Regional Shoreline Adaptation Plan:

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

Draft for Public Comment (September 2024)

San Francisco Bay Conservation and Development Commission (BCDC)


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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 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 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 work will be counted as allowed for by the current guidelines and standards.
Require adaptation responses to coastal flood hazards affected by sea level rise.	Require adaptation responses to all climate-driven hazards.

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Executive Summary

Global sea level rise is already being felt in the Bay Area. It has disrupted daily life and damaged the region's natural habitats and built infrastructure. 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.[1] These events also threaten the ecological health of the Baylands, reduce access to public trails and parks, and send untreated wastewater into the Bay[2].

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.[3] With four feet of sea level rise, the region could see serious impacts to existing and planned job spaces and housing units, disproportionate impacts to vulnerable communities, highway vehicle trips and commuter rail lines, and acres of habitats for depressional wetlands, lagoons and tidal marshes.[4]

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 a worst-case sea level rise and storm surge scenario by 2050 would cost at least $110 billion.[5] However, there will be a much higher cost 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 to could become.

The region's response to sea level rise, and approach to coordinated adaptation, depends on aligning values, planning, and actions across jurisdictions toward a shared regional strategy. **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.**

This plan begins to lay a path toward that alignment. This document is the first part of a

1 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.

2 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.

3 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.;

4 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)

5 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.

regionwide plan for a resilient and sustainable future for the Bay shoreline – The Regional Shoreline Adaptation Plan (RSAP). The RSAP will guide coordinated, locally planned sea level rise adaptation actions that all fit together to realize shared goals.

To do so, this document contains standards and requirements for regional and local actors to use to ensure coordinated and consistent adaptation across the San Francisco Bay Area. The major components of this document are:

- **A One Bay Vision and Strategic Regional Priorities** – the big picture goals and actions whose implementation will enable the region to successfully adapt to sea level rise.
- **Subregional Shoreline Adaptation Plan Guidelines and Standards** – the guidance and minimum standards that describe how local governments will develop local adaptation plans, including what the plans should contain and what standards they should meet. The Guidelines and Minimum Standards are designed to ensure that local plans fulfill the One Bay Vision and the Strategic Regional Priorities while reflecting local needs, values, and conditions.

As of Autumn 2023, all local governments located along the San Francisco Bay shoreline are now required to develop a Subregional Shoreline Adaptation Plan by January 2034. This document explains the "why" and details the "how."

SB 272, BCDC, the Bay Plan, and Bay Adapt

SB 272 (Laird 2023): Sea level Rise Planning and Adaptation was signed into law October 7, 2023. It requires all local governments along the San Francisco Bay shoreline to address how they will tackle the ramifications of sea level rise through Shoreline Resiliency Subregional Plans by January 1, 2034.[6] The San Francisco Bay Conservation and Development Commission (BCDC) is the agency responsible for developing the guidelines used by the local governments to prepare these plans in San Francisco Bay, and BCDC is required to approve or deny plans based on consistency with the guidelines. While SB 272 provides the mandate for these plans, BCDC has been setting the stage for local governments to create coordinated adaptation plans for well over a decade.

The San Francisco Bay Plan (Bay Plan) is BCDC's guiding policy document for implementing the laws as outlined in the McAteer Petris Act of 1965.[7] In 2011, BCDC updated the Bay Plan to include Climate Change Policies. Climate Change Policy

6 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.

7 California Government Code, McAteer Petris Act, Title 7.2, Chapter 5, § 66650 (repealed and added by Stats. 1969, Ch. 713), https://law.justia.com/codes/california/code-gov/title-7-2/chapter-5/section-66650/.

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."[8] After a decade of groundbreaking work by BCDC's Adapting to Rising Tides program, 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 must take to protect people and the natural and built environment from rising sea levels. The Bay Adapt Joint Platform builds on a decade of cutting-edge research, findings, and policies to prepare for sea level rise, and sets the stage by describing specific tasks that the RSAP is now implementing.

Sea Level Rise, Coastal Flood Hazards, and Adaptation

Science has made it clear that sea level rise in the Bay is real and accelerating. In addition to shoreline inundation, climate change will lead to more extreme high tides, more intense and frequent storms, and rising groundwater tables. Successful adaptation will help protect our shorelines from these hazards, meaning that adapting to rising sea levels will protect people, sustain habitat, and grow the economy. There are different approaches to adaptation, ranging from avoiding new development in places that will flood to protecting development with shoreline infrastructure or even relocating assets out of harm's way. All different types of approaches will be necessary to implement along the Bay shoreline, and a primary goal of this document is to guide users through the myriad considerations and decision points in adaption planning to identify what solutions work best where.

This document is designed to move users toward outcomes that are more equitable, protect and expand shoreline ecosystems and habitats, increase access to the shoreline and shoreline-dependent uses, and balance the need for new development and housing – the cornerstones of a thriving and sustainable economy – with protection of people, habitat, and assets.

Setting a Regional Vision and Priorities

The One Bay Vision describes successful outcomes of regional adaptation to sea level rise for the Bay Area shoreline. The vision reflects the Bay Area's values today and acknowledges that the future Bay shoreline will look different as communities continuously adapt over time.

Strategic Regional Priorities are key regionally significant issues to be resolved through successful regional adaptation. These large-scale challenges and opportunities must be addressed and integrated into local plans so that the Bay Area's regional systems serve everyone. Achieving these regional "big moves" relies on local plans that include critical actions in specific locations. Combined, the One Bay Vision and Strategic Regional Priorities set forth a road map that outlines what the region wants to accomplish, and

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

the key policies enacted in key locations that will help achieve them. The One Bay Vision sets visions and goals for the following topic areas:

- 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
- Governance, collaboration, and finance

The Guidelines: Plan Elements and Minimum Standards

The Guidelines shape what Subregional Shoreline Adaptation Plans contain, how they are to be developed, and the standards the plans must meet. They also outline which Bay Area jurisdictions are required to create a plan, what plan submittal, review, and approval process involves, how and when plan updates should be completed, and guidance for how to access support and resources. The Guidelines are organized by required 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 standards include requirements for including Coastal Flood Hazards and Sea Level Rise Scenarios, Minimum Categories and Assets, conducing an Equity Assessment, and Adaptation Strategy Standards to guide the identification, evaluation, and prioritization of adaptation approaches. A complete plan submittal checklist is available to be used for ensuring all requirement components of the Subregional Shoreline Adaptation Plans are submitted.

Subregional Shoreline Adaptation Plans must meet Minimum Standards to reduce coastal flood hazards that are increasing due sea level rise, including tidal inundation, storm surge, shallow groundwater, and groundwater emergence flooding. The standards also include four sea level rise scenarios as minimums based on best available science from the State of California's Ocean Protection Council Sea Level Rise Guidance (California Sea Level Rise Guidance 2024).

The Adaptation Strategy Standards enable local governments to achieve positive adaptation outcomes while giving jurisdictions necessary flexibility to determine what suite of adaptation strategies are most appropriate for their communities and shorelines. Just as important, the standards will ensure that those successful choices will contribute to regional success that reduces flood risk and increase the long-term health and well-being of people, natural habitats, and our regional economy.

This document contains the initial segments of a larger body of work that will create a long-term comprehensive Shoreline Adaptation Plan for the San Francisco Bay Area. This beginning provides the context, background, and strategies upon which region-wide adaptation planning can succeed. And this document creates a transparent public policy in which adaptation planning for the Bay Area can set the region on a path toward coordinated and successful proactive adaptation planning, resulting in in a future Bay shoreline that is resilient and supports a thriving and sustainable Bay Area.

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 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.

This document contains information that is required, and information that provides necessary context for sea level rise adaptation planning. The terms **"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. If that information cannot be provided or met, a description of why must be included. All plan requirements and standards are mandatory.

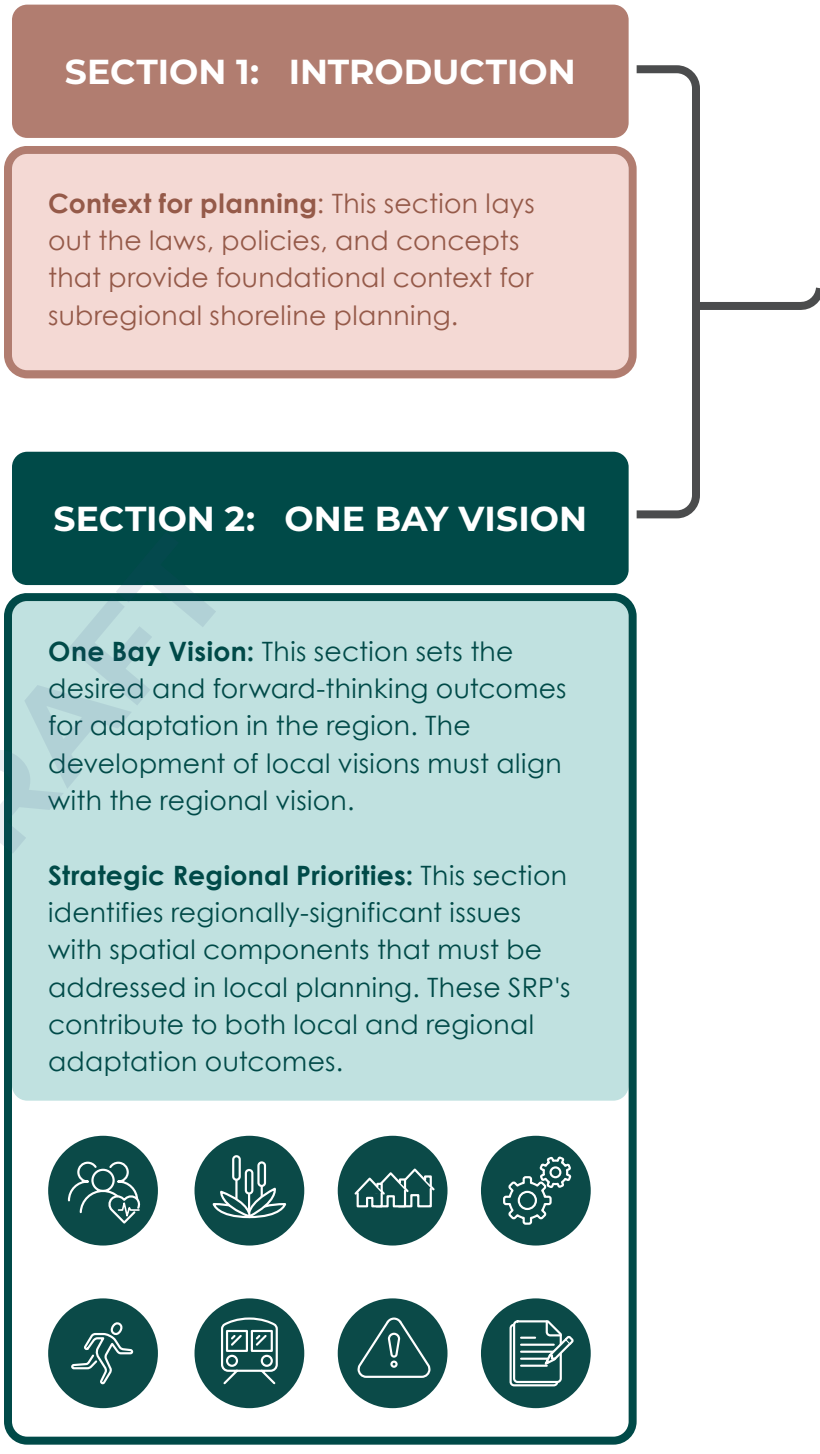


Figure 1—1. How the RSAP sections guide development of a local jurisdiction's Shoreline Adaptation Plan

SECTION 3: SUBREGIONAL SHORELINE ADAPTATION PLAN GUIDELINES

Subregional Plan Elements: This section 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:

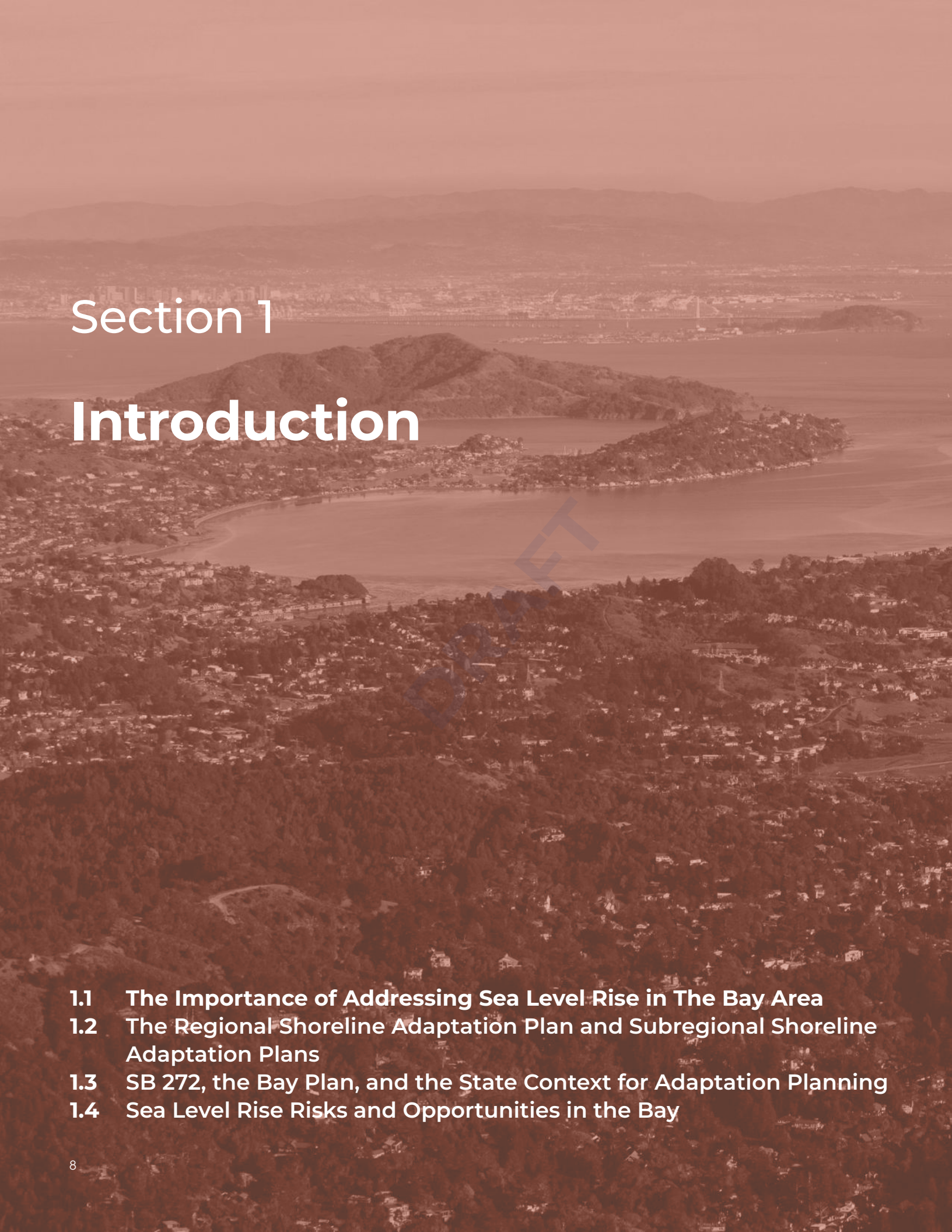
- **A** Planning Process
- **B** Existing Conditions
- **C** Vulnerability Assessment
- **D** Adaptation Pathways
- **E** Land Use and Policy Plan
- **F** Implementation Plan
- **G** Project List

Minimum Standards: Certain Guidelines require compliance with common standards. The Standards outline the minimums that must be met to comply with the Guidelines. The Minimum Standards provide regional consistency for the following:

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

Requirements related to plan development, responsibilities, submission and approval can be found in later sections of Section 3, as well as checklists, resources, and direction for regionally available datasets that should be used to meet the Guidelines.

A LOCAL JURISDICTION'S SHORELINE ADAPTATION PLAN



Section 1

Introduction

View overlooking the San Francisco Bay. Photo by SF Baykeeper, Cole Robb Most, and LightHawk.

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.[4] 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.

4 Laird, California Senate Bill 272, 2023.

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.[5] 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 a diversity of wildlife, habitat for endangered species, support recreation and tourism, provide climate resilience, among other ecosystem services.[6]

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.

Bayside and Bay shoreline refers to areas along the shoreline that touch the San Francisco Bay and is 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.

5 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.;

6 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)

Many Bay shoreline cities and counties have not planned for and are not prepared for its impacts.[7] 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 hydrologically connected and neighboring jurisdictions will become increasingly dependent on one another to successfully manage and reduce flood risk.[8] 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 scenario by 2050 would cost at least $110 billion.[9] However, there will be a much higher cost 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 to could become. Every $1 spent on hazard mitigation saves $6 in avoided costs of damages.[10] 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 and more resilient future.

7 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

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

9 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.

10 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.

1.2 The Regional Shoreline Adaptation Plan and Subregional Shoreline Adaptation Plans

1.2.1 The Regional Shoreline Adaptation Plan Drives Adaptation Regionally

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 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 hydrologically 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 may include funneling projects to a region-wide funding strategy.

1.2.2 Subregional Shoreline Adaptation Plans Implement Adaptation Locally

Subregional Shoreline Adaptation Plans (Subregional Plans) are locally created 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 must develop 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 Local Government Responsibilities (Section 3.4.1).

Subregional Plans can be developed at multiple scales: including a city or town, county, multi-jurisdictional, or any combination thereof. 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 stakeholder will be essential in the creation comprehensive adaptation planning.

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 region-wide goals and targets for adaptation.

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.

Community workshop. Photo by Karl Nielson Green

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

1.3 SB 272, the Bay Plan, and the State Context for Adaptation Planning

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 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 to address sea level rise through either "San Francisco Bay Shoreline Resiliency Subregional Plans" within the San Francisco Bay or a Local Coastal Programs on the outer coast or by January 1, 2034.[13] SB 272 further names BCDC as the agency responsible for developing "guidelines for the preparation of these plans."[14] BCDC will then have authority to approve or deny plans based on consistency with the guidelines. Local governments that receive approval from their respective agency will be prioritized for funding for the implementation of sea level rise adaptation strategies and recommended projects in the approved plan.[15] 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 California Public Resources Code, § 30985.2.
15 California Public Resources Code, § 30985.5.

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 by adding targeted and concrete long-term adaptation outcomes.

The core themes of each Guiding Principle can be seen in the RSAP's One Bay Vision, Strategic Regional Priorities, Subregional Plan Guidelines, and Minimum Standards.

Bay Adapt Guiding Principles:

Support socially vulnerable communities
Climate change will disproportionately impact marginalized communities with fewer resources. 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 tradeoffs 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. Adaption is place based, and the Bay is a collection of distinct places with unique physical and social conditions; there is no "one size fits all" solution or timeline to address climate-related impacts.

1.3.2 BCDC, the Bay Plan, and Bay Adapt: Regional Strategy for a Rising Bay

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.[16] 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."[17] 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. In addition to the adoption of the Climate

16 California Government Code, McAteer-Petris Act, § 66650.

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

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 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 adaption responses.
- In 2016, following a series of public workshops on rising sea level, 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. Others are planned over the next few years.
- BCDC is also 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 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.

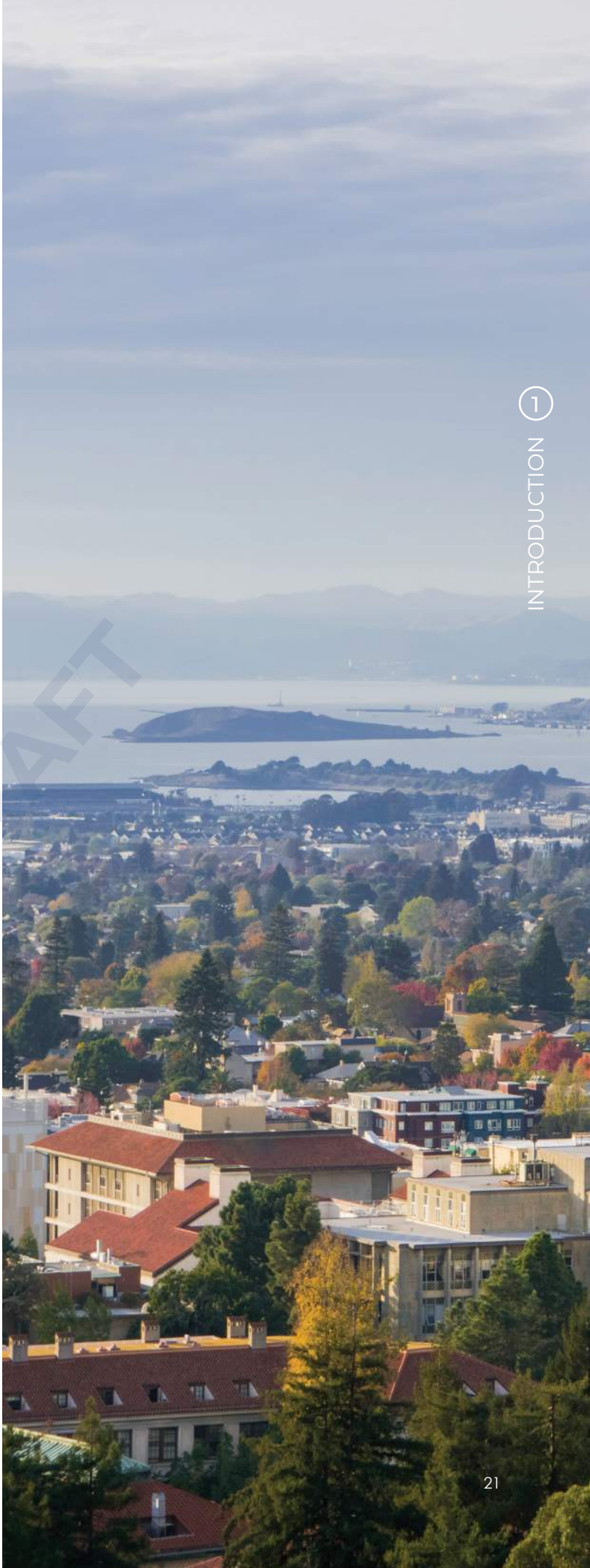
SB 375: Sustainable Communities and Climate Protection Act (Steinberg, 2008)
This bill instructs the California Air Resources Board (CARB) to set regional emissions' reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region develops a "Sustainable Communities Strategy" (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 update cycle in response to SB 375. Additionally, 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
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. 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.



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.[18]

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. Other types of climate-driven flooding that affects inland areas, such as increased precipitation, atmospheric rivers, fluvial and pluvial flooding, and other climate hazards can 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.[19] The high amount of GHGs 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.**

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

18 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.

19 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.

the Bay is projected to experience an additional 10 inches rise by 2050 (Figure 1—2).[20] As of 2024, the best available science agrees that between 2 - 7 feet of sea level rise are expected by 2100.[21] 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.[22]

There is greater confidence in the amount of sea level rise expected in the near-term due to the measurement of GHGs in the atmosphere today and current models on glacial and ocean dynamics. However, as projections extend into the future, the timing for higher levels of sea level rise is less certain. Future societal choices, such as the rate and extent of future GHG 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.[23] The RSAP uses the California Sea Level Rise Guidance (2024) to inform the Minimum Standards for sea level rise. Refer to Figure 1—3 and Figure 1—4 to see two of the sea level rise scenarios used in the RSAP Minimum Standards, including the 0.8 ft (2050) sea level rise scenario and 3.1 ft (2100 - Intermediate) sea level rise scenario. The California Sea Level Rise Guidance is updated typically every five years.

State of California Sea Level Scenarios from 2020 to 2150

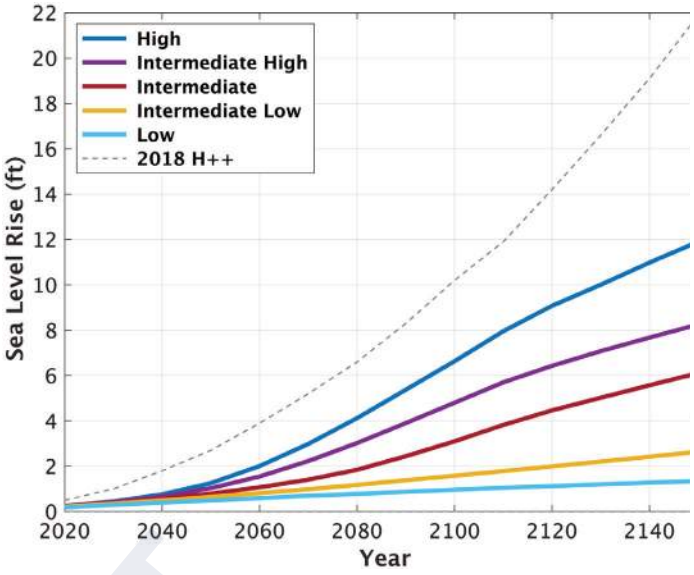


Figure 1—2. Sea Level Scenarios from 2020 to 2150, in feet, with a baseline of 2000. Source: California Sea Level Rise Guidance (2024).

20 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.

21 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.;

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

23 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.

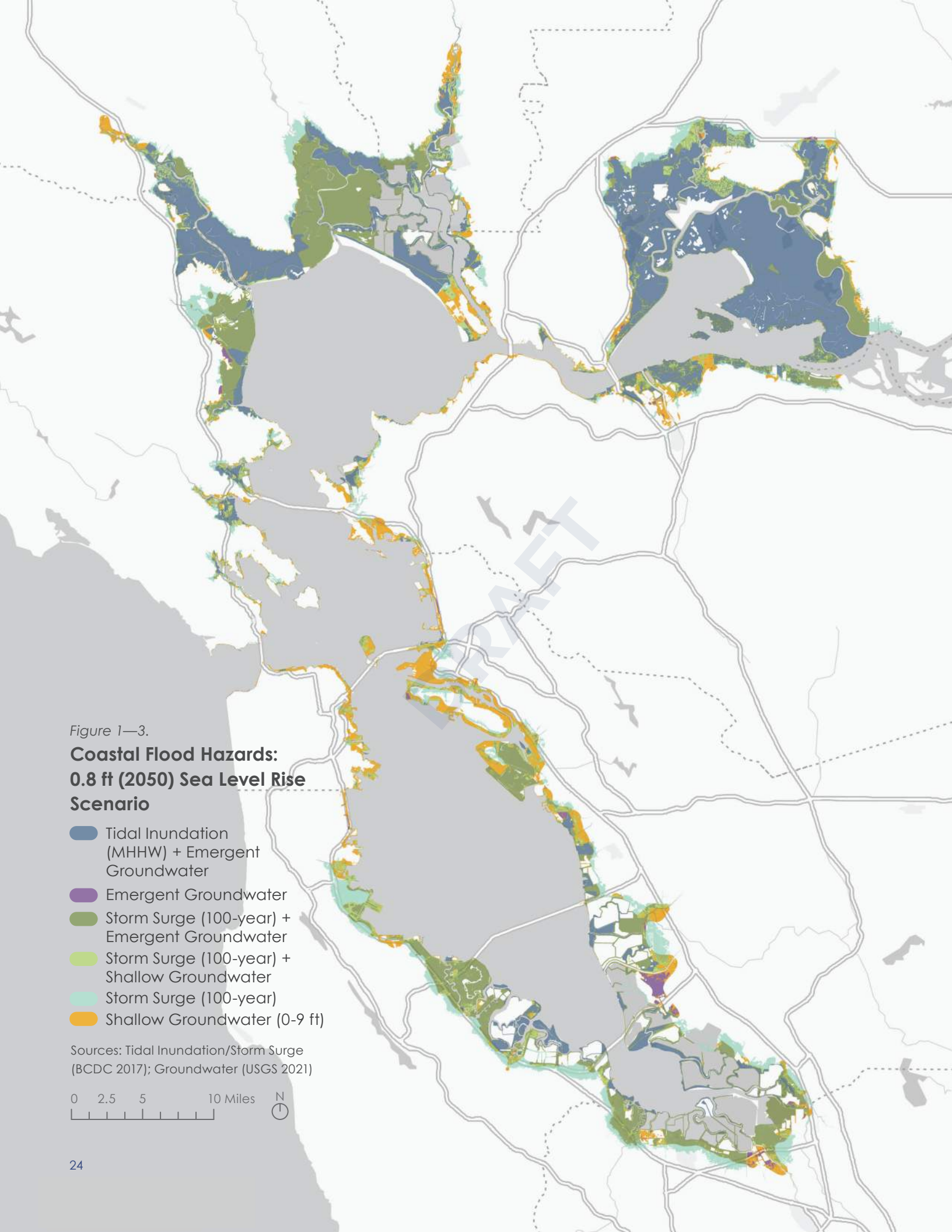


Figure 1—3.

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

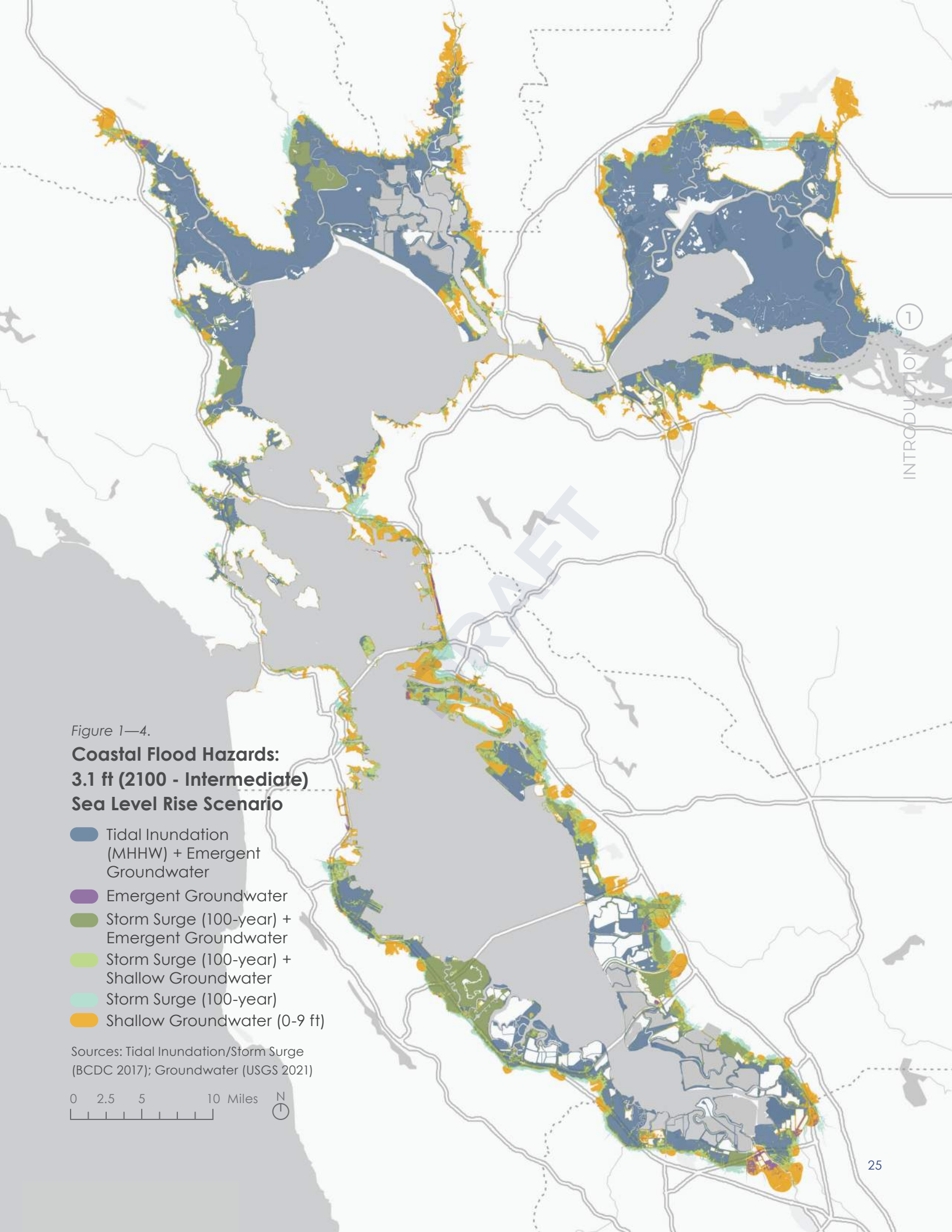


Figure 1—4.

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); Groundwater (USGS 2021)

Sea Level Rise Worsens Existing Coastal Flooding Hazards

Sea level rise can be considered a "threat multiplier" as it worsens existing flood hazards, including extreme high tides (known as King Tides), shallow and emergent groundwater rise, and storm surge (Figure 1—5). It exacerbates existing social inequities such as exposure to shoreline contamination, housing displacement, and limited shoreline access, while increasing stress on Baylands habitats and water-dependent shoreline uses. 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.

As sea levels rise, the tidal range of the shoreline will move inland — in the absence of an adaptation intervention. Normally occurring episodic flood events such as King Tides will increase in frequency, extent, depth, and duration. 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 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.[24] 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.[25] 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.

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. As sea levels rise so will groundwater, with areas

SETTING CONSISTENT STANDARDS FOR CURRENT AND FUTURE FLOODING

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

24 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).

25 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).

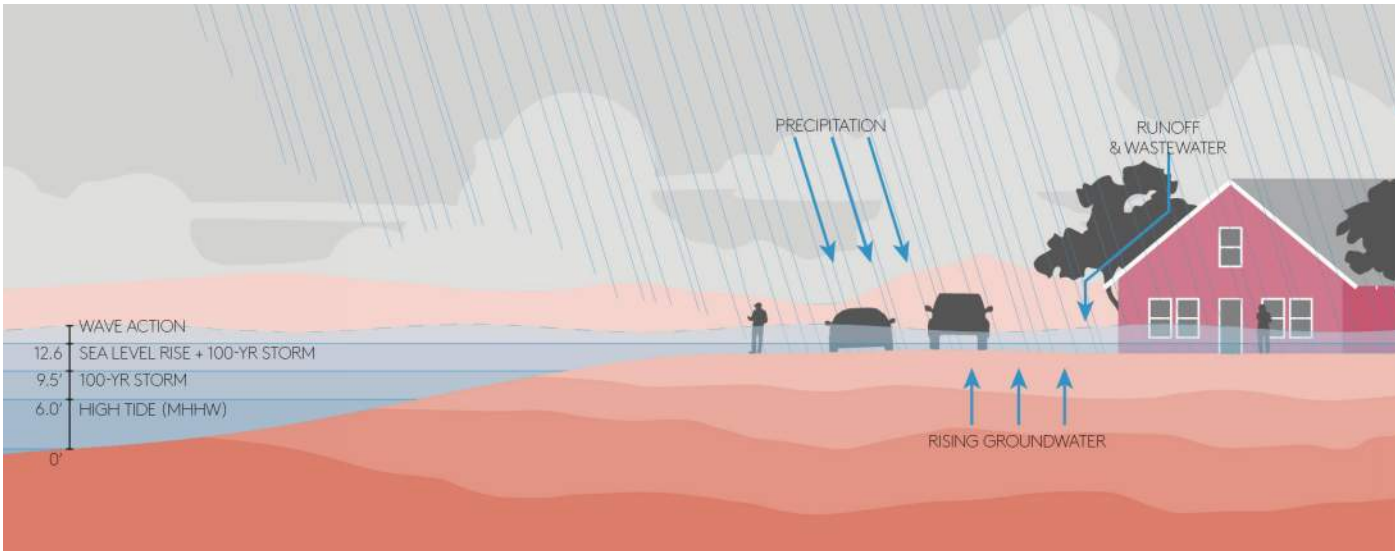


Figure 1—5. Understanding sea level rise as a "threat multiplier"

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.[26] Additionally, hydrostatic pressure will increase leading to saltwater intrusion in coastal aquifers. This hazard poses new and significant considerations when it comes to addressing sea level rise. 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.[27] Groundwater rise also poses unique challenges for infrastructure, especially underground or aging infrastructure and may risk mobilizing contaminants from toxic sites in the region.[28]

26 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.

27 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.

28 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.

1.4.2 Adaptation Strategies and Benefits Beyond Flood Risk Reduction

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 as sea levels rise is often the most challenging—and exciting—aspect of adaptation. 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. A comprehensive approach to reducing flood risk along a shoreline will likely include multiple strategies that work together, both across a shoreline and function effectively as phased strategies over time as flood risks increase.

Adaptation can include physical adaptation strategies that affect the natural and built landscapes of the shoreline. Physical adaptation strategies can range from natural and nature-based strategies such as constructing ecotone levees, combining marsh restoration with nearshore reefs with eelgrass plantings, or augmenting mudflats, to conventional infrastructure such as elevating land, building seawalls and flood walls, or creating levees or dikes that reduce flood risk[29]. Adaptation can occur across a spectrum of conventional to natural and nature-based and can include hybrids of these approaches (Figure 1—7). Adaptation strategies can also be non-physical and include policy and regulatory actions such as zoning and 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.[30]

Risk is 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 exposure (e.g., sensitivity, adaptive capacity, and consequence) (Figure 1—6). Different 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, activities, or other aspects of society important to a community.

29 J. Beagle, J. Lowe, K. McKnight, S. M. Safran, L. Tam, and S. Jo Szambelan, San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units, SFEI Contribution No. 915 (Richmond, CA: SFEI & SPUR, 2019), 255.

30 Beagle et al., San Francisco Bay Shoreline Adaptation Atlas, 255.

Flood Risk = Hazard x Exposure x Vulnerability

Hazard	Exposure	Vulnerability
• Tidal inundation • Shallow groundwater rise • Groundwater emergence/ flooding • Storm surge	• .8 ft scenario (2050) • 3.1 ft scenario (2100) - INT • 4.9 ft scenario (2100) - INT-HIGH • 6.6 ft scenario (2100) -HIGH	• Sensitivity • Adaptive capacity • Consequence

Figure 1—6. 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 the Science of Sea Level Rise and Coastal Hazards (Section 1.4.1).

A promising approach to the challenge of making adaptation decisions today that supports flexibility for future adaptation options is known as adaptation pathways. This means developing adaptation strategies comprised of discrete, manageable steps that can be sequenced and adjusted as sea levels rise and risk changes over time.[31] Pathways rely on developing triggers and decision-points based upon monitoring the effectiveness of strategies and evaluating the changing physical and social conditions that signal when changes to the pathways need to occur.

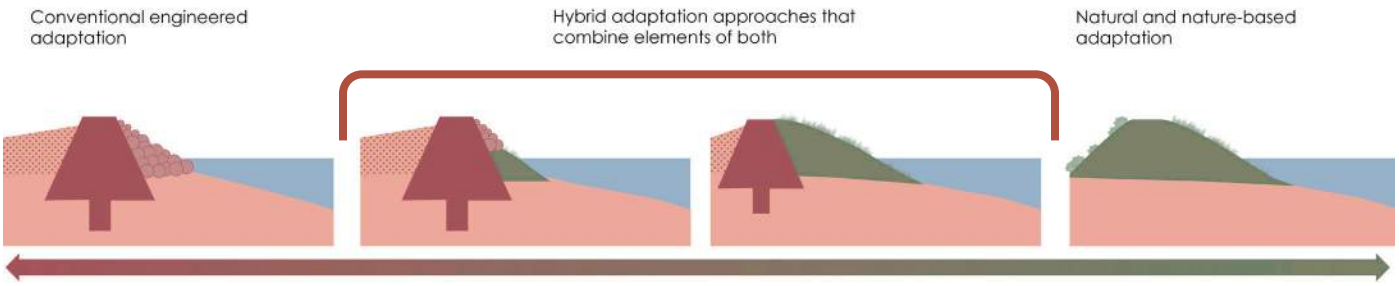


Figure 1—7. Spectrum of natural and nature-based adaptation and conventional adaptation

31 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.

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 can 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 reduces 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 that are designed to be flooded could include wetland restoration that removes a dike and allows water to expand to 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, 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)

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 hard infrastructure and hybrid approaches. Protect strategies can include physical 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 to reduce impacts in a certain area. This could also include actions such as groundwater pumping that reduces the exposure of flooding on an area, though 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 water-dependent industry. Strategies that rely on protection approaches for adaptation should ensure that they are economically and physically feasible over the project lifespan 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. 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.

Benefits of Adaptation Beyond Flood Risk Reduction

Adaptation solutions can provide more benefits than just reducing flood risk along shorelines — they can increase quality of life for residents, help correct past harms, advance economies, and improve habitats. Understanding potential co-benefits and weighing tradeoffs 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.

Maximizing Benefits of Water-Dependent Shoreline Uses and Baylands Habitats

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.[32] 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 the preservation of lands in their natural state.

The shoreline contains diverse recreational uses and provide 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 water-dependent industry uses, including the ports, refineries, and other water-related industry.

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

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 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.[33] They also support essential services of recycling nutrients, improving water quality, and storing and sequestering carbon that draws GHGs out of the atmosphere. Complete Baylands habitats includes subtidal habitats, to 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 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.[34]

Improving Baylands not only supports habitats and ecosystem services, but it can also reduce coastal flood risk and impacts. Baylands can reduce wave

TOWARDS GREENER ADAPTATION

Using natural and nature-based adaptation to reduce coastal flood risk while also improving Baylands habitats is an emerging field in adaptation. However, there are differences in planning, feasibility, goals, methods, costing and other considerations for the spectrum of nature-based to hard infrastructure adaptation. Engineering standards and permitting criteria will need to be refined over time to ensure that nature-based and hybrid adaptation approaches can be widely used.

Increasing efforts will be needed to champion, test, learn from, and employ effective nature-based approaches region-wide and advance the concept that adaptation can include both promoting nature and providing benefits to shoreline communities.

33 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.

34 Beagle et al., San Francisco Bay Shoreline Adaptation Atlas, 61-183.

energy and wave heights during storms, minimize erosion along the shoreline, and absorb and store excess floodwater that reduces catastrophic flooding.[35] These flood protection benefits are often referred to as natural and nature-based infrastructure. While adaptation can range from nature-based to hard infrastructure, in many cases a hybrid approach that utilizes engineered strategies with natural elements whenever feasible can provide the flood risk reduction benefits while also supporting natural habitats and other ecosystems services.

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 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 clean-up 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 housing affordability. The

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 the Subregional Plans. This standard is referred to for use in the Subregional Shoreline Adaptation Plan Guidelines in across all plan elements.

35 Beagle et al., San Francisco Bay Shoreline Adaptation Atlas, 25

California Department of Housing and Community Development (HCD) requires local jurisdictions to designate areas to meet the State's housing needs via Housing Element update cycles.[36] 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 via commercial and industrial uses. These factors may provide a 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.

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 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.

36 California Government Code, § 65582.

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 for use in the Subregional Shoreline Adaptation Plan Guidelines in Element D: Adaptation Strategies and Pathways and Element E: Land Use and Policy Plan.

DEFINING LANGUAGE IN THE RSAP

Adaptation strategy means a specific action, or set of inter-dependent actions, that achieve a particular outcome. A comprehensive approach to reducing flood risk along a shoreline will likely include multiple strategies that work together, both across a shoreline and function effectively as phased strategies over time as flood risks increase. These can be physical and non-physical.

Adaptation pathways means developing adaptation strategies comprised of discrete, manageable steps that can be sequenced and adjusted as sea levels rise and risk changes over time. Pathways rely on developing triggers and decision-points and monitoring the effectiveness of strategies and changing physical and social conditions that signal when changes to the pathways need to occur.

Strategic Approach is a grouping of like strategies that achieve specific outcomes related to flood risk reduction. Strategic approaches can include both physical and nonphysical 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.

Water-dependent uses are those whose functions depend on their proximity to, and relationship with, the water and/or Bay. This includes assets such as ports, marinas, and boat launches, shoreline public access, and Baylands habitats that require specific hydrological conditions for ecosystem functions.

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 as described below, as well as people of all backgrounds and income levels.

Socially vulnerable communities refers to block groups that rank from Moderate to Highest Social Vulnerability according to BCDC's Community Vulnerability Map.

Environmental Justice communities refers to communities that lie within the 60th percentile of environmental burden according to CalEnviroscreen 4.0.

Disadvantaged communities refers to Communities that fall below 80 percent of the statewide Median Household Income (MHI).

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 describes the results of successful adaptation to sea level rise for the Bay Area shoreline and outlines the regional goals to collectively achieve shared, successful adaptation. 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 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 — a required policy action — that must be implemented locally to advance the region's shared goals.

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 the Subregional Plans will be required to demonstrate how they advance the One Bay Vision to ensure that local adaptation strategies and outcomes are adding up to regional success.

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. Over 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.

For more details on the equitable engagement and outreach, see the Equitable Outreach and Engagement Process in the Appendix.

REGIONAL 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.

As sea levels rise...

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

2.2 Strategic Regional Priorities for Region-Wide Action

Strategic Regional Priorities (SRPs) are key policies of regionally significant issues that stem from the One Bay Vision. They include regional challenges and opportunities that must be addressed and integrated into Subregional Plans to achieve adaptation goals across region-wide systems and patterns. Achieving these regional "big moves" relies on Subregional Plans including critical actions in specific locations.

Local jurisdictions containing one or more Strategic Regional Priorities must incorporate identified assets in their Subregional Plans and develop policies into their plans that accomplish the Priority at a local level. The Subregional Shoreline Adaptation Plan Guidelines provides more information on how to integrate Strategic Regional Priorities into local planning efforts.

The RSAP's Strategic Regional Priorities include issues that 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 transparency of local issues that governments are already thinking about. For example, the cleanup of contaminated sites or consideration of anti-displacement measures and siting of new housing are likely occurring. The Strategic Regional Priority places them in the context of sea level rise 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 represent the best available data at the time of this publication. However, the data source identified under each Strategic Regional Priority is the basis for the required policy.

In addition to the maps on the following pages, Strategic Regional Priorities can be found in the Minimum Categories and Assets Standards (Section 3.2.2).

Strategic Regional Priority (SRP)

Reduced Involuntary Displacement

Complete and Connected Ecosystems

Safe and strategic shoreline growth and density

Reliable Critical Infrastructure and Services

Connected Regional Shoreline Access

Regional Movement of People and Goods

Reduced Contamination in Environmental Justice Communities

Cross-jurisdictional Flood Risk Reduction

2.3 Topic Areas — Regional to the Local Perspective

The purpose of this section is to illuminate the regional and local context for each of the topic areas. The following section describes each of the RSAP's eight topic areas, including the One Bay Vision statement and goals, minimum categories and assets, and Strategic Regional Priority.

The Subregional Shoreline Adaptation Plan Guidelines provide additional information for how local governments must apply these components into their local planning processes to align local and regional outcomes. The Strategic Regional Priority (SRP) Adaptation Standards listed in this section must be incorporated into the adaptation strategies within Subregional Shoreline Adaptation Plans as described in the Subregional Shoreline Adaptation Plan Guidelines (Section 3).

One Bay Vision and Goals

Sets the desired and forward-thinking outcomes for adaptation in the region. The development of local visions must align with the regional vision.

Minimum Categories and Assets

Describe what the RSAP includes in the topic area, including both required and recommended assets to address in Subregional Shoreline Adaptation Plans.

Example Topic Area

Figure 2—1. Understanding the Visions and Strategic Regional Priorities for each Topic Area

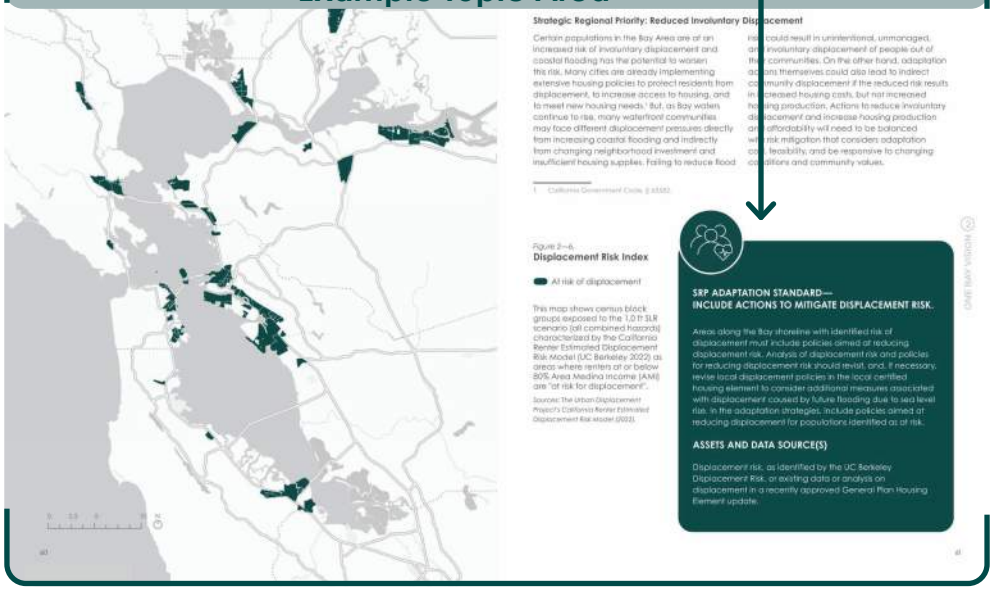
Strategic Regional Priorities

Identifies a regionally-significant issue with spatial component that must be addressed in local planning but contributes to both local and regional outcomes.

SRP Adaptation Standard

Describes how a local jurisdiction's Shoreline Adaptation Plan should address the Strategic Regional Priority.

Example 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.

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.

ONE BAY VISION

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

Assets to be included in Subregional Shoreline Adaptation Plans

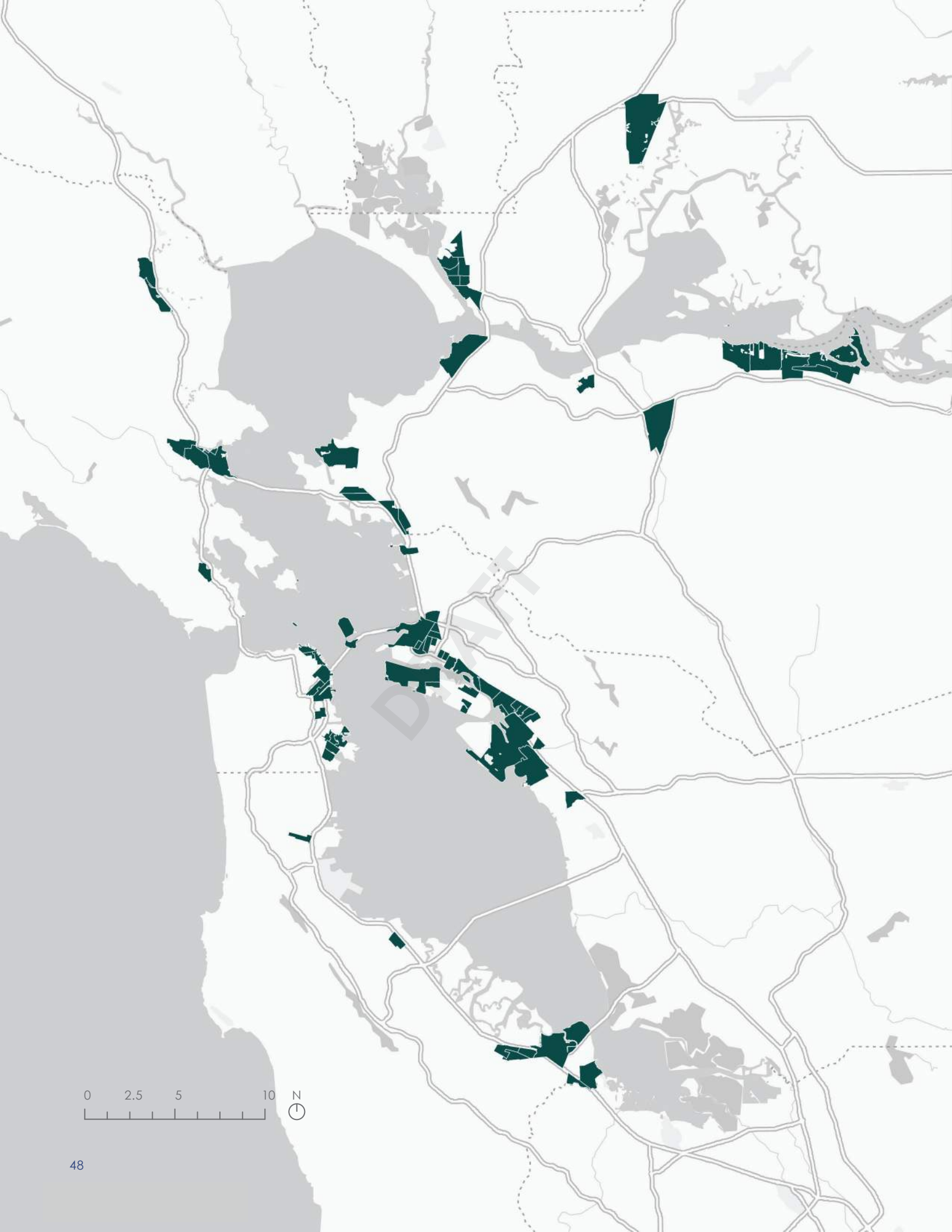
Required to assess:
Populations
- Population demographics
- Vulnerable communities*
- Environmental justice communities*

Community services
- Health care facilities
- Historic and cultural resources
- Tribal resources
- Police stations*
- Fire stations*
- Emergency management 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.**



STRATEGIC REGIONAL PRIORITY: Reduced Involuntary Displacement

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, feasibility, and be responsive to changing conditions and community values.

1 California Government Code, § 65582.

Figure 2—2.
Displacement Risk Index

At risk of displacement

This map shows census block groups exposed to the 0.8 ft (2050) sea level rise scenario 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".

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

SRP ADAPTATION STANDARD— INCLUDE ACTIONS TO MITIGATE DISPLACEMENT RISK.

Areas along the Bay shoreline with identified risk of displacement must include policies aimed at reducing displacement risk. Analysis of displacement risk and policies for reducing displacement risk should revisit, and, if necessary, revise local displacement policies in the local certified housing element to consider additional measures associated with displacement caused by future flooding due to sea level rise. In the adaptation strategies, include policies aimed at reducing displacement for populations identified as at risk.

ASSETS AND DATA SOURCE(S)

Displacement risk, as identified by the UC Berkeley Displacement Risk, or existing data or analysis on displacement in a recently approved General Plan Housing Element update.

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, and 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 using nature 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).

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.
- **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.

ONE BAY VISION

Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Existing Baylands Habitats
- Subtidal Habitats, including eelgrass
- Intertidal flats
- Tidal marshes
- Diked Baylands
- Beaches
- Rocky Intertidal
- Estuarine-terrestrial Transition zones
- Adjacent uplands – undeveloped or lightly developed

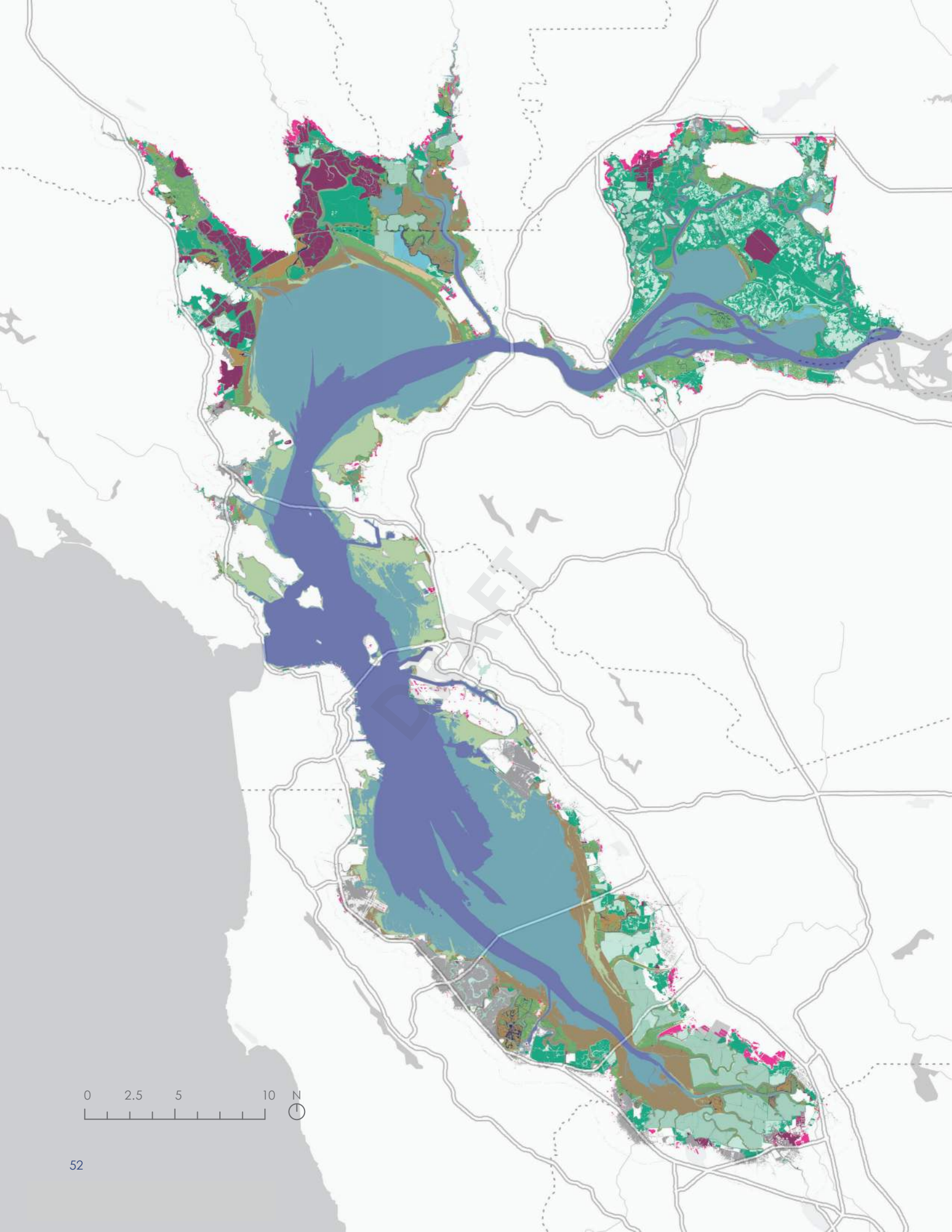
Creeks & Channels draining to Bay

Baylands Habitat Characteristics and Services
- Habitat resilience characteristics
- Ecosystem services and functions

Wetlands Migration Space
- Migration space
- Upland transition zone
- State listed endangered species
- Federal listed endangered species

Recommended to assess:
- Soft mobile substrate
- Inmobile rock substrate
- Shellfish beds
- Artificial structures
- Additional submerged aquatic vegetation

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



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 that remain today, it is essential to preserve and restore fragmented habitats into complete ecosystems that are connected across a landscape, from the Bay waters to its upland areas, and across the Bay shoreline. These habitats can then support the movement of wildlife such as birds, fish, and other organisms, and provide resilience as sea levels rise.

Figure 2—3.

Complete and Connected Ecosystems

BAYLANDS HABITATS

- Developed/Urban Baylands

Tidal Baylands

- Shallow Subtidal
- Deep Subtidal
- Tidal Flat
- Tidal Pond/Panne
- Intertidal Channel
- Tidal Marsh
- Beach

Non-Tidal Baylands (Restoration Opportunities)

- Other Marsh (e.g., muted tidal, seasonal wetlands)
- Non-Aquatic Diked Bayland (e.g., agricultural fields)
- Other Open Water (e.g., salt ponds, duck clubs)

Existing Estuarine-Upland Transition Zone

- Existing Estuarine-Upland Transition Zone
- Migration Space

Eelgrass Suitability

- 70% Accuracy

This map shows tidal Baylands habitats, nontidal Baylands, marsh migration and upland existing transition zones, and subtidal eelgrass habitats.

SRP ADAPTATION STANDARD— ENSURE COMPLETE AND CONNECTED ECOSYSTEMS.

Areas along the Bay shoreline where existing Baylands habitats cross jurisdictional boundaries must ensure that this habitat connectivity is maintained or improved with adaptation. In the adaptation strategies, demonstrate and describe where habitats currently, or have the potential to in the future, cross jurisdictional boundaries and describe coordination efforts with neighboring jurisdictions, private, state, and/or federal managers and/or landowners to maintain habitat connectivity for landscape-scale habitat processes.

ASSETS AND DATA SOURCE(S)

Baylands habitats and opportunities for restoration, as identified by the San Francisco Estuary Institute's (SFEI) Baylands Habitat Map and SFBJV Implementation Plan, opportunities for upland connectivity, as identified in the Adaptation Atas (SFEI & SPUR), and suitability for subtidal eelgrass.

Sources: Tidal and Non-tidal Baylands Habitat Map 2020 (SFEI 2024); Migration Space (SFEI & SPUR 2019); Baseline Transition Zone (Fulfrost 2018); Eelgrass Suitability (Audubon 2024).

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, and 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.

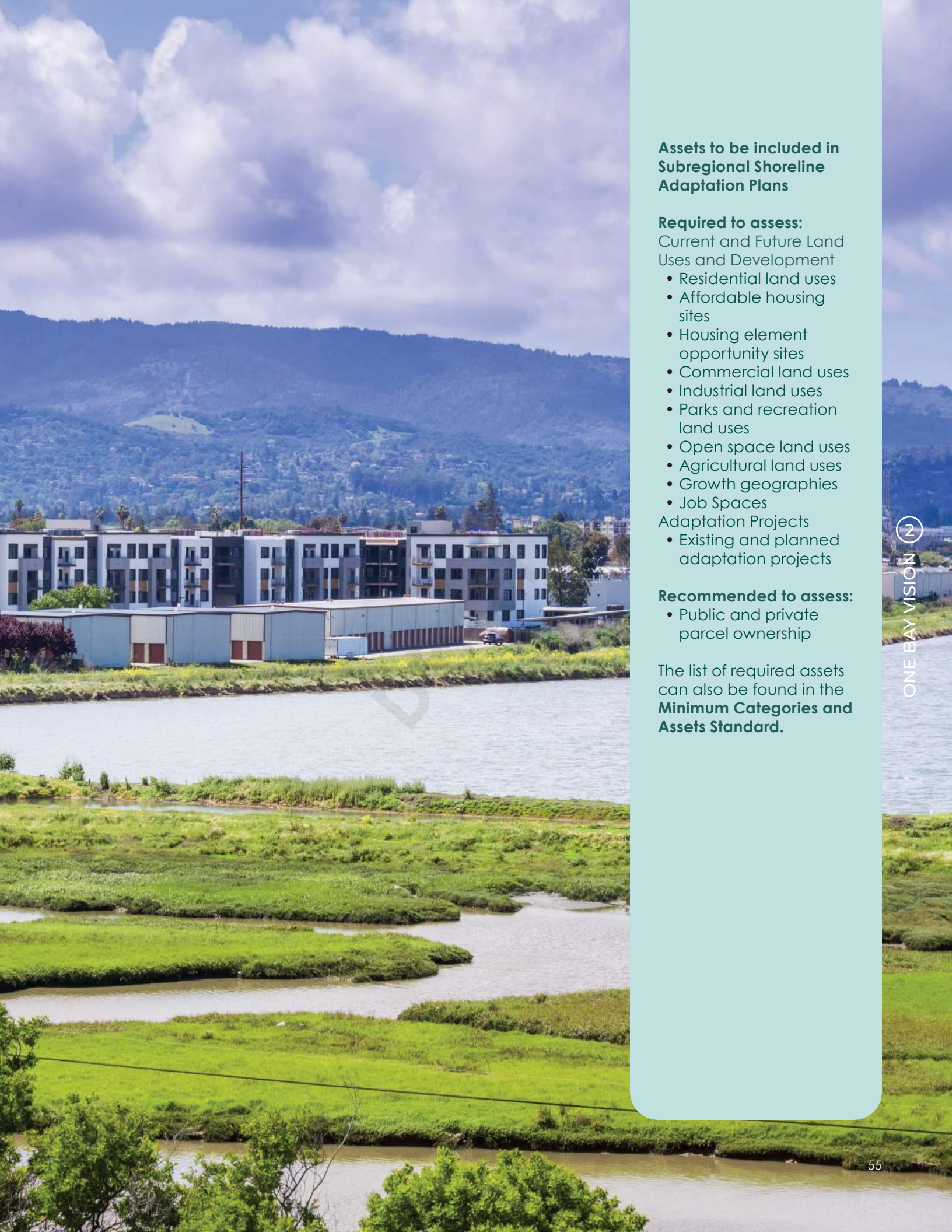
AS SEA LEVELS RISE...

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.

ONE BAY VISION



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
- Growth geographies
- Job Spaces

Adaptation Projects
- Existing and planned adaptation projects

Recommended to assess:
- Public and private parcel ownership

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

STRATEGIC REGIONAL PRIORITY: Safe and strategic shoreline growth and density

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 is a critical plan for meeting these regional needs. The Bay Area's jobs and economic output contribute to a strong regional economy, while at the same time there is an affordable housing crisis and need to maintain existing housing while also meeting the region's growing needs. Given geographic and zoning constraints in urban areas, many local jurisdictions have worked to identify suitable development sites 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. In these cases, the choice is not between adaptation or development, but instead careful consideration of how to integrate development with appropriate adaptation strategies to preserve the benefits of both. 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.

Figure 2—10.
Development

Plan Bay Area 2050 Growth Geographies

This map shows Plan Bay Area 2050 Growth Geographies, including Priority Development Areas, Transit Rich and High Resource Areas exposed to the 6.6 ft (2100 High) sea level rise scenario.

Sources: Plan Bay Area Growth Geographies (MTC 2022).

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

Areas along the Bay shoreline within MTC/ABAG's designated growth geographies must promote safe and sustainable growth in these locations over other shoreline areas at risk of sea level rise. Within growth geographies, include effective measures that address changing future flood risks, such as plans and policies that result in development and infrastructure that is resilient to sea level rise and adaptable over time. When local conditions allow for it, consider how variations in zoning can enable greater levels of density in areas not exposed to coastal flood hazards within the growth geography. In the adaptation strategies, demonstrate and describe how safe and sustainable growth geographies will reduce future flood risks.

ASSETS AND DATA SOURCE(S)

Growth geographies, as consistent with the Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG) Plan Bay Area.

2.3.4 Critical Infrastructure and Services

Critical Infrastructure and Services includes 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 parts 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.

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**.

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Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Utilities Infrastructure

- Electric and natural gas facilities
- Publicly owned wastewater treatment works
- Wastewater lifting stations
- Water supply
- Communications infrastructure
- Oil refineries

Stormwater and Flood Management Infrastructure

- Flood management infrastructure
- Stormwater systems

Emergency Management

- Emergency management centers and public safety
- Fire stations
- Police stations

Public Trust Lands

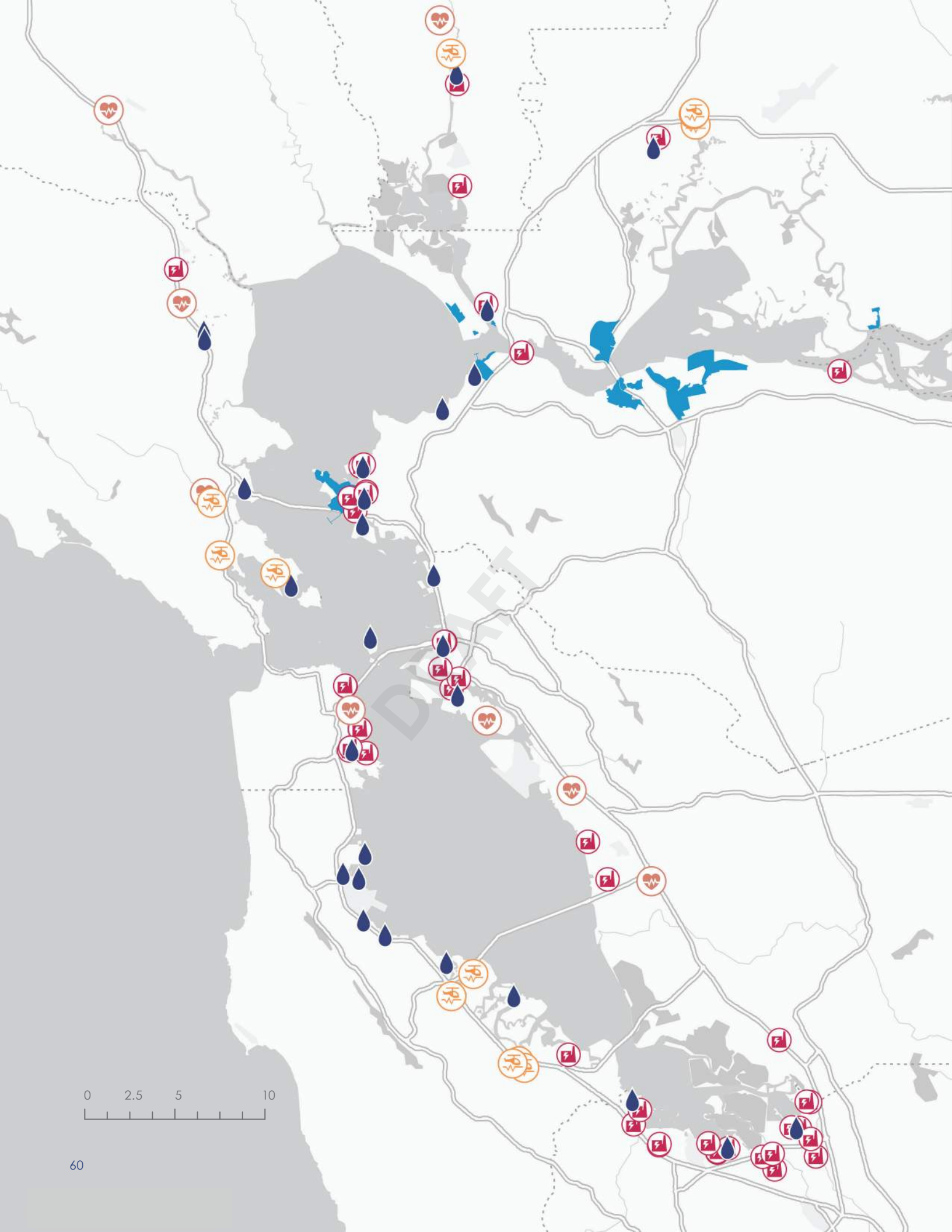
- Marinas, harbors, and other water-dependent infrastructure

Recommended to assess:

- Evacuation shelters
- Resilience hubs

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.**



STRATEGIC REGIONAL PRIORITY: Reliable Critical and Emergency Services

Certain types of critical infrastructure and emergency service centers serve populations beyond a single jurisdiction. In an emergency event such as an earthquake, major flood, or wildfire, critical infrastructure support services are vital to the region's emergency response and public safety. Many regionally critical 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, which may be affected by flooding during an emergency, further exacerbating challenges. Disruption to the services of regionally critical infrastructure can have immediate impacts on the ability to provide basic services and can have cascading impacts on other services within the region and other regions.

Figure 2—11.

Critical Infrastructure

- Wastewater
- Power Plants
- Healthcare
- Emergency Operations Centers
- Water-Related Industry Priority Use Area

This map shows critical infrastructure assets exposed to the 6.6 ft (2100 High) sea level rise scenario, including Emergency Operation Centers, Publicly Owned Wastewater Treatment Works, Healthcare facilities. SF Bay Plan Water-related Industry Priority Use Areas include Waterfront land used by industries that require access to deep water shipping and are unable to move inland.

Sources: Electrical powerplants (CEC 2022); Publicly Owned Wastewater Treatment Works (CalEPA 2023); Healthcare Facilities (OSHPD 2023); Local Emergency Operations Centers (CalOES 2024); Water Related Industry Priority Use Area (BCDC 2023).

SRP ADAPTATION STANDARD— MAINTAIN RELIABLE CRITICAL AND EMERGENCY SERVICES.

Areas along the Bay shoreline containing identified emergency operation centers, publicly owned wastewater treatment works, and healthcare facilities must include effective strategies to ensure the continued function of these services. 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. Critical infrastructure may also be water dependent. These approaches can change over time through adaptation pathways. In the adaptation strategies, demonstrate and describe how the functions of critical and emergency services are being maintained over time. For assets not owned or operated by a local government, provide a description of what coordination efforts are occurring with appropriate agencies to maintain these services.

ASSETS AND DATA SOURCE(S)

Emergency Operations Centers, Publicly owned wastewater treatment works, and Healthcare Facilities, as identified by 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, 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 refuges from heat and noise and can 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.

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.

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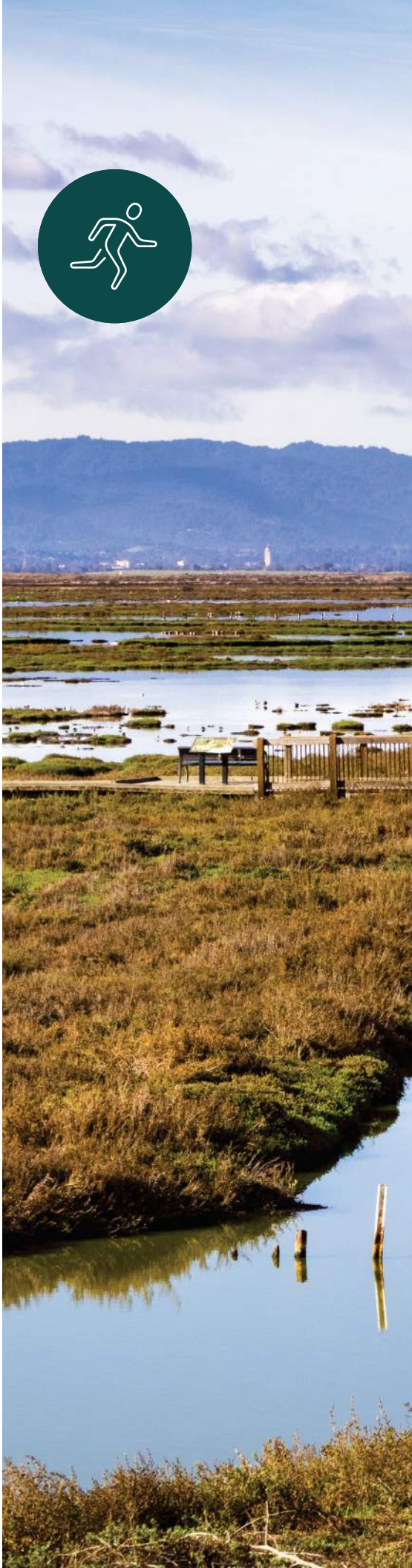

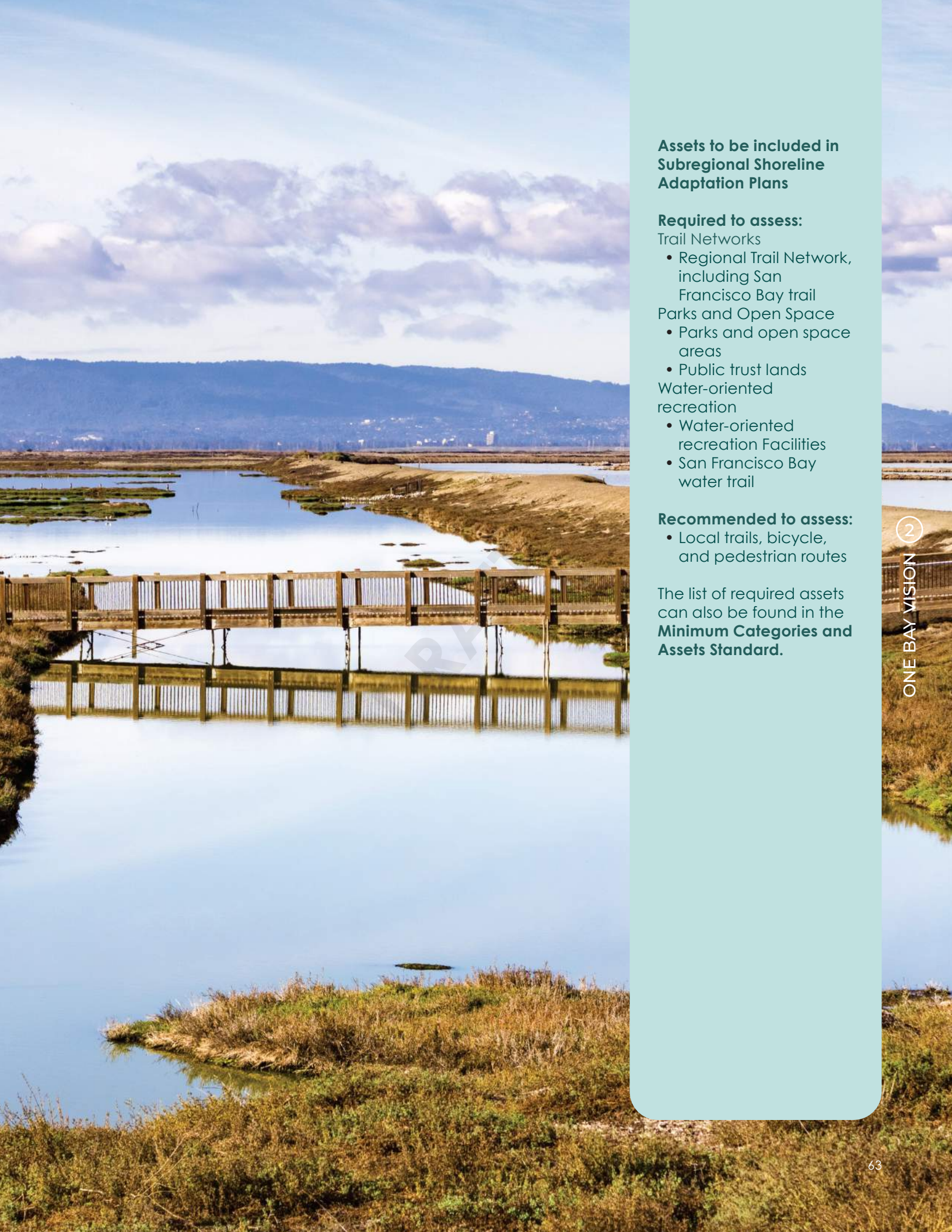

Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Trail Networks

- Regional Trail Network, including San Francisco Bay trail

Parks and Open Space

- Parks and open space areas
- Public trust lands

Water-oriented recreation

- Water-oriented recreation Facilities
- San Francisco Bay water trail

Recommended to assess:

- Local trails, bicycle, and pedestrian routes

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


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STRATEGIC REGIONAL PRIORITY: Connected Regional Shoreline Access

Adaptation strategies along the shoreline have the potential to disconnect shoreline public access networks *unless* coordinated adaptation planning occurs across jurisdictions. Areas along the Bay shoreline, including waterfront parks, beaches, public access sites, and the Bay 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 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. 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.

Figure 2—12.

Regional Shoreline Access Network

— The San Francisco Bay Trail

Waterfront Park Beach Priority Use Area

This map shows San Francisco Bay Plan designated Waterfront Park, Beach Priority Use Areas and The San Francisco Bay Trail.

Sources: SF Bay Plan Waterfront Parks/ Beaches designated Priority Use Areas (BCDC 2023); SF Bay Trail (MTC 2023).

SRP ADAPTATION STANDARD— IMPROVE CONNECTED REGIONAL SHORELINE ACCESS NETWORKS.

Areas along the Bay shoreline containing regionally significant waterfront parks, beaches, and trails must preserve or improve the networked connectivity of these assets across jurisdictional boundaries to ensure public access connections are maintained and improved. In the adaptation strategies, demonstrate and describe how connectivity of regionally serving parks, beaches, and trails across jurisdictions will be maintained, including a description of coordination with neighboring jurisdictions and efforts to continue coordination as adaptation strategies are implemented and adjusted over time.

ASSETS AND DATA SOURCE(S)

San Francisco Bay Trail, as designated by the Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG); and BCDC's Waterfront Park, Beach Priority Use Areas.

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.

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.

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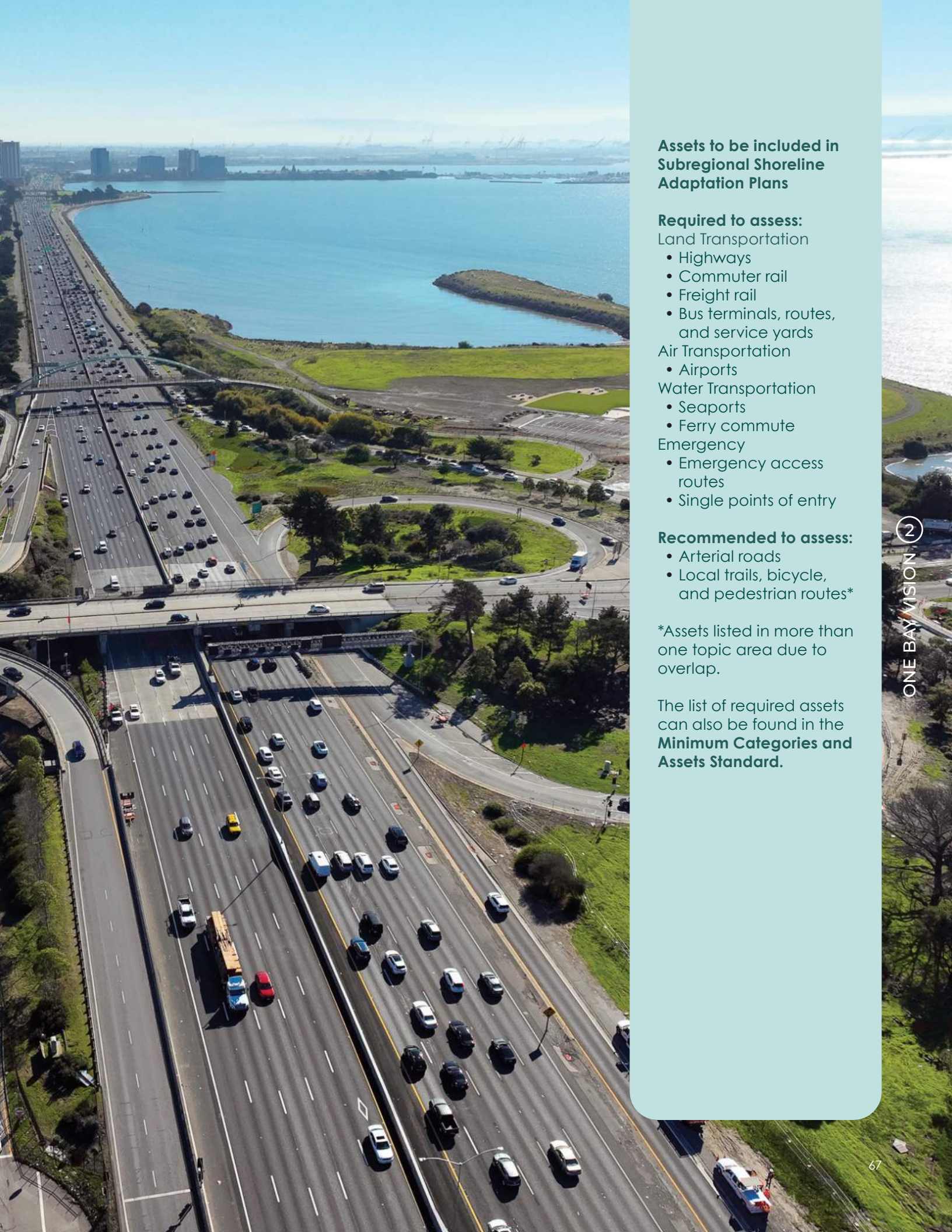

Assets to be included in Subregional Shoreline Adaptation Plans

Required to assess:

Land Transportation
- Highways
- Commuter rail
- Freight rail
- Bus terminals, routes, and service yards

Air Transportation
- Airports

Water Transportation
- Seaports
- Ferry commute

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.**

STRATEGIC REGIONAL PRIORITY: Regional Movement of People and Goods

Communities and economies across the Bay Area depend upon a functioning regional network of transportation, 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 vulnerable to flooding. In many cases, these assets lack redundancy, meaning that 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—13.
Transportation

- Highways
- Commuter Rail Stations
- Commuter Rail
- Freight Rail
- Airport Priority Use Area
- Seaport Priority Use Area
- Ferry Terminals

This map shows transportation assets exposed to the 6.6 ft (2100 High) sea level rise scenario.

Sources: Commuter rail stations + lines (MTC 2019); Highways (MTC 2019); Freight Rail (Caltrans 2013); Ferry terminals (BCDC 2024).

SRP ADAPTATION STANDARD—MAINTAIN THE FUNCTIONS OF TRANSPORTATION ASSETS THAT PROVIDE REGIONAL MOVEMENT OF PEOPLE AND GOODS.

Areas along the Bay shoreline containing identified regionally significant transportation infrastructure must include effective strategies to ensure the continued functioning of these services. 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. In the adaptation strategies, demonstrate and describe how transportation assets and the connected systems upon which these services depend maintain their function over time. For assets not owned or operated by a local government, provide a description of 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.

ASSETS AND DATA SOURCE(S)

Commuter rail station and lines and highways, as identified by the Metropolitan Transportation Commission and Association of Bay Area Governments (MTC/ABAG); freight rail as identified by Caltrans; and Seaports, airports, and ferry terminals as identified by BCDC.

2.3.7 Shoreline Contamination

Shoreline Contamination includes sites and/or land uses that utilize or store hazardous materials/substances or that are known to have impacts from hazardous waste that may pose a potential future risk to people, the environment, and/or water quality. As sea levels rise, coastal flood, coastal and inland groundwater shoaling, 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 habitat. 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 may need to be re-evaluated to determine if they can continue to provide protection against contamination mobilization as sea levels rise.

AS SEA LEVELS RISE...

People and ecosystems are safe from contamination risks.

To achieve this:

- Collaborate with communities, 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** into planning and adaptation decisions and identify innovative solutions.

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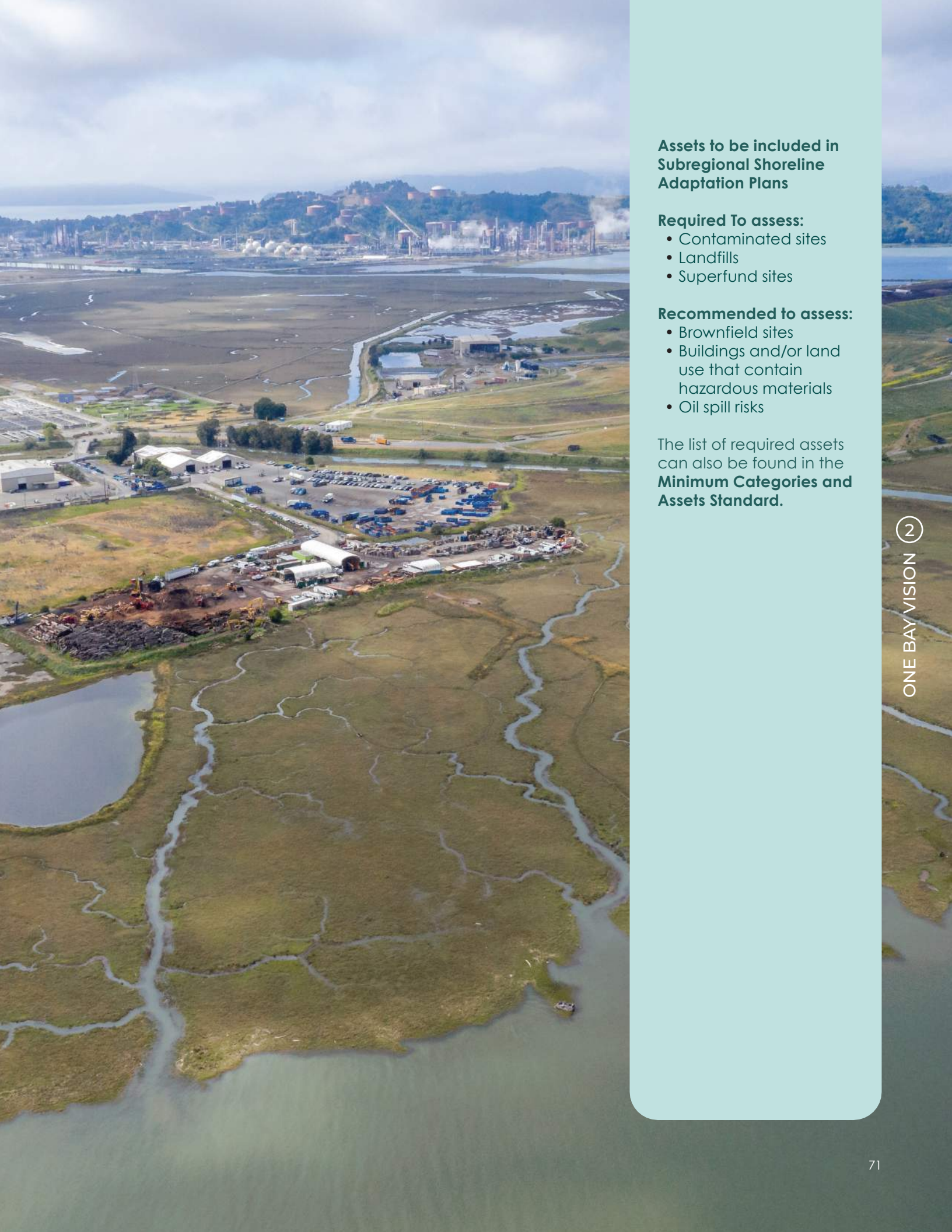
Right: San Pablo Bay shoreline in North Richmond. Photo by Tom Fitzgerald.

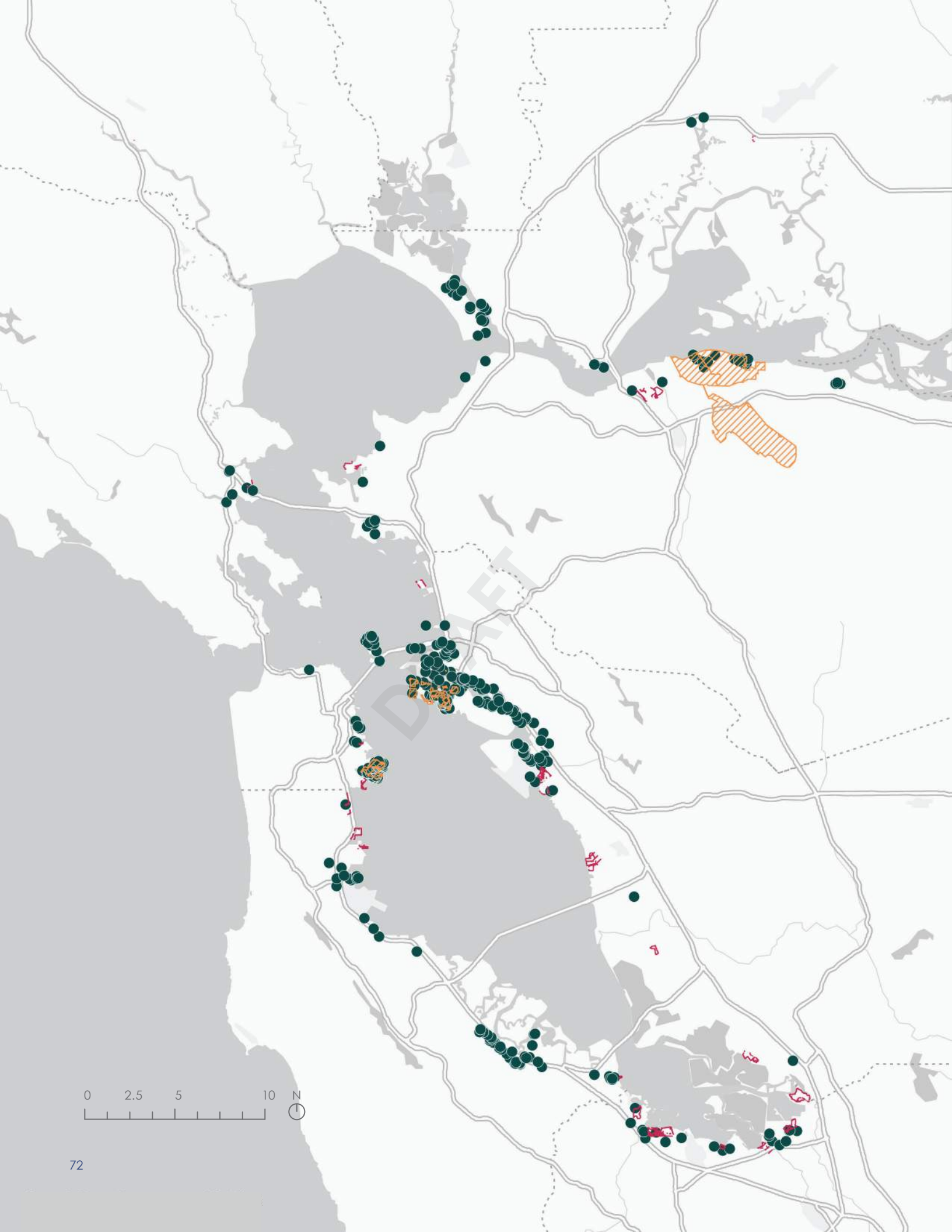


Assets to be included in Subregional Shoreline Adaptation Plans

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

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

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

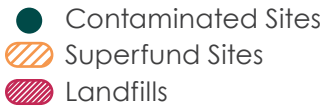


STRATEGIC REGIONAL PRIORITY: Reduced Contamination in Environmental Justice Communities

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 areas at risk of flooding are located on or near former shoreline industrial sites that have a legacy of contamination. 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 concerns if contaminants are mobilized, or how dry land cleanup standards will perform if lands become submerged. Additionally, many socioeconomically vulnerable communities live adjacent to or even on contaminated sites

Figure 2—14.

Contaminated Sites



This map shows contaminated sites exposed to the 0.8 ft (2050) sea level rise scenario, but does not include the coastal flood hazard for shallow groundwater rise deeper than 6 ft, with Open/Active status, that are located in census tracts with CalEnvironscreen score of 75 or greater or identified as contamination vulnerable in BCDC's Community Vulnerability mapping.

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

SRP ADAPTATION STANDARD—REDUCE CONTAMINATION RISKS IN ENVIRONMENTAL JUSTICE COMMUNITIES.

Areas along the Bay shoreline containing identified contaminated sites in Environmental Justice communities must identify strategies to advance remediation and reduce risks of toxic materials mobilization and vaporization in communities due to flooding. This should include analysis of how planned adaptation will prevent mobilization of contaminants or demonstration of how coordination with a lead regulatory agency is being conducted for prevention purposes (where appropriate). In the adaptation strategies, demonstrate and describe where and how remediation is being prioritized and what coordination is occurring with the responsible parties and regulatory agencies, which may include the U.S. EPA Region IX, the California Environmental Protection Agency's (Cal/EPA's) State Water Resources and Control Board and/or Regional Boards, the Cal/EPA's Department of Toxic Substances Control, and/or a County's Department of Environmental Health, or the Local Oversight Program (LOP).

ASSETS AND DATA SOURCE(S)

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 — within communities identified by CalEnviroscreen and BCDC's Contamination Vulnerability.

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 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.

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 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.

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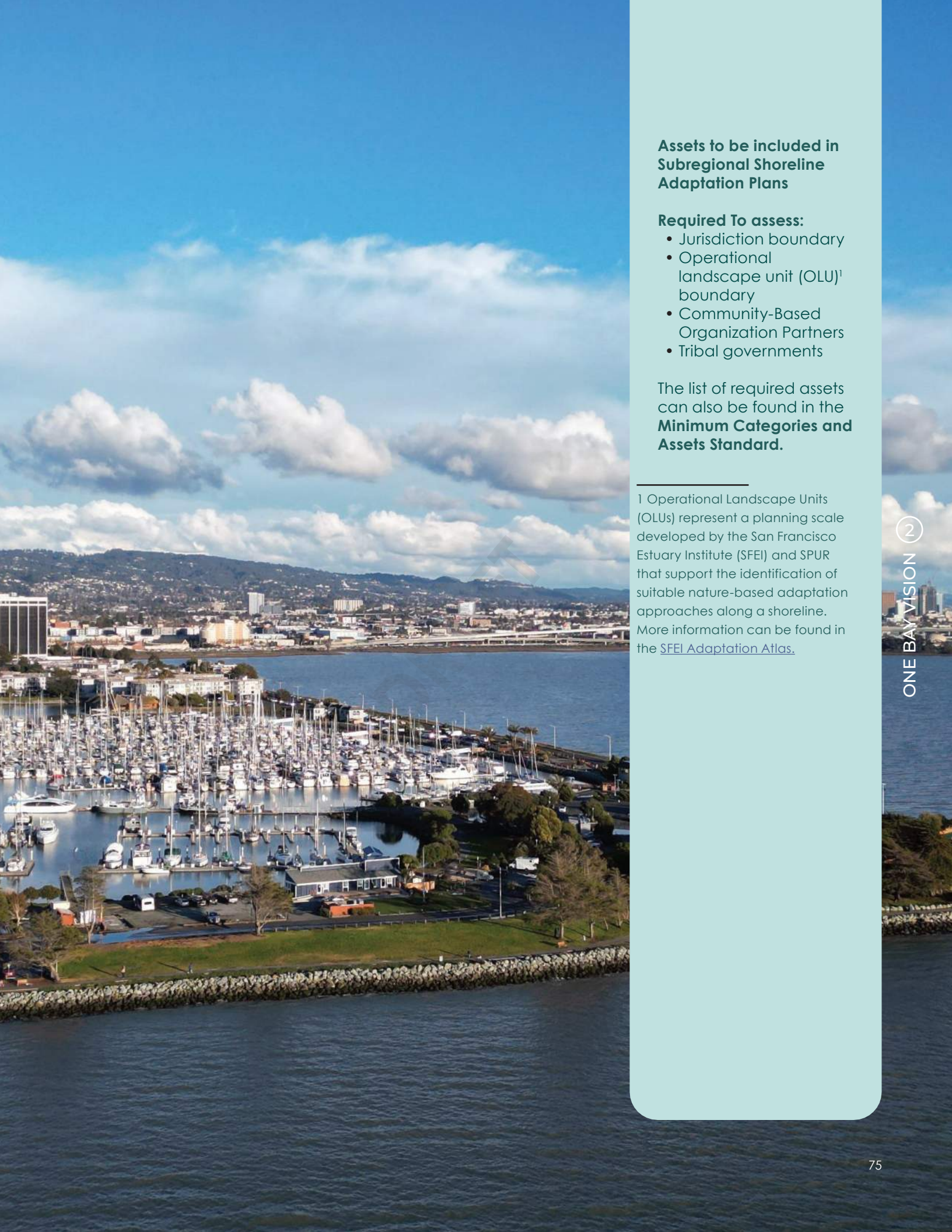

Assets to be included in Subregional Shoreline Adaptation Plans

Required To assess:

- Jurisdiction boundary
- Operational landscape unit (OLU)[1] boundary
- Community-Based Organization Partners
- Tribal governments

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

1 Operational Landscape Units (OLUs) represent a planning scale 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 SFEI Adaptation Atlas.


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STRATEGIC REGIONAL PRIORITY: Cross-jurisdictional Flood Risk Reduction

Along hydrologically connected areas of the Bay shoreline, flood risk reduction strategies in one jurisdiction may not provide necessary flood protection if adjacent shoreline jurisdictions haven't integrated their adaptation strategies or hydrologically disconnected the shorelines. Different parts of the Bay shoreline face varying risks and have differing levels of resources to respond. Yet, flooding doesn't respect jurisdictional boundaries. In areas that are hydrologically 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 jurisdiction 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—15.

Hydrological Connectivity

Connectivity at 100 yr storm + 3 ft sea level rise (MHHW)

This map shows bands on the shoreline that will be hydrologically connected under future sea level rise scenarios.

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

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

Areas along the Bay shoreline identified as containing high shoreline connectivity across jurisdictional boundaries must include measures to effectively coordinate to develop cross-jurisdictional flood risk reduction responses and plan for future coordination and/or governance to maintain flood risk reduction. This should include considerations for creating redundant flood protections such as berms to reduce the likelihood of flooding from flood protection failure originating in adjacent jurisdictions and hydrologically evaluating significant changes to basins that would hydrologically disconnect them in areas with in-bay hydrological impacts. In the adaptation strategies, demonstrate and describe adaptation coordination and approaches for reducing flood risk across jurisdictional boundaries.

ASSETS AND DATA SOURCE(S)

Hydrologically connected shorelines, as identified by the San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group (CHARG).

Section 3

Subregional Shoreline Adaptation Plan Guidelines

BCDC's Subregional Shoreline Adaptation Plan Guidelines (Guidelines) include all the required components for the preparation of a Regional Shoreline Adaptation Plan.[1] This section includes the Subregional Plan Elements, Minimum Standards, Complete Plan Submittal Checklist, Plan Development, Submission, and Approval, and Tools to Support Plan Development. 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 Plan Elements

This section contains plan requirements that local governments within BCDC's jurisdiction (see a full list of cities and counties in Section 3.4.1) must meet when submitting Subregional Plans.[2]

The plan requirements are organized into the following elements:

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

Plan requirements may reference Minimum Standards (Section 3.3) that must also be met for compliance. The Minimum Standards provide consistency for the following:

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

Additional requirements related to plan development, submission, and approval can be found in later sections of the document (Section 3.4). 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 3.5).

The Plan Elements and Minimum Standards utilize an adaptation planning process where components of different elements build upon one another. An example plan requirement can be found in Figure 3—1 to the right, along with an overview of the plan elements, minimum standards, and their relationships to one another.

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

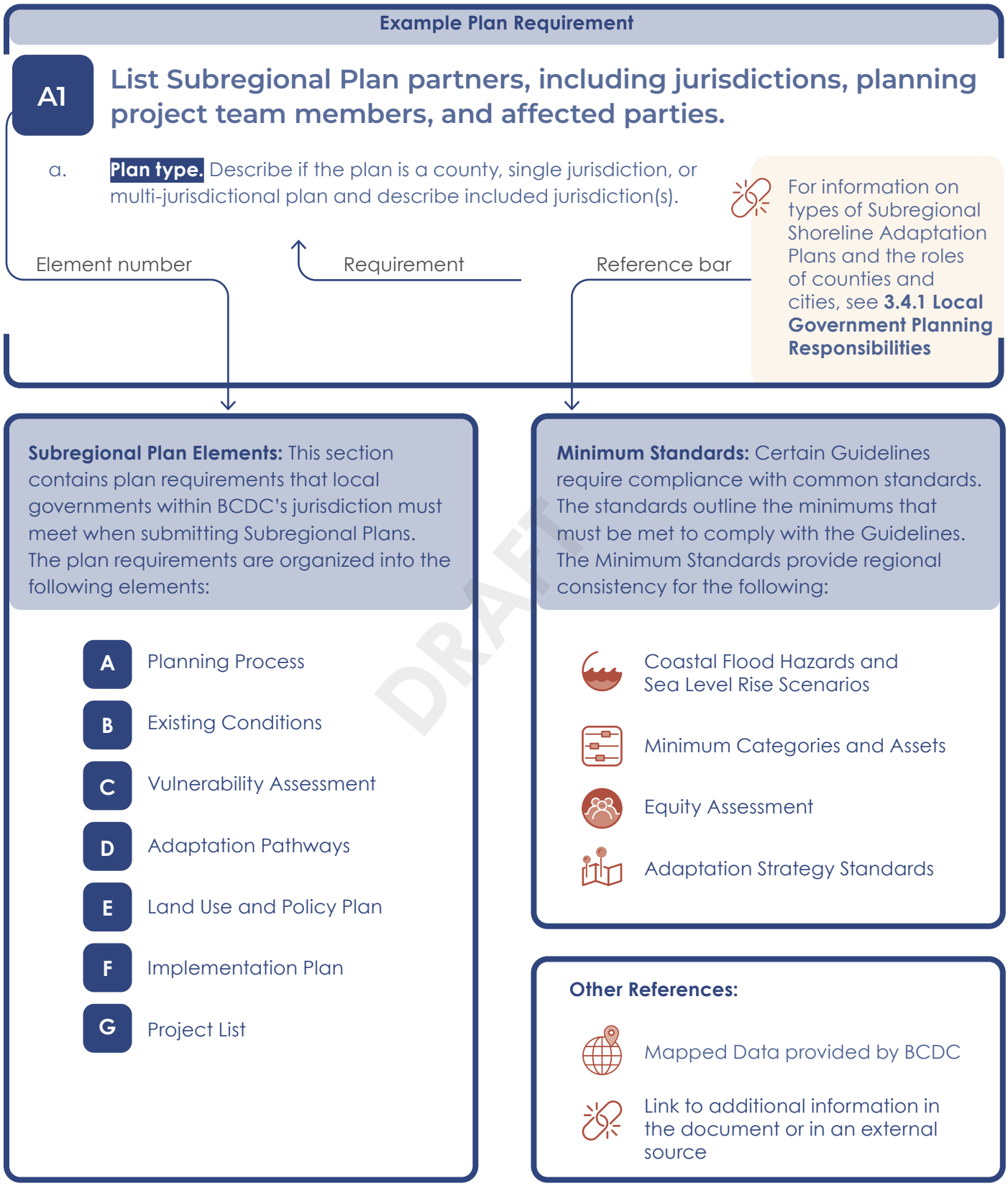


Figure 3—1. Organization and structure of the Plan Elements

3.1.1 Element A: 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 that brings together multiple and diverse perspectives and areas of expertise to ensure there is a deep understanding of issues and assets present throughout the process. This means that diverse communities and expertise be represented and engaged in the planning process. Incorporating equity into planning requires intentional and explicit efforts to bring members of socially vulnerable communities, Environmental Justice communities, 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. The RSAP includes an **Equity Assessment Standard**— which is a series of equity-specific questions throughout the Plan Elements — to ensure equity is being appropriately considered and integrated across the planning process.

While many aspects of developing the Subregional Plan can likely be completed by local government staff and local partners, additional expertise will likely be necessary in the form of consultants and/or other expertise. In particular, additional expertise is likely to be needed for Bay ecological health, flood control management, and coastal engineering.

Plan Element A requires documenting meaningful and robust efforts to include and engage a mix of government departments, community members (including those from socially vulnerable communities, indigenous people, and Tribal governments), and local interested and affected parties, which could include special districts, utilities, State or Federal agencies, major landowners, and others.

Minimum Standards to be Used in this Element

Coastal Flood Hazards and Sea Level Rise Scenarios—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—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).

For information on types of Subregional Shoreline Adaptation Plans and the roles of counties and cities, see **3.4.1 Local Government Planning Responsibilities**

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 at least the following areas of expertise: local planning, public works, emergency management, public health, transportation, parks and recreation, environment and sustainability, and Baylands ecology. Complete the Equity Assessment to describe efforts towards equitable representation.

Required **Element A—Equity Assessment** Questions

c. **Affected parties.** Describe other affected and interested parties in the plan area, including, at a minimum: special districts, including transit and open space; asset owners, operators, and managers; major landowners, industries, or businesses; neighborhoods, communities, and/or community groups or community-based organizations; and environmental organizations, as applicable.

d. **Staffing and resources.** Describe current resources for sea level rise adaptation and/or flood hazard mitigation, such as current staffing, including roles and departments; budgets; and/or consultant support. This may include internal and external (public or private) resources.

A2 Include a map of the subregional adaptation planning area ("planning area").

a. **Planning area.** Provide a map of the planning area covered by the plan, which must include all participating jurisdictions' boundaries, and 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.

Mapped Data provided by BCDC

Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

A3 Describe the multi-jurisdictional coordination process.

a. **Multi-jurisdictional coordination.** Describe how the planning project team coordinates with neighboring jurisdictions 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 and comments from other jurisdictions were incorporated into the plan. Coordination across jurisdictions is required for all plans, not just multi-jurisdictional plans.

b. **State agency coordination.** Describe how participating jurisdictions coordinate with BCDC and/or other State and regional entities in the Bay Area, as applicable.

A4 Summarize equitable engagement efforts throughout the planning process.

a. **Vulnerable community identification.** Define and identify socially and contamination vulnerable populations and Environmental Justice populations within the planning area. This may also include disadvantaged communities. Locations should be mapped, and community characteristics described. BCDC's definitions for these communities must be used or meet best available data criteria and deemed satisfactory by BCDC. Throughout the plan element requirements, the term "vulnerable communities" will be used to refer to populations identified in this section.

b. **Equitable outreach and engagement.** Include a summary of equitable outreach and engagement efforts conducted throughout the planning process. Complete the Equity Assessment to describe efforts for inclusion of multilingual communities, equitable engagement of vulnerable communities, and community partnerships to demonstrate how equity was incorporated to the maximum extent possible. Outreach must occur at the following points, at a minimum, and be included in the summary.

- When identifying populations, assets, sectors, services, and land uses (B3)
- When identifying assets and areas of significance (C1)
- When identifying priority action areas in the vulnerability assessment (C2)
- When creating the local vision and goals that align with the One Bay Vision (D1)
- When identifying potential adaptation strategies for each shoreline reach (D2)
- When evaluating adaptation alternatives (D3)

Required **Element A—Equity Assessment** Questions.

Element A — Submittal Checklist

		Submittal Requirements	Included	N/A
A1	a.	Description of plan type and included jurisdiction(s).	☐	☐
	b.	List and description of planning team.	☐	☐
	c.	List of affected and interested parties.	☐	☐
	d.	Description of current resources available for adaptation and/or flood hazard mitigation.	☐	☐
A2	a.	Map with boundaries of plan area.	☐	☐
A3	a.	Description of multi-jurisdictional and county coordination.	☐	☐
	b.	Description of regional and state coordination.	☐	☐
A4	a.	Definitions and mapped locations of Environmental Justice and socially vulnerable communities.	☐	☐
	b.	Summary of equitable outreach and engagement efforts, and responses in the Equity Assessment.	☐	☐

Element A—Equity Assessment

Complete the following Equity Assessment questions for Element A guidelines:

A1

b. **Inclusion of diverse perspectives.** The planning effort should ensure that representation in the planning project team matches the diversity of the planning area. Describe how the project team compares to the makeup of the demographics of the planning area, and the steps taken to include people from vulnerable groups such as the unhoused, disabled, linguistic communities, LQBTQIAA+, youth, and elders.

Inclusion of multilingual communities. The planning effort must 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. **Equity in the engagement plan**. The engagement plan must prioritize outreach efforts in vulnerable communities. This includes hosting outreach meetings in vulnerable communities, partnering with 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 plan includes people from vulnerable communities.

Community partnerships. The planning effort should identify and partner with community-based organizations to support engagement and support equitable planning, with appropriate partnership agreements. Describe the community partnerships in the planning effort.

3.1.2 Element B: Existing Conditions

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, and identifying local populations, land uses, assets, and services.

The information in this section supports the development of effective adaptation actions and will be utilized in other plan elements. Understanding the physical and ecological conditions of the shoreline provides an essential baseline to evaluate vulnerabilities to coastal flood hazards, which will be used in Element C: Vulnerability Assessment. This information will then aid 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. The RSAP defines **Minimum Categories and Assets Standard** that must be included in the existing conditions element to ensure essential populations, assets, and services are incorporated in the process.

Understanding vulnerability and its consequences depends on understanding existing land uses in the area, what populations are present (with particular attention to socially vulnerable and Environmental Justice communities), the different types of development, infrastructure, and/or transportation systems that exist along the shoreline, and the current structure of land ownership, management, and governance.

Minimum Standards to be Used in this Element

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

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

Information on local plans, policies, codes and regulations is particularly important for developing adaptation strategies and identifying appropriate policies, land uses, and regulatory changes that can accommodate the preferred adaptation strategies identified in Element D: Adaptation Strategies and Pathways. Additionally, this information can be used to establish concurrent planning efforts to align Subregional Plans with other local plans and establish common update timelines.

Requirements in this element include identification and existing conditions of Strategic Regional Priorities if they are located within the planning area.

Element B — Plan Requirements

B1 List and describe existing plans, studies, regulatory codes, 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 and Maintenance Plans, and/or other applicable hazard and emergency plans.

c. **Codes and regulations.** Include a summary of how coastal flooding hazards are currently referenced and addressed in regulatory codes and processes, such as building codes, zoning codes, permitting requirements, regulations, and/or requirements, including the special requirements in overlay zones, hazard zones, or flood management zones.

d. **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.

e. **Sector and issue area plans.** Include a summary of how coastal flooding hazards are currently referenced and addressed in sector and issue area plans, such as transportation plans, bike and pedestrian plans, trails and access plans, parks and recreation plans, public and community health plans, shoreline management plans, ecological management plans, economic development plans, utility plans, and/or other similar applicable plans.

f. **Existing barriers.** Summarize major known or anticipated barriers or conflicts in existing plans and policies that could interfere with the implementation of adaptation strategies, such as current land use entitlements, takings law, building height limitations, waterfront design guidelines, site geotechnical requirements, or other.

g. **Concurrent plan updates.** Summarize the timing of relevant plan updates at the local level. Identify what relevant plan(s) are being simultaneously updated and what aspects of the process, outreach, assessment, and/or adaptation strategy outcomes are coordinated across plans. If timelines are not currently aligned, identify a path for how to align relevant plan updates in the future.

The California Office of Planning and Research (OPR) developed the **Coastal Resilience Compass Plan Alignment Guide** to promote plan alignment, particularly across the Safety Element of general plans, Local Coastal Program Plans, and Local Hazard Mitigation Plans, including reference to SB 1035 and SB 379.

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

a. **Physical conditions.** Describe and map the current physical landscape conditions and characteristics, including topography and bathymetry, vertical elevation and subsidence, erosion, artificial shoreline features, depth of Bay mud, and shallow groundwater depth to surface. Include where physical features extend across jurisdictional boundaries.

b. **Coastal and nearshore hydrological conditions.** Describe and map the existing coastal and nearshore hydrological characteristics, including high tides, 100-year still water elevation, FEMA Flood Mapping (100-year and 500-year storms), wave climate, and the location of creeks and streams. Include where hydrological features extend across jurisdictional boundaries.

c. **Ecosystem health and resilience conditions.** Map and describe the existing ecological and biological conditions in the nearshore, shoreline, and uplands area as listed in the Bay Ecosystem Health and Resilience Minimum Categories and Assets. This includes spatial extents of subtidal habitats (including eelgrass), intertidal flats, tidal marshes, diked Baylands, beaches, rocky intertidal, estuarine-terrestrial transition zones, adjacent uplands, and creeks and channels connected to the Bay in the planning area. A description of habitat resilience characteristics, ecosystem services and functions of these habitats, and the presence of state of federal listed endangered species must also be provided. Include areas of potential marsh migration space and upland transition areas. Include where habitats cross jurisdictional boundaries, as identified in the Strategic Regional Priority: Complete and Connected Ecosystems. Complete the Equity Assessment specific to this topic area.

d. **Planned future changes.** Describe any 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.

e. **Historical conditions**. Describe the historical (pre-colonization) physical and ecological landscape characteristics, including historical Baylands and creeks, and significant land use changes over time.

Mapped Data provided by BCDC

Required to use **Minimum Categories and Assets Standard.**

Required **Element B—Equity Assessment** questions.

B3

Map and describe existing populations, assets, sectors, services, and land uses within the planning area. This must include at least, all Minimum Categories and Assets, applicable Strategic Regional Priorities, and responses to relevant Equity Assessment Standards.

a. **Community health and well-being conditions.** Map and describe populations and community services as listed in the Community Health and Well-being Minimum Categories and Assets. This includes general population demographics, vulnerable communities, Environmental Justice populations, healthcare facilities, historical, cultural, and tribal resources. Include areas of displacement, as identified in the Strategic Regional Priority: Reduce Involuntary Displacement Risk. Complete the Equity Assessment specific to this topic area.

b. **Development, housing, and land use conditions.** Map and describe current and future land uses, development, and projects as listed in the Development, Housing, and Land Use Minimum Categories and Assets. 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, and existing and planned adaptation projects. Include growth geographies as identified in the Strategic Regional Priority: Safe and Strategic Shoreline Growth and Density. Complete the Equity Assessment specific to this topic area.

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 Critical Infrastructure and Services Minimum Categories and Assets. This includes electric and natural gas facilities, publicly owned wastewater treatment works, wastewater lifting stations, water supply, communications infrastructure, oil refineries, food management infrastructure, stormwater systems, emergency management centers and public safety, fire stations, police stations, marinas, harbors, and other water-dependent infrastructure. Include assets as identified in the Strategic Regional Priority: Maintain Emergency and Critical Services. Complete the Equity Assessment specific to this topic area.

For all B3:

Mapped Data provided by BCDC

Required to use **Minimum Categories and Assets Standard.**

Required **Element B—Equity Assessment** questions

d. **Public access and recreation conditions.** Map and describe trails networks, parks and open spaces, and water-oriented recreation as listed in the Public Access and Recreation Minimum Categories and Assets. This includes the regional trail network, including The San Francisco Bay Trail, parks and open space areas, public trust lands, water-oriented recreation facilities, and The San Francisco Bay Water Trail. Include assets as identified in the Strategic Regional Priority: Connected Regional Shoreline Access. Complete the Equity Assessment specific to this topic area.

e. **Transportation and transit conditions.** Map and describe land, air, water, and emergency transportation as listed in the Transportation and Transit Minimum Categories and Assets. This includes highways, commuter rail, freight rail, bus terminals, routes, service yards, airports, seaports, ferries, emergency access routes, and single points of entry. Include assets as identified in the Strategic Regional Priority: Regional Movement of People and Goods. Complete the Equity Assessment specific to this topic area.

f. **Shoreline contamination conditions.** Map and describe sites as listed in the Shoreline Contamination Minimum Categories and Assets. This includes contaminated sites, landfills, and superfund sites. Include assets as identified in the Strategic Regional Priority: Reduced Contamination and Environmental Justice. Complete the Equity Assessment specific to this topic area.

g. **Governance, collaboration, and finance conditions.** Map and describe boundaries and partnerships as listed in the Collaborative Governance, Flood Management, and Finance Minimum Categories and Assets. This includes jurisdiction boundaries, Operational Landscape Unit boundaries, and applicable partnerships with community-based organizations (CBO), Tribal government, and special districts. Include areas of hydrological shoreline connectivity as identified in the Strategic Regional Priority: Improved Cross-jurisdictional Flood Risk Reduction. Complete Equity Assessment questions specific to this topic area.

For all B3:

Mapped Data provided by BCDC

Required to use **Minimum Categories and Assets Standard.**

Required **Element B—Equity Assessment** questions

Element B — Submittal Checklist

		Submittal Requirements	Included	N/A
B1	a.	Summary of how coastal flooding hazards are referenced and addressed in general and other land use plans.	☐	☐
	b.	Summary of how coastal flooding hazards are referenced and addressed in hazard and emergency plans.	☐	☐
	c.	Summary of how coastal flooding hazards are referenced and addressed in regulatory codes and processes.	☐	☐
	d.	Summary of how coastal flooding hazards are referenced and addressed in climate and resilience plans.	☐	☐
	e.	Summary of how coastal flooding hazards are referenced and addressed in sector and issue area plans.	☐	☐
	f.	Summary of known barriers or conflicts in existing plans and policies.	☐	☐
	g.	Summary of timing of relevant plan updates and coordination points across plans; or path for how to align relevant plan updates.	☐	☐
B2	a.	Description and maps of physical landscape conditions and characteristics.	☐	☐
	b.	Description and maps of existing coastal and nearshore hydrological characteristics.	☐	☐
	c.	Description and maps of existing ecological and biological conditions in the nearshore, shoreline, and uplands areas.	☐	☐
	d.	Description of planned future shoreline changes.	☐	☐
	e.	Description of historical physical and ecological landscape characteristics.	☐	☐

B3

	Submittal Requirements	Included	N/A
a.	Map(s) and description of populations and community services as related to Community Health and Well-being, and responses in the Equity Assessment.	☐	☐
b.	Map(s) and description of utilities infrastructure, stormwater and flood management infrastructure, emergency management, and public trust lands related to Development, Housing, and Land Use, and responses in the Equity Assessment.	☐	☐
c.	Map(s) and description of current and future land uses, development, and projects related to Critical Infrastructure and Services, and responses in the Equity Assessment.	☐	☐
d.	Map(s) and description of trail networks, parks and open spaces, and water-oriented recreation related to Public Access and Recreation, and responses in the Equity Assessment.	☐	☐
e.	Map(s) and description of land, air, water, and emergency transportation related to Transportation and Transit, and responses in the Equity Assessment.	☐	☐
f.	Map(s) and description of sites as related to Shoreline Contamination, and responses in the Equity Assessment, and responses in the Equity Assessment.	☐	☐
g.	Map(s) and description of boundaries and partnerships related to Collaborative Governance, Flood Management, and Funding, and responses in the Equity Assessment.	☐	☐

Element B—Equity Assessment

B2

b. **Ecosystem Health and Resilience Conditions.** Natural habitats can provide many community benefits and ecosystem services. Describe if and how vulnerable communities interact with the Baylands habitats and community desires, concerns, or interests in supporting ecosystem services improvements.

B3

a. **Community Health and Resilience Conditions.** Vulnerable communities must be able to provide input and identify important community assets and services. Describe how the existing conditions include community services identified by and serving the socially vulnerable populations in the planning area. Describe what conditions may limit vulnerable communities' access to these resources and services.

b. **Development, Housing, and Land Use Conditions**. Describe what critical services are most frequently utilized by socially vulnerable populations. Provide additional information on how infrastructure can be improved to better serve vulnerable communities.

c. **Critical Infrastructure and Services Conditions.** Describe how land use patterns have affected vulnerable communities. Include how many vulnerable community populations are at the risk of displacement, and how changes in development in terms of jobs or planned or new affordable housing contribute or reduce this risk.

d. **Public Access and Recreation Conditions.** Describe the accessibility of shoreline access to vulnerable communities and how or why access has been hindered for socially vulnerable communities in the planning area. Include how public access can better serve socially vulnerable populations.

e. **Transportation and Transit Conditions.** Describe how the transportation options affect the mobility and safety of socially vulnerable communities.

f. **Shoreline Contamination Conditions.** Describe the history and sources of contamination, community health concerns, and status of cleanup efforts in the planning area. Include how many open and closed contaminated sites are in moderate, high, and very high social vulnerability zones according to BCDC's social vulnerability map

g. **Collaborative Governance, Flood Management, and Finance Conditions.** Describe what existing community efforts and partnerships are established. Include how this planning effort builds on those existing efforts.

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

3.1.3 Element C: Vulnerability Assessment

This element identifies and summarizes existing and future vulnerability of populations, assets, services, ecosystems, and land uses along the shoreline. This includes identifying and describing the exposure of existing physical and social conditions to coastal flood hazards, identifying high priority assets and areas of significance for more detailed study, documenting the results of vulnerability assessments for these assets, confirming priority actions areas that will drive more detailed adaptation responses. And identifying shoreline reaches and summarizing vulnerability for use in developing adaptation strategies.

Understanding the vulnerability of assets and land uses along the shoreline requires an analysis of exposure — at a minimum to the **Coastal Flood Hazards and Sea Level Rise Scenarios Standard**— followed by an assessment of the sensitivity, adaptive capacity, and consequences of key assets if exposed to flooding. Subregional Plans are only required to assess the additional factors of vulnerability for assets and areas of significance to ensure greater detail and responsiveness of adaptation occurs for the highest priority assets and risks and is not overly detailed in lower priority parts of the shoreline. Flood exposure analysis of required coastal flood hazards and sea level rise scenarios is available for the majority of **Minimum Categories and Assets Standard** through available data layers by BCDC. Local governments must use the data provided by BCDC, unless more locally appropriate data is available and meets the RSAP's best available data criteria.

Based on existing conditions and vulnerabilities, this element also includes identifying shoreline reaches that are used for adaptation strategies in Element D: Adaptation Strategies and Pathways. 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.

For jurisdictions that have completed vulnerability assessments within the last five years, please review the information in Coastal Flood Hazards and Sea Level Rise Scenarios Standard (Section 3.2.1). Existing vulnerability assessments may be used to meet the following Guidelines if they comply with the standards set in this section.

Minimum Standards to be Used in this Element

Coastal Flood Hazards and Sea Level Rise Scenarios – Required to be used in the exposure analysis and for a more detailed vulnerability assessment of assets and areas of high importance.

Minimum Categories and Assets – All minimum categories and assets must undergo an exposure analysis to all Coastal Flood Hazards and Sea Level Rise Scenario Standards.

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

Element C — Plan Requirements

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

a. **Exposure to coastal flood hazards.** Summarize the exposure of all assets in the Minimum Categories and Assets to the required 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 as identified in the Coastal Flood Hazards and Sea Level Rise Scenarios, at a minimum. This should include additional assets as identified by communities and affected parties in B3. Complete the Equity Assessment to describe how assets identified by vulnerable communities were incorporated. Additional hazards and/or sea level rise scenarios may be included as relevant to 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).

b. **Shoreline flood risk conditions.** Assess and describe the planning area's shoreline conditions and characteristics to identify factors that influence flood risk: areas of overtopping, flood pathways, thresholds, tipping points, ad hoc flood management, hydrologically 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).

Mapped Data provided by BCDC

Required to use **Minimum Categories and Assets Standard**

Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

Required **Element C—Equity Assessment** questions

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

C2 Conduct a vulnerability assessment for areas of significance, summarize vulnerability to current and future hazards, and confirm priority action areas for adaptation.

a. **Assets and areas of significance.** Map and describe areas of significance within the planning area. These areas must include populations, assets, and services that meet the following criteria, at a minimum:

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

Complete the Equity Assessment to describe how assets identified by vulnerable communities were incorporated.

b. **Assess vulnerability.** Describe the vulnerability of the assets, populations, and services within areas of significance 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, the methodologies must fulfil 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.

Required **Element C—Equity Assessment** questions

For more information on **Assets And Areas of Significance** reference the box at the end of Element C

c. **Priority action area.** Map and describe priority action areas within the planning area. Priority action areas should be based on initial areas of significance as identified in C2-1 and meet one or more of the following criteria, at a minimum:

- High sensitivity assets as identified in C2-b.
- Low adaptive capacity assets as identified in C2-b.
- High consequence assets as identified in C2-b.
- High consequence secondary or cascading impacts of vulnerability.
- Geographic clusters of vulnerability or high priority populations, assets, and services.
- An area that contains a Strategic Regional Priority.
- An area that contains assets linked to a local priority issue.
- Vulnerable communities (A4).
- Baylands habitats (B2-b).
- Additional criteria as locally identified.

Complete the Equity Assessment to describe how assets identified by vulnerable communities were incorporated.

Required **Element C—Equity Assessment** questions

For more information on **Priority Action Areas** reference the box at the end of Element C

C3 Describe cost of inaction that would result from identified flood risk.

a. **Cost of damage from inaction.** Describe the cost of damages, disruption, and losses to the economy, ecology, and community based on the vulnerabilities identified in C2-b that would occur in the absence of adaptation action. This description can be a high-level estimate, and can be quantitative, qualitative, and may include non-financial metrics. This must include, at least, an economic impact analysis of critical infrastructure identified as vulnerable. This value can provide an important baseline against which to evaluate adaptation costs as it represents the cost of inaction.

C4 Identify and describe "shoreline reaches" that cover the entirety of the planning area, based on existing conditions, exposure, and vulnerability.

a. **Reaches.** Map and describe characteristics of segments of the shoreline, or "shoreline reaches." Reaches may be identified based on similar characteristics and conditions such as large natural features or land uses, segments containing hydrologically connected areas, and/or areas that are overtopped at the same time. Reaches may also be defined by significant infrastructure or other features. Submittal should include a map of all reaches in the planning area as well as individual maps of each reach.

b. **Summarize vulnerability by reach.** Include a summary of vulnerability for each reach at the required 0.8 ft (2050), 3.1 ft (2100 Intermediate), 4.9 ft (2100 Intermediate-High), and 6.6 ft (2100 High) sea level rise scenario as identified in the Coastal Flood Hazards and Sea Level Rise Scenarios, at a minimum. This summary must include exposure and vulnerability of Priority Action Areas (C2-c), 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.

c. **Timing and phasing.** For each priority action area, summarize the anticipated timing of exposure to identify when critical action will need to be taken to address vulnerabilities over time. This timing must be based upon the required 0.8 ft (2050), 3.1 ft (2100 Intermediate), 4.9 ft (2100 Intermediate-High), and 6.6 ft (2100 High) sea level rise scenario as identified in the Coastal Flood Hazards and Sea Level Rise Scenarios, and this may include additional sea level rise scenarios as identified by best available science on sea level rise projections, which is the California Sea Level Rise Guidance (2024). In addition to timing, this should include developing appropriate triggers or decision-points based on local conditions and risks that can help identify when changes in conditions prompt changes in vulnerability.

For C4b. and C4c.:

Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

ASSETS AND AREAS OF SIGNIFICANCE

To conduct an effective vulnerability assessment, it is important to narrow down the wide range of potential assets and focus on specific populations, assets, and services that are of high priority to the region and participating jurisdictions. This subset of assets and areas of significance will then undergo a more detailed vulnerability assessment. This requirement is intended to reduce the need to create a highly detailed vulnerability assessment for low-risk or low-priority portions of the shoreline. Assets and areas of significance should be identified in the planning area based on the minimum criteria in C2-a and can include additional local criteria as identified.

In addition to the listed criteria: assets exposed to coastal flood hazards in the 0.8 ft (2050) sea level rise scenario, vulnerable communities, Baylands habitats, and assets that are Strategic Regional Priorities, local jurisdictions should consider what additional assets and areas are of significance to the communities and affected parties. This may include assets and areas of high economic importance, cultural or historic value, or services or functions that are particularly important to local communities. Also consider where damage to a specific asset (for example, a heavily used bridge or telecommunications infrastructure) could initiate multiple failures across other sectors within a community or beyond. Local communities should be involved in helping to identify local priorities, and this may provide an opportunity to think about additional vulnerability characteristics beyond those used in A4, such as legacies of local historical injustices.

PRIORITY ACTION AREAS

A priority action area includes geographic locations that contain high vulnerability and high priority to local communities and the region. These areas determine where adaptation strategies must be developed in greater detail to respond to and reduce the risks of flooding in that location, which will be carried forward in Element D: Adaptation Strategies and Pathways. Priority action areas build upon the initial areas of significance identified and confirms what should become a priority action area based on the results of the vulnerability assessment. An example of a priority action area would be an area that include a number of high priority populations, assets, and/or services and where, if the area were to be damaged, disrupted, or lost to flooding there would be significant consequences to the communities, ecology, or economy of the jurisdiction.

Element C — Submittal Checklist

		Submittal Requirements	Included	N/A
C1	a.	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 Standards, and responses in the Equity Assessment.	☐	☐
	b.	Description of shoreline conditions and characteristics that contribute to flood risk.	☐	☐
C2	a.	Map and description of areas of significance, and responses in the Equity Assessment.	☐	☐
	b.	Description of vulnerability (sensitivity, adaptive capacity, and consequence) within areas of significance.	☐	☐
	c.	Map and describe priority action areas, including criteria used to identify these areas, and responses in the Equity Assessment.	☐	☐
C3	a.	Description of costs of damages, disruption, and loss in the absence of adaptation.	☐	☐
C4	a.	Maps and descriptions of shoreline reaches, including criteria used to identify reaches. Submittal should include a map of all reaches in the planning area as well as individual maps of each reach.	☐	☐
	b.	Summary of vulnerability for each reach at each scenario as outlined in the Coastal Flood Hazards and Sea Level Rise Scenarios Standard.	☐	☐
	c.	Summary of timing of exposure for each priority action area.	☐	☐

Element C—Equity Assessment

C1

a. **Community assets and services.** Describe what community assets and services identified by vulnerable communities were incorporated into the exposure analysis.

C2

a. **Areas of significance.** Describe which community assets and services identified by vulnerable communities were incorporated into the assets and areas of significance for further vulnerability assessment. Include what characteristics, conditions, or information on vulnerable communities is being used to inform the vulnerability assessment.

b. **Priority Action Area.** Describe which community assets and services identified by vulnerable communities were identified in priority action areas.

Example of a visual from the RSAP community pop-up events where information was shared with community members in English and Spanish.

3.1.4 Element D: Adaptation Strategies and Pathways

This element identifies and describes the preferred 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, developing and evaluating adaptation strategy alternatives for individual reaches and the planning area as a whole, and selecting preferred physical and non-physical adaptation options that meet the **Adaptation Strategy Standards**.

The RSAP provides an overview of adaptation strategies and strategic approaches in the Introduction (Section 1.4.2), where an adaptation "strategy" refers to a specific action, or set of inter-dependent actions, that achieve a particular outcome. Specific strategies can include physical strategies (e.g., ecotone levee, flood wall, ecosystem restoration) and/or non-physical (land use change, policy development, community capacity building) actions 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 in each shoreline reach to ensure that different viable approaches are considered, and their tradeoffs are appropriately evaluated.

Responding to the dynamic challenges that rising sea levels bring will require iterative 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.

Element D Guidelines require the development and evaluation of adaptation alternatives and the selection of preferred adaptation strategies described in both unified conceptual plans and through land use and policy updates in Element E: Land Use and Policy Plan.

Minimum Standards to be Used in this Element

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

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

Adaptation Strategy Standards – Required outcomes that adaptation strategies must 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. **Planning area assumptions.** Describe the planning assumptions that underlie the expectations, priorities, values, objectives, and feedback from the community. Planning area assumptions may include concepts like assets that must be protected in place until the end of their useful life, prioritization of habitat or housing, or other "must haves" that should be reflected in the local vision and adaptation strategies.

b. **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 each reach. The vision should consider existing conditions from Element B and vulnerability assessment outcomes and priority action areas from Element C. Complete the Equity Assessment to describe incorporation of equity into the local vision.

Required **Element D—Equity Assessment** questions

D2 Identify adaptation strategy alternatives for priority action areas in each shoreline reach and the planning area as a whole.

a **Adaptation alternatives.** Describe at least two adaptation alternatives containing adaptation strategies for each shoreline reach that respond to summarized vulnerability by reach (C4-b), incorporate the planning area assumptions (D1-a), advance the local and One Bay Vision (D1-b), and meet the Adaptation Strategy Standards. Adaptation alternatives must include conceptual designs of strategies (physical strategies) and descriptions (physical and non-physical strategies) that contribute to flood risk reduction at the required 0.8 ft (205)) and 3.1 ft (2100 Intermediate) sea level rise scenario, 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 Hazard and Sea Level Rise Scenarios, at a minimum. The requirements for level of detail for adaptation strategies depend on if they are within a priority action area or not:

- **Within Priority Action Areas**. For areas within a Priority Action Areas, adaptation strategies must be detailed enough to demonstrate a feasible approach for flood risk reduction. Strategies identified for each sea level rise scenario must be able to feasibly build upon one another and should respond to shoreline flood risk conditions (C1-b) and timing and phasing identified (C4-c). Alternatives should incorporate existing or planned shoreline adaptation or flood risk reduction projects (B2-e), and include their relevant lifespan and protection level, if known.
- **Outside Priority Action Areas.** For areas along a shoreline containing assets exposed, but not within a Priority Action Area, there must be, at a minimum, a narrative description of what adaptation strategies may become necessary in that location as coastal flood hazards increase and must include information related to thresholds, triggers, decision-points, and/or other conditions that would change the level of priority of that asset and require additional assessment and development of adaptation strategies.

All strategies identified in the Priority Action Areas and in non-Priority Action Areas must meet Adaptation Strategy Standards, and there must be a description of how adaptation alternatives work together across the planning area as a whole. Review the Equity Assessment to ensure evaluation and preferred adaptation strategies incorporate community benefits, build capacity, and reduce unintended negative consequences to communities.

Required **Element D—Equity Assessment** questions.

Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

Required to meet **Adaptation Strategy Standards.**

D3 Evaluate adaptation alternatives to identify preferred adaptation strategies for shoreline reach(es).

a. **Evaluation criteria.** Include evaluation criteria that reflects planning assumptions (D1-a), local vision and the One Bay Vision (D1-b), incorporates the Equity Assessment for Element D, and any other known tradeoffs and challenges identified from affected parties and communities. The evaluation criteria must be applicable to evaluate adaptation strategies and include a scoring system or some means of evaluating strategies against each other.

Required **Element D—Equity Assessment** questions

D4 Provide conceptual plans and descriptions of preferred adaptation strategies and adaptation pathways for shoreline reaches, including physical and non-physical strategies.

a. **Preferred adaptation strategies.** Using the evaluation criteria from D2-a, provide maps and descriptions of the preferred adaptation strategy approach for each shoreline reach that respond to summarized vulnerability by reach (C4-b), incorporate the planning area assumptions (D1-a), advance the local and One Bay Vision (D1-b), and meet the Adaptation Strategy Standards. Preferred adaptation strategies must include conceptual designs of strategies — physical adaptation strategies must be mapped and described — and a description of non-physical adaptation strategies must be included. Non-physical strategies that apply to areas larger than a shoreline reach (such as a city-wide or planning area scale) and guide the overarching strategy must also be included. These may include policies, design guidelines, programs, processes, and/or other changes and will be included in land use and policy maps in Element F. The strategies must demonstrate 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 scenario, as identified in the Coastal Flood Hazard and Sea Level Rise Scenarios, at a minimum. The requirements for level of detail for adaptation strategies depend on if they are within a priority action area or not:

Required **Element D—Equity Assessment** questions

Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

Required to meet **Adaptation Strategy Standards.**

- **Within Priority Action Areas**. For areas within a Priority Action Area, adaptation strategies must be detailed enough to demonstrate a feasible approach for flood risk reduction. Strategies identified for each sea level rise scenario must be able to feasibly build upon one another and should respond to shoreline flood risk conditions (C1-b) and timing and phasing identified (C4-c). Preferred strategies should incorporate existing or planned shoreline adaptation or flood risk reduction projects (B2-e), and include their relevant lifespan and protection level, if known.
- **Outside Priority Action Areas.** For areas along a shoreline containing assets exposed, but *not* within a Priority Action Area, there must be, at a minimum, a narrative description of what adaptation strategies may become necessary in that location as coastal flood hazards increase and must include information related to thresholds, triggers, decision-points, and/or other conditions that would change the level of priority of that asset and require additional assessment and development of adaptation strategies.

All strategies identified in the Priority Action Areas and in non-Priority Action Areas must meet Adaptation Strategy Standards, and there must be a description how adaptation alternatives work together across the planning area as a whole. Complete the Equity Assessment to describe how adaptation preferred strategies incorporate community benefits, build capacity, and reduce unintended negative consequences to communities.

Required **Element D—Equity Assessment** questions

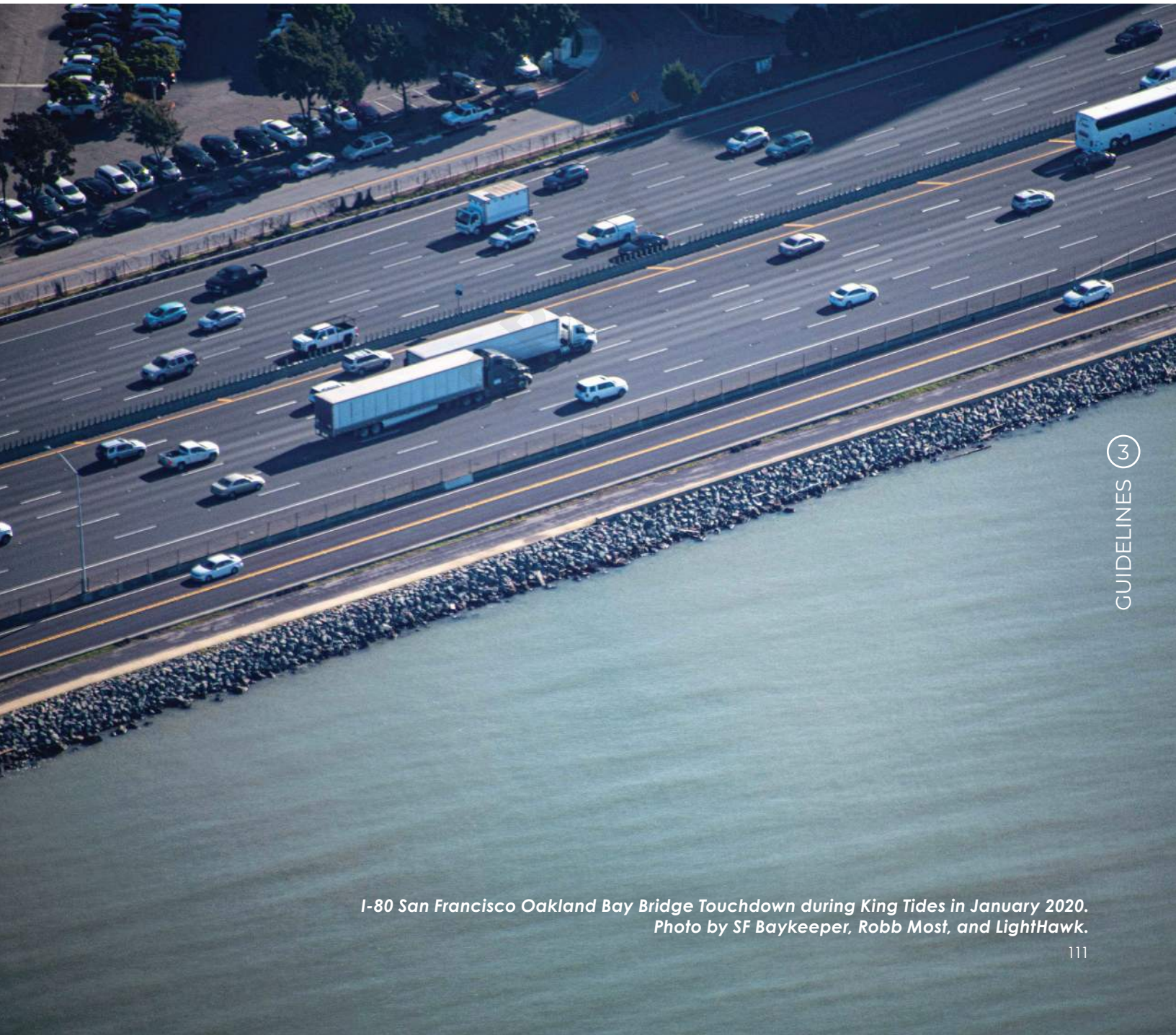
Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard**

Required to meet **Adaptation Strategy Standards.**

b. **Adaptation pathways.** For preferred adaptation strategies within a Priority Action Area (D4-a), provide a schematic diagram with additional details on the phasing of adaptation strategies (i.e. adaptation pathways) that describes when and how adaptation strategies identified in the 0.8 ft (2050) sea level rise scenario will 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. These additional details must include, but are not limited to, identification of triggers (e.g., water levels, timeframe, changing land use, asset lifecycle, regulatory policy change), decision points, lead times, and adaptation strategy efficacy and lifespan.

c. **Matrix of Adaptation Strategy Standards.** Demonstrate how the **Adaptation Strategy Standards** have been incorporated into the preferred adaptation strategies and pathways to the maximum extent possible using the provided matrix, including 1) if standards are being met, 2) if not, a description for why, and 3) where in the plan the outcomes of the standards can be found. A template for the matrix can be found in Matrix of Adaptation Standards (Section 3.6.3).

Required to meet **Adaptation Strategy Standards.**



I-80 San Francisco Oakland Bay Bridge Touchdown during King Tides in January 2020. Photo by SF Baykeeper, Robb Most, and LightHawk.

Element D — Submittal Checklist

		Submittal Requirements	Included	N/A
D1	a.	Description of planning assumptions in the plan area.	☐	☐
	b.	Local vision and goals statement(s) and goals for the full planning area, and responses to the Equity Assessment.	☐	☐
D2	a.	Description of at least two adaptation alternatives for each shoreline reach that meet the Adaptation Strategy Standards and comply with the scenarios in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard, and responses to the Equity Assessment.	☐	☐
D3	b.	Evaluation criteria for evaluating adaptation strategies.	☐	☐
D4	a.	Maps and description of the preferred adaptation strategy approach for each reach that meets the Adaptation Strategy Standards and complies with the scenarios in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard, and responses in the Equity Assessment.	☐	☐
	b.	Description of adaptation pathways for preferred adaptation strategies within priority action areas.	☐	☐
	c.	Matrix of compliance with Adaptation Strategy Standards.	☐	☐

Element D—Equity Assessment

D1

a. **Local vision**. Describe how the local vision takes into consideration and elevates the needs of vulnerable communities.

D4

a. **Community benefits.** Describe how the adaptation strategies can maximize community benefit and minimize cumulative burden. Include who will benefit from or be burdened by the potential outcomes of the different adaptation alternatives.

Community capacity. Describe how the adaptation strategies build community capacity for adaptation and self-determination.

Consequences. Describe how the adaptation strategies could cause unintended negative consequences, in the short term or long term for socially vulnerable communities. For consequences identified, describe how a change in strategies could mitigate them and what the consequences of not taking these strategies would be.

3.1.5 Element E: Land Use and Policy Plan

This element outlines land use, policy, and programmatic changes that will be necessary to implement projects, protect, preserve, expand, or change certain land uses, and establish citywide or site-specific policies and programs that support a more resilient shoreline over time.

Land use decisions play critical roles 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 tradeoffs among equity, housing, economic prosperity, 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.

Examples of land use changes may include:

- Designation of upland migration areas for nearshore habitats and wetlands.
- Designation of undeveloped or lightly developed areas at high risk that should remain open space.
- Designation of existing conservation zones that provide flood mitigation.
- Designation of zones of densification due to low/no risk areas in which flood management strategies are planned and will be implemented in a timeframe that will reduce risk, and other local factors.

Similarly, citywide and site-specific policies or programs can decide 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.

Minimum Standards to be Used in this Element

Coastal Flood Hazards and Sea Level Rise Scenarios – Land use approaches must include strategies to facilitate adaptation across the required standards.

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

Element E — Plan Requirements

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

a. **Land use approach description.** Describe the short and long-term land use changes necessary to achieve the preferred adaptation strategies (D4-a) and adaptation pathways (D4-b) and how they support your overall approach to shoreline resilience. 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 Equity Assessment questions to describe potential equity implications of land use approaches.

Required **Element E—Equity Assessment** questions

b. **Land use approach map.** Include maps showing necessary land use changes in the project area or beyond necessary to achieve the preferred adaptation strategies (D4-a) and adaptation pathways (D4-b). This should include changes that enable and facilitate adaptation in the 0.8 ft (2050) and 3.1 ft (2100 Intermediate) sea level rise scenarios, and a narrative description of what land use changes would be necessary to facilitate adaptation strategies at the 6.6 ft (2100 High) sea level rise scenario, as identified in the Coastal Flood Hazard and Sea Level Rise Scenarios, at a minimum. Complete the Equity Assessment to describe potential equity implications of land use changes.

Required **Coastal Flood Hazards and Sea Level Rise Scenarios Standard.**

Required **Element E—Equity Assessment** questions

c. **Policy changes.** Summarize 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, or other similar policies.

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 necessary planning and adaptation process to update or change land use plans and/or adopt new policies to achieve the changes described in E1-a-E1-c. 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 the preferred adaptation strategies (D4-a).

The State of California has Statewide climate policies including the **30x30 Initiative** and the **Natural and Working Lands Climate Smart Strategy** that can be integrated

Element E — Submittal Checklist

		Submittal Requirements	Included	N/A
E1	a.	Description of short and long-term land use changes necessary to achieve the preferred adaptation strategies, and responses in the Equity Assessment.	☐	☐
	b.	Maps of necessary land use changes required to achieve the preferred adaptation strategies, and responses in the Equity Assessment.	☐	☐
	c.	Description of policies or programs and how they support the overall approach to shoreline resilience.	☐	☐
E2	a.	Description of processes necessary to update or change land use plans and/or adopt new policies.	☐	☐

Element E—Equity Assessment

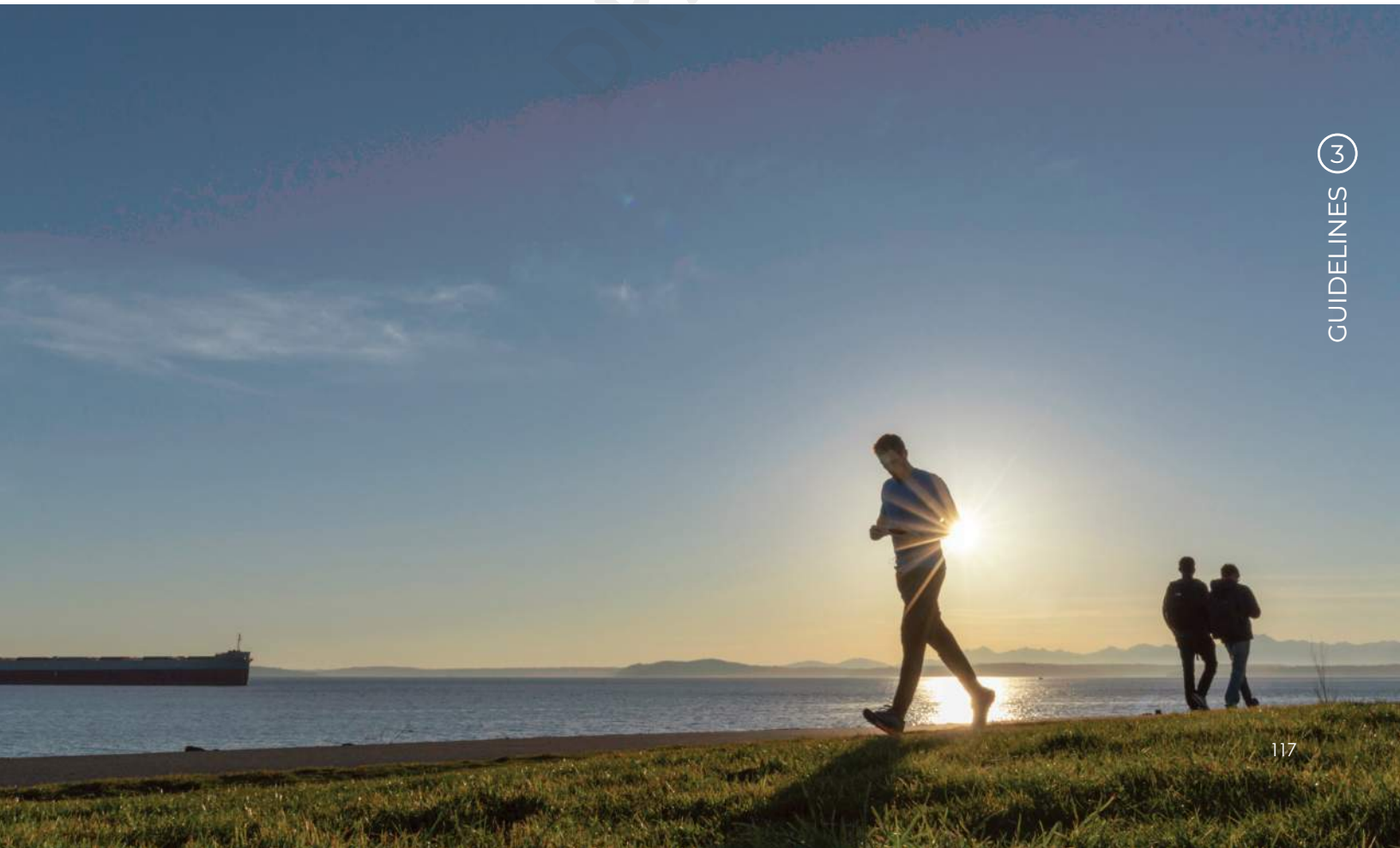
E1

a. **Land use changes.** Describe if any of these land use changes result in the displacement of socially vulnerable communities.

Benefits of land use plans. Describe the benefits and co-benefits that the land use plans and policies will provide to vulnerable communities.

Resource displacement. Describe if the land use changes will result in the displacement of critical infrastructure or resources and services to vulnerable communities.

Community benefits. Describe if the strategies provide other community benefits in addition to sea level rise and flooding reduction, such as job training and opportunity, new opportunities for open space and recreation, or other benefits.



3.1.6 Element F: Project Implementation Plan and Funding Strategy

This element describes how adaptation 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 strategy for updating Subregional Shoreline Adaptation Plans on the required update timeline.

Taking strategies from concept to design to construction is a significant lift. Effective sea level rise protection requires much work beyond existing planning documents 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 of the jurisdiction 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. Describe high-level costs for projects and identify 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.

Minimum Standards to be Used in this Element

Equity Assessment – Complete questions related to equitable outcomes of prioritized projects.

Element F — Plan Requirements

F1 Include an Implementation Plan that identifies next steps and responsible entities for implementing the preferred 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 adaptation strategies in Priority Action Areas, including leads, 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, 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.

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 adaptation strategies in Priority Action Areas, identify any known fund sources and calculate the potential gap between needed and existing funding. This must include capital costs of adaptation, including additional planning, design, construction, and permitting and ongoing operations and maintenance costs, including, where applicable, expected costs of groundwater pumping and other flood control management. Identify potential funding and financing mechanisms (e.g., grants, bonds, etc.) that could be used to help fill these gaps and key actions to initiate securing funding. Complete the Equity Assessment to describe how funding supports community benefits.

Required **Element F—Equity Assessment** questions

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 priority adaptation pathways as identified in D4-b.

b. **Measure and communicate progress.** Identify ways to measure and communicate progress for priority 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.

F4 Include a strategy for plan updates according to the Plan Requirements.

a. **Plan updates.** Identify and 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 B2).

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.

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

Coyote Hills Regional Park shoreline

Element F — Submittal Checklist

		Submittal Requirements	Included	N/A
F1	a.	Identification of an overall lead for plan implementation.	☐	☐
	b.	Implementation plan for adaptation strategies in priority action areas.	☐	☐
	c.	Description of ongoing mechanisms for engaging with other implementation stakeholders.	☐	☐
F2	a.	Summary of high-level costs of priority adaptation strategies and known and potential funding sources, and responses in the Equity Assessment.	☐	☐
F3	a.	Description of monitoring program linked to triggers, thresholds, and decision points for adaptation pathways.	☐	☐
	b.	Description of strategy for measuring and monitoring progress of implementation.	☐	☐
F4	a.	Description of strategy for implementing required plan updates.	☐	☐
	b.	Description of known gaps in capacity for implementing and maintaining the plan.	☐	☐
	c.	Summary of sources of funding for ongoing plan updates.	☐	☐

Element F—Equity Assessment

F2

a. **Funding prioritization.** Describe where and how much funding has been prioritized to projects that benefit socially vulnerable communities.

b. **Community benefits agreement.** Describe if a community benefits agreement has been established to hire local people or companies for monitoring, construction, public outreach, or other benefits.

3.1.7 Element G: Project List

This plan element requires the submission of project data for short-term or critical projects that will strategically advance shoreline adaptation within the plan area. The projects on this list are a subset of the strategies in the adaptation pathways identified in Element D that are a near-term (in the next 10 years) priority.

Establishing a regional database of plans and projects has many benefits — it helps to identify where adaptation gaps remain along the shoreline, evaluate how projects work together, and establish priorities for strategic funding. 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 priority short-term projects 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.

Element G — Plan Requirements

G1 Include a priority project list that summarizes priority adaptation projects for the short term.

a. **Project list.** Submit a short list of adaptation strategies identified in D6 that includes, at a minimum, adaptation strategies within a priority action area that are identified to be initiated or completed in the next 10 years. Provide the following data for these strategies:
- Project Name
- Short project description (1-2 sentences)
- Design life
- Design condition (feet of sea level rise the project is designed to)
- Estimated year of construction

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

b. **Regional project database.** Submit relevant project data for adaptation strategies identified in D6 that includes, at a minimum, adaptation strategies within a priority action area that are identified to be initiated or completed in the next 10 years. Project data should be submitted via Regional Project Database and comply with the project checklist template provided online.

Required **Element G—Equity Assessment** questions

Element G — Submittal Checklist

	Submittal Requirements	Included	N/A
G1	a. Project list that contains all required information for projects in priority action areas to be initiated or completed in the next 10 years.	☐	☐
	b. Submittal of relevant project data via the Regional Project Database.	☐	☐

Element G—Equity Assessment

G1

a. **Priority projects:** Describe which priority projects provide flood risk reduction and/or benefits to vulnerable communities.

3.2 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 adaptation planning occurs based upon minimum criteria and standards across the region.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3.2.1 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 the 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—1 includes the minimum required coastal flood hazards, the sea level rise scenarios, and applicability of the sea level rise scenarios across the vulnerability assessment and adaptation planning components of the Subregional Plan. This information represents the minimums 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.

	Minimum Coastal Flood Hazards				Required Elements	
Sea Level Rise Scenarios	**Tidal Inundation (MHHW)**	**Storm Surge (100-year)**	**Shallow Groundwater**	**Groundwater Emergence/ Flooding**	**Element C: Vulnerability Assessment****	**Element D: Adaptation Strategies and Pathways****
0.8 ft (2050)	MHHW + 0.8 ft	MHHW + 3.5 ft + 0.8 ft	Depth to groundwater for 0.8 ft of sea level rise	Groundwater that has reached the surface for 0.8 ft of sea level rise	✓	✓
3.1 ft (2100 Intermediate)	MHHW + 3.1 ft	MHHW + 3.5 ft + 3.1 ft	Depth to groundwater for 3.1 ft of sea level rise	Groundwater that has reached the surface 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	Depth to groundwater for 4.9 ft of sea level rise	Groundwater that has reached the surface for 4.9 ft of sea level rise	✓	
6.6 ft (2100 High)	MHHW + 6.6 ft	MHHW + 3.5 ft + 6.6 ft	Depth to groundwater for 6.6 ft of sea level rise	Groundwater that has reached the surface for 6.6 ft of sea level rise	✓	✓*

Table 3—1. Combined Coastal Flood Hazard and Sea Level Rise Requirements.
***Assets with a check mark (✓) indicate that the sea level rise scenario and the associated minimum coastal flood hazards are required in the respective element of the Subregional Shoreline Adaptation Plan Guidelines. Assets with an asterisk check mark (✓*) means that a narrative description of this sea level rise scenario is required.*

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). For developing adaptation strategies, the RSAP requires adaptation strategies to be developed at a conceptual level and respond to vulnerabilities identified by, at a minimum, the 0.8 ft (2050 Intermediate) and 3.1 ft (2100 Intermediate) scenarios. A narrative description of how adaptation strategies identified in the 3.1 ft (2100 Intermediate) scenario may need to further adapt for flood risk reduction in the 6.6 ft (2100 High) scenario is also required.

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 6.1ft (intermediate), 8.1ft (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 feet + Sea Level Rise
- Groundwater Emergence/Flooding: 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 Appendix: Methodology for Coastal Flood Hazards and Sea Level Rise Scenarios (Section 4.1).

Shallow Groundwater and Groundwater Emergence

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 layer 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. Shallow groundwater is described in greater detail in the introduction in the science of sea level rise and coastal flood hazards (Section 1.4.1).

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—2 provides a list and description of the minimum coastal flood hazards that are required by the relevant guideline(s). Maps for these coastal flood hazards are readily available regional data layers through BCDC.

Additional flood hazards may be useful to include in Subregional Plans but are not required by the RSAP. For additional recommended hazards, see the Appendix: Recommended Assets and Hazard Layers (Section 4.3).

Wave Run-up

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 under Element B: Existing Conditions. 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.

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
Groundwater Emergence/Flooding	Groundwater that reaches the surface and can drain (emergence) or is trapped and ponds (flooding).
Shallow Groundwater	Groundwater that is within 9 ft of the surface.

Table 3—2. Minimum coastal flood hazards (and descriptions) to be included in Subregional Shoreline Adaptation Plans.

Sea Level Rise Scenarios

The following minimum sea level rise scenario reflect the best available science at the time of publication and are derived from the California Sea Level Rise Guidance (2024).[1] Table 3—3 provides a list of the sea level rise scenarios, including the OPC Sea Level Rise data. Maps for these sea level rise scenarios are readily available regional data layers through BCDC.

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—3. Sea level rise scenarios from the California Sea Level Rise Guidance (2024) and RSAP requirements to be included in Subregional Shoreline Adaptation Plans. The California Sea Level Rise Guidance (2024) recommends using the Intermediate scenario for 2050 and the Intermediate to High scenarios for 2100.

1 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/.

Using RSAP Data or Best Available Science 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 ART Bay Shoreline Flood Explorer and USGS CosMos), and what is considered the best available science on sea level rise continues to be updated and improved. The RSAP standards 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.

BCDC provides readily available data for local jurisdictions to use that include all required coastal flood hazards at each sea level rise scenario outlined in this standard. Table 3—4 provides the specific values used by BCDC in developing the readily available layers. The tidal inundation and groundwater rise data 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 layer. These represent allowable deviations. If local jurisdictions decide to conduct their own analysis, they should make every attempt possible to use the closest numbers to the most recent California Sea Level Rise Guidance. However, values that are within 0.5 ft for the 2050 scenario, and within 1 ft of the 2100 scenarios may be accepted, if provided justification for why closer numbers could not be used. Data used for this analysis outside the data available from BCDC must adhere to the best available data criteria in this document (Section 3.5.2).

Additionally, there are existing sea level rise hazard models and vulnerability assessments that have already been completed by local jurisdictions prior to release of the California Sea Level Rise Guidance update and RSAP Guidelines adoption in 2024. Existing assessments may have used different sea level rise values for conducting their sea level rise assessments than the RSAP standards. However, local jurisdictions are encouraged to use their existing vulnerability assessments where possible, particularly if the vulnerability assessment was completed within the last 5 years and can demonstrate alignment with the RSAP standards within the allowable deviation.

Those local governments with existing vulnerability assessments should identify which of their existing sea level rise scenarios are closest to the RSAP standards. If multiple scenarios are within 1 foot of the scenarios identified in Figure 3—2, then it is recommended to use the amount closer to the standard as the representative scenario. If equally close, use the higher value. If existing analysis does not contain scenarios that are within 1 foot of the required scenarios, additional analysis is required to comply with the requirements. Future plan updates that require new analysis should use updated minimum standards.

Statewide Averages and Regionally Available Data

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)	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—4. Mapping Data Values that can be used to meet the plan requirements.
**Closest available to the California Sea Level Rise Guidance (2024)+ 3.5 ft.*

One Map, Many Futures

Each sea level rise scenario in the RSAP standard includes three water levels: tidal inundation, shallow groundwater rise, and a 100-year storm surge. Using the combined flood hazard layers 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 a storm surge. See Figure 3—2 for an example.

One Map, Many Futures Approach

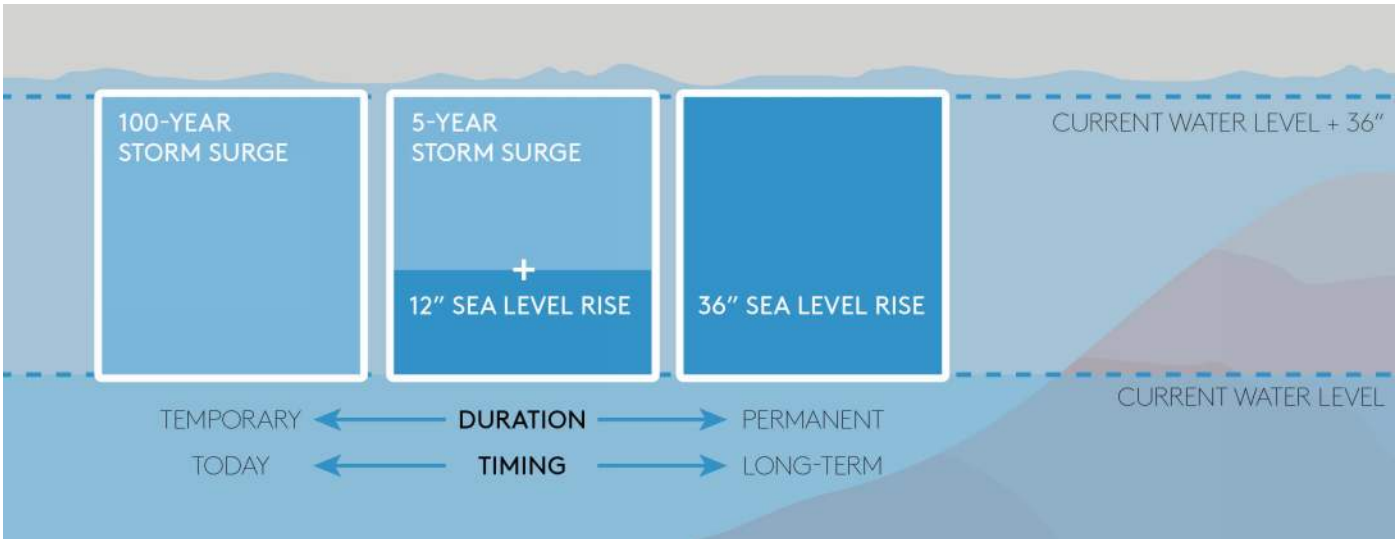
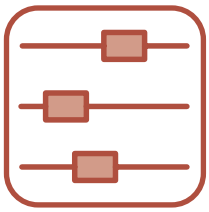


Figure 3—2. The One Map, Many Futures Approach allows a user to consider multiple types of flooding from a single water level. In this example, 36-inches of water can occur due to a 100-year storm today, 12-inches of sea level rise and 5-year storm, or 36-inches of sea level rise.

3.2.2 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, environment, 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, identify assets and areas of significance for a full vulnerability assessment, and then identity Priority Action Areas to develop adaptation responses; and
- Element D: Adaptation Strategies and Pathways, to develop adaptation strategies in response to identified risks.

Table 3—5 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. Local jurisdictions are encouraged to use locally refined data, if available, that meet criteria for best available science. Lastly, the table denotes where minimum assets and categories are required for Plan Elements.

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 hazards, see the Appendix: Recommended Assets and Hazard Layers (Section 4.3).

Minimum Categories and Assets

One Bay Vision Topic Area	Category	Asset/Service	RSAP Data Available from BCDC**	Strategic Regional Priority
Community Health and Well-Being	**Populations**	Population demographics	✓	
		Vulnerable populations	✓	✓*
		Environmental Justice populations		✓*
	Community Services	Health care facilities	✓	✓*
		Historic and cultural resources		
		Tribal resources		
	Strategic Regional Priority (where additional)	Displacement risk	✓	✓
Bay Ecosystem Health and Resilience	**Existing Baylands Habitats**	Subtidal habitats, including eelgrass	✓	✓
		Intertidal flats	✓	✓
		Tidal marshes	✓	✓
		Diked Baylands, other marsh	✓	✓
		Diked Baylands, open water	✓	✓
		Diked Baylands, non-aquatic	✓	✓
		Beaches	✓	✓
		Rocky intertidal	✓	✓
		Estuarine-terrestrial transition zones	✓	✓
		Adjacent uplands — undeveloped or lightly developed	✓	✓
		Creeks and channels connected to the Bay	✓	✓
	Baylands Habitat Resilience Characteristics, Services, and Functions	Habitat resilience characteristics (qualitative)	✓	
		Ecosystem services and functions (qualitative)	✓	
	Wetlands Migration Space	Marsh migration space	✓	✓
		Upland transition zone	✓	✓
	Endangered Species	State listed endangered species		✓
		Federal listed endangered species		✓
	Strategic Regional Priority (where additional)	Connected ecosystems	✓	✓

Minimum Categories and Assets

One Bay Vision Topic Area	Category	Asset/Service	RSAP Data Available from BCDC**	Strategic Regional Priority
Housing, Development, and Land Use	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	✓	
	Adaptation Projects	Existing and planned adaptation projects	✓	
	Strategic Regional Priority	Growth geographies	✓	✓
Critical Infrastructure	Utilities Infrastructure	Electric and natural gas facilities	✓	
		Publicly owned wastewater treatment works	✓	✓
		Wastewater lifting stations		
		Water supply		
		Communications infrastructure	✓	
		Oil refineries	✓	
	Stormwater and Flood Management Infrastructure	Flood management infrastructure		
		Stormwater systems		
	Emergency Management	Emergency management centers and public safety	✓	✓
		Fire stations	✓	
		Police stations	✓	
	Public Trust Lands	Marinas, harbors, and other water-dependent infrastructure		
	Strategic Regional Priority (where additional)	Water Related Industry Priority Use Areas	✓	✓

Minimum Categories and Assets

One Bay Vision Topic Area	Category	Asset/Service	RSAP Data Available from BCDC**	Strategic Regional Priority
Public Access and Recreation	Trails Networks	Regional trail network, including San Francisco Bay Trail	✓	✓
	Parks and Open Space	Parks and open space areas	✓	
		Public trust lands		
	Water-Oriented Recreation	Water-oriented recreation facilities		
		San Francisco Bay water trail	✓	
	Strategic Regional Priority	Connected Access	✓	✓
		Waterfront Park, Beach Priority Use Area	✓	✓
Transportation and Transit	Land Transportation	Highways	✓	✓
		Commuter rail	✓	✓
		Freight rail	✓	✓
		Bus terminals, routes, and service yards		
	Air Transportation	Airports	✓	✓
	Water Transportation	Seaports	✓	✓
		Ferry	✓	✓
	Emergency	Emergency access routes		
		Single points of entry		
Shoreline Contamination	Sites	Contaminated sites	✓	✓
		Landfills	✓	✓
		Superfund sites	✓	✓
Collaborative Governance, Flood Management, and Funding	Boundaries	Jurisdiction boundary	✓	
		Operational landscape unit boundary	✓	
	Partnerships	Community Based Organizations (CBO)	✓	
		Tribal government		
		Special districts		
	Strategic Regional Priority	Hydrological shoreline connectivity		✓

Table 3—5. Minimum Categories and Assets.
***Assets with a check mark (✓) indicate that this recommended data source is available as data layers from BCDC. Assets with an asterisk check mark (✓*) means that a data layer from one category topic area is used as part of the Strategic Regional Priority for another topic area. See the Data and Assets for each Strategic Regional Priority (Section 2.4) or access data layers from BCDC.*

3.2.3 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 measures, 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 plan;
- 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 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 Plans and Policy Plan, to understand the impacts and benefits of land use changes on vulnerable communities;
- Element F: Project 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—6 provides a list of questions to assess equity 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. An equity assessment response form is available to use for submittal (Section 3.6.2).

Right: People visiting and exploring recreational trails near the Baylands of Palo Alto. Photo by Jitze Couperus licensed under CC BY 2.0.

Equity Assessment Plan Element Requirements

Equity Assessment | Element A: Planning Process		
A1	b.	**Inclusion of diverse perspectives.** The planning effort should ensure that representation in the planning project team matches the diversity of the planning area. Describe how the project team compares to the makeup of the demographics of the planning area, and the steps taken to include people from vulnerable groups such as the unhoused, disabled, linguistic communities, LQBTQIA+, youth, and elders.
A4	b.	**Inclusion of multilingual communities.** The planning effort must 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.
	b.	**Equity in the engagement plan.** The engagement plan must prioritize outreach efforts in vulnerable communities. This includes hosting outreach meetings in vulnerable communities, partnering with 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 plan includes people from vulnerable communities.
	b.	**Community partnerships.** The planning effort should identify and partner with community-based organizations to support engagement and support equitable planning, with appropriate partnership agreements. Describe the community partnerships in the planning effort.

Equity Assessment Plan Element Requirements

Equity Assessment | Element B: Existing Conditions		
B2	b.	**Ecosystem Health and Resilience Conditions.** Natural habitats can provide many community benefits and ecosystem services. Describe if and how vulnerable communities interact with the Baylands habitats and community desires, concerns, or interests in supporting ecosystem services improvements.
B3	a.	**Community Health and Resilience Conditions.** Vulnerable communities must be able to provide input and identify important community assets and services. Describe how the existing conditions includes community services identified by and serving the socially vulnerable populations in the planning area. Describe what conditions may limit vulnerable communities access to these resources and services.
	b.	**Development, Housing, Housing and Land Use Conditions.** Describe what critical services are most frequently utilized by socially vulnerable populations. Provide additional information on how infrastructure can be improved to better serve vulnerable communities.
	c.	**Critical Infrastructure and Services Conditions.** Describe how land use patterns have affected vulnerable communities. Include how many vulnerable community populations are at the risk of displacement, and how changes in development in terms of jobs or planned or new affordable housing contribute or reduce this risk.
	d.	**Public Access and Recreation Conditions.** Describe the accessibility of shoreline access to vulnerable communities and how or why access has hindered for socially vulnerable communities in the planning area. Include how can public access better serve socially vulnerable populations.
	e.	**Transportation and Transit Conditions.** Describe how the transportation options affect the mobility and safety of socially vulnerable communities.
	f.	**Shoreline Contamination Conditions.** Describe the history and sources of contamination, community health concerns, and status of cleanup efforts in the planning area. Include how many open and closed contaminates sites are in moderate, high, and very high social vulnerability zones according to BCDC's social vulnerability map
	g.	**Collaborative Governance, Flood Management, and Finance Conditions.** Describe what existing community efforts and partnerships are established. Include how this planning effort builds on those existing efforts.
Equity Assessment | Element C: Vulnerability Assessment		
C1	a.	**Community assets and services.** Describe what community assets and services identified by vulnerable communities were incorporated into the exposure analysis.
C2	a.	**Areas of significance.** Describe which community assets and services identified by vulnerable communities were incorporated into the assets and areas of significance for further vulnerability assessment. Include what characteristics, conditions, or information on vulnerable communities is being used to inform the vulnerability assessment.
	b.	**Priority Action Area.** Describe which community assets and services identified by vulnerable communities were identified in priority action areas.

Equity Assessment Plan Element Requirements		
Equity Assessment | Element D: Adaptation Strategies and Pathways		
D1	a.	**Local vision.** Describe how the local vision takes into consideration and elevates the needs of vulnerable communities.
D4	a.	**Community benefits.** Describe how the adaptation strategies can maximize community benefit and minimize cumulative burden. Include who will benefit from or be burdened by the potential outcomes of the different adaptation alternatives.
		Community capacity. Describe how the adaptation strategies build community capacity for adaptation and self-determination.
		Consequences. Describe how the adaptation strategies could cause unintended negative consequences, in the short term or long term for socially vulnerable communities. For consequences identified, describe how a change in strategies could mitigate them and what the consequences of not taking these strategies would be.
Equity Assessment | Element E: Land Use and Policy Plan		
E1	a.	**Land use changes.** Describe if any of these land use changes result in the displacement of socially vulnerable communities.
		Benefits of land use plans. Describe the benefits and co-benefits that the land use plans and policies will provide to vulnerable communities.
		Resource displacement. Describe if the land use changes will result in the displacement of critical infrastructure or resources and services to vulnerable communities.
		Community benefits. Describe if the strategies provide other community benefits in addition to sea level rise and flooding reduction, such as job training and opportunity, new opportunities for open space and recreation, or other benefits.
Equity Assessment | Element F: Project Implementation Plan and Funding Strategy		
F2	a.	**Funding prioritization.** Describe where and how much funding has been prioritized to projects that benefit socially vulnerable communities
	b.	**Community benefits agreement.** Describe if a community benefits agreement has been established to hire local people or companies for monitoring, construction, public outreach, or other benefits.
Equity Assessment | Element G: Project List		
G1	a.	**Priority projects.** Describe which priority projects provide flood risk reduction and/or benefits to vulnerable communities.

Table 3—6. Equity Assessment Plan Requirements.

3.2.4 Adaptation Strategy Standards

This section describes the required adaptation strategy standards that must be applied when developing initial and final adaptation strategies and pathways for Subregional Shoreline Adaptation Plans. There are many different approaches that governments and communities can take to reduce flood risk that result in differences in the levels of protection, costs, local and regional benefits, and consequences for the long-term health and well-being of people, the economy, and natural ecosystems upon which the region depends. The Adaptation Standards provide a framework for exploring and identifying adaptation strategies that meet local and community needs while also contributing to regional outcomes as defined in the One Bay Vision and Strategic Regional Priorities.

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

- Element D: Adaptation Pathways and Strategies, to ensure adaptation strategies are initially developed, evaluated, and identified that meet the standards in this section;
- Element E: Land Use and Policy Plan, to describe the outcomes of non-physical adaptation strategies identified in Element D;
- Element F: Project Implementation Plan and Funding Strategies, to describe the outcomes of adaptation strategies identified in Element D and provide additional detail related to implementation and funding; and
- Element G: Project List, to identify specific projects resulting from the adaptation strategies developed in Element D.

Table 3—7 includes the adaptation strategy standards that must be met by the preferred adaptation strategies. The adaptation strategy standards are organized following the same approach as introduced in Adaptation Strategies and Benefits of Adaptation Beyond Flood Risk Reduction (Section 1.4.2). The standards apply to all areas with adaptation strategies, and standards with an icon refer to Strategic Regional Priorities and are only required if the applicable Strategy Regional Priority is present in the planning area. A completed adaptation strategy matrix with descriptions of responses must be provided as part of the submittal for the Subregional Shoreline Adaptation Plan. An adaptation strategy standards matrix is available to use for submittal (Section 3.3.3).

Left: CBO Workshop feedback. Photo by Karl Nielson.

Overview of Adaptation Strategy Standards

Maximize benefits of water-dependent shoreline uses and Baylands habitats.

1. Improve public access and connection to the shoreline.
2. Improve connected regional shoreline access.
3. Prioritize water-dependent uses along the shoreline.
4. Improve Baylands habitats and facilitate their long-term survival.
5. Ensure complete and connected ecosystems.

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

6. Reduce flood risk in areas with existing 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 movement of people and goods.
11. Reduce contamination risks in Environmental Justice communities.
12. Use nature-based adaptation where feasible.
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. Preserve natural, undeveloped, and open space.
16. Incorporate climate-responsive standards and codes for adaptive design.
17. Plan for changes in land use, removal of assets, and/or equitable relocation.
18. Identify actions necessary to enable future adaptation decisions, if currently not available.
19. Develop and maintain cross-jurisdictional flood risk reduction.
20. Evaluate and minimize consequences of failure.

Table 3—7. Overview of Adaptation Strategy Standards. Standards are organized by principles of maximizing benefits of water-dependent shoreline uses and Bay habitats, improving community health, economic development and housing needs, and creating pathways to respond to changing flood risks over time.

Adaptation Strategy Standards	Strategy options to achieve this:

Maximize benefits of water-dependent shoreline uses and Baylands habitats.

1. **Improve public access and connection to the shoreline.**
Areas along the Bay shoreline must provide maximum feasible public access that maintains, increases, and/or enhances existing access. 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. In the adaptation strategies, demonstrate and describe where and how public access is being maintained or improved.

2. **Improve connected regional shoreline access networks.**
Areas along the Bay shoreline containing regionally significant waterfront parks, beaches, and trails must preserve or improve the networked connectivity of these assets across jurisdictional boundaries to ensure public access connections are maintained and improved.

In the adaptation strategies, demonstrate and describe how connectivity of regionally serving parks, beaches, and trails across jurisdictions will be maintained, including a description of coordination with neighboring jurisdictions and efforts to continue coordination as adaptation strategies are implemented and adjusted over time.

3. **Prioritize water-dependent uses along the shoreline.**
Areas along the Bay shoreline must prioritize water-dependent and water-oriented uses along the shoreline over uses that don't require a location along the shoreline. Prioritize means preserving, enhancing, or expanding water-dependent uses. Water-dependent uses include those that can only be carried out on, in, or adjacent to water, such as ports, marinas, boat, kayak, or kite-surfing launches, fishing piers, and certain industries. In the adaptation strategies, demonstrate and describe where and how water-dependent uses are being prioritized.

Adaptation Strategy Standards	Strategy options to achieve this:
4. **Improve Baylands habitats and facilitate their long-term survival.** Areas along the Bay shoreline with existing Baylands habitats must protect, restore, and/or enhance these habitats to meet regional habitat goals. Protection means continuing the functions and services the habitats provide as sea levels rise over time. Restoring means bringing back functions and services where they once existed. Enhancing 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 so long as the functions are maintained or enhanced. This can be achieved by ensuring that the spatial extent, distribution, abundance, and conditions of habitat types can be maintained or improved as sea levels rise; identifying and designating marsh migration space and upland transition zones; and/or identifying opportunities to connect Baylands habitats to one another and to sustainable sources of water and sediment supply that will support natural adaptation processes and actions that improve the connections among the Bay, watersheds, and uplands. Adaptation strategies that would significancy affect Bay resources, such as flood gates must be avoided. In the adaptation strategies, demonstrate and describe how Baylands habitats and their characteristics are expected to change from the existing conditions and how they will be protected or improved.	• Zoning to protect existing habitats • Restoration and/or enhancement • Ecotone levees that provide habitat space • Re-connecting creeks to Baylands • Conservation easements • Designating overlay zones such as marsh migration space and upland transition zone
5. **Ensure complete and connected ecosystems.** Areas along the Bay shoreline where existing Baylands habitats cross jurisdictional boundaries must ensure that this habitat connectivity is maintained or improved with adaptation. In the adaptation strategies, demonstrate and describe where habitats currently, or have the potential to in the future, cross jurisdictional boundaries and describe coordination efforts with neighboring jurisdictions, private, state, and/or federal managers and/or landowners to maintain habitat connectivity for landscape-scale habitat processes.	• Zoning to protect existing habitats • Restoration and/or enhancement • Ecotone levees that provide habitat space • Re-connecting creeks to Baylands • Conservation easements • Designating overlay zones such as marsh migration space and upland transition zone

Adaptation Strategy Standards	Strategy options to achieve this:

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

6. **Reduce flood risk in areas with existing development.**
Areas along the Bay shoreline with existing development — such as housing, commercial, industry — must minimize flood risk to existing development through the end of the development's planned useful life. Strategies should consider 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 example, this may occur when a strategy is no longer physically and/or economically or when development or land use patterns change. In the adaptation strategies, demonstrate and describe how flood risk reduction is being achieved for existing development at risk.

- Sea level rise overlay zones
- Real estate disclosures
- Increase freeboard above BFE
- Climate responsive standards and codes

7. **Include actions to mitigate involuntary displacement risk.**
Areas along the Bay shoreline with identified risk of displacement must include policies aimed at reducing displacement risk. Analysis of displacement risk and policies for reducing displacement risk should revisit, and, if necessary, revise local displacement policies in the local certified General Plan Housing Element to consider additional measures associated with displacement caused by future flooding due to sea level rise. In the adaptation strategies, include policies aimed at reducing displacement for populations identified at risk.

- Anti-displacement policies

8. **Promote safe, sustainable and strategic growth and density.**
Areas along the Bay shoreline within MTC/ABAG's designated growth geographies must promote safe and sustainable growth in these locations over other shoreline areas at risk of sea level rise. Within growth geographies, include effective measures that address changing future flood risks, such as plans and policies that result in development and infrastructure that is resilient to sea level rise and adaptable over time. When local conditions allow for it, consider how variations in zoning can enable greater levels of density in areas not exposed to coastal flood hazards within the growth geography. In the adaptation strategies, demonstrate and describe how safe and sustainable growth geographies will reduce future flood risks.

- Transfer of Development Rights
- Climate overlay zone
- Rolling easements
- Downzoning in flood zones
- Shoreline setbacks
- Increasing density or clustering development outside areas of risk
- Avoidance opportunities
- Real estate disclosures
- Increase freeboard above BFE
- Climate responsive standards and codes

Adaptation Strategy Standards	Strategy options to achieve this:
9. **Maintain reliable critical and emergency services.** Areas along the Bay shoreline containing identified emergency operation centers, publicly owned wastewater treatment works, and healthcare facilities must include effective strategies to ensure the continued function of these services. 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. Critical infrastructure may also be water dependent. These approaches can change over time through adaptation pathways. In the adaptation strategies, demonstrate and describe how the functions of critical and emergency services are being maintained over time. For assets not owned or operated by a local government, provide a description of what coordination efforts are occurring with appropriate agencies to maintain these services.	• 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 movement of people and goods.** Areas along the Bay shoreline containing identified regionally significant transportation infrastructure must include effective strategies to ensure the continued functioning of these services. 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. In the adaptation strategies, demonstrate and describe how transportation assets and the connected systems upon which these services depend maintain their function over time. For assets not owned or operated by a local government, provide a description of 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.	• 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. **Reduce contamination risks in Environmental Justice communities.** Areas along the Bay shoreline containing identified contaminated sites in Environmental Justice communities must identify strategies to advance remediation and reduce risks of toxic materials mobilization and vaporization in communities due to flooding. This should include analysis of how planned adaptation will prevent mobilization of contaminants or demonstration of how coordination with a lead regulatory agency is being conducted for prevention purposes (where appropriate). In the adaptation strategies, demonstrate and describe where and how remediation is being prioritized and what coordination is occurring with the responsible parties and regulatory agencies, which may include the U.S. EPA Region IX, the California Environmental Protection Agency's (Cal/EPA's) State Water Resources and Control Board and/or Regional Boards, the Cal/EPA's Department of Toxic Substances Control, and/or a County's Department of Environmental Health, or the Local Oversight Program (LOP).	
12. **Use nature-based adaptation where feasible.** In areas along the Bay shoreline where protection approaches for flood risk reduction are utilized, adaptation must incorporate natural and nature-based adaptation strategies suitable to the landscape to the greatest extent feasible before using traditional hardscape approaches. Where nature-based adaptation is deemed infeasible, approaches should incorporate habitat enhancements (i.e., utilizing hybrid approaches). In the adaptation strategies, demonstrate and describe the suitability of nature-based solutions and where nature-based adaptation is used, or habitat enhancements are incorporated.	• Beaches with backing levee or fortified seawall • Ecotone levee • Living seawall • Shellfish reefs • Submerged aquatic vegetation • Mudflat augmentation • Protecting, maintaining, or restoring tidal marshes

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 utilized, adaptation must appropriately utilize bay fill. This means that bay fill must be avoided or minimized for new hardscape or traditional engineering approaches, but Bay fill for the purpose of habitat restoration and/or nature-based adaptation may be appropriate. If fill is necessary, include an analysis of why the public benefits of the fill exceed the public detriment, why the fill has not alternative upland location, is the minimum amount necessary for the strategy, would be constructed with sound safety standards, and minimizes impacts to Bay resources. 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. In the adaptation strategies, demonstrate and describe how the strategies avoid and minimize fill for the sole purpose of shoreline protection.

14. **Integrate multiple benefits into adaptation.**
In areas along the Bay where protection approaches for flood risk reduction are utilized, adaptation projects must incorporate multiple benefits whenever possible. 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 improve Baylands habitats. In the adaptation strategies, demonstrate and describe how benefits beyond flood risk reduction were considered and incorporated.

Create pathways to respond to changing flood risks over time.

15. **Preserve natural and undeveloped lands and open space.**
Areas along the Bay shoreline with existing natural lands, undeveloped lands, and/or open space areas must be protected, maintained, and where possible, expanded to avoid putting new development at risk and to provide shoreline resilience. Preservation of these lands should allow for uses such as providing public access, buffer space for future adaptation protection structures, and/or space for wetlands migration space or upland transition zone. In the adaptation strategies, demonstrate and describe where and how existing natural lands, open spaces, and undeveloped shoreline areas are being preserved and designated for shoreline resilience.

- Zoning to maintain natural or open space
- Land acquisition
- Re-zoning
- Sea level rise overlay zones
- Conservation easements
- Transfer of development rights

Adaptation Strategy Standards	Strategy options to achieve this:
16. **Incorporate climate-responsive standards and codes for adaptive design.** Areas along the Bay shoreline containing assets and/or Baylands habitats at risk of flooding must incorporate standards and codes that incorporate adaptive design into new, retrofit, or rebuilt infrastructure. This must include standards, codes, and/or policies that address shallow groundwater and groundwater emergence flood risks. These standards may be used in areas where protection is not appropriate or may be used in addition to shoreline protection. In the adaptation strategies, demonstrate and describe what standards and codes for climate-responsive designs 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)
17. **Plan for changes in land use, removal of assets, and/or equitable relocation.** Areas along the Bay shoreline containing assets or development at risk of flooding must incorporate policies, regulations, and/or financial incentives that allow for transitions at the end of the asset or development's life cycle. Transitions can include shifts in land use to lower density or less vulnerable uses, or planned removal or relocation of assets. Removal or relocation of assets should be prioritized in areas suitable for marsh migration space and upland transition zone. 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. In the adaptation strategies, demonstrate and describe the policies, regulations, and/or financial incentives included and timeline for implementation.	• Increasing density outside areas of risk • Avoidance opportunities • Rolling easements • Downzoning in flood zones • Transfer of Development Rights

Adaptation Strategy Standards	Strategy options to achieve this:
18. **Identify actions necessary to enable future adaptation decisions, if currently not available.** Areas where future adaptation pathways could provide effective flood risk reduction but are considered infeasible by current conditions (such as existing knowledge, values, and rules in society[1]) should identify what actions would likely be necessary to facilitate changes to the future context in which decisions are made. In the adaptation strategies, describe existing barriers and changes in knowledge, values, or rules that would be needed to achieve desired options of adaptation pathways.	
19. **Develop and maintain cross-jurisdictional flood risk reduction.** Areas along the Bay shoreline identified as containing high shoreline connectivity across jurisdictional boundaries must include measures to effectively coordinate to develop cross-jurisdictional flood risk reduction responses and plan for future coordination and/or governance to maintain flood risk reduction. This should include considerations for creating redundant flood protections such as berms to reduce the likelihood of flooding from flood protection failure originating in adjacent jurisdictions and hydrologically evaluating significant changes to basins that would hydrologically disconnect them in areas with in-bay hydrological impacts. In the adaptation strategies, demonstrate and describe adaptation coordination and approaches for reducing flood risk across jurisdictional boundaries.	• Development of formal cross-jurisdictional governance such as Joint Powers Authority (JPA), Memorandums of Understanding (MOUs), or legislation
20. **Evaluate and minimize consequences of failure.** In areas along the Bay where protection approaches for flood risk reduction are utilized, flood protection must be designed to minimize the consequences of failure. This should include an analysis of causes and consequences of failure, such as future coastal flood hazards, local geological soil conditions, earthquake and liquefaction risk, and the projection of current and potential future populations that would be at risk in the event of a flood protection failure. In the adaptation strategies, describe the potential impacts of flood protection failure, the likelihood of failure, and how risks of failure are being minimized.	

1 Gorddard et al., "Values, Rules and Knowledge: Adaptation as change in the decision context." Environmental Science and Policy. Volume 57, March 2016.

3.3 Complete Plan Submittal Checklists

3.3.1 Subregional Plan Checklist

Subregional Plans must be submitted to BCDC for plan review for consistency with the Guidelines. Local governments must submit the following checklist as part of their plan submittal.

Plan Element Requirements		Submittal Requirements	Included	N/A
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.	☐	☐
	c. Affected parties	List of affected and interested parties.	☐	☐
	d. Staffing and resources	Description of current resources available for adaptation and/or flood hazard mitigation.	☐	☐
A2.	a. Planning area	Map with boundaries of plan area.	☐	☐
A3.	a. Multi-jurisdictional coordination	Description of multi-jurisdictional and county coordination.	☐	☐
	b. State agency coordination	Description of regional and state coordination.	☐	☐
A4.	a. Vulnerable community identification	Definitions and mapped locations of Environmental Justice and socially vulnerable communities.	☐	☐
	b. Equitable outreach and engagement	Summary of equitable outreach and engagement efforts, and responses in the Equity Assessment.	☐	☐
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.	☐	☐

Plan Element Requirements			Submittal Requirements	Included	N/A
	c.	Codes and regulations	Summary of how coastal flooding hazards are referenced and addressed in regulatory codes and processes.	☐	☐
	d.	Climate and resilience plans	Summary of how coastal flooding hazards are referenced and addressed in climate and resilience plans.	☐	☐
	e.	Sector and issue area plans	Summary of how coastal flooding hazards are referenced and addressed in sector and issue area plans.	☐	☐
	f.	Existing barriers	Summary of known barriers or conflicts in existing plans and policies.	☐	☐
	g.	Concurrent plan updates	Summary of timing of relevant plan updates and coordination points across plans; or path for how to align relevant plan updates.	☐	☐
B2.	a.	Physical conditions	Description and maps of physical landscape conditions and characteristics.	☐	☐
	b.	Coastal and nearshore hydrological conditions	Description and maps of existing coastal and nearshore hydrological characteristics.	☐	☐
	c.	Ecosystem health and resilience characteristics	Description and maps of existing ecological and biological conditions in the nearshore, shoreline, and uplands areas.	☐	☐
	d.	Planned future changes	Description of planned future shoreline changes.	☐	☐
	e.	Historical conditions	Description of historical physical and ecological landscape characteristics.	☐	☐
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, and responses in the Equity Assessment.	☐	☐
	b.	Development, housing, and land use conditions	Map(s) and description of utilities infrastructure, stormwater and flood management infrastructure, emergency management, and public trust lands related to Development, Housing, and Land Use, and responses in the Equity Assessment.	☐	☐
	c.	Critical infrastructure and services conditions	Map(s) and description of current and future land uses, development, and projects related to Critical Infrastructure and Services, and responses in the Equity Assessment.	☐	☐
	d.	Public access and recreation conditions	Map(s) and description of trails networks, parks and open spaces, and water-oriented recreation related to Public Access and Recreation, and responses in the Equity Assessment.	☐	☐

Plan Element Requirements		Submittal Requirements	Included	N/A
	e. Transportation and transit conditions	Map(s) and description of land, air, water, and emergency transportation related to Transportation and Transit, and responses in the Equity Assessment.	☐	☐
	f. Shoreline contamination conditions	Map(s) and description of sites as related to Shoreline Contamination, and responses in the Equity Assessment, and responses in the Equity Assessment.	☐	☐
	g. Governance, collaboration and finance conditions	Map(s) and description of boundaries and partnerships related to Governance, Collaboration and Finance, and responses in the Equity Assessment.	☐	☐
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 Standards, and responses in the Equity Assessment.	☐	☐
	b. Shoreline flood risk conditions	Description of shoreline conditions and characteristics that contribute to flood risk.	☐	☐
C2.	a. Assets and areas of significance	Map and description of areas of significance, and responses in the Equity Assessment.	☐	☐
	b. Assess vulnerability	Description of vulnerability (sensitivity, adaptive capacity, and consequence) within areas of significance.	☐	☐
	c. Priority action area	Map and describe priority action areas, including criteria used to identify these areas, and responses in the Equity Assessment.	☐	☐
C3.	a. Cost of damages from inaction	Description of costs of damages, disruption, and loss in the absence of adaptation.	☐	☐
C4.	a. Reaches	Maps and descriptions of shoreline reaches, including criteria used to identify reaches. Submittal should include a map of all reaches in the planning area as well as individual maps of each reach.	☐	☐
	b. Summarize vulnerability by reach	Summary of vulnerability for each reach at each scenario as outlined in the Coastal Flood Hazards and Sea Level Rise Scenarios Standard.	☐	☐
	c. Timing and phasing	Summary of timing of exposure for each priority action area.	☐	☐

Plan Element Requirements			Submittal Requirements	Included	N/A
Element D: Adaptation Strategies and Pathways					
D1.	a.	Planning area assumptions	Description of planning assumptions in the plan area.	☐	☐
	b.	Local vision	Local vision and goals statement(s) and goals for the full planning area, and responses to the Equity Assessment.	☐	☐
D2.	a.	Adaptation alternatives	Description of at least two adaptation alternatives for each shoreline reach that meet the Adaptation Strategy Standards and comply with the scenarios in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard, and responses to the Equity Assessment.	☐	☐
D3.	b.	Evaluation criteria	Evaluation criteria for evaluating adaptation strategies.	☐	☐
D4.	a.	Preferred adaptation strategies	Maps and description of the preferred adaptation strategy approach for each reach that meet the Adaptation Strategy Standards and comply with the scenarios in the Coastal Flood Hazard and Sea Level Rise Scenarios Standard, and responses in the Equity Assessment.	☐	☐
	b.	Adaptation pathways	Description of adaptation pathways for preferred adaptation strategies within priority action areas.	☐	☐
	c.	Matrix of adaptation strategy standards	Matrix of compliance with Adaptation Strategy Standards.	☐	☐
Element E: land use and policy plan					
E1.	a.	Land use approach description	Description of short and long-term land use changes necessary to achieve the preferred adaptation strategies, and responses in the Equity Assessment.	☐	☐
	b.	Land use approach map	Maps of necessary land use changes required to achieve the preferred adaptation strategies, and responses in the Equity Assessment.	☐	☐
	c.	Policy changes	Description of 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.	☐	☐

Plan Element Requirements			Submittal Requirements	Included	N/A
Element F: Project Implementation Plan and Funding Strategy					
F1.	a.	Plan implementation lead	Identification of an overall lead for plan implementation.	☐	☐
	b.	Implementation plan	Implementation plan for adaptation strategies in priority action 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, and responses in the 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.	☐	☐
	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	a.	Project list	Project list that contains all required information for projects in priority action areas to be initiated or completed in the next 10 years.	☐	☐
	b.	Regional project database	Submittal of relevant project data via the Regional Project Database.	☐	☐

3.3.2 Equity Assessment Response Checklist

Subregional Plans must be submitted to BCDC for plan review for consistency with the Guidelines, including meeting the Equity Assessment Standards (Section 3.2.3). Local governments must submit an equity assessment as part of their plan submittal.

Plan Element Requirements			Included	N/A
Element A: Planning Process				
A1.	b.	Inclusion of diverse perspectives.	☐	☐
		Inclusion of multilingual communities.	☐	☐
A4.	b.	Equity in the engagement plan.	☐	☐
		Community partnerships.	☐	☐
Element B: Existing Conditions				
B2.	b.	Ecosystem Health and Resilience Conditions.	☐	☐
	a.	Community Health and Resilience Conditions.	☐	☐
	b.	Development, Housing, and Land Use Conditions.	☐	☐
	c.	Critical Infrastructure and Services Conditions.	☐	☐
B3.	d.	Public Access and Recreation Conditions.	☐	☐
	e.	Transportation and Transit Conditions.	☐	☐
	f.	Shoreline Contamination Conditions.	☐	☐
	g.	Collaborative Governance, Flood Management, and Finance Conditions.	☐	☐

Plan Element Requirements			Included	N/A
Element C: Vulnerability Assessment				
C1.	a.	Community assets and services.	☐	☐
C2.	a.	Areas of significance.	☐	☐
	b	Priority Action Areas.	☐	☐
Element D: Adaptation Strategies and Pathways				
D1.	a.	Local vision.	☐	☐
D4.	a.	Community benefits.	☐	☐
		Community capacity.	☐	☐
		Consequences.	☐	☐
Element E: Land Use and Policy Plan				
E1.	a.	Land use changes.	☐	☐
		Benefits of land use plans.	☐	☐
		Resource displacement.	☐	☐
		Community benefits.	☐	☐
Element F: Project Implementation Plan and Funding Strategy				
F2.	a.	Funding prioritization.	☐	☐
	b.	Community benefits agreement.	☐	☐
Element G: Project List				
G1	a.	Project List.	☐	☐

3.3.3 Adaptation Strategy Standards Matrix Checklist

Subregional Plans must be submitted to BCDC for plan review for consistency with the Guidelines, including meeting the Adaptation Strategy Standards (Section 3.2.4). Local governments must submit the following matrix as part of their plan submittal, as identified in requirement D4-c. Information to meet the submittal requirement can either be described in the matrix response, or response can identify where specific section and page numbers where this information exists in the Subregional Shoreline Adaptation Plan. If there are no applicable Strategic Regional Priorities (SRP), check "N/A".

A single matrix may be submitted that provides descriptions of the standards for the planning area as a whole, however, individual matrices for each shoreline reach can also be submitted but must be clearly stated.

Adaptation Strategy Standards Matrix

Standard		Submittal Requirements	Included (Planning Area or Reach)	N/A
Maximize benefits of water-dependent shoreline uses and Baylands habitats.				
1	Improve public access and connection to the shoreline.	Demonstrate and describe where and how public access is being maintained or improved.	☐	☐
2.	SRP: Maintain connected regional shoreline access networks.	Demonstrate and describe how connectivity of regionally serving parks, beaches, and trails across jurisdictions will be maintained, including a description of coordination with neighboring jurisdictions and efforts to continue coordination as adaptation strategies are implemented and adjusted over time.	☐	☐
3.	Prioritize water-dependent uses along the shoreline.	Demonstrate and describe where and how water-dependent uses are being prioritized.	☐	☐
4.	Improve Baylands habitats and facilitate their long-term survival.	Demonstrate and describe how Baylands habitats and their characteristics they are expected to change from the existing conditions and how they will be protected or improved.	☐	☐
5.	SRP: Ensure complete and connected ecosystems	Demonstrate and describe where habitats currently, or have the potential to in the future, cross jurisdictional boundaries and describe coordination efforts with neighboring jurisdictions, private, state, and/or federal managers and/or landowners to maintain habitat connectivity for landscape-scale habitat processes.	☐	☐

Adaptation Strategy Standards Matrix

Standard		Submittal Requirements	Included (Planning Area or Reach)	N/A
Improve community health, economic development, and housing needs.				
6.	Reduce flood risk in areas with existing development.	Demonstrate and describe how flood risk reduction is being achieved for existing d evelopment at risk.	☐	☐
7.	SRP - Include actions to mitigate involuntary displacement risk.	Include and/or reference policies aimed at reducing displacement for populations identified at risk.	☐	☐
8.	SRP - Promote safe, sustainable and strategic growth and density.	Demonstrate and describe how safe and sustainable growth geographies will reduce future flood risks.	☐	☐
9.	SRP: Maintain reliable critical and emergency services.	Demonstrate and describe how the functions of critical and emergency services are being maintained over time. For assets not owned or operated by a jurisdiction, provide a description of what coordination efforts are occurring with appropriate agencies to maintain these services.	☐	☐
10.	SRP: Maintain regional movement of people and goods.	Demonstrate and describe how transportation assets and the connected systems in which these services depend upon maintain their function over time. For assets not owned or operated by a jurisdiction, provide a description of 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.	☐	☐
11.	SRP: Reduce contamination risks in Environmental Justice communities.	Demonstrate and describe where and how remediation is being advanced and what coordination is occurring with the responsible parties and agencies, which may include the California State Water Resources Control Board and California Department of Toxic Substances Control	☐	☐
12.	Use nature-based adaptation where feasible.	Demonstrate and describe the suitability of nature-based solutions and where nature-based adaptation is used or green elements are incorporated.	☐	☐
13.	Appropriately utilize Bay fill for shoreline protection.	Demonstrate and describe how the strategies avoid and minimize fill for the sole purpose of shoreline protection.	☐	☐
14.	Integrate multiple benefits into adaptation.	Demonstrate and describe how benefits beyond flood risk reduction were considered and incorporated.	☐	☐

Adaptation Strategy Standards Matrix

Standard		Submittal Requirements	Included (Planning Area or Reach)	N/A
Create pathways to respond to changing flood risks over time.				
15.	Preserve natural and undeveloped lands and open space.	Demonstrate and describe where and how existing natural lands, open spaces, and undeveloped shoreline areas are being preserved and designated for shoreline resilience.	☐	☐
16.	Incorporate climate-responsive standards and codes for adaptive design.	Demonstrate and describe what standards and codes for climate-responsive designs are incorporated.	☐	☐
17.	Plan for changes in land use, removal of assets, and/or equitable relocation.	Demonstrate and describe where and what policies, regulations, and/or financial incentives were identified and along what timeline they will be implemented.	☐	☐
18.	Identify actions necessary to enable future adaptation decisions, if currently not available.	Describe existing barriers and changes in knowledge, values, or rules that would be needed to achieve desired options of adaptation pathways.	☐	☐
19.	SRP- Develop and maintain cross-jurisdictional flood risk reduction.	Demonstrate and describe adaptation coordination and approaches for reducing flood risk across jurisdictional boundaries.	☐	☐
20.	Evaluate and minimize consequences of failure.	Describe the potential impacts of flood protection failure, the likelihood of failure, and how risks of failure are being minimized.	☐	☐

Richmond wetlands. Photo by Jaclyn Perrin-Martinez.

3.4 Plan Development, Submission, and Approval Process

Photo by SF Baykeeper, Cole Burchiel, and LightHawk.

3.4.1 Local Government Planning Responsibilities

Any local government within any portion of BCDC's jurisdiction is required to prepare a Subregional Shoreline Adaptation Plan (Subregional Plan). Local governments that are not within BCDC's jurisdiction but that share flood risk with their neighbors are highly encouraged to collaborate with their neighbors to develop a Subregional Plan. A Subregional Plan may consist of a local plan, a county plan, or a multi-jurisdictional plan, as described in the following section.

BCDC's jurisdiction includes the San Francsico Bay, a 100-foot band inland from the shoreline around the San Francisco Bay and its salt ponds, managed wetlands, and certain waterways. More information about each of these jurisdictions and what's included can be found on BCDC's website and in the McAteer-Petris Act, codified at Government Code Section 66610.

Who is Required to Develop a Plan?
Local governments required to develop a Subregional Plan are listed in Table 3—8. The table also includes local governments not currently in BCDC's jurisdiction, but likely impacted by near term coastal flood hazards (*) and are likely planning partners.

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

On the following page is a table of local governments that are required by SB 272 to develop Subregional Shoreline Adaptation Plans and local governments (labeled with an asterisk) whose residents and assets will be directly affected by sea level rise and other coastal hazards that are not within BCDC's jurisdictions. 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 of 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. In either case, counties are also encouraged to coordinate the planning process for all cities within the county subject to SB 272 to ensure coordination and collaboration among all plans within the county. Required roles for the county include:

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

Suggested roles for the county include:

- Helping to identify and set up multi-jurisdictional plans (see below) to ensure that beneficial partnerships based on shared resources or priorities can be supported and established within the county.
- Leading a countywide, multi-jurisdictional plan that serves all or most of the jurisdictions 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.
- 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 plans or policies outlined in plans.

Counties with BCDC Jurisdiction	Cities with BCDC Jurisdiction or impacted by near-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—8. Local governments within BCDC jurisdiction and others impacted by near-term coastal hazards (as indicated by an asterisk). DRAFT.
**Jurisdictions not in BCDC jurisdiction but impacted by near term coastal flood hazards and therefore likely planning partners.*

Role of Cities

Cities 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 Guidelines around coordination with their county as well as other cities. Required roles for cities include:

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

Multi-jurisdictional plans

Local governments are encouraged to partner amongst cities and counties to develop multi-jurisdictional plans. Multi-jurisdictional plan teams should designate a lead to ensure coordination and participation from all jurisdictions ensure completeness of the plan and submittal of the plan. Counties are encouraged to take on this role. Multi-jurisdictional plans are not required to establish formal agreements (Memorandum of Understanding, Joint Power Authority, etc.) but may wish to do so 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, utilities districts, parks districts, etc. who 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:

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

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.[2]
    - A logical shoreline section or landscape-scale feature (such as a watershed) or infrastructure or utility system or network that encompasses multiple jurisdictions.

Decisions and responsibilities outside a jurisdiction's control

Many aspects of planning and implementing sea level rise adaptation are outside the control or authority of the lead planning jurisdiction. While comprehensive planning and implementation of shoreline adaptation involves voluntary cooperation of all affected parties, this may not be realistic in the planning horizon of a Subregional Plan. BCDC expects jurisdictions to make their best efforts to involve all affected parties, but in the case of absent or non-cooperative parties, privately held data, or some other governance limitations, local governments should indicate known barriers and either develop approaches that do not rely on the limitation or establish a long-term plan that accounts for the possibility of changed conditions in the future.

2 Beagle et al., *San Francisco Bay Shoreline Adaptation Atlas*, 25

3.4.2 Submitting Plans and Getting Approval

Plan Submittal Deadline
As outlined in SB 272, all plans are due by January 1, 2034. However, BCDC strongly encourages submissions before the legislative deadline.

Submittal Requirements
Local jurisdictions within a county are highly encouraged to submit their plans to BCDC together, even if they are not part of a multi-jurisdictional plan. This will allow BCDC to evaluate adaptation strategies at a larger scale for cohesiveness and context.

Local Data Evaluation and Submittal
BCDC provides access to regional data on existing conditions, hazards, Strategic Regional Priorities, exposure, and adaptation to develop Subregional Plans using consistent data. The data made available by BCDC is considered best available data by the agency for the purposes of complying with these Guidelines and standards, and will be updated as new data and science is made available.

However, in many cases local jurisdictions may have more locally refined or up-to-date data on coastal hazards and/or assets 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 regionally 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.

A request for data verification 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 how the data or science meets the criteria listed in Section 3.5.2. The Executive Director will review the request and provide a written response within 30 days of the request. Local governments may appeal any denial of alternative data by the Executive Director. Approved local data used beyond BCDC's regional data should also be submitted to BCDC so that it can be evaluated and integrated into regional datasets, as appropriate. This data will contribute to regional knowledge and facilitate efficient updates and tracking of regional planning progress.

Required data should be submitted at the same time as the plan document for the plan to be considered complete.

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 the Commission a notice of intent to prepare a Subregional Plan. The notice must include a detailed description of the process including local government staff contact, project scope, workplan, schedule, plan for the preparation of any necessary environmental documentation[3] (i.e., compliance with the California Environmental Quality Act), and engagement plan describing the public process. Within 30 days of receiving the notice of intent to

3 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.

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 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.

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 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. Additional consultation meetings may be conducted based on agreement between the local government and Executive Director.

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.

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 earlier 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 the California Code of Regulations. If two (2) or more members of the Commission object to the Executive Director's intent to approve a Plan with modifications, the 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. 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, 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.

3.4.3 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.

5-year Limited Updates

To review progress on implementation of plans and to make any necessary updates to sea level rise science and projections, no later than five years after Commission approval, plan submitters must submit a **limited update** for review and approval by the Commission through the process provided by these Guidelines. Limited updates do not need to be formatted as a complete plan but should summarize the required updated information and include updated geospatial data. Limited updates 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 measures 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.

Failure to submit a limited plan update by the 5-year deadline will result in the previous plan being considered out of compliance and will no longer be considered approved by the Commission, unless an extension of time is granted by the Executive Director.

10-year Comprehensive Updates

No later than ten years after Commission approval and five years after the limited update, plan submitters teams 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 Elements and Minimum Standards and comply with requirements as current at that time and follow the adoption

process as current at that time.

Failure to submit a comprehensive plan update by the 10-year deadline will result in the previous plan being considered out of compliance and will no longer be considered approved by the Commission, 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.

CBO Workshop site walk. Photo by Karl Nielson.

3.5 Tools to Support Plan Development

To support the development of plans, local jurisdictions may, and should, use many of their existing plans, studies, and data as described below. Additionally, BCDC will offer resources to augment local capacity and reduce barriers to plan development.

3.5.1 Using Existing Plans and Plan Content

Many jurisdictions already have created much of the content required to be submitted for compliance with these plan Guidelines either through existing adaptation plans, local hazard mitigation plans, general plan elements, climate action plans, or other local plans, such as vulnerability assessments or identified adaptation strategies, projects, or pathways. BCDC encourages the use of existing material when feasible. If jurisdictions submit existing plans, studies, and data to meet the requirements of the RSAP they must ensure prior to submittal that all material that is submitted is compliant with Guidelines.

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 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 adaptation plans into these existing plans. 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, like housing, transportation, or environmental justice.

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.

3.5.2 Best Available Data Criteria and BCDC Regionally Available Data

The RSAP seeks to leverage existing research, data, and analysis in the region to support the development of Guidelines and Subregional Plans. BCDC provides regionally available data layers for local governments to use in the development of their Subregional Plans. This data is used to visualize existing conditions, map Strategic Regional Priorities, and support vulnerability assessments and is considered best available science. For the purposes of the RSAP best available data reflects criteria adapted from the Delta Stewardship Council, including:

- **Relevance:** Scientific information used should be relevant to 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. Many analysis tools are available to the scientific community (e.g., search engines and citation indices)
- **Objectivity**: Data collection and analyses considered must meet the standards of the scientific method and be void of nonscientific influences and considerations.
- **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 year) 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.[4]
- **Regional**: Includes data for all nine Bay Area counties.[5]

4 It is recognized that differences exist among the accepted standards of peer review for various fields of study and professional communities. When applying the criteria for best available science, BCDC recognizes that 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.

5 Similarly, locally refined data may be used as described below, and may not cover the full nine-county Bay Area.

Water crashes against the San Francisco seawall on the Embarcadero during King Tides in December 2019. Photo by Sergio Ruiz courtesy of California Bay King Tides Project.

Creating a more resilient San Francisco Bay for all.

Appendix

4.1 Data Sources and Analytical Methodology

The sections below summarize details of the Data Sources and Analytical Methodology Appendix accessible at RSAP Guidelines Appendix: Data Sources and Analyical Methodology (bayadapt.org)

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

RSAP guidance elements 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 Shoreline Adaptation Plans.

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 develops 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 acknowledgements:** Include an equity and/or land acknowledgement 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
- Absorb and implement the practices described throughout this Equity Strategy and other guidance from the Equity Subcommittee.

The Outreach and Communications plan include three types of community engagement events, with each a series of 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 give 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 a 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 3.2.3).

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 now. 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 below) 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 doesn't work about the way cities do vulnerability assessments and how can the VA requirements maximize responsive adaptation strategies while minimizing excessive analysis?

In May-June 2024, staff also partnered with 5 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 advance 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

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 Shoreline Adaptation 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 Run-up
Land Subsidence/Vertical Land Motion (VLM)
Shoreline Erosion and intertidal habitat conversion (due to increased inundation and erosion)
Saltwater Intrusion
Tsunami
Levee/Floodwall Failure

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 Shoreline Adaptation Plans. The Minimum Categories and Assets Standard (Section 3.2.2) describe the required assets that must be assessed for Existing Conditions, Vulnerability, and considered when designing Adaptation Strategies and Pathways in the Subregional Shoreline Adaptation 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
Bay Ecosystem Health and Resilience	Existing Baylands Habitats	• Soft substrate (both intertidal and subtidal mudflats) includes mobile soft substrate - sand, gravel, pebble, cobble • Rock- boulders to bedrock (not mobile) • Artificial structures- piers, pilings, bridge footings, that can be modified or removed • Shellfish beds- oysters, mussels • Submerged aquatic vegetation- eelgrass, sago pondweed, widgeon grass, surfgrass • Seaweed beds aka macroalgal beds
Housing, Development, and Land Use	Current Land Uses or Areas	• Housing Element opportunity sites • Economic areas such as business hubs • Commercial, Industrial, and non-residential land uses • Agricultural lands
Critical Infrastructure	Emergency Services	• Evacuation shelters • Resilience hubs
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
Collaborative Governance, Flood Management and Funding	Boundaries and Authorities	• Special districts

Table 4—2. Recommended additional categories and assets that can be included in Subregional Shoreline Adaptation Plans.

Glossary

Adaptation pathways: An approach to addressing uncertainty in strategy development and implementation through discrete actionable steps.[1]

Adaptive capacity: The ability to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.[2]

Baylands: The lands that lie between the elevations of the high and low tides, including those areas that would be covered by the tides in the absence of levees or other structures.[3]

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.[4]

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.[5]

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.[6]

Decision-points: Manageable steps that when put into sequence make up strategy approaches for making decisions under deep uncertainty. This process supports the ability to take shorter-term actions with longer-term alternative futures in mind.[7]

Ecosystem services: The services and benefits provided by natural areas we depend upon, from

1 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).
2 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).
3 San Francisco Estuary Partnership, Habitat Goals: Part 2 (December 2012), https://sfestuary.org/wp-content/uploads/2012/12/3Habitat_GoalsPart2.pdf.
4 San Francisco Estuary Institute (SFEI), Documenting Sediment Reuse: A Summary of San Francisco Bay Area Projects, (May 10, 2023), https://www.sfei.org/sites/default/files/biblio_files/DocumentingSedimentReuse_final_20230510.pdf.
5 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.
6 City and County of San Francisco, San Francisco Vulnerability and Consequences Assessment (February 2020), https://sfplanning.org/node/456#info
7 Adapting to Rising Tides, Adaptation Roadmap, 22.

stormwater, water quality and flood control, to habitats and climate resilience, and even our enjoyment of natural places.[8]

Environmental Justice communities: A neighborhood or community that experiences a disproportionate burden of environmental hazards and reduced quality of life compared to similar communities.[9]

Equitable participation: Explicitly including individuals from populations who have been historically excluded from planning efforts.[10]

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.[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.[12]

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.[13]

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.[14]

Groundwater rise: As sea levels rise, saltier groundwater connected to the Bay moves inland, pushing the

8 Adapting to Rising Tides, Adaptation Roadmap, 22.

9 U.S. Environmental Protection Agency, Environmental Justice, last updated June 15, 2021, https://www.epa.gov/environmentaljustice.

10 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.

11 Adapting to Rising Tides, Adaptation Roadmap, 11.

12 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.

13 National Oceanic and Atmospheric Administration, "Shallow Coastal Flooding (Nuisance Flooding)."

14 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.

fresher inland groundwater table upwards toward the surface. This elevated groundwater table leads to increased infiltration into the sewer system and subsequent flow into drainage channel.[15]

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.[16]

Hazard: Events or conditions that could injure people or damage assets.[17]

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.[18]

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.[19]

Non-physical Adaptation: Measures 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.[20]

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.[21]

Operational Landscape Unit (OLU): Combinations of landscape patches with their hydrogeological and biotic connections, as a tool to facilitate wetland restoration in catchments with a high degree of fragmentation and strongly altered hydrology. The combined consideration of biotic (i.e. dispersal, transports of organisms) and hydrological connections (flooding events, groundwater flowpaths) is a new approach.[22]

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15 ArcGIS, San Francisco Bay Shoreline Adaptation Atlas, https://storymaps.arcgis.com/stories/80c2e4ff9a04461f98780a7505779131.

16 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)

17 U.S. Global Change Research Program, "Understand Exposure," Climate Resilience Toolkit, https://toolkit.climate.gov/steps-to-resilience/understand-exposure.

18 Hydrologically Connected, Law Insider, https://www.lawinsider.com/dictionary/hydrologically-connected.

19 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.

20 Metropolitan Transportation Commission, Adaptation Planning, 7.2.

21 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.

22 J. T. A. Verhoeven, M. B. Soons, R. Janssen, and N. Omtzigt, "An Operational Landscape Unit Approach for Identifying Key Landscape Connections in Wetland Restoration," Journal of Applied Ecology 45 (2008): 1496–1503, https://doi.org/10.1111/j.1365-2664.2008.01534.x.

Physical adaptation: Measures such as constructing levees, flood walls, and wetlands or relocating an asset, that mitigate the flooding impacts of sea level rise.[23]

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.[24]

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.[25]

Risk: The estimated impact that a hazard would have on people, services, facilities, and structures in a community.[26]

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.[27]

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.[28]

Sensitivity: The degree to which a species, natural system, or community, government, and