methodology Report.[2]

Coastal Flood Hazards and Descriptions

Minimum Coastal Flood Hazards	Hazard Description
Tidal Inundation	Inundation from increases in mean higher high water (MHHW) (which increases as sea levels rise).
Storm Surge	Temporary flooding from the 100-year still water levels.
Emergent Groundwater	Groundwater that reaches the surface and can drain (emergence) or is trapped and ponds (flooding).
Shallow Groundwater	Groundwater influenced by corresponding sea level rise within 9 ft of the surface.

Table 3–3. Minimum coastal flood hazards (and descriptions) to be included in Subregional Shoreline Adaptation Plans.

WAVE RUN UP

Local jurisdictions are encouraged to use wave run up data in planning if and where that data is available. Detailed analysis of wave run up is not required in the RSAP as it is most useful in project-level and site-specific design. The RSAP does require the review of FEMA flood zones in Element B: Existing Conditions. FEMA flood zones V and VE are areas at increased risk of flooding from storm surge due to the velocity of coastal waves. BCDC can provide these data layers to support the Plan requirements. It is important to note that the FEMA flood zones do not account for increases due to sea level rise. Increased wave run up due to sea level rise will affect many shoreline areas of the San Francisco Bay. If local modeling of wave run up exists, local jurisdictions are highly encouraged to include analysis of wave run-up in both their vulnerability assessment and adaptation pathways.

2 BCDC. 2024. Regional Shoreline Adaptation Plan: Data Sources and Analytical Methodology Report.

Selecting Sea Level Rise Scenarios Projections

The following minimum sea level rise scenarios reflect the best available science at the time of publication and are derived from the California Sea Level Rise Guidance (2024).[3] Table 3–4 provides a list of the water levels in feet and the associated sea level rise scenarios required by the Guideline(s). Maps for these sea level rise scenarios are readily available through BCDC.

These values were selected for the RSAP because they represent two key time horizons: mid-century and end-of-century. It is likely that planning for adaptation will require an evaluation of risks in between these two water levels, and thus these serve as minimum benchmarks upon which to evaluate sea level rise vulnerability and adaptation pathways planning. The California Sea Level Rise Guidance (2024) recommends using the Intermediate scenario for 2050 and the Intermediate to High scenarios for 2100. When considering adaptation to these hazards, strategies in Subregional Plans should consider best available engineering guidelines such as the FEMA coastal flood building requirements.

California Sea Level Rise Guidance 2024 - Statewide Averages

Value	Scenario
0.8 ft	2050
3.1 ft	2100 Intermediate
4.9 ft	2100 Intermediate-High
6.6 ft	2100 High

Table 3–4. Sea level rise scenarios from the California Sea Level Rise Guidance (2024) and RSAP requirements to be included in Subregional Shoreline Adaptation Plans.

Using BCDC's Regional Data or Subregional/ Local Data to Meet the Standard

The purpose of this standard is to provide a consistent baseline upon which vulnerability assessments and adaptation planning are conducted around the Bay Area. However, there are slight variations among existing modeling tools (such as the BCDC's ART Sea Level Rise Flood Mapping and USGS CoSMoS), and what is considered the best available science on sea level rise continues to be updated and improved. The RSAP Coastal Flood Hazards and Sea Level Rise Scenarios listed above must be used; however, there are allowable deviations from the exact numbers that can be accepted as meeting this requirement due to these small differences in modeling.

3 Ocean Protection Council, *State of California Sea Level Rise Guidance: 2024 Science and Policy Update* (January 2024), https://opc.ca.gov/2024/01/draft-slr-guidance-2024/.

Statewide Averages Compared to Regionally Available Data Acceptable for the RSAP

2024 California Sea Level Rise Guidance (Statewide Averages)		Closest Data Available to California Sea Level Rise Guidance Scenarios		
		Tidal Inundation (ART Flood Explorer)	Groundwater Rise (USGS CoSMos - GW)	Storm Surge** (ART Flood Explorer)
0.8 ft	2050	1.0 ft	0.8 ft	4.3 ft
3.1 ft	2100 Intermediate	3.0 ft	3.3 ft	6.4 ft
4.9 ft	2100 Intermediate-High	4.3 ft	4.9 ft	8.0 ft
6.6 ft	2100 High	6.4 ft	6.6 ft	9.0 ft

Table 3–5. Mapping data values that can be used to meet the Plan requirements.
**This data is mapped in figures 3-3 through 3-6. For more information on methods, see the Data Sources and Analytical Methodology Report. **Closest available to the California Sea Level Rise Guidance (2024)+ 3.5 ft. 3.5 ft comes from the AECOM 2016 Tidal Datums and Extreme Tides Study that was produced for the San Francisco Bay. The 3.5 ft 100-year storm surge estimate is intended for high-level planning purposes and should not take the place of site-specific hydrodynamics modeling or engineering analyses.*

BCDC provides readily available data for local jurisdictions to use that includes all required coastal flood hazards at each sea level rise scenario outlined in this standard. Table 3–5 provides the specific values used by BCDC in developing the readily available layers. The tidal inundation and groundwater rise data provided by BCDC deviates from the California Sea Level Rise Guidance (2024) by no more than 0.6 ft and is within 0.2 ft for all but one scenario.

If local jurisdictions decide to conduct their own analysis, or use alternative data sources, they should make every attempt possible to use the closest numbers to the most recent California Sea Level Rise Guidance (2024). However, values that are within 0.5 ft for the 2050 scenario, and within 1.0 ft of the 2100 scenarios may be accepted, if provided justification for why closer numbers could not be used. This is applicable for tidal inundation, emergent groundwater, and shallow groundwater. For storm surge, values must be within 0.5 ft of the 2050 scenario + 3.5 ft and within 1.0 ft of the 2100 scenarios + 3.5 ft. Data used for this analysis outside the data available from BCDC must adhere to the best available data criteria in this document (Section 3.1.2). If existing work is outside this range, consult with BCDC staff during planning process.

One Map, Many Futures Approach

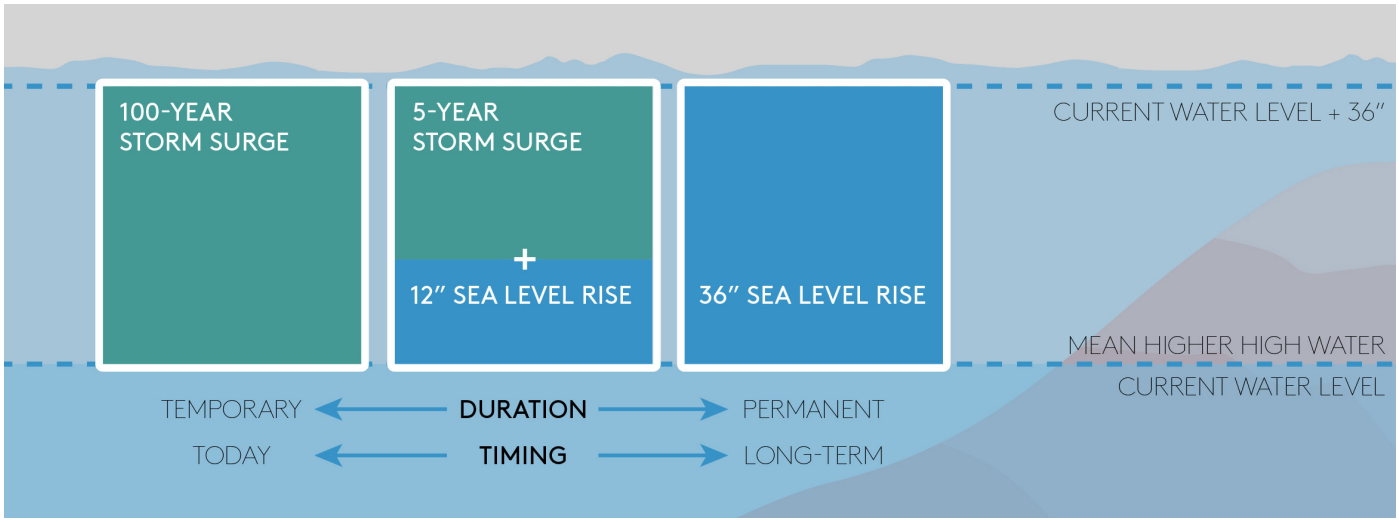


Figure 3–6. The One Map, Many Futures approach allows a user to consider multiple types of flooding from a single water level. In this example, 36 inches of water can occur due to a 100-year storm today, 12 inches of sea level rise and a 5-year storm, or 36 inches of sea level rise.

Using the RSAP Minimum Standards to Evaluate Sea Level Rise and Storm Surge Across Different Time Horizons

Each sea level rise scenario in the RSAP standard includes two water levels: tidal inundation and a 100-year storm surge. Using the coastal flood hazard maps available from BCDC provides a range of water levels that can be used to evaluate sea level rise and storm surge across a variety of time scenarios beyond the minimum standards. This approach is considered "One Map, Many Futures" and allows a user to look at a map of a single water level and consider flooding resulting from either permanent sea level rise or temporary flooding from storm surge. See Figure 3–6 for an example.

When cross-referenced with values from the 2024 California Sea Level Rise Guidance, the eight water levels included across the coastal flood hazard maps account for 32 future sea level rise scenarios (Intermediate, Intermediate-High, or High) across different time horizons, extending out to 2150 (Figure 3–7).

While only the 0.8 ft (2050) sea level rise scenario, and three scenarios for 2100: 3.1 ft (Intermediate), 4.9 ft (Intermediate-High), and 6.6 ft (High) are required for analysis, the One Map, Many Futures approach can prove helpful for planners during the creation of their adaptation pathways and when considering project level analysis.

For landscapes that are naturally resilient to storm surge, such as an open space area, park, or wetland, planners may wish to consider viewing the 6.6 ft (2100 High) scenario + storm surge as tidal inundation under the High scenario in 2120 or the Intermediate scenario in 2140. Conversely, for assets such as critical infrastructure—which a storm surge may have an outsized impact on—a planner could also view 6.6 ft (2100 High) tidal inundation as the 2070 High + storm surge or the 2080 Intermediate-High + storm surge. While not required, understanding how future scenarios relate to different time horizons can be a valuable tool in developing adaptation pathways.

One Map, Many Futures Approach for Coastal Flood Hazard Maps and 2024 California Sea Level Rise Guidance

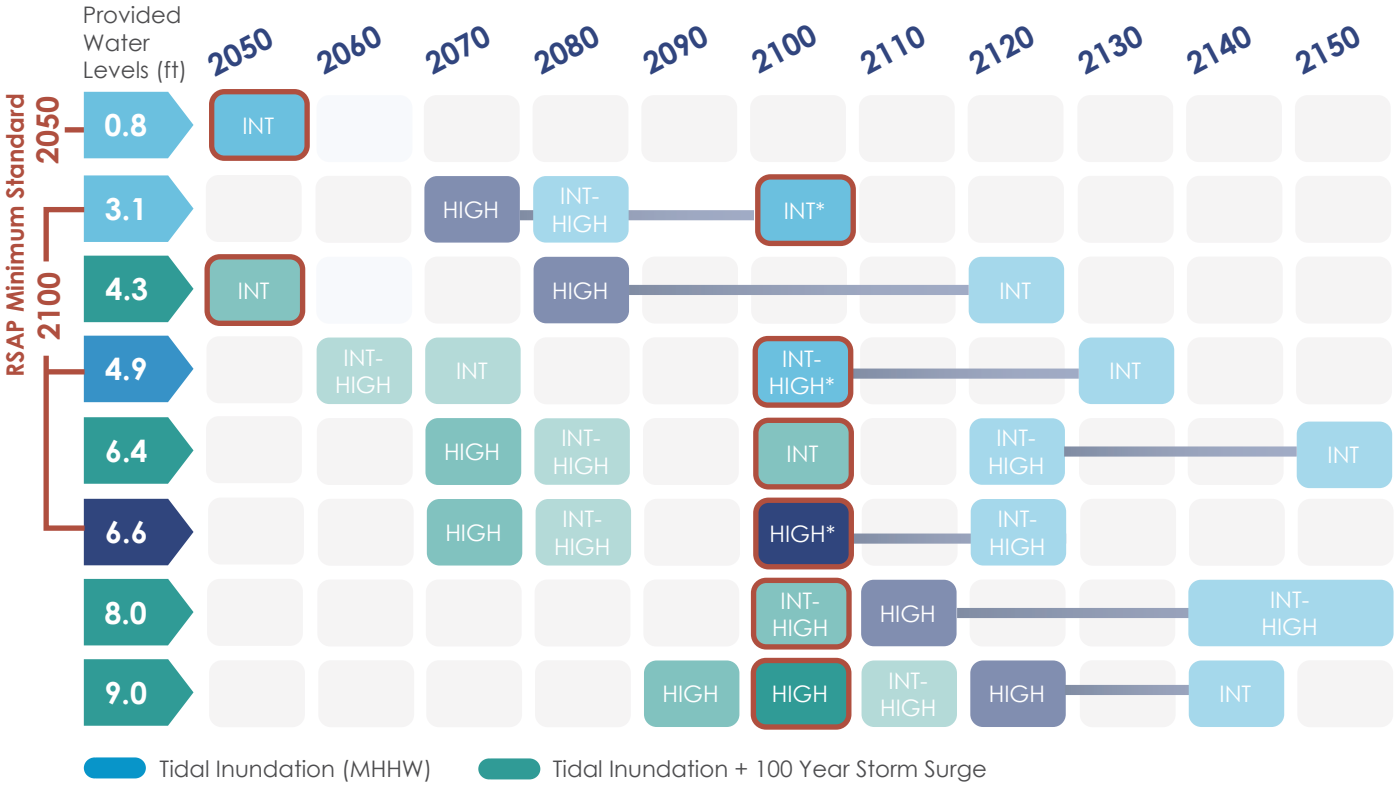


*Figure 3–7. The 2024 California Sea Level Rise Guidance includes a range of values for sea level rise projections at each time horizon (2050 - 2150) based on different future scenarios: Intermediate (INT), Intermediate-High (INT-HIGH) and High (HIGH) scenarios. The RSAP sets Minimum Standards for sea level rise, including 0.8 ft for 2050, and three scenarios for 2100, 3.1 ft (Intermediate), 4.9 ft (Intermediate-High) and 6.6 ft (High). Each sea level rise scenario in the RSAP also includes a storm surge value above the tidal inundation. Therefore, eight water levels are available through BCDC data that can be used to support local adaptation planning. Use this graphic to understand how each of the eight water levels correspond to different sea level rise scenarios (Intermediate, Intermediate-High, and High) and under what time horizons. For example, a 100-year storm surge above a 0.8 ft of sea level rise in 2050 would yield a water level of 4.3 ft. This water level can represent: the impacts of temporary storm surge in 2050, permanent tidal inundation in 2080 under a High sea level rise scenario, or permanent inundation in 2120 under an Intermediate sea level rise scenario. The purpose of this table is to support more nuanced adaptation planning that can be responsive to risk at water levels between 2050 to 2100, and beyond. * 2024 Sea Level Rise Guidance scenarios are included if they are within ±3 inches of the provided water levels.*

3.3.2 Minimum Categories and Assets Standard

This section describes the required minimum categories and assets that must be assessed in the Subregional Shoreline Adaptation Plans.

These categories and assets represent significant aspects of physical, environmental, social, and economic issues that must be considered in adaptation planning. This standard is used throughout the Subregional Plan Elements, including:

- Element B: Existing Conditions, to describe existing conditions of required assets;
- Element C: Vulnerability Assessment, to conduct an exposure analysis on all required assets and identify priority areas for a full vulnerability assessment; and
- Element D: Adaptation Strategies and Pathways, to develop adaptation strategies in response to identified risks.

Table 3–6 provides the minimum categories and assets, organized by topic areas that correspond to the One Bay Vision, asset category, and required asset/service. The table indicates whether this data is regionally available through BCDC or whether it needs to be collected from local sources. If data does not exist locally, is too costly to collect, or sensitive in nature, local jurisdictions may have flexibility in how those assets are addressed in their Subregional Plans. Lastly, the table denotes which minimum categories and assets are required for Plan Element C1-a exposure to coastal flood hazards.

The minimum categories and assets are designed to set minimum standards for the region to assess risk and ensure adaptation strategies and pathways are responsive to essential assets and services. Local governments are encouraged to incorporate additional assets that are locally identified within their planning process that go beyond the minimum standards as identified by their communities. For additional recommended assets, see the Appendix: Recommended Coastal Flood Hazards and Assets (Section 4.3).

ACKNOWLEDGING THE CHALLENGES OF ACCESSING CERTAIN DATA

The Minimum Categories and Asset Standard is meant to provide a helpful guide to understanding what data should be considered and incorporated consistently in local planning. BCDC is able to provide a majority of required data at a regional scale, but certain data is only available locally.

In some cases, data may be too sensitive to share publicly such as Tribal cultural resources, may be difficult to obtain, or cannot be shared due to security risks. BCDC asks that local jurisdictions make a meaningful effort to acquire local data where it is not provided by BCDC. If that data cannot be obtained or shared, consult with BCDC staff to come up with a satisfactory approach to meeting the relevant Plan requirement(s).

Minimum Categories and Assets

Topic Area	Category	Asset/Service	Required for C1-a[1]	RSAP Data Available from BCDC[2]
Community Health and Well-being	**Strategic Regional Priority**	Displacement risk	✓	✓
	Populations	Population demographics	✓	✓
		Vulnerable communities	✓	✓
		Environmental Justice communities	✓	
		Tribes	✓	
	Community Services	Healthcare facilities	✓	✓
		Historic and cultural resources	✓	
		Tribal cultural resources	✓	
Ecosystem Health and Resilience	**Strategic Regional Priority**	See assets with an asterisk* below	✓	✓
	Existing Baylands Habitats	Adjacent uplands	✓	✓
		Estuarine-upland transition zones*	✓	✓
		Beaches*	✓	✓
		Tidal marshes*	✓	✓
		Intertidal channels*	✓	✓
		Tidal ponds/pannes*	✓	✓
		Tidal flats*	✓	✓
		Subtidal habitats (shallow and deep)*	✓	✓
		Eelgrass beds*	✓	✓
		Rocky intertidal		
		Creeks/channels connected to the Bay	✓	✓
	Endangered Species	State listed endangered species	✓	
		Federal listed endangered species	✓	
	Baylands Resilience Characteristics and Ecosystem Services	Baylands resilience characteristics (qualitative)		✓
		Ecosystem services and functions (qualitative)		✓
	Restoration and Connectivity Opportunities	Undeveloped migration space*	✓	✓
		Other marsh (e.g., muted tidal, seasonal wetlands)*	✓	✓
		Non-aquatic diked Baylands (e.g., agricultural fields)*	✓	✓
		Other open water (e.g., salt ponds)*	✓	✓
	Nature-based Adaptation	Suitability (e.g., nearshore reefs, mudflat augmentation, ecotone levees, creek to Baylands re-connection, etc.)		✓

1 A check (✓) means this asset should be included in the exposure analysis for plan requirement C1-a.

2 A check (✓) means this data for this asset is available by BCDC.

Minimum Categories and Assets

One Bay Vision Topic Area	Category	Asset/Service	Required for C1-a[1]	RSAP Data Available from BCDC[2]
Development, Housing, and Land Use	**Strategic Regional Priority**	Plan Bay Area Growth Geographies	✓	✓
	Current and Future Land Uses and Development	Residential land uses	✓	✓
		Affordable housing sites	✓	
		Housing element opportunity sites	✓	
		Commercial land uses	✓	
		Industrial land uses	✓	
		Parks and recreation land uses	✓	
		Open space land uses	✓	
		Agricultural land uses	✓	
		Job spaces	✓	✓
		Tribal lands and sacred spaces	✓	
	Adaptation Projects	Existing and planned adaptation projects	✓	✓
Critical Infrastructure and Services	**Strategic Regional Priority**	Water-Related Industry Priority Use Areas and assets with an asterisk* below	✓	✓
	Utilities Infrastructure	Power plants*	✓	✓
		Substations	✓	✓
		Natural gas stations	✓	✓
		Publicly-owned wastewater treatment works and wet weather facilities	✓	✓
		Wastewater lifting stations	✓	
		Water supply	✓	
		Communications infrastructure	✓	✓
		Oil refineries	✓	✓
	Stormwater and Flood Management Infrastructure	Flood management infrastructure (e.g. levees, pumping stations, drains, culverts)	✓	
		Stormwater systems	✓	
		Sewer systems		
	Emergency Management	Emergency operations centers*	✓	✓
		Fire stations	✓	✓
		Police stations	✓	✓
	Public Trust Lands	Marinas, harbors, and other water-dependent infrastructure	✓	

1 A check (✓) means this asset should be included in the exposure analysis for plan requirement C1-a.

2 A check (✓) means this data for this asset is available by BCDC.

Minimum Categories and Assets

One Bay Vision Topic Area	Category	Asset/Service	Required for C1-a[1]	RSAP Data Available from BCDC[2]
Public Access and Recreation	**Strategic Regional Priority**	Waterfront Park, Beach Priority Use Area and assets with an asterisk* below	✓	✓
	Trails Networks	The San Francisco Bay Trail*	✓	✓
		Regional Active Transportation Network*	✓	✓
	Parks and Open Space	Parks and open space areas	✓	✓
		Public trust lands	✓	✓
	Water-Oriented Recreation	Water-oriented recreation facilities	✓	
		San Francisco Bay Area Water Trail *	✓	✓
Transportation and Transit	**Strategic Regional Priority**	See assets with an asterisk* below		✓
	Land Transportation	Highways*	✓	✓
		Passenger rail*	✓	✓
		Freight rail*	✓	✓
		Bus terminals, routes, and service yards	✓	
		Transit stops	✓	✓
	Air Transportation	Airports*	✓	✓
	Water Transportation	Seaports*	✓	✓
		Ferry terminals*	✓	✓
	Emergency	Emergency access routes	✓	
		Single points of entry	✓	
Shoreline Contamination	**Strategic Regional Priority**	Contaminated sites in Environmental Justice communities		✓
	Sites	Contaminated sites	✓	✓
		Landfills	✓	✓
		Superfund sites	✓	✓
Collaborative Governance, Flood Management, and Funding	**Strategic Regional Priority**	Hydraulically connected shorelines		✓
	Boundaries	Jurisdiction boundary		✓
		Operational Landscape Unit boundary		✓
	Partnerships	Community-based organizations (CBO)		✓
		Tribal government		
		Special districts		

Table 3–6. Minimum Categories and Assets.

1 A check (✓) means this asset should be included in the exposure analysis for plan requirement C1-a.

2 A check (✓) means this data for this asset is available by BCDC.

Assets with an asterisk (*) are those that are part of a Strategic Regional Priority for that topic area. See the Data and Assets for each Strategic Regional Priority (Section 2.4) or access data layers from BCDC.

3.3.3 Equity Assessment Standard

This section describes the required Equity Assessment that must be completed within a Subregional Plan to help ensure that the benefits and burdens of adaptation strategies are distributed fairly across all communities, particularly those that are socially vulnerable and historically marginalized.

Shoreline adaptation actions, such as the construction of seawalls, restoration of wetlands, and the implementation of flood management, systems can have varied impacts on different communities. Without an equity assessment, initiatives could exacerbate existing disparities by unfairly prioritizing affluent areas at the expense of neglecting or continuing to marginalize disadvantaged communities that may be more vulnerable to climate change impacts.

This standard is used throughout the Subregional Plan Elements, including:

- Element A: Planning Process, to ensure diverse representation, inclusion of multilingual communities, and equity in the engagement process;
- Element B: Existing Conditions, to identify existing conditions as they affect vulnerable communities, including identification of locally important community assets and services;
- Element C: Vulnerability Assessment, to ensure that local values and priorities are included in exposure and vulnerability assessments to inform adaptation planning;
- Element D: Adaptation Strategies and Pathways, to ensure vulnerable communities are incorporated in the local vision and that adaptation strategies include community benefits, build community capacity, and evaluate consequences on communities;
- Element E: Land Use and Policy Plan, to understand the impacts and benefits of land use changes on vulnerable communities;
- Element F: Implementation Plan and Funding Strategy, to ensure funding is identified for projects with community benefits; and
- Element G: Project list; to ensure priority projects include those providing flood risk reduction and/or community benefits to vulnerable communities.

Table 3–7 provides equity considerations to address throughout the planning process. A completed Equity Assessment with descriptions of responses must be provided as part of the submittal for the Subregional Shoreline Adaptation Plan.

Equity Assessment Plan Element Requirements

Equity Assessment | Element A: Planning Process

A1-b **Planning project team**

- **Diverse perspectives.** The planning effort should strive to include a representative project planning team that matches the diversity of the planning area. This means comparing how the team reflects the makeup of the demographics of the planning area. Include the steps taken to include people from vulnerable groups such as the unhoused, disabled, Tribes, diverse linguistic communities, LQBTQIAA+, youth, and elders. Describe what efforts were taken to include diverse perspectives on the project planning team.
- **Multilingual communities.** The planning effort should take every effort to offer language services. This includes maintaining a budget for translating documents, providing a translator for meetings, and providing FAQs and informational documents in languages other than English. Describe how language services are included in the planning effort.

A4-b **Equitable outreach and engagement**

- **Equity in engagement**. The engagement process must prioritize outreach efforts in vulnerable communities. This can include hosting outreach meetings in vulnerable communities, partnering and providing fiscal support for local community-based organizations to conduct outreach, and providing accommodations to make meetings more accessible to people from vulnerable communities. These accommodations may include childcare, food, and participation stipends. Describe how the engagement process includes people from vulnerable communities.
- **Community and Tribal partnerships.** The planning effort should identify and partner with community-based organizations, community groups, and Tribes to support equitable planning and engagement, with appropriate partnership agreements. Describe efforts to engage communities and Tribes in partnerships.

Equity Assessment | Element B: Existing Resources

B2-c **Ecosytem Health and Resilience conditions**

- **Communities and ecosystems**. Natural habitats can provide many community benefits through a wide array of ecosystem services, including flood risk reduction. Include if and how vulnerable communities interact with the Baylands habitats and community desires, concerns, or interests in supporting ecosystem services improvements. Describe the known relationships of communities and ecosystems and values toward natural and nature-based adaptation.

B3-a **Community Health and Well-being conditions**

- **Community assets.** Vulnerable communities should provide input and identify important community assets and services. Include community services identified by and serving socially vulnerable populations into the planning effort. Describe what community assets and services were identified by communities.

B3-b **Development, Housing, and Land Use conditions**

- **Displacement and land use patterns.** Land use patterns are likely to affect historical and future trends of displacement risk for vulnerable communities. Include how many vulnerable community populations are at risk of displacement, and how changes in development in terms of jobs or planned or new affordable housing contribute to reduce this risk. Describe how land uses may have contributed to displacement risk.

Equity Assessment Plan Element Requirements

B3-c **Critical Infrastructure and Services conditions**

- **Dependency on services.** Critical services are essential for all populations, but there may be specific conditions that make vulnerable communities more susceptible to service disruptions or have a lack of redundancy in certain communities. Describe if and how vulnerable communities have specific service dependencies.

B3-d **Public Access and Recreation conditions**

- **Access and safety.** In some vulnerable communities, access to trails, recreation, and public access is limited, non-existent, or is unsafe to get to. Include where this may occur and why or how access has been limited to inform how future changes can better serve these communities. Describe the state of connection to and safety of public access.

B3-e **Transportation and Transit conditions**

- **Mobility and affordability.** Vulnerable communities may have limited mobility options and/or be cost-burdened by transportation and transit. Describe known challenges of transportation mobility and affordability.

B3-f **Shoreline Contamination conditions**

- **Known and unknown sites.** Many vulnerable communities face contamination risks. Include the history and sources of contamination, community health concerns, status of cleanup efforts in the planning area, and concerns of unidentified contaminated sites, where known. Describe the status of contamination in communities.

B3-g **Collaborative Governance, Flood Management, and Funding conditions**

- **Community and Tribal capacity.** Building the leadership and capacity of community members to participate in adaptation planning is essential. Describe if and how funding was included for community partnerships in budgets.

Equity Assessment | Element C: Vulnerability Assessment

C1-a **Exposure to coastal flood hazards**

- **Community assets and services.** Community priorities identified in Element B: Existing Conditions should be incorporated. Describe what community assets and services were incorporated into the exposure analysis.

C2-a **Priority areas.**

- **Community input on priority areas**. Communities should help shape what assets and services are included for a more detailed vulnerability assessment. Include what characteristics, conditions, or information on vulnerable communities is being used to inform the vulnerability assessment. Describe how communities provided input to shape the identification of priority areas.

Equity Assessment | Element D: Adaptation Strategies and Pathways

D1-a **Local vision**

- **Community input in the local vision.** Communities should help shape the local vision. Describe how the local vision takes into consideration and elevates vulnerable community needs.

Equity Assessment Plan Element Requirements

D4-a **Selected adaptation strategies for the 0.8 ft (2050) sea level rise scenario**

- **Community benefits**. Adaptation strategies can help maximize community benefits and minimize cumulative burdens. Include who will benefit from or be burdened by the potential outcomes of adaptation strategies. Describe the community benefits from selected adaptation strategies.
- **Community and Tribal capacity**. Adaptation strategies have the potential to further improve community and Tribal capacity. Describe how the adaptation strategies build community capacity for adaptation and self-determination.
- **Unintended negative consequences**. Adaptation strategies could cause unintended negative consequences in the short term or long term for socially vulnerable communities. Evaluate if there are negative consequences to vulnerable communities, what the consequences of not taking these strategies would be, and how a change in strategies could mitigate issues. Describe potential unintended negative consequences in the short term and long term and how strategies reduce impacts.

Equity Assessment | Element E: Land Use and Policy Plan

E1-a **Proposed land use approach.**

- **Land use changes and benefits.** Land uses can have significant impacts on community health and well-being and affect current and future displacement risk. Include if any of these land use changes may result in the displacement of socially vulnerable communities, and benefits and co-benefits of land use plans and policies. Describe how proposed land use changes due to selected adaptation strategies and adaptation pathways may affect vulnerable communities.
- **Resource displacement.** Plans and policies can affect the location and quality of resources and services, including critical infrastructure, Tribal resources, and services to vulnerable communities. Describe how proposed land use changes due to selected adaptation strategies and adaptation pathways may affect resources.
- **Community benefits.** Adaptation strategies can result in a wide range of benefits. Describe if the strategies provide other community benefits in addition to sea level rise and flooding reduction.

Equity Assessment | Element F: Implementation Plan and Funding Strategy

F2-a **Adaptation costs and sources**

- **Funding prioritization.** Prioritizing economic opportunities from adaptation in vulnerable communities is part of the One Bay Vision. Describe where and how much funding has been prioritized to projects that benefit vulnerable communities.
- **Community benefits agreement**. A community benefits agreement can ensure adaptation funding will go toward hiring local people or companies for monitoring, construction, public outreach, or other benefits. Describe if and how how a community benefits agreement is supporting vulnerable communities.

Equity Assessment | Element G: Project List

G1-a **Project data**

- **Priority projects.** Describe which priority projects (if any) provide flood risk reduction and/or benefits to vulnerable communities.

Table 3–7. Equity Assessment required to be completed as part of the Plan Requirements in Elements A-G.

3.3.4 Adaptation Strategy Standards

This section describes the required Adaptation Strategy Standards that must be applied in the selected adaptation strategies (Element D) of Subregional Plans.

There are many different approaches that governments and communities can take to reduce flood risk. Identifying a specific adaptation strategy—whether it be a physical strategy such as an ecotone levee or seawall, or a non-physical strategy such as a change to zoning code—is a local choice. Communities must consider the short- and long-term desired levels of protection, costs, benefits, and consequences. The Adaptation Strategy Standards provide a framework for exploring and identifying adaptation strategies that meet a range of local and community needs while also contributing to regional outcomes as defined in the One Bay Vision and Strategic Regional Priorities. See Figure 3–9 for an overview of the Adaptation Strategy Standards.

Local Flexibility in How to Achieve the Standards
While the One Bay Vision sets ambitious and visionary goals for the Bay Area to strive for, there are realities and often competing priorities to consider once adaptation decisions begin to unfold on the ground.

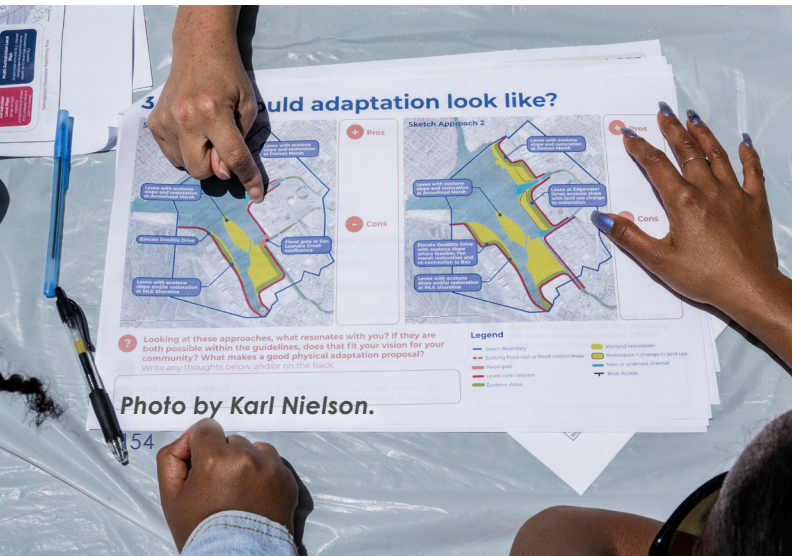


Photo by Karl Nielson.

BCDC will review Subregional Plans with an eye toward balancing strategies and achieving the broad outcomes of the standards set forth in this section. The Adaptation Strategy Standards are not intended to impose a one-size-fits all mandate, but instead ensure that core issues and outcomes are kept top of mind during the adaptation development and evaluation process.

Local governments are empowered to create innovative and flexible adaptation strategies that work together across a landscape and over time that meet their local needs while supporting regional outcomes and success. The Adaptation Strategy Standards are designed to provide guidance and support for local jurisdictions when evaluating challenging trade offs by stating the outcomes that adaptation strategies should be striving to achieve. The standards also include ideas for potential adaptation strategy options to achieve the standard to provide helpful guidance.

The extent to which these outcomes are achieved in any given location is likely to look different based on differences in local conditions, risks, barriers, and opportunities. Evaluation criteria, as required in D3, is designed to understand and balance trade offs and make local choices. Factors such as alignment with the local and One Bay Vision, equity considerations, and other locally-identified criteria should all be a part of strategy evaluation.

Some standards may be applicable everywhere and do not conflict with other standards, such as prioritizing natural and nature-based adaptation where feasible. However, some standards may not be achievable to their fullest extent in a single adaptation strategy. In these cases, trade offs will need to be weighed. Some standards apply only if certain conditions are met. For example, some standards only apply if specific assets are identified

in the Strategic Regional Priorities (indicated by the green icons). Standards may also only apply if a certain strategy approach is taken, such as incorporating climate-responsive designs and standards or planning for the removal of assets or equitable relocation. In all cases, the standards encourage jurisdictions to consider both the short-term and long-term implications of adaptation choices. Certain standards may not be applicable in the short term but may support adaptation necessary at higher water levels as conditions, strategies, and adaptation pathways change.

When trying to identify adaptation strategies: start with maximizing the benefits of shoreline uses and Baylands habitats that depend on their proximity to the Bay, then improving community health, economic development, infrastructure, and housing needs, and lastly, creating pathways to respond to changing risk over time.

Overview of Adaptation Strategy Standards

Maximize the benefits of shoreline uses and Baylands habitats that depend on their proximity and relationship to the Bay.

1. Improve public access and connection to and across the shoreline.
2. Prioritize uses that require a location along the shoreline.
3. Protect, restore, enhance, and adapt Baylands habitats, ensure complete and connected ecosystems, and facilitate their long-term survival.
4. Prioritize natural and nature-based adaptation where feasible.
5. Preserve natural and undeveloped lands for shoreline resilience.

Improve community health, economic development, infrastructure, and housing needs.

6. Minimize flood risk to existing and planned development.
7. Include actions to mitigate involuntary displacement risk.
8. Promote safe, sustainable and strategic growth and density.
9. Maintain reliable critical and emergency services.
10. Maintain regional networks that facilitate the reliable movement of people and goods.
11. Prioritize contamination remediation in Environmental Justice communities.
12. Reduce contamination risks to all communities and ecosystems.
13. Appropriately utilize Bay fill for shoreline protection.
14. Integrate multiple benefits into adaptation.

Create pathways to respond to changing flood risks over time.

15. Incorporate climate-responsive standards, codes, and zoning for adaptive design.
16. Plan for changes in land use, removal of assets, and/or equitable relocation.
17. Identify actions necessary to enable future adaptation decisions, if currently not available.
18. Develop and maintain cross-jurisdictional flood risk reduction.
19. Integrate coastal flood protection with stormwater and riverine flood management.
20. Evaluate and minimize consequences of failure.

Figure 3–9. Overview of Adaptation Strategy Standards.

Adaptation Strategy Standards	Strategy options to achieve this:

Maximize the benefits of shoreline uses and Baylands habitats that depend on their proximity and relationship to the Bay.

1. **Improve public access and connection to and across the shoreline.**

Along the Bay shoreline, provide maximum feasible public access that maintains, increases, and/or enhances existing access and preserves or improves the connectivity of regionally-significant waterfront parks, beaches, and trails across jurisdictional boundaries. Plan for a continuous San Francisco Bay Trail along the shoreline, including maintaining existing trail segments and completing planned segments to expand connections to other trail networks, including Water Trail sites, and public transportation. Public access should be compatible with Baylands habitat needs. In locations that currently have limited to no shoreline access, particularly in or near socially vulnerable and/or Environmental Justice communities, expanding safe and reliable connections to public access should be prioritized. Ensure public access will be resilient or have the capacity to adapt to changing shoreline conditions. Include how coordination with neighboring jurisdictions will occur to maintain future public access connectivity as strategies are implemented and adjusted over time. Demonstrate and describe where and how the adaptation strategies improve public access and connection to and across the shoreline.

> See the **Strategic Regional Priority: Connected Regional Shoreline Access** for more information on areas identified as regionally-significant waterfront parks, beaches, and trails.

- Adaptable design and materials
- Climate-responsive standards and codes
- Floodable spaces
- Incorporating public access with physical adaptation, such as an ecotone levee, to maintain Bay views and support habitat improvements where appropriate
- Requiring public access as a condition of new development
- Areas for future public access relocation
- Salt-water tolerant plants and landscaping
- Culturally relevant shoreline public amenities and signage

2. **Prioritize uses that require a location along the shoreline.**

Along the Bay shoreline, preserve and enhance uses that require a location along the shoreline. Uses that require a shoreline location are those that can only be carried out on, in, or adjacent to water, such as ferry terminals, ports, marinas, motorized and non-motorized boat launches, fishing piers, public access, Baylands habitats, and certain industries. This may also include related uses that support these functions. In addition, San Francisco Bay Plan designated Priority Use Areas are locations reserved for certain water-oriented uses, including ports, water-related industry, airports, wildlife refuges, and water-related recreation, and should be preserved with adaptation. Demonstrate and describe where and how uses and facilities that require shoreline location are being prioritized.

- Adaptable design
- Climate-responsive standards and codes
- Floodable spaces
- Aligning zoning with desired shoreline uses
- Capital improvements
- Incentives for private investment

Adaptation Strategy Standards	Strategy options to achieve this:
3. **Protect, restore, enhance, and adapt Baylands habitats, ensure complete and connected ecosystems, and facilitate their long-term survival.** In areas along the Bay shoreline with existing Baylands habitats, protect, restore, and/or enhance these habitats to the greatest extent feasible to meet regional habitat goals. "Protect" means continuing the functions and services the habitats provide as sea levels rise over time. "Restore" means bringing back functions and services where they once existed. "Enhance" means expanding the functions and services of habitats. Habitats do not need to be protected in place but should be able to migrate or be expanded as long as the functions are protected or enhanced. This can be achieved by ensuring that the spatial extent, distribution, abundance, characteristics, and conditions of habitat types can be protected or enhanced as sea levels rise. This includes identifying and designating marsh migration space and upland transition zones and identifying opportunities to connect Baylands habitats to one another and to sustainable sources of water and sediment supply that will support natural adaptation processes. Ecosystems should also be planned for and connected across jurisdictions and throughout the Bay, which include actions that improve the connections among the Bay, watersheds, and uplands. Include coordination efforts with agencies, jurisdictions, and stakeholders, as applicable, for maintaining ecosystem connectivity as part of the adaptation strategies. Adaptation strategies that would significantly adversely affect Bay resources should, to the greatest extent feasible, be avoided, including, but not limited to, strategies that result in significant harm to sensitive habitat areas, pollute the Bay, disrupt remediated sites or other legacy contamination, or reduce water surface area and circulation, such as flood barriers in the Bay. Demonstrate and describe where and how Baylands habitats are being protected, restored, enhanced, and adapted and how ecosystems will be facilitated to support their long-term survival and connectivity. > See the **Strategic Regional Priority: Complete and Connected Ecosystems** for more information on areas identified as existing habitats and restoration and connectivity opportunities.	• Zoning to protect existing habitats • Habitat restoration and/or enhancement • Ecotone levees that provide habitat space • Re-connecting creeks to Baylands • Land acquisition • Conservation easements • Designating overlay zones such as marsh migration space and upland transition zones • Restoring shellfish reefs • Eelgrass restoration • Mudflat augmentation • Shoreline setbacks or buffer zones for wetlands migration and/or upland transition zones

Adaptation Strategy Standards	Strategy options to achieve this:
4. **Prioritize natural and nature-based adaptation where feasible.** In areas along the Bay shoreline where protection approaches for flood risk reduction are selected, prioritize natural and nature-based adaptation strategies suitable to the landscape to the greatest extent feasible before using traditional hardscape approaches. Where only natural and nature-based adaptation is deemed infeasible, incorporate habitat enhancements (i.e., utilizing hybrid approaches). Use best available science and information to identify suitability for natural and nature-based adaptation. Demonstrate and describe where and how natural and nature-based adaptation are being incorporated and where deemed infeasible, describe where habitat enhancement has been incorporated into traditional hardscape.	• Beaches with backing levee or fortified seawall • Ecotone levee • Living seawall • Shellfish reefs • Submerged aquatic vegetation • Mudflat augmentation • Protecting, maintaining, or restoring tidal marshes • Multi-habitat living shorelines approaches
5. **Preserve natural and undeveloped lands for shoreline resilience.** In areas along the Bay shoreline with natural and undeveloped lands vulnerable to flooding and containing existing Baylands habitats and/or species that are especially suitable for ecosystem enhancement, preserve these areas to provide shoreline resilience, where possible. Preservation of these lands should allow for uses such as providing public access, buffer space for future adaptation protection structures, habitat enhancement, and/or space for wetlands migration and upland transition zones. Demonstrate and describe where and how existing natural lands and undeveloped lands are being preserved and designated for shoreline resilience.	• Zoning to maintain natural or open space • Land acquisition • Overlay zone for sea level rise and shallow groundwater rise • Conservation easements • Transfer of development rights

Improve community health, economic development, infrastructure, and housing needs.

6. **Minimize flood risk in areas with existing and planned development.** In areas along the Bay shoreline with existing and planned development, minimize flood risk to communities and resources to the greatest extent feasible. Adaptation strategies should consider a range of adaptation approaches to minimize flood risk, such as protection, avoidance, accommodation, relocation, and preparation, and these approaches can change over time through adaptation pathways. For example, approaches may change when a strategy is no longer physically and/or economically feasible or when development or land use patterns change. Demonstrate and describe where and how flood risk is being minimized for existing and planned development at risk.	• Climate-responsive standards and codes • Overlay zone for sea level rise and shallow groundwater rise • Real estate disclosures • Increase freeboard above base flood elevation (BFE) • Redevelopment incentives to improve building safety and resilience in suitable locations

Adaptation Strategy Standards	Strategy options to achieve this:
7.  **Include actions to mitigate involuntary displacement risk.** In areas along the Bay shoreline identified as at risk for displacement, include policies aimed at reducing displacement risk due to coastal flood hazards. Identification of policies for reducing displacement risk should review, and if necessary revise, existing local displacement policies already in place to include the additional displacement risk due to coastal flood hazards. Policies can be in a local certified general plan housing element and/or incorporated into future plan updates. Demonstrate and describe where and how involuntary displacement risk due to coastal flood hazards is being mitigated in local policy. > See the **Strategic Regional Priority: Reduced Involuntary Displacement Risk** for more information on areas identified as at risk for displacement.	• Anti-displacement policies as aligned with Affirmatively Furthering Fair Housing in housing elements • Incentives for housing preservation and production in areas with low flood risk
8.  **Promote safe, sustainable, and strategic growth and density.** In areas along the Bay shoreline within Plan Bay Area Growth Geographies, promote safe, sustainable, and strategic growth along the shoreline by incorporating strategies that allow the Growth Areas to be resilient to sea level rise now and over time. This may include protecting Growth Geographies in place and/or land use policies that minimize risk within the Growth Geography. When local conditions allow for it, consider how variations in zoning within the Growth Geography can enable greater levels of density in areas with lower risk to coastal flood hazards while still accommodating overall housing commitments and affirmatively furthering fair housing. If Growth Geographies are in or near contaminated sites, adaptation strategies should also consider how to minimize health risks associated with contaminated sites from coastal flooding hazards, including groundwater. Demonstrate and describe where and how safe, sustainable and strategic Growth Geographies are being achieved. > See the **Strategic Regional Priority: Safe, Sustainable, and Strategic Shoreline Growth and Density** for more information on areas identified in Plan Bay Area's Growth Geographies.	• Climate-responsive standards and codes • Overlay zone for sea level rise and shallow groundwater rise • Rolling easements • Increasing density or clustering development outside areas of risk to attract private development • Transfer of development rights • Downzoning in flood zones paired with upzoning in alternate locations • Shoreline setbacks • Avoidance opportunities • Real estate disclosures • Increase freeboard above base flood elevation (BFE)

Adaptation Strategy Standards	Strategy options to achieve this:
9. **Maintain reliable services provided by critical infrastructure and emergency facilities.** In areas along the Bay shoreline containing regionally-significant critical infrastructure and locally identified critical infrastructure, ensure the continued function of the services they provide. Continued function may be dependent upon preserving the asset or other systems the asset relies on, such as energy, water, transportation, etc., but could also consider a range of adaptation approaches to reduce flood risk, such as protection, avoidance, accommodation, relocation, and preparation. These approaches can change over time through adaptation pathways. For assets not owned or operated by a local government, describe what coordination efforts with appropriate agencies are occurring to maintain these services. Demonstrate and describe where and how the services from critical infrastructure and emergency facilities are being maintained over time. > See the **Strategic Regional Priority: Reliable Critical and Emergency Services** for more information on areas identified as regionally-significant critical infrastructure.	• Incorporating adaptation into future changes such as significant upgrades, maintenance, and repairs, and/or siting of new infrastructure • Siting new infrastructure outside of flood risk areas • Protecting the asset in place • Shifting the asset to maintain relationship to future shorelines (for water-dependent infrastructure)
10. **Maintain regional networks that facilitate the reliable movement of people and goods.** In areas along the Bay shoreline that contain regionally-significant transportation infrastructure, ensure the continued function of the services they provide. Continued functioning could be achieved through a range of adaptation approaches to reduce flood risk, such as protection, avoidance, accommodation, relocation, and preparation, and these approaches can change over time through adaptation pathways. For assets not owned or operated by a local government, describe what coordination efforts are occurring with appropriate agencies to maintain these services, such as the California Department of Transportation (Caltrans), Bay Area Rapid Transit (BART), ports, airports, Water Emergency Transportation Authority (WETA) and other agencies. Demonstrate and describe where and how the regional movement of people and goods is being maintained. > See the **Strategic Regional Priority: Regional Movement of People and Goods** for more information on areas identified as regionally-significant transportation infrastructure.	• Incorporating adaptation into future changes such as significant upgrades, maintenance, and repairs, and/or siting of new infrastructure • Siting new infrastructure outside of flood risk areas • Protecting the asset in place • Realigning or shifting the asset to maintain relationship to future shorelines (for water-dependent infrastructure)

Adaptation Strategy Standards	Strategy options to achieve this:
11. **Prioritize contamination remediation in Environmental Justice communities.** In areas along the Bay shoreline containing contaminated sites in Environmental Justice communities, disclose information about contaminated site status, hazard types and risk, and advance remediation to reduce the risks of toxic materials mobilization and vaporization in communities due to flooding, including rising groundwater. Remediation efforts should be conducted transparently and in coordination with impacted communities. Evaluate how planned adaptation will prevent mobilization of contaminants, not worsen contamination risks, and demonstrate how coordination with a lead regulatory agency is being conducted for prevention purposes (where appropriate). Many different agencies or individuals may be involved in remediation efforts of specific sites, which may include the U.S. EPA Region IX, the California Environmental Protection Agency's (Cal EPA's) State Water Resources Control Board and/or Regional Boards, Cal EPA's Department of Toxic Substances Control, and/or a county's department of environmental health, or the Local Oversight Program (LOP). Demonstrate and describe where and how cleaner communities are being prioritized in Environmental Justice communities. > See the **Strategic Regional Priority: Clean Communities to Improve Environmental Justice** for more information on contaminated sites identified in Environmental Justice communities.	• Treating contaminated areas to eliminate or reduce the presence of contamination, which can include bioremediation • Capping contamination to cut off pathways of exposure, if it can incorporate current and future flooding risks, including groundwater • Excavation and offsite disposal of contaminated materials, while reducing transferring contamination burden to other vulnerable communities • Engaging communities in remediation discussions with local government and landowners
12. **Reduce contamination risks across communities and Baylands ecosystems.** In areas along the Bay shoreline containing contaminated sites that have been locally prioritized in the planning process, disclose information about contaminated site status, hazard types and risk, and describe proposed or potential remediation efforts that would reduce contamination risks in communities and Baylands ecosystems due to flooding, including rising groundwater. Many different agencies or individuals may be involved in remediation efforts of specific sites, which may include the U.S. EPA Region IX, the California Environmental Protection Agency's (Cal EPA's) State Water Resources Control Board and/or Regional Boards, Cal EPA's Department of Toxic Substances Control, and/or a county's department of environmental health, or the Local Oversight Program (LOP). Demonstrate and describe where and how contamination risks are being reduced in communities and ecosystems.	• See strategy options identified in Adaptation Strategy Standard #11

Adaptation Strategy Standards	Strategy options to achieve this:
13. **Appropriately utilize Bay fill for shoreline protection.** In areas along the Bay shoreline where protection approaches for flood risk reduction are selected, appropriately utilize Bay fill for adaptation. Fill proposals for adaptation should consider whether they are consistent with the requirements of Government Code section 66605. Bay fill for the purpose of habitat restoration and/or nature-based adaptation may be appropriate and should be encouraged where feasible. Measures should be evaluated to determine whether they will require future Bay fill to remain effective, and measures that avoid or reduce the likely need for future Bay fill should be prioritized. Demonstrate and describe how the strategies avoid and minimize fill for the sole purpose of shoreline protection.	• Identify suitable upland shoreline locations where available to avoid fill • Beneficially reuse sediment for wetland restoration • Utilize natural and nature-based adaptation to provide habitat benefits • Site shoreline protection out of the Bay
14. **Integrate multiple benefits into adaptation.** In areas along the Bay where flood risk reduction strategies are selected, incorporate multiple benefits where they can be achieved successfully. This could include opportunities to advance the One Bay Vision goals, such as advancing equity and community benefits, improvements to shoreline public access, opportunities to improve transit and increase low-emissions mobility, and/or protect, restore, enhance, and adapt Bay habitats. This should also include strategies to minimize greenhouse gas emissions from adaptation activities, where possible. Demonstrate and describe how benefits beyond flood risk reduction were considered and incorporated.	• Habitat restoration or enhancement alongside transportation projects • Improving public access alongside uses that require a shoreline location • Native plants and landscaping to sequester carbon, provide shade, and other ecosystem services • Beneficial sediment reuse

Adaptation Strategy Standards	Strategy options to achieve this:

Create pathways to respond to changing flood risks over time.

15. **Incorporate climate-responsive standards, codes, and zoning for adaptive design.**
In areas along the Bay shoreline where protection and/ or accommodation approaches for flood risk reduction are selected, incorporate standards, codes, and/or zoning that implement adaptive design. This can include specific requirements for new, retrofit, or rebuilt infrastructure. Ensure standards, codes, and/or land use policies appropriately address different coastal flood hazards, including rising groundwater. In areas on or near contaminated sites, ensure standards, codes, and/or zoning policies reflect appropriate standards of remediation for contamination and promote clean communities and environments. These standards may be used in areas where protection is not appropriate, where accomodation is necessary, or may be used in addition to shoreline protection. Demonstrate and describe what standards, codes, or zoning for climate-responsive design are incorporated.

- Wet or dry proofing
- Increasing design heights of ground floor
- Climate-adapted vegetation
- Increased capacity for stormwater infrastructure
- Designing infrastructure to be adaptable to future flood risks
- Limiting below ground and ground floor uses
- Elevating or flood-proofing water and salt sensitive components and equipment (e.g., heating and cooling units, generators, electrical controls)

16. **Plan for changes in land use, removal of assets, and/or equitable relocation.**
In areas along the Bay shoreline where assets or development are at risk of flooding, utilize a phased adaptation approach to manage risk to populations and structures over time. Transitions can include shifts in land use density patterns, shifts towards lower risk uses, or planned removal or relocation of assets that cannot be protected. Removal or relocation of assets should be prioritized in areas suitable for marsh migration space and upland transition zones. This may include policies, regulations, and/ or financial incentives that would allow for transitions at the end of the asset or development's life cycle to allow for more resilient uses as part of a comprehensive planning strategy. Removal should include structures, foundations, utilities and infrastructure both above and below ground to ensure that aging and dilapidated development does not lead to future Bay fill and contamination. Demonstrate and describe where and how changes for land use, removal of assets, and/or equitable relocation are occurring.

- Overlay zone for sea level rise and shallow groundwater rise
- Increasing density outside areas of risk
- Downzoning in flood zones paired with upzoning in alternate locations
- Transfer of development rights
- Avoidance opportunities
- Rolling easements
- Removal permits
- Redevelopment policies or standards

Adaptation Strategy Standards	Strategy options to achieve this:
17. **Identify actions necessary to enable future adaptation decisions, if currently not available.** In areas along the Bay shoreline where future adaptation pathways could provide effective flood risk reduction but are considered infeasible by current conditions (such as due to a lack of existing knowledge, social values, and/or existing rules or regulations), identify what actions would likely be necessary to facilitate changes to the future context in which decisions are made. By identifying existing barriers and the changes needed, these can become part of the adaptation strategy to facilitate necessary changes in the future. Describe what actions may be necessary to enable future adaptation decisions, if currently not available.	• Identifying funding revenue measures • Developing education and/or capacity building community programs • Technical studies or research • Researching and/or development of formal cross-jurisdictional governance structures, such as special tax districts, Joint Powers Authorities (JPAs), etc. • Legislation
18. **Develop and maintain cross-jurisdictional flood risk reduction.** In areas along the Bay shoreline containing high hydraulic connectivity across jurisdictional boundaries, include measures to develop adaptation strategies that result in cross-jurisdictional flood risk reduction, and plan for ongoing coordination and governance to maintain reduced flood risk. This may include enhancing shared understanding by evaluating the hydrological impacts of major shoreline changes, coordinating to hydraulically disconnect portions of the shoreline that are currently connected to prevent flooding from spreading, creating redundant flood protection to reduce the likelihood of flooding originating from neighboring jurisidictions, and/or creating flood risk reduction strategies that cross jurisdictional boundaries. Demonstrate and describe adaptation coordination and approaches for reducing flood risk across jurisdictional boundaries. > See the **Strategic Regional Priority: Cross-Jurisdictional Flood Risk Reduction** for more information on areas identified as high shoreline connectivity.	• Design and operational redundancy • Physical features to limit flood extent in case of failure • Developing formal cross-jurisdictional governance structures, such as special tax districts, Joint Powers Authorities (JPAs), etc. • Legislation

Adaptation Strategy Standards	Strategy options to achieve this:
19. **Integrate coastal flood protection with stormwater and riverine flood management.** In areas along the Bay shoreline where protection approaches for flood risk reduction are selected, plan and design adaptation strategies to ensure they are integrated within stormwater and riverine flood management and do not exacerbate or worsen flooding originating in upland or inland areas. This should include an evaluation of changes in stormwater or riverine flood risk resulting from adaptation actions and identification of strategies to minimize back-end flooding which can occur if inland flooding is unable to drain to the Bay. For example, adaptation strategies to reduce coastal flood hazards, such as levees and subsurface groundwater barriers to reduce coastal flood hazards, can inadvertently worsen inland flooding without appropriate mitigation. Demonstrate and describe where and how coastal flood protection is being integrated with stormwater and riverine flood management.	• Climate-responsive standards and codes • Stormwater management strategies like permeable pavements, retention basins, and swales • Structural and nonstructural flood control strategies
20. **Evaluate and minimize consequences of failure.** In areas along the Bay where protection approaches for flood risk reduction are utilized, plan and design flood protection to minimize the consequences of failure. This should include an evaluation of the likelihood and causes of failure, such as future coastal flood hazards, local geological and soil conditions, earthquake shaking and liquefaction risk, and/or landslide risk. Also include impacts and consequences of failure, including future and projected populations that would be at risk and any risks to human health and safety. If the evaluation indicates that consequences of failure involve risks to human health and safety, describe the elements of the project design included to provide redundancy and reliability of systems, backup systems, features that minimize the geographic extent of failure, and emergency response systems to minimize these risks to the extent feasible. Demonstrate and describe where and how the consequences of failure are being minimized.	• Design and operational redundancy • Physical features to limit flood extent in case of failure • Access to flood fighting materials • Using flood resilient features in areas at risk • Coordinated emergency response systems • Economic impact assessment

3.4 Complete Subregional Plan Checklist

Subregional Plans, to be considered complete, include many plan submittals and responses to the Equity Assessment and Adaptation Strategy Standards.

Local governments may use the following checklist to assess completeness of all submittal requirements and required responses. Any alternative paths to comply with the Plan requirements should be discussed with BCDC staff and prior approval should be granted before submission. See Section 3.5 for details on the Plan submission, approval and update process.

Equity Assessment responses can be written within a Plan or attached separately. Responses to the Adaptation Strategy Standards should be completed alongside the conceptual plans of selected adaptation strategies. Responses can describe how the adaptation strategies meet the standards across the full suite of adaptation strategies and/or specific to individual reaches, if applicable. If there are any areas that are not applicable, please note that in the submittal and consult with BCDC staff.

	Plan Requirements	Plan Submittal Requirements		Standard Submittals
Element A: Planning Process				
A1.	List Subregional Plan partners, including jurisdictions, planning project team members, and affected parties.			
a.	Plan type	Description of plan type and included jurisdiction(s).	☐	
b.	Planning project team	List and description of planning team.	☐	
	Diverse perspectives	Description of what efforts were taken to include diverse perspectives on the project planning team.	☐	Equity Assessment
	Multilingual communities	Description of how language services are included in the planning effort.	☐	Equity Assessment
c.	Affected parties	List of affected and interested parties.	☐	
d.	Tribal consultation	Description of government-to-government consultation process.	☐	
A2.	Include a map of the Subregional Shoreline Adaptation Plan area ("planning area").			
a.	Planning area	Map with boundaries of planning area.	☐	
A3.	Describe the multi-jurisdictional coordination process.			
a.	Multi-jurisdictional coordination	Description of multi-jurisdictional and county coordination.	☐	
A4.	Summarize equitable engagement efforts throughout the planning process.			
a.	Vulnerable community identification	Definitions and mapped locations of Environmental Justice, socially vulnerable communities, and Tribes.	☐	
b.	Equitable outreach and engagement	Summary of equitable outreach and engagement efforts.	☐	
	Equity in engagement	Description of how the engagement process includes people from vulnerable communities.	☐	Equity Assessment
	Community and Tribal partnerships	Description of efforts to engage communities and Tribes in partnerships.	☐	Equity Assessment
Element B: Existing Conditions				
B1.	List and describe existing plans, studies, and/or other information that may be relevant to addressing and responding to coastal flooding hazards.			
a.	General and land use plans	Summary of how coastal flooding hazards are referenced and addressed in general and other land use plans.	☐	
b.	Hazard and emergency plans	Summary of how coastal flooding hazards are referenced and addressed in hazard and emergency plans.	☐	
c.	Climate and resilience plans	Summary of climate and resilience plans and how they relate to this plan.	☐	

	Plan Requirements	Plan Submittal Requirements	Standard Submittals
B2.	Map and describe physical and ecological characteristics of the landscape within the planning area.		
a.	Physical conditions	Map(s) and description of physical landscape conditions and characteristics.	☐
b.	Coastal and nearshore hydrological conditions	Map(s) and description of existing coastal and nearshore hydrological characteristics.	☐
c.	Ecosystem Health and Resilience conditions	Map(s) and description of existing ecological and biological conditions.	☐
	Communities and ecosystems	Describe the known relationships of communities and ecosystems and values towards natural and nature-based adaptation.	☐ Equity Assessment
d.	Historical conditions	Map(s) and description of historical physical and ecological landscape characteristics.	☐
e.	Planned future changes	Description of planned future shoreline changes.	☐
B3.	Map and describe existing populations, assets, sectors, services, and land uses within the planning area.		
a.	Community Health and Well-being conditions	Map(s) and description of populations and community services as related to Community Health and Well-being.	☐
	Community assets	Description of what community assets and services were identified by communities.	☐ Equity Assessment
b.	Development, Housing, and Land Use conditions	Map(s) and description of current and future land uses, development, and projects related to Development, Housing, and Land Use.	☐
	Displacement and land use patterns	Description of how land uses may have contributed to displacement risk.	☐ Equity Assessment
c.	Critical Infrastructure and Services conditions	Map(s) and description of utilities infrastructure, stormwater and flood management infrastructure, emergency management, and public trust lands related to Critical Infrastructure and Services.	☐
	Dependency on services	Description of if and how vulnerable communities have specific service dependencies.	☐ Equity Assessment
d.	Public Access and Recreation conditions	Map(s) and description of trails networks, parks and open spaces, and recreation related to Public Access and Recreation.	☐
	Access and safety	Description of the state of connection to and safety of public access.	☐ Equity Assessment
e.	Transportation and Transit conditions	Map(s) and description of land, air, water, and emergency transportation related to Transportation and Transit.	☐
	Mobility and affordability	Description of known challenges of transportation mobility and affordability.	☐ Equity Assessment

	Plan Requirements	Plan Submittal Requirements	Standard Submittals
f.	Shoreline Contamination conditions	Map(s) and description of sites as related to Shoreline Contamination.	☐
	Known and unknown sites	Description of the status of contamination in communities.	☐ Equity Assessment
g.	Collaborative Governance, Flood Management, and Funding conditions	Map(s) and description of boundaries and partnerships related to Collaborative Governance, Flood Management, and Funding.	☐
	Community and Tribal capacity	Description of if and how funding was included for community partnerships in project budgets.	☐ Equity Assessment
Element C: Vulnerability Assessment			
C1.	Map and describe the exposure of people, assets, ecosystems, and services to coastal flood hazards across minimum sea level rise scenarios.		
a.	Exposure to coastal flood hazards	Exposure maps and/or summary tables for each required Coastal Flood Hazard and Sea Level Rise Scenarios Standard and assets for each Minimum Categories and Assets Standards.	☐
	Community assets and services	Description of what community assets and services were incorporated into the exposure analysis.	☐ Equity Assessment
b.	Shoreline flood risk conditions	Description of shoreline conditions and characteristics that contribute to flood risk.	☐
c.	Potential costs of damages from inaction	Description of potential costs of damage, disruption, and/or losses in the absence of adaptation.	☐
C2.	Conduct a vulnerability assessment for priority areas and summarize vulnerability to current and future hazards.		
a.	Priority areas	Map(s) and description of priority areas.	☐
	Community input on priority areas	Description of how communities provided input to shape the identification of priority areas.	☐ Equity Assessment
b.	Assess vulnerability	Description of vulnerability (sensitivity, adaptive capacity, and consequence) within priority areas.	☐
c.	Summarize vulnerability	Summary of vulnerability at each scenario as outlined in the Coastal Flood Hazards and Sea Level Rise Scenarios Standard.	☐
d.	Timing and phasing	Summary of timing of exposure for each priority area.	☐

	Plan Requirements	Plan Submittal Requirements		Standard Submittals
Element D: Adaptation Strategies and Pathways				
D1.	Include a local vision and goals for the planning area that incorporates and localizes the One Bay Vision.			
a.	Local vision	Local vision for the full planning area that aligns with the One Bay Vision.	☐	
	Community input in local vision	Description of how the vision takes into consideration and elevates vulnerable community needs.	☐	
D2.	Identify adaptation strategy alternatives for priority areas and consider flood risks across the entire planning area.			
a.	Adaptation strategy alternatives for the 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios	Map(s) and description of at least two adaptation alternatives for both the 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios as outlined in the Coastal Flood Hazards and Sea Level Rise Scenarios Standard.	☐	
D3.	Evaluate adaptation alternatives to determine selected adaptation strategies.			
a.	Evaluation criteria	Evaluation criteria for evaluating strategies.	☐	
D4.	Provide conceptual plans and descriptions of selected adaptation strategies and adaptation pathways that include physical and non-physical strategies.			
a.	Selected adaptation strategies for the 0.8 ft (2050) sea level rise scenario	Map(s) and description of the selected adaptation strategies that meet the Adaptation Strategy Standards (below) and comply with the scenarios as outlined in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard.	☐	
	1. Improve public access and connection to and across the shoreline	Demonstration and description of where and how the adaptation strategies improve public access and connection to and across the shoreline.	☐	Adaptation Strategy Standard
	2. Prioritize facilities and uses that require a location along the shoreline over facilities and uses that do not	Demonstration and description of where and how uses and facilities that require shoreline location are being prioritized.	☐	Adaptation Strategy Standard
	3. Protect, restore, enhance, and adapt Baylands habitats and ecosystems and facilitate their long-term survival	Demonstration and description of where and how Baylands habitats are being protected, restored, enhanced, and adapted and how ecosystems will be facilitated to support their long-term survival.	☐	Adaptation Strategy Standard
	4. Prioritize natural and nature-based adaptation solutions where feasible	Demonstration and description of where and how natural and nature-based adaptation is being prioritized.	☐	Adaptation Strategy Standard
	5. Preserve natural and undeveloped lands and open space for shoreline resilience	Demonstration and description of where and how existing natural lands, and undeveloped lands are being preserved and designated for shoreline resilience.	☐	Adaptation Strategy Standard

Plan Requirements	Plan Submittal Requirements	Standard Submittals
6. Minimize flood risk in areas with existing and planned development	Demonstration and description of where and how flood risk reduction is being minimized for existing and planned development at risk.	☐ Adaptation Strategy Standard
7. Include actions to mitigate involuntary displacement risk	Demonstration and description of where and how involuntary displacement risk is being mitigated.	☐ Adaptation Strategy Standard
8. Promote safe, sustainable and strategic growth and density	Demonstration and description of where and how safe, sustainable, and strategic Growth Geographies are being achieved.	☐ Adaptation Strategy Standard
9. Maintain reliable services provided by critical infrastructure and emergency facilities	Demonstration and description of where and how the services from critical infrastructure and emergency facilities are being maintained over time.	☐ Adaptation Strategy Standard
10. Maintain regional networks that facilitate the reliable movement of people and goods.	Demonstration and description of where and how the regional movement of people and goods is being maintained.	☐ Adaptation Strategy Standard
11. Prioritize and engage Environmental Justice communities in contamination remediation	Demonstration and description of where and how cleaner communities are being prioritized in Environmental Justice communities.	☐ Adaptation Strategy Standard
12. Reduce contamination risks in communities and ecosystems	Demonstration and description of where and how contamination risks are being reduced in communities and ecosystems.	☐ Adaptation Strategy Standard
13. Appropriately utilize Bay fill for shoreline protection	Demonstration and description of how the strategies avoid and minimize fill for the sole purpose of shoreline protection.	☐ Adaptation Strategy Standard
14. Integrate multiple benefits into adaptation	Demonstration and description of how benefits beyond flood risk reduction were considered and incorporated.	☐ Adaptation Strategy Standard
15. Incorporate climate-responsive standards, codes, and zoning for adaptive design	Demonstration and description of what standards, codes, or zoning for climate-responsive designs are incorporated.	☐ Adaptation Strategy Standard
16. Plan for changes in land use, removal of assets, and/or equitable relocation	Demonstration and description of where and how changes for land use, removal of assets, and/or equitable relocation are occurring.	☐ Adaptation Strategy Standard
17. Identify actions necessary to enable future adaptation decisions, if currently not available	Description of what actions may be necessary to enable future adaptation decisions, if currently not available.	☐ Adaptation Strategy Standard

	Plan Requirements	Plan Submittal Requirements		Standard Submittals
	18. Develop and maintain cross-jurisdictional flood risk reduction	Demonstration and description of adaptation coordination and approaches for reducing flood risk across jurisdictional boundaries.	☐	Adaptation Strategy Standard
	19. Integrate coastal flood protection with stormwater and riverine flood management	Demonstration and description of where and how coastal flood protection is being integrated with stormwater and riverine flood management.	☐	Adaptation Strategy Standard
	20. Evaluate and minimize consequences of failure	Demonstration and description of where and how the consequences of failure are being minimized.	☐	Adaptation Strategy Standard
	Community benefits	Description of the community benefits from selected adaptation strategies.	☐	Equity Assessment
	Community and Tribal capacity	Description of how the adaptation strategies build community capacity for adaptation and self-determination.	☐	Equity Assessment
	Unintended negative consequences	Description of potential unintended negative consequences in the short-term and long-term and how strategies reduce impacts.	☐	Equity Assessment
b.	Adaptation pathways for 2100 and beyond	Description of how adaptation pathways options can provide flood risk reduction at higher water levels as outlined in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard.	☐	
Element E: Land Use and Policy Plan				
E1.	Describe proposed land use and policy changes necessary to enact the adaptation strategies and pathways identified in Element D.			
a.	Proposed land use approach	Description and maps of proposed land use changes at all required time horizons necessary to achieve the selected adaptation strategies.	☐	
	Land use changes and benefits	Description of how proposed land use changes due to selected adaptation strategies and adaptation pathways may affect vulnerable communities.	☐	Equity Assessment
	Resource displacement	Description of how proposed land use changes due to selected adaptation strategies and adaptation pathways may affect resources.	☐	Equity Assessment
	Community benefits	Description of if and how strategies provide community benefits beyond flood risk reduction.	☐	Equity Assessment
b.	Policy changes	Description of policies or programs and how they support the overall approach to shoreline resilience.	☐	
E2.	Describe policy and programmatic changes necessary to enact the adaptation strategies and pathways identified in Element D.			
a.	Codifying plans and policies	Description of processes necessary to update or change land use plans and/or adopt new policies and where adaptation strategies will be incorporated into existing city plans.	☐	

	Plan Requirements	Plan Submittal Requirements	Standard Submittals
Element F: Implementation Plan and Funding Strategy			
F1.	Include an implementation plan that identifies next steps and responsible entities for implementing the preferred adaptation strategies and pathways.		
a.	Plan implementation lead	Identification of an overall lead for Plan implementation.	☐
b.	Implementation plan	Implementation plan for selected adaptation strategies in priority areas.	☐
c.	Ongoing coordination	Description of ongoing mechanisms for engaging with other implementation stakeholders.	☐
F2.	Include a funding strategy that identifies potential costs and sources of funding to implementing adaptation strategies and pathways.		
a.	Adaptation costs and sources	Summary of high-level costs of priority adaptation strategies and known and potential funding sources.	☐
	Funding prioritization	Description of where and how funding has been prioritized to projects that benefit vulnerable communities.	☐ Equity Assessment
	Community benefits agreement	Description of if and how a community benefits agreement is supporting vulnerable communities.	☐ Equity Assessment
F3.	Include a monitoring program that describes how adaptation strategies and triggers are being assessed to ensure adaptation pathways can be effectively implemented.		
a.	Monitoring program	Description of monitoring program linked to triggers, thresholds, and decision points for adaptation pathways.	☐
b.	Measure and communicate progress	Description of strategy for measuring and monitoring progress of implementation.	☐
F4.	Include a timeline and strategy for Plan updates.		
a.	Plan updates	Description of strategy for implementing required Plan updates and update timeline.	☐
b.	Known gaps in capacity	Description of known gaps in capacity for implementing and maintaining the Plan.	☐
c.	Plan update funding	Summary of sources of funding for ongoing Plan updates.	☐
Element G: Project List			
G1.	Include a priority project list that summarizes priority adaptation projects.		
a.	Project data	Project list that contains all required information for priority projects.	☐
	Priority projects	Description of which priority projects (if any) provide flood risk reduction and/or benefits to vulnerable communities.	☐ Equity Assessment
b.	Regional project database	Submittal of relevant project data via the regional project database.	☐

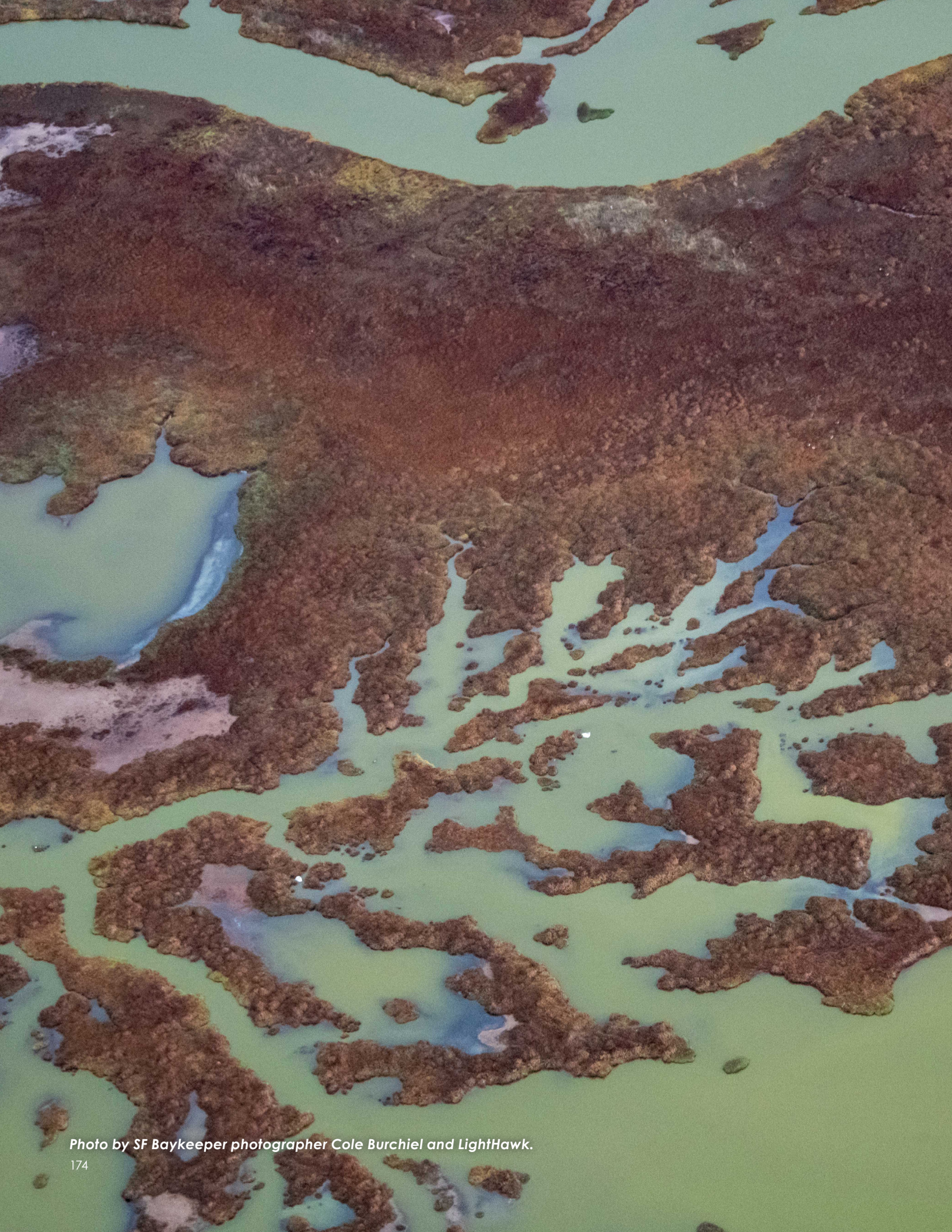


Photo by SF Baykeeper photographer Cole Burchiel and LightHawk.

3.5 Plan Submission, Approval, and Update Process

3.5.1 Submitting Plans and Getting Approval

Plan Submittal Deadline

As outlined in SB 272, all Plans must be approved by January 1, 2034. However, BCDC strongly encourages submissions before the legislative deadline.

Initiation of the Subregional Shoreline Adaptation Planning Process

Prior to initiating the process to prepare a Subregional Plan pursuant to Section 30985(a)(2) of the Public Resources Code, a local government must submit electronically to BCDC a notice of intent to prepare a Subregional Plan. The notice must include a detailed description of the process, including local government staff contact, including names and contact information for all participating jurisidictions in multi-jurisidctional Plans, including the designated lead, project scope, workplan, schedule, plan for the preparation of any necessary environmental documentation[4] (i.e., compliance with the California Environmental Quality Act), and an engagement plan describing the public process. Within 30 days of receiving the notice of intent to prepare a Subregional Plan, the Executive Director will confirm receipt of the notice and contact the local government to schedule a preliminary consultation meeting with representatives of the local government to advise the local government on whether information contained in the notice aligns with these Guidelines.

Within 30 days of the preliminary consultation meeting with the Executive Director, or designated Commission staff, the Commission must electronically post a notice on the agency's website notifying the public that the local government intends to initiate a process to prepare a Subregional Plan. Within 30 days of the preliminary consultation meeting with the Executive Director, or designated Commission staff, the local government must also post a notice notifying the public that the local government intends to initiate a process to prepare a Subregional Plan consistent with its local public noticing procedures.

Consultation Process

Prior to submitting a request for review and approval of a Subregional Plan, the local government must attend a preliminary consultation with the Executive Director, as described above, and must attend at minimum two (2) additional consultation meetings with the Executive Director, or designated Commission staff, during the process to prepare the Subregional

4 The Commission expects that, because local governments will be approving Subregional Shoreline Adaptation Plans in the first instance before submitting them to the Commission for approval as consistent with these Guidelines, the submitting local governments rather than the Commission will serve as lead agency for purposes of the California Environmental Quality Act.

Plan to ensure the process and Plan aligns with these Guidelines. The consultation meetings must be included in the workplan and schedule submitted with the intent to prepare a Plan as described above. Consultations may be used to assess existing work or alternative data, do initial review of Plan elements prior to final submittal, or other local staff-driven requests. Additional consultation meetings may be conducted based on agreement between the local government and Executive Director.

Requests for Data Verification

A request for data verification, as described in Section 3.1.2, can occur at any time prior to or as part of the Plan submittal by submitting a written justification for use of the data addressing the proposed alternative data set and how the data or science meets the criteria listed in Section 3.1.2. Requests for data verification can result from a desire to use alternative or additional data than that provided by BCDC. The Executive Director will review the request and provide a written response within 30 days of the request. Local governments may appeal any rejection of alternative data by the Executive Director. Alternative data submitted to BCDC will be integrated into regional datasets, as appropriate. This data will contribute to regional knowledge and facilitate efficient updates and tracking of regional planning progress. However, BCDC acknowledges that there may instances where local data might not be available, costly to collect, or sensitive in nature. In those cases, BCDC may provide flexibility in how local jurisdictions address those minimum asset categories in their Subregional Plan and data submittal requirements.

Local Government Approval of Subregional Shoreline Adaptation Plans

The local government must only submit a Subregional Plan for review and approval by the Commission after it has formally adopted the Subregional Plan upon resolution adopted after at minimum one (1) public meeting, of which a 30-day public notice has been given.

The local government must provide the Commission with notification in writing of the nature and text of the proposed Subregional Plan at least 30 days prior to adoption.

For multi-jurisdictional Plans, all participating local governments must adopt the Subregional Plan.

ARE SUBREGIONAL PLANS SUBJECT TO CEQA?

The appropriate level of environmental analysis required under the California Environmental Quality Act (CEQA), if any, is a determination that will need to be made by the local government and may vary depending on the specific circumstances of each local government's plan development.

SB 272 requires local governments to prepare sea level rise adaptation plans. Local governments currently comply with CEQA when they develop a variety of plans and have established processes to do so. Individual local governments that prepare the adaptation plans will determine whether and how they meet CEQA requirements and the appropriate level of CEQA review prior to submitting their plans to BCDC. Adopting a plan will be a local discretionary action, so BCDC anticipates that the local government in question would be the Lead Agency for environmental review to comply with CEQA, should the local government determine that such a review is required. That appropriate level of review will depend on several factors, such as whether the plan is considered a "project" under CEQA law, any previous CEQA review that has taken place, and whether the project may have a significant effect on the environment.

Submittal And Commission Consideration of a Subregional Shoreline Adaptation Plan

The Subregional Plan prepared pursuant to Section 30985(a)(2) of the Public Resources Code must be submitted to the Commission for review and approval. The submittal must include a request to approve the Subregional Plan and include the full Subregional Plan including all submittal requirements, checklists, and data, the local government resolution adopting the Plan, any necessary environmental documentation, a summary of the public process and response to public comments received during the process. The Commission will, after public hearing, either approve or deny the Subregional Plan pursuant to the following procedure:

a. After a request to review and approve a local government-approved Subregional Shoreline Adaptation Plan has been submitted to the Commission, the Executive Director will review the submittal within 90 days to determine if it is complete. If this review concludes that the submittal is not complete, the Executive Director will inform the local government in writing of any missing information. If the Executive Director determines that the submittal is complete, and the Plan may be brought before the Commission for review, the Executive Director will electronically post a notice of public hearing setting the date for the public hearing no later than 150 days from the date that the request to review and approve the Subregional Plan was submitted by the local government. The Commission will determine whether the Subregional Shoreline Adaptation Plan prepared pursuant to Section 30985(a)(2) of the Public Resources Code is in conformance with these Guidelines after a public hearing and by majority vote of those members present. At least 30 days prior to the public hearing, the Executive Director will mail a staff summary and recommendation to the Commission evaluating conformance of the Subregional Shoreline Adaptation Plan with these Guidelines.

   If the Commission approves the Subregional Shoreline Adaptation Plan, the Subregional Shoreline Adaptation Plan is deemed approved as submitted and the Commission must adopt findings to support its action. The local government may withdraw submittal of its request to approve a Subregional Shoreline Adaptation Plan at any time.

b. The Commission may only deny the request to approve a Subregional Shoreline Adaptation Plan prepared by the local government pursuant to Section 30985(a)(2) of the Public Resources Code on the basis that the Subregional Shoreline Adaptation Plan is not consistent with these Guidelines.

   If the Commission determines to deny the request to approve a Subregional Shoreline Adaptation Plan, the Commission must provide a written explanation and may recommend modifications. If recommended modifications are adopted in the manner recommended by the Commission and transmitted to the Commission by the local government, the Executive Director may approve the Plan after informing the Commission by listing the Plan with the Commission as part of the administrative listing of administrative permits and consistency determinations as provided in BCDC's regulations.[5] If one (1) or more members of the Commission object to the Executive Director's intent to approve a Plan with modifications, the

5 Reference 14 CCR section 10621."

Executive Director shall not approve the Plan and will electronically post a notice of public hearing for the Commission to review and vote to approve or deny the Plan. The local government may elect to meet the Commission's recommended modifications in a manner other than as suggested by the Commission and may then resubmit its revised Subregional Shoreline Adaptation Plan to the Commission, as provided in subsection (a).

c. The Commission must approve a Subregional Shoreline Adaptation Plan if it finds that a Subregional Shoreline Adaptation Plan meets the requirements of, and is in conformity with, these Guidelines, or the most current Guidelines in effect at the time of Plan submission. Except as provided in paragraph (2) of subdivision (b), a decision to approve must require a majority vote of those members of the Commission present.
d. Following Commission final approval, the approved Subregional Shoreline Adaptation Plan will be circulated with interested parties, posted on BCDC's website, and distributed to the Secretaries of the California Natural Resources Agency and the California Department of Finance.
e. Commission approval of a local government Subregional Shoreline Adaptation Plan does not represent a finding that the projects identified within the Plan are consistent with the Commission's other laws and policies, including consistency with McAteer-Petris Act or the San Francisco Bay Plan, and does not exempt those projects from any requirement to obtain a permit from the Commission under the McAteer-Petris Act or the Suisun Marsh Preservation Act.
f. The Commission may vote to revoke its approval of a Subregional Shoreline Adaptation Plan, at a public hearing and a majority vote of Commissioners present, upon a finding that the local government has failed to update the Plan consistent with these Guidelines, has amended or otherwise modified the Subregional Shoreline Adaptation Plan in a manner inconsistent with these Guidelines, and/or taken action in a manner that is inconsistent with an approved plan.

3.5.2 Updating Plans

Plan Amendments

After approval by the Commission, the Subregional Plan, or any component thereof, may be amended or modified by the local government at any time. Any such amendment or modification must meet, in all respects, the requirements of, and be in conformity with, the Guidelines then in effect. Any amendment or modification to an approved Subregional Plan must be reviewed for approval or denial by the Commission through the process outlined by these Guidelines.

Plan Update Schedule

Local governments are required to submit a proposed timeline for updates, as outlined in Plan Requirement F4-a, that includes an interim status report and a comprehensive Plan update timeline. BCDC staff must approve the proposed update in consultation with the local government. Comprehensive Plan updates should occur no less frequently than 10 years after approval of the initial Plan.

Interim Status Reports

To review progress on implementation of Plans and to make any necessary changes reflective of updated conditions, local governments must include a schedule for submitting an **interim status report** midpoint between Plan approval and the comprehensive update. Interim status reports are intended to be brief in nature but should summarize the relevant updated information and include updated geospatial data, if applicable. Interim status reports shall be submitted to BCDC staff and do not require Commission approval. Interim status reports should include, as applicable:

- Updated sea level rise guidance and projections.
- Changes to major plans at the local level, including changes to the general plan, land use/zoning changes, local hazard mitigation plans, or new specific plans that impact the vulnerability of the jurisdiction or alter adaptation pathways.
- New legislation or mandates that alter the process and/or outcomes for adaptation planning.
- Any new or substantially changed development patterns that alter the prioritization of adaptation strategies.
- Triggers or thresholds (as identified in Subregional Plans) that have been crossed or are close to being crossed, such as increased frequency or duration of flooding, new areas being exposed to flooding, or increased damage, disruption, or loss due to flooding, signaling the need to shift to another phase in an adaptation pathway.
- Progress on adaptation strategies, new or updated policies, or funding updates for projects outlined in the Plan.
- Changes to adaptation plans and policies through a locally adopted planning process.
- Analysis of continued suitability of the adaptation pathways included in the original plan to identify changes in assumptions, barriers, conditions, or efficacy of original strategies that should substantially alter a strategy, such as choosing a different approach or altering a timeline.

Comprehensive Plan Updates

According to the update timeline submitted by the local government and approved by BCDC, local governments must submit a **comprehensive Plan update** for review and approval by the Commission through the process provided by these Guidelines. Comprehensive updates should consist of a complete Plan document with all elements outlined in the Subregional Plan Guidelines. Sections of the Plan that do not need to be changed from the original may be included by reference or just re-printed with proper citation. For instance, it may not be necessary to complete a new economic

WHAT IS AN ECONOMIC IMPACT ANALYSIS?

An economic impact analysis is a useful tool to help evaluate the cost of inaction compared to project costs to adapt. SB 272 requires that Plan updates include an economic analysis of, at a minimum, costs to critical public infrastructure and implementation strategies and projects,[1] although this can and should be expanded to include other important shoreline assets and resources. A basic economic impact analysis includes potential costs of damages of inaction (See C1-c) compared to costs of adaptation (See F2-a). However, it may also include other information, such as non-market valuation of public trust and natural resources, valuation of lost revenues or tax bases associated with changing land uses, and robust life cycle analyses to help determine when assets cannot function without substantial investment in adaptation or relocation. A detailed analysis may also include coordinating with asset managers to complete life cycle analyses for individual assets/facilities to evaluate the costs for routine repair, maintenance, and upgrades associated with the hazard, compared to more substantial adaptation investments, such as new infrastructure, protective measures, or relocation.

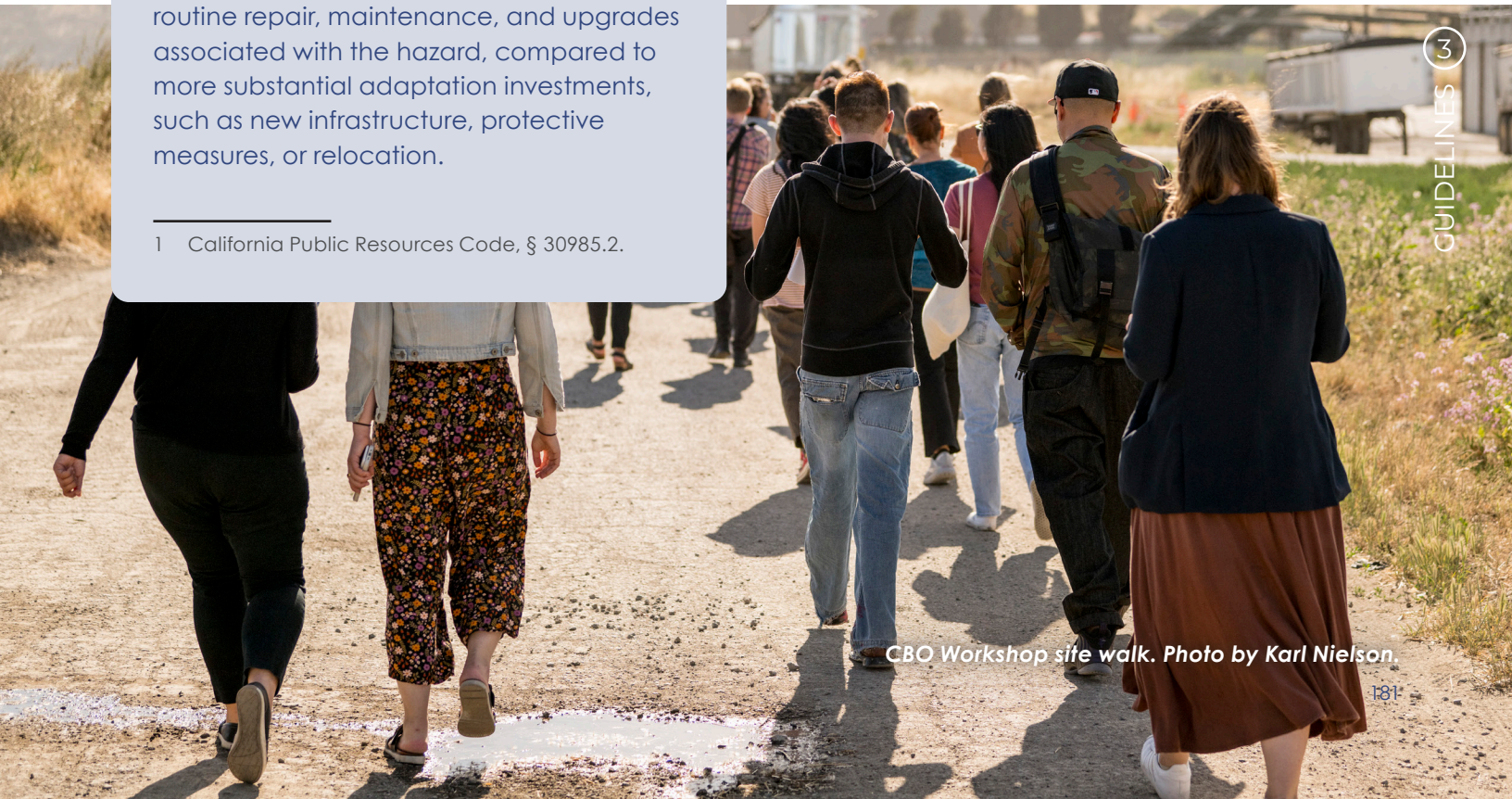
1 California Public Resources Code, § 30985.2.

analysis if the alternatives included remain the same. Updated Plans should comply with Plan requirements and standards as current at that time and follow the adoption process as current at that time.

Comprehensive updates must include an economic impact analysis, as defined in the Plan requirements current at that time. Failure to submit a comprehensive Plan update by the established update schedule will result in BCDC deeming the Subregional Plan no longer consistent with these Guidelines for purposes of being prioritized for funding per SB 272, unless an extension of time is granted by the Executive Director.

Subregional Shoreline Adaptation Plan Guidelines

BCDC will provide updates to the Guidelines contained within this document on a regular update schedule. Guideline updates will reflect new or revised sea level rise science and other information as necessary. Local governments will be expected to comply with the most current Guidelines version in effect at the time of the Plan submission to BCDC.



CBO Workshop site walk. Photo by Karl Nielson.

Creating a more resilient San Francisco Bay for all.

Appendix

4.1 Data Sources and Analytical Methodology

The sections below summarize details of the RSAP Data Sources and Analytical Methodology Report.

For more detailed information please visit the RSAP Data Sources and Analytical Methodology Report, which can be found online at www.bcdc.ca.gov.[1]

4.1.1 Combined Flood Hazards

The RSAP utilizes combined hazard layers to support exposure analysis, Guideline development, and implementation. These layers represent the potential future flooding conditions exacerbated by sea level rise, including tidal inundation, groundwater rise, and storm surge/extreme tides. The scenarios used are based on the California Sea Level Rise Guidance (2024) and combine hazard data from two sources, the Adapting to Rising Tides sea level rise flood maps and USGS Coastal Storm Modeling System (CoSMoS) shallow groundwater rise maps.

4.1.2 Exposure Analysis

The core analysis conducted for the RSAP is the exposure of topic area GIS data to combined flood hazards representing future flooding conditions based on scenarios described in the California Sea Level Rise Guidance (2024). This regional exposure analysis can be used to inform Subregional Plan requirements, including the vulnerability assessment of Minimum Categories and Assets.

4.1.3 Strategic Regional Priorities

Strategic Regional Priorities build upon the exposure analysis to identify subsets of Minimum Categories and Assets representative of the One Bay Vision. Strategic Regional Priorities methods vary between topic areas and utilize complementary data in some cases.

4.1.4 Additional Guideline Data Sources

Elements in the RSAP Guidelines relate to planning process, existing conditions, and adaptation strategies and pathways. BCDC intends to make data to support these Guidelines available to support the creation of Subregional Plans.

1 BCDC. 2024. Regional Shoreline Adaptation Plan: Data Sources and Analytical Methodology Report. https://bcdc.ca.gov/wp-content/uploads/sites/354/2024/11/05_Data-Sources-and-Analytical-Methodology.pdf.

4.2 Equity in the RSAP

4.2.1 Equity Strategy

An Equity Strategy is a crucial component to ensuring the RSAP process and its intended outcomes align with the region and its communities' climate justice priorities. The intent for the Equity Strategy was to serve as a living document throughout the course of the project, co-created with the Equity Subcommittee, Environmental Justice Representatives and the Advisory Group, addressing equity in two parts:

- **Part One: Embedding Equity into the RSAP Development Process.** Guidance on how Advisory Group conversations, community interactions, outreach, and meetings are structured to center equity in the process of creating the Regional Shoreline Adaptation Plan.
- **Part Two: Developing an Equity Assessment for Subregional Shoreline Adaptation Plan Guidelines.** Co-creating an approach towards an Equity Assessment to be used in Subregional Shoreline Adaptation Plan Guidelines and Minimum Standards to ensure that local jurisdictions integrate equitable processes, outcomes, and accountability in their Subregional Plans.

Part One: Embedding Equity into the RSAP Processes

Developing an equitable process in the RSAP included multiple components, including paid representatives for equity and environmental justice on the Advisory Group, developing an Equity Subcommittee, setting internal meetings processes for the Advisory Group, outlining equity in the Outreach and Communications Plan, and conducting outreach and engagement.

Equity and Environmental Justice Representatives on the Advisory Group

The initial scoping and budget for developing the RSAP included compensation for up to five paid positions for equity and Environmental Justice representatives to participate in six Advisory Group meetings over the course of the project, with funding for additional participation in Advisory Group subcommittees. Participants were paid at a rate comparable to a consultant and a partnership agreement was developed to ensure fair understanding of expectations and participation.

Equity Subcommittee

All equity and Environmental Justice representatives, along with interested members of the broader Advisory Group, volunteered to participate in an Equity Subcommittee. This group met an additional six times throughout the project to provide input, share expertise, and provide recommendations on various project components, including topic areas for the RSAP, the One Bay Vision, Subregional Shoreline Adaptation Plan Guidelines and Standards, and the Equity Assessment.

Equitable Advisory Group Meeting Process

The Equity Subcommittee developed a series of considerations to be reflected on and enacted when the team developed Advisory Group meeting structure and content. The following bullets summarize key concepts implemented in the process as outlined by the Strategy:

- **Agenda creation**: Equity and Environmental Justice representatives meet 1 week prior to each Advisory Group meeting to discuss and refine the upcoming meeting agenda.
- **Meeting facilitation:** Allow people to raise concerns during meetings and have a structure in place for conflict resolution to take place live during meetings when possible.
- **Community-builders:** Provide a warm-up activity at the beginning of each meeting and utilize small group discussions to allow participants to know one another as people.
- **Equity debriefs after each meeting:** Create a 15-minute meeting de-brief after each Advisory Group meeting to allow for follow-up and meeting reflections.
- **Working agreements:** Seven working agreements were developed by the Equity Subcommittee and shared at the beginning of each Advisory Group meeting.
- **Equity and land acknowledgments:** Include an equity and/or land acknowledgment at the beginning of each meeting and led by a member of the Equity Subcommittee.
- **Inclusion of Indigenous perspectives and participation:** Continue to reach out to indigenous organizations to participate in the process. Inclusion of Indigenous perspectives and meaningful integration of priorities and approaches that emerge from Indigenous partnerships is a crucial missing piece of the process to date.

Equity in the Outreach and Communications Plan

Goal #1 of the Outreach and Communications Plan was to "Build community engagement and involvement for the RSAP, particularly among communities who have been traditionally excluded from climate resilience decision-making." Supporting the ambitions of this goal are a series of equity practices:

- Listen to understand what work is already being done in the community;
- Expand on the Bay Adapt goal of focusing on environmental justice; and
- Implement the practices described throughout this Equity Strategy and other guidance from the Equity Subcommittee.

The Outreach and Communications Plan included three types of community engagement events, with equitable practices applicable to each.

- **Pop-up Event Community Visits:** Selection for which community events to visit began with areas where RSAP equity and Environmental Justice representatives are active, followed by consideration of other vulnerable shoreline communities, and material development to include language translation needs based on community demographics, and visuals that are legible for different vision abilities.
- **Local Place-based Workshops:** Partner with and provide paid compensation to up to five local community-based organization to co-lead the development of a workshop calibrated to local places and communities. The development of the workshops should, at a minimum, make space in the agenda for people to share the needs and concerns they have, to celebrate and support existing work in progress in the local area, and recognize that sea level rise adaptation planning has the potential to address a community as a whole by engaging with expressed needs and focusing on multiple benefits along a shoreline.

- **At-Large Public Events:** Provide transparent and accessible virtual public events that allow for broad participation from interested parties at crucial points in the process, including: initial development of the One Bay Vision, introduction to the Subregional Shoreline Adaptation Plan approach, and sharing the Guidelines and Standards during the public comment period.

Part Two: Developing an Equity Assessment for Subregional Shoreline Adaptation Plan Guidelines

This component of the Equity Strategy focused on how to ensure that the outcomes of the RSAP would contribute to tangible equity improvements on the ground for socially vulnerable and Environmental Justice communities. This part of the process was the most dynamic and iterative, with the development of initial equity checks on the RSAP process, followed by the desire to create a required Equity Assessment accompanying the Subregional Shoreline Adaptation Plan Guidelines as a Minimum Standard.

Defining the Equity Checks and Equity Assessment Process

As part of developing a transparent, respectful, and collaborative process, BCDC and the consultant team engaged with the Equity Subcommittee to set the basis for this task. Initial discussions included identifying mutual understandings of what factors will make these checks a successful part of the process, who will lead and facilitate the checks, and at what point in the process these checks will occur.

An "Equity Check" was initially identified as a way to create a continuous learning environment that co-evolved a shared understanding of how justice, equity, diversity, and inclusion is intentionally being practiced and resulting in the desired outcomes. The goal of these Equity Checks is to reflect on both the process and the deliverables; how the process and deliverables are/aren't supporting the commitment to improve systems and remove barriers and biases that impede justice-minded outcomes; and tracking progress through criteria co-designed with the Equity Subcommittee. This system of Equity Checks was envisioned to be iterative, in which feedback from the check is processed, content revised, and re-checked. Following meetings with the Equity Subcommittee, it was determined that the most effective approach to ensuring equitable outcomes would be an Equity Assessment that required local jurisdictions to conduct these concepts of equity checks on their own planning process.

Developing and Refining the Equity Assessment

The foundations of the Equity Assessment came from numerous Equity Subcommittee meetings throughout the RSAP that identified important questions and considerations that should be asked when developing a local adaptation process and determining the potential outcomes of adaptation strategies. Through collaboration with the Equity subcommittee, BCDC developed an initial Equity Assessment, which was refined and improved through input over the course of multiple Equity Subcommittee meetings. The final version of the Equity Assessment can be found in the Equity Assessment Standard (Section 3.3.3).

4.2.2 Equitable Outreach and Engagement

Equitable engagement was a major cornerstone in the development of the RSAP. One of the first steps in planning the process for developing the Guidelines was to create an Equity Strategy to ensure that equity, diversity, and inclusion were embedded in the Guidelines development process and that the Guidelines themselves guide users to create equitable processes in their own plan development and achieve equitable outcomes in their plans. Engagement in the Guidelines development also came in the form of significant public outreach and stakeholder engagement. Staff hosted or participated in over 70 separate meetings, focus groups, presentations, pop-ups, workshops, and panels to share progress and solicit feedback and engagement from hundreds of stakeholders from Fall 2023 to December 2024. The RSAP Equity Strategy outlined a process for ensuring that equity, representation from Environmental Justice communities, and diverse voices were included in the outreach process. A description of the Equity Strategy can be found in the previous section (Section 4.2.1).

Standing Leadership Groups

The RSAP Advisory Group was a major brain trust that provided significant input and feedback into the Guidelines. The Advisory Group consisted of nearly 50 stakeholders from around the region representing organizations and interests from equity, business, environment, special districts, climate science, policy, academia, local planning, transportation, and more. This group offered specific paid equity and environmental justice seats to ensure equitable representation and included members from BCDC's Environmental Justice Advisors as well as from other Environmental Justice communities. This group met six times over the development of the Guidelines and provided direct feedback and edits on the One Bay Vision and Guidelines at multiple points throughout the development process. Several group members also participated in multiple subcommittees to provide more detailed input on certain topic areas. Subcommittees included:

- Data and Mapping: This group provided significant input into the data the Guidelines should use for hazards scenarios, data sets to be analyzed for vulnerability, and presentation of data in the Online Mapping Platform tool.
- Equity: This group was designed to help staff develop the RSAP Equity Strategy (see Section 4.2.1) and ensure that the Guidelines sufficiently incorporate equity via the Equity Assessment.
- Subregional Plans: This group provided input on the development of the structure of the Subregional Plans. This helped to shape the elements the plans should contain and the model for the scale and process for developing Subregional Plans.
- Outreach and Communications: This group provided input into the overall communications and outreach plan as well as some outreach materials.
- Environment: This group helped to ensure that environmental issues were being appropriately characterized and addressed in the One Bay Vision and Guidelines.

The Local Electeds Task Force is an ongoing group consisting of two local elected officials from each county who are poised to be champions for climate adaptation work within their jurisdictions. The Task Force received multiple briefings on the RSAP to ensure that local electeds are aware of what requirements their cities will be expected to meet and create buy-in for the Guidelines.

The Bay Adapt Implementation Coordinating Group (ICG) is an ongoing group of Executive Director-level stakeholders who play a role in helping BCDC implement the tasks and actions in the Bay Adapt Joint Platform. The ICG received

briefings on the RSAP and provided strategic input on the development of the Guidelines.

Staff provided regular updates to BCDC's Commission and the Commission's Rising Sea Level Working Group, which are public meetings and allow for public engagement. Staff also presented to BCDC's Engineering Criteria Review Board and Design Review Board for feedback.

Outreach Events

From September-November 2023, BCDC and Mithun staff attended ten pop-up events around the region to solicit input that helped shape the One Bay Vision. Staff brought informational materials about the RSAP and asked participants to engage in a dot voting exercise to articulate their priorities for the Bay Area now and in the future. The pop-ups included the following:

- Suisun City (Solano County) – Rush Ranch
- Menlo Park (San Mateo County) – Belle Haven Neighborhood Block Party
- American Canyon (Napa County) – Pumpkin Path
- San Rafael (Marin County) – Free Movies in the Park – Canal District and Peacock Gap
- San Francisco – Youth Climate Environmental Justice Summit
- Newark (Alameda County) – Newark Days Community Information Faire
- Richmond (Contra Costa County) – Thrive Thursdays
- Oakland (Alameda County) – Land is Liberation
- Mountain View (Santa Clara County) – 40th anniversary of Shoreline at Mountain View Regional Park

In addition to the pop-ups, BCDC hosted an online survey on the Bay Adapt website from September - October 2023 that allowed residents to provide similar input on their priorities for the Bay Area. These survey responses were considered in developing the One Bay Vision. Staff also hosted a public workshop in October 2023 designed to introduce the RSAP via an online video developed by Mithun and a presentation, followed by breakout sessions covering various aspects of the RSAP process, a discussion of the draft One Bay Vision, and geographic-specific breakout sessions highlighting the unique needs of different parts of the Bay.

In January-February 2024, staff hosted four focus groups targeted towards specific audiences/topic areas to generate specific discussion around areas with outstanding questions to resolve. These focus groups included:

- **Consultants:** What is the appropriate role for consultants to play in Subregional Shoreline Adaptation Plans and what feedback can they provide on the Guidelines based on their subject matter expertise and experience working on many different types of plans?
- **Special Districts:** Special districts are not required to prepare Subregional Shoreline Adaptation Plans according to SB 272, but many have prepared their own plans and/or will need to engage with multiple jurisdictions as they prepare their own plans since special districts own, operate, and/or manage many parts of the shoreline and assets along the shoreline. How can special districts most effectively engage in this process?
- **Planners:** How will Subregional Shoreline Adaptation Plans fit into the daily planning that staff already do? What kind of plan would best balance the additional burden on staff with maximum effectiveness? What can we learn from planners who have already done adaptation plans in the region?
- **Vulnerability Assessments:** What works and does not work about the way cities do vulnerability assessments and how can the requirements maximize responsive adaptation strategies while minimizing excessive analysis?

In May-June 2024, staff also partnered with five community-based organizations around the region to develop place-based workshops to identify how the draft Guidelines would help different locations with differing conditions, levels of capacity, and progress on adaptation planning. These workshops took place in the following communities with the following partners:

- Suisun City – Sustainable Solano
- North Richmond – The Watershed Project
- San Rafael – Canal Alliance
- East Oakland – Hood Planning
- East Palo Alto – Climate Resilient Communities

In Summer 2024, senior staff embarked on a 9-county "road show" to present on the RSAP to elected officials in every county at the local jurisdiction and county scales. Venues included:

- San Mateo Council of Cities
- Alameda County Mayor's Conference
- Contra Costa County Mayor's Conference
- Marin BayWAVE Steering Committee
- Solano County City Coordinating Committee
- Sonoma County Board of Supervisors
- Napa County Board of Supervisors
- Santa Clara Shoreline Cities Meeting

Staff also presented on the RSAP at many workshops and smaller meetings around the region, including the California Adaptation Forum in 2023 and the State of the Estuary in May 2024 and Bay Adapt Summit in August 2024.

4.3 Recommended Coastal Flood Hazards and Assets

4.3.1 Additional Coastal Flood Hazards

This section describes additional coastal flood hazards that are encouraged, but not required, to be included in a vulnerability assessment and addressed in adaptation pathways in the development of Subregional Plans. This information may be needed for project level design following plan approval and should be considered for inclusion in a vulnerability assessment to enhance understanding of vulnerability. Tsunami, levee failure, and base flood elevation are hazards that may already be addressed in local hazard mitigation plans, but if not should be considered as part of this Plan. Table 4–1 lists additional coastal flood hazards that may be included in Plans but are not required for compliance with the Guidelines.

Recommended Coastal Flood Hazards
10-Year Storm Surge
Compound Tidal/Fluvial Flooding
FEMA 100-year and 500-year Storms
Nearshore Wave Height and/or Wave Runup
Land Subsidence/Vertical Land Motion (VLM)
Shoreline Erosion and Intertidal Habitat Conversion (due to increased inundation and erosion)
Saltwater Intrusion
Tsunami
Levee/Floodwall Failure
Backwater Flooding

Table 4–1. Recommended additional coastal flood hazards that can be included in Subregional Shoreline Adaptation Plans.

4.3.2 Additional Assets

This section includes recommended assets that may be used in the development of Subregional Plans. The Minimum Categories and Assets Standard (Section 3.3.2) describe the required assets that must be assessed for Existing conditions, vulnerability, and considered when designing adaptation strategies and pathways in the Subregional Plans. However, there may be additional assets that are locally important to be included in Subregional Plans. Table 4–2 lists additional assets that may be included in plans but are not required for compliance with the Guidelines.

Additional Categories and Assets

Topic Area	Category	Asset/Service
Community Health and Well-being	Community Services	• Unhoused populations • Schools/colleges • Faith-based institutions • Assisted living facilities • Childcare centers • Community centers • Senior centers • Libraries • Grocery stores
Ecosystem Health and Resilience	Existing Baylands Habitats	• Soft mobile substrate (both intertidal and subtidal mudflats) including sand, gravel, pebble, and cobble • Immobile rock substrate including boulders to bedrock • Shellfish beds including oysters and mussels • Artificial structures, including piers, pilings, bridge footings, that can be modified or removed • Submerged aquatic vegetation, including eelgrass, sago pondweed, widgeon grass, and surfgrass • Seaweed beds aka macroalgal beds
Development, Housing, and Land Use	Current Land Uses or Areas	• Economic areas such as business hubs • Commercial, industrial, and non-residential land uses • Manufactured home parks (e.g., mobile home parks)
Critical Infrastructure	Emergency Services	• Evacuation shelters • Resilience hubs • Electrical transmission lines • Natural gas pipelines
Public Access and Recreation	Recreation	• Local parks, trails, and recreation facilities
Transportation and Transit	Roads	• Arterial roads
Shoreline Contamination	Contaminated Sites	• Brownfield sites • Buildings and/or land uses that contain hazardous materials • Oil spill risks

Table 4–2. Recommended additional categories and assets that can be included in Subregional Shoreline Adaptation Plans.

Glossary

Adaptation pathways: An approach to the challenge of making adaptation decisions today that supports flexibility for future adaptation options. It provides a useful structure for considering different options (or pathways) to respond to increasing flood risk over time and helps communities understand what actions taken in the short term can enable options for the long term.[2] Pathways rely on developing triggers and decision points based upon monitoring the effectiveness of strategies, lifespan of adaptation actions, and evaluating the changing physical and social conditions that signal when changes to the pathways need to occur.

Adaptation project: A specific and detailed action that has advanced into a greater level of design and/or implementation beyond the conceptual phase.

Adaptation strategic approach: A grouping of like adaptation strategies that achieve specific outcomes related to flood risk reduction. Strategic approaches can include both physical and non-physical strategies, be used in tandem along different parts of a shoreline and change and phase over time in response to changing local conditions and risk. Developing effective adaptation strategies and pathways along a shoreline will likely require multiple individual actions that may cross different strategic approaches.

Adaptation strategy: An adaptation strategy refers to a specific action, or set of interdependent actions, that are designed to achieve a particular outcome. A comprehensive approach to reducing flood risk along a shoreline will likely include multiple strategies that work together across a shoreline and function effectively as phased strategies over time as flood risks increase. These can be physical and non-physical. Physical adaptation strategies can include natural and nature-based solutions, such as combining marsh restoration with eelgrass plantings or augmenting mudflats. Physical adaptation strategies can also involve "gray infrastructure" such as building sea walls or flood walls or creating levees or dikes. Strategies can also include non-physical actions such as non-physical land use changes, policy development and/or community capacity building. The RSAP requires consideration of natural and nature-based adaptation for all proposed adaptation strategies.

Adaptive capacity: The ability to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.[3]

Bay Area: The nine-county San Francisco Bay Area. The term Bay Area is used interchangeably with the word region and regional in the RSAP.

Baylands: Consist of the shallow water habitats around the San Francisco Bay between the minimum and maximum tidal elevations, subtidal habitats, and transition zones and adjacent uplands and their associated plants, animals, and other organisms. These habitats provide essential ecosystem services that support environmental, social, and economic well-being. Coastal flooding has the potential to alter Baylands ecosystems and drown certain habitats in the absence of effective adaptation responses, while using nature and nature-based adaptation can support flood risk reduction and provide ecosystem benefits.[4]

Bay shoreline: Areas along the shoreline that touch the San Francisco Bay and is used when referring to jurisdictions that are within BCDC's jurisdiction. "Bayside" is used interchangeably with Bay shoreline in the RSAP.

Beneficial sediment reuse: The removal of a large volume of sediment from a channel that is reused locally and is financially viable for both the agency completing the removal and the project that is using the sediment. The combination of increasing Bayland sediment demand and altered watershed sediment supply has necessitated creative and non-traditional methods and solutions be developed and utilized to provide sediment to locations where it is needed.[5]

2 Saskia E. Werners, Russell M. Wise, James R.A. Butler, Edmond Totin, and Katharine Vincent, "Adaptation Pathways: A Review of Approaches and a Learning Framework," Environmental Science & Policy 116 (2021): 266–275.

3 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).

4 San Francisco Estuary Partnership, Habitat Goals: Part 2 (December 2012), https://sfestuary.org/wp-content/uploads/2012/12/3Habitat_GoalsPart2.pdf.

5 San Francisco Estuary Institute (SFEI), Documenting Sediment Reuse: A Summary of San Francisco Bay Area Projects, (May

Brownfield sites: Brownfield sites are real properties, the expansion, development, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.[6] A brownfield differs from a Superfund site in that it is less severely contaminated, and thus less likely to be cleaned up with federal funds.

Climate adaptation planning: The process by which communities assess potential future risks, including those specific to their context, and develop strategies to prepare for and mitigate these risks before they occur.[7]

Community: Community is used broadly to refer to any populations in the region that make up constituencies of cities and counties. This can include vulnerable communities (see definitions for socially vulnerable communities and Environmental Justice communities), as well as people of all backgrounds and income levels.

Contamination and Contaminated Sites: Areas where soils and sediments have been contaminated by environmental releases of chemicals and toxins. The US Environmental Protection Agency and relevant California state agencies are responsible for providing solutions and restoring sites so that ecosystems and public health are protected from harmful exposures.[8]

Consequence: The result or effect of the climate change impacts on society, equity, the economy, and the built and natural environment. Consequences can be quantitative or qualitative.[9]

Decision points: A point in time when a decision needs to be made in order to provide enough lead time for the next actions to be effective. This could occur at the same time as a trigger, before or after.[10]

Ecosystem: Includes all the living things (plants, animals, and other organisms) in a given area, interacting with each other, and with their non-living environments (weather, earth, sun, soil, climate, atmosphere). In an ecosystem, each organism has its own niche or role to play.[11]

Ecosystem services: The services and benefits provided by natural areas we depend upon, from stormwater, water quality and flood control, to habitats and climate resilience, and even our enjoyment of natural places.[12]

Environmental Justice communities: A neighborhood or community that experiences a disproportionate burden of environmental hazards and reduced quality of life compared to similar communities.[13] The RSAP uses this term to refer to communities receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0.

Equitable participation: Explicitly including individuals from populations who have been historically excluded from planning efforts.[14]

Equity: Centering people in inclusive decision-making, which means fairness and access for all to participate in the processes, removing barriers to participation between certain groups, ensuring voices and perspectives are heard and integrated in meaningful ways, and a commitment to transparency, sustained engagement, and measurement of actions that improve outcomes for all.[15]

10, 2023), https://www.sfei.org/sites/default/files/biblio_files/DocumentingSedimentReuse_final_20230510.pdf.

6 U.S. Environmental Protection Agency, "Brownfield Overview and Definition," last modified January 19, 2017, https://19january2017snapshot.epa.gov/brownfields/brownfield-overview-and-definition_.html.

7 California Governor's Office of Emergency Services, California Adaptation Planning Guide (Sacramento, CA: California Governor's Office of Emergency Services, June 2020), https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/CA-Adaptation-Planning-Guide-FINAL-June-2020-Accessible.pdf.

8 U.S. Environmental Protection Agency, "Contaminated Land," last modified September 2023, https://www.epa.gov/report-environment/contaminated-land.

9 City and County of San Francisco, San Francisco Vulnerability and Consequences Assessment (February 2020), https://sfplanning.org/node/456#info.

10 Adapting to Rising Tides, Adaptation Roadmap, 22.

11 Australian Museum, "What Is an Ecosystem?" last modified December 22, 2020, https://australian.museum/learn/species-identification/ask-an-expert/what-is-an-ecosystem/.

12 Adapting to Rising Tides, Adaptation Roadmap, 22.

13 U.S. Environmental Protection Agency, Environmental Justice, last updated June 15, 2021, https://www.epa.gov/environmentaljustice.

14 Adapting to Rising Tides, Adaptation Roadmap: A Practitioner's Guide to Sea-Level Rise Adaptation, (March 2022), https://www.adaptingtorisingtides.org/wp-content/uploads/2022/04/AdaptationRoadmap_A-Practitioner-Guide-Sea-Level-Rise-Adaptation_BCDC_ART_March2022_Final_ADA.pdf.

15 Adapting to Rising Tides, Adaptation Roadmap, 11.

Exposure: The people, property, systems, or functions that could be lost to a hazard. Generally, exposure includes what lies in the area the hazard could affect.[16]

Extreme high tides: Also known as King Tides, these tides are astronomical in origin. They occur when the Moon is at its closest distance to Earth (perigee) during a new or full moon, with the Earth, Moon, and Sun aligned. The combined gravitational forces of the Moon and Sun lead to higher-than-usual tide levels.[17]

Greenhouse gas emissions: Gases that trap heat in Earth's atmosphere, crucial for regulating the planet's surface temperature. Human activities, including electricity generation, vehicle use, and farming and forestry practices, have increased the concentration of these gases beyond natural levels. This enhanced greenhouse effect contributes significantly to global climate change.[18]

Groundwater rise: In nearshore coastal areas, the shallow groundwater table will rise as sea levels rise. This slow but chronic threat can flood communities from below, damaging buried infrastructure and roadway subgrades, increasing infiltration into sewer systems, and flooding below grade structures.[19]

Growth Geography: Areas developed by the Metropolitan Transportation Commission Association of Bay Area Governments (MTC/ABAG) and used in the Plan Bay Area 2050 report.[20] The Growth Geographies feature set combines Priority Development Areas, Priority Production Areas, Transit Rich Areas, and High Resource Areas. The RSAP dataset for the Strategic Regional Priority does not include Priority Production Areas as the focus of the Strategic Regional Priority is on housing.

Habitat resilience characteristics: Metrics used to evaluate the effectiveness of habitats in supporting wildlife, as outlined in the San Francisco Estuary Institute's "Baylands Resilience Framework." Key characteristics include transition zone connectivity, mudflat connectivity, patch connectivity, patch size and compactness, marsh elevation, the ratio of marsh pannes to vegetated areas, marsh islands, mounds, natural levees, redundancy of complete marshes, tidal connectivity, and the rate of vertical accretion.[21]

Hazard: Events or conditions that could injure people or damage assets.[22] The RSAP identifies minimum coastal flood hazards driven by sea level rise to be assessed in Subregional Plans, including tidal inundation, storm surge, emergent groundwater, and shallow groundwater.

Hydrologically connected: The interconnection of groundwater and surface water such that they constitute one water supply and use of either result in an impact to both.[23] Hydrologic connectivity is an important characteristic controlling ecosystem services, since movement of chemical constituents and biological organisms are often associated with water flow. The degree to which wetlands are connected to other ecosystems can be a controlling influence on the larger landscape.[24] Hydrology constitutes the interactions among the water cycle and all of its components.

Hydraulical connectivity: The degree by which water moves and flows across a landscape. Hydraulics is the mechanical behavior of water, which is impacted by natural and man-made features.

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16 Federal Emergency Management Agency (FEMA), Introduction to Hazardous Materials (IS-393.a), Lesson 3: "Hazardous Materials and Health," https://training.fema.gov/emiweb/is/is393a/is393.a-lesson3.pdf.

17 National Oceanic and Atmospheric Administration, "Shallow Coastal Flooding (Nuisance Flooding)."

18 Metropolitan Transportation Commission and Association of Bay Area Governments, Plan Bay Area 2050: Draft Environmental Impact Report: Climate Change and Greenhouse Gas Emissions (2021), https://planbayarea.org/sites/default/files/documents/2021-06/3.6%20CC-GHG-EN_DEIR.pdf.

19 May, C. L., A. Mohan, E. Plane, D. Ramirez-Lopez, M. Mak, L. Luchinsky, and T. Hale. Shallow Groundwater Response to Sea-Level Rise: Alameda, Marin, San Francisco, and San Mateo Counties. Prepared by Pathways Climate Institute and San Francisco Estuary Institute, 2022. https://doi.org/10.13140/RG.2.2.16973.72164.

20 Metropolitan Transportation Commission Association of Bay Area Governments (MTC/ABAG). Plan Bay Area 2050 Growth Geographies. 2021. https://opendata.mtc.ca.gov/datasets/MTC::plan-bay-area-2050-growth-geographies/about.

21 San Francisco Estuary Institute, Regional Analysis of Potential Beneficial Use Locations San Francisco Bay (April 2024), Regional Analysis of Potential Beneficial Use Locations (sfei.org).

22 U.S. Global Change Research Program, "Understand Exposure," Climate Resilience Toolkit, https://toolkit.climate.gov/steps-to-resilience/understand-exposure.

23 Hydrologically Connected, Law Insider, https://www.lawinsider.com/dictionary/hydrologically-connected.

24 Leibowitz et al., Wetland Hydrological Connectivity: A Classification Approach and United States Assessment, paper presented

Intergenerational equity: Planning guided by generational thinking. This concept considers how the decisions of past and present generations will impact future generations and what may be owed to them or mended based on these decisions. Environmentally, this form of justice focuses on a sense of moral repair and generational obligation.[25]

Local governments: Local government is defined as "any chartered or general law city, chartered or general law county, or any city and county."[26]

Natural and nature-based adaptation: Occurs when sustainable planning, design, environmental management, and engineering practices weave natural features and processes into the built environment to promote adaptation and resilience. Such solutions enlist natural features and processes in efforts to combat climate change, reduce flood risks, improve water quality, protect coastal property, restore and protect wetlands, stabilize shorelines, reduce urban heat, add recreational space, and more. Nature-based solutions offer significant benefits, monetary and otherwise, often at a lower cost than more traditional infrastructure. These benefits include economic growth, green jobs, increased property values, and improvements to public health, including better disease outcomes and reduced injuries and loss of life.[27]

Non-physical adaptation: Actions or strategies that involve changing policies and regulations (such as new building codes or zoning requirements like setbacks and buffer zones), updating design guidelines, or enhancing education and community outreach to raise awareness and bolster community resilience.[28]

One Bay Vision: Essential component of BCDC's Regional Shoreline Adaptation Plan (RSAP). It describes what adaptation to sea level rise should look like for our communities, and outlines actions we can take across our region to achieve successful adaptation.[29]

Operational Landscape Unit (OLU): Connected geographic areas sharing certain physical characteristics that would benefit from being managed as a unit to provide particular desired ecosystem functions and services.[30]

Physical adaptation: Actions or strategies such as constructing levees, flood walls, and wetlands or relocating an asset, that mitigate the flooding impacts of sea level rise.[31]

Public Trust: A legal principle at the core of BCDC's mission. Under the Public Trust Doctrine, "sovereign lands," such as tidelands and the Bay itself, are held in trust by the state of California for the benefit, use, and enjoyment of the public. The McAteer-Petris Act and the Bay Plan are an exercise of authority by the Legislature over public trust lands. When BCDC takes any action affecting lands subject to the public trust, it considers whether its actions are consistent with the public trust needs for the area.[32]

Regional habitat goals: Targets for habitat restoration, protection, and/or enhancement for a variety of Baylands ecosystems. Habitat goals for the RSAP are based on the best available science, which at the time of publication is the 2022 San Francisco Joint Ventures Implementation Strategy.[33]

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at the 2017 AWRA Spring Specialty Conference on Aquatic System Connectivity, Snowbird, UT, May 1-3, 2017.

25 Tira Okamoto and Andréanne Doyon, "Equity and Justice in Urban Coastal Adaptation Planning: New Evaluation Framework," Buildings & Cities 4, no. 1 (2023), https://doi.org/10.5334/bc.377.

26 California Public Resources Code, § 30109.

27 Federal Emergency Management Agency (FEMA), Risk MAP Nature-Based Solutions Guide (Washington, D.C.: FEMA, 2021), https://www.fema.gov/sites/default/files/documents/fema_riskmap-nature-based-solutions-guide_2021.pdf.

28 Metropolitan Transportation Commission, Adaptation Planning, 7.2.

29 Bay Adapt, Regional Shoreline Adaptation Plan (RSAP): One Bay Vision (Working Draft) (March 2024), https://www.bayadapt.org/wp-content/uploads/2024/03/RSAP_OneBayVision_March2024.pdf.

30 SFEI and SPUR. 2019. San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units. Publication #915, San Francisco Estuary Institute, Richmond, CA.

31 Metropolitan Transportation Commission, Adaptation Planning: Chapter 7, 7.2 Climate Change Adaptation Measures, https://mtc.ca.gov/sites/default/files/Chapter_7_Adaptation_Planning.pdf.

32 San Francisco Bay Conservation and Development Commission, Laws and Regulations.

33 San Francisco Bay Joint Venture, San Francisco Bay Joint Venture Implementation Strategy (San Francisco, CA: San Francisco Bay Joint Venture, 2023), https://sfbayjv.org/wp-content/uploads/2023/02/SFBJV_IS_r1_FINAL_reduced.pdf.

Resilience: The capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience.[34]

Risk: Defined in the RSAP as a function of a hazard (e.g., coastal flood hazards), exposure to those hazards (which is increasing as sea levels rise), and the vulnerability of assets exposed (e.g., sensitivity, adaptive capacity, and consequence).

San Francisco Bay Conservation and Development Commission: A California state planning and regulatory agency with regional authority over the San Francisco Bay, the Bay's shoreline band, and the Suisun Marsh. Its mission is to protect and enhance San Francisco Bay and to encourage the Bay's responsible and productive use for this and future generations. State law requires sponsors of projects that propose to fill or extract materials from the Bay to apply for a BCDC permit. In addition to minimizing any fill required for an appropriate project and ensuring that the project is compatible with the conservation of Bay resources, BCDC is tasked with requiring maximum feasible public access within the Bay's 100-foot shoreline band.[35]

Sea level rise: The worldwide average increase in ocean water levels due to human caused climate change, where warmer atmospheric and ocean temperatures cause ocean waters to expand and glaciers and ice sheets to melt.[36]

Sensitivity: The degree to which a species, natural system, or community, government, and other associated systems would be affected by changing climate conditions.[37]

Socially vulnerable communities: Communities that exhibit certain characteristics, such as, but not limited to, people without vehicles, people with disabilities, older adults, and people with limited English proficiency. These communities are especially at risk during public health and environmental emergencies because of factors like socioeconomic status, household characteristics, racial and ethnic minority status, or housing type and transportation.[38] The RSAP considers this to be block groups that rank from Moderate to Highest Social Vulnerability according to BCDC's Community Vulnerability Map.

Storm surge: An abnormal rise of water generated by high winds and low atmospheric pressure in the presence of a storm that is over and above the predicted astronomical tide. Often these storms are explained in terms of the probability that they will occur in a given year. For example:

- 5-year storm surge has a 1-in-5 chance (20% chance) of occurring any given year.
- 50-year storm surge has a 1-in-50 chance (2% chance) of occurring any given year.[39]

Subregion or subregional: A smaller, more localized area within a larger region that is considered for detailed planning and management. This term is used to refer to any areas smaller than the nine-county San Francisco Bay region to address local conditions, vulnerabilities, and adaptation strategies.[40]

Subregional Shoreline Adaptation Plan: Plans created by cities and counties, supported by BCDC, that are consistent with the RSAP guidelines to ensure that the region is prepared for sea level rise both locally and in alignment with the region.[41]

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34 Adapting to Rising Tides, Adaptation Roadmap, 11.

35 California State Government, San Francisco Bay Conservation and Development Commission, https://www.ca.gov/agency/?item=san-francisco-bay-conservation-and-development-commission#:~:text=The%20San%20Francisco%20Bay%20Conservation,band%2C%20and%20the%20Suisun%20Marsh.

36 NASA, "Sea Level," Global Climate Change Vital Signs of the Planet, (July 2021), https://climate.nasa.gov/vital-signs/sea-level/.

37 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).

38 Agency for Toxic Substances and Disease Registry, Social Vulnerability Index: At a Glance, updated August 2023, https://www.atsdr.cdc.gov/placeandhealth/svi/at-a-glance_svi.html#:~:text=Helpful%20Terms%20&%20Facts,the%20Census%20collects%20statistical%20data.

39 National Oceanic and Atmospheric Administration, Shallow Coastal Flooding (Nuisance Flooding), last updated June 2023, https://toolkit.climate.gov/topics/coastal-flood-risk/shallow-coastal-flooding-nuisance-flooding#:~:text=Extreme%20high%20tides&text=These%20perigean%20spring%20tides%E2%80%94also,are%20in%20a%20straight%20line.

40 Adapting to Rising Tides, Adaptation Roadmap.

41 Bay Adapt, Regional Shoreline Adaptation Plan: Overview (2023), https://www.bayadapt.org/wp-content/uploads/2023/10/BCDC_RegionalShorelineAdaptationPlan_Overview_2023.pdf.

Suisun Marsh Preservation Act: The Act gives BCDC permitting and enforcement responsibilities for the Suisun Marsh. BCDC shares these responsibilities with other agencies and local governments.[42]

Superfund and Superfund-qualified sites: Uncontrolled or abandoned sites or properties where hazardous waste or other contamination is located. A contaminated site is generally considered a "Superfund site" if the federal government is or plans to be involved in cleanup efforts.[43]

Triggers: The set of conditions that signals the time for a new strategy. A trigger is based on factors specific to the effect it addresses. It can be any number of signals (e.g. such as a specified level of service disruption such as transit service availability).[44]

Vulnerability: Defined in the RSAP as a function of three components: sensitivity, adaptive capacity, and consequence. Sensitivity is the degree to which the conditions, functions, and/or performance of an asset are adversely affected due to exposure. Adaptive capacity is the ability of an asset to adjust to exposure or effectively manage and cope with the consequences Consequence is the harm or disruption that may result from exposure to the asset. Ecological vulnerability refers to the degree of ecosystem disturbance, system damage, and the ability of system restoration.[45]

Vulnerability Assessment: A process that involves understanding the physical and ecological conditions of a shoreline to establish a baseline for evaluating vulnerabilities to coastal flood hazards. It specifies the types of flood hazards present and aids in identifying adaptation strategies that consider local conditions and opportunities. This includes determining suitable natural and nature-based adaptation approaches, assessing the impact of current and future development patterns, and incorporating other locally relevant factors to inform the selection and evaluation of adaptation alternatives.

Vulnerable Communities: Refers to areas with current and future flood risk and high concentrations of households exhibiting socio-economic and/or mental or physical conditions that may make it more difficult to prepare for, respond to, or recover from coastal flood hazards. The RSAP requires an identification of "vulnerable communities" that should include, at least, socially vulnerable and Environmental Justice communities (see individual definitions). This term can also include communities identified by other state and regional agency definitions, such as "disadvantaged communities" or "equity priority communities." Additionally, this can include frontline communities, which include lower-income communities, communities of color, Indigenous peoples and Tribal nations, and immigrant communities who are especially vulnerable to the impacts of climate change because of decades-long, pervasive socioeconomic conditions that are perpetuated by systems of inequitable power and resource distribution.[46]

Water-dependent uses: Uses and facilities which require direct access to, or location in, marine or tidal waters and which therefore cannot be located inland, including but not limited to: marinas, recreational and commercial fishing and boating facilities, finfish and shellfish processing plants, waterfront dock and port facilities, shipyards and boat building facilities, water-based recreational uses, navigation aides, basins and channels, industrial uses dependent upon water-borne transportation or requiring large volumes of cooling or process water which cannot reasonably be located or operated at an inland site and uses which provide general public access to marine or tidal waters.[47]

Wildlife: Any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof.[48]

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42 San Francisco Bay Conservation and Development Commission, Laws and Regulations.

43 U.S. Environmental Protection Agency, "Types of Contaminated Sites," last modified January 19, 2017, https://19january2017snapshot.epa.gov/enforcement/types-contaminated-sites_.html.

44 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).

45 Hou et al., "A New Perspective on Ecological Vulnerability and Its Transformation Mechanisms," Ecosystem Health and Sustainability 8 (2022): 2115403.

46 Greenlining Institute, Making Equity Real in Climate Adaptation and Community Resilience Policies and Programs: A Guidebook (Oakland, CA: Greenlining Institute, 2019), https://greenlining.org/wp-content/uploads/2019/08/Making-Equity-Real-in-Climate-Adaption-and-Community-Resilience-Policies-and-Programs-A-Guidebook-1.pdf.

47 Law Insider, Water-Dependent Uses, https://www.lawinsider.com/dictionary/water-dependent-uses.

48 U.S. Fish and Wildlife Service, "Endangered Species Act: Section 3," https://www.fws.gov/laws/endangered-species-act/section-3.

San Francisco Bay Conservation and Development Commission (BCDC)

Regional Shoreline Adaptation Plan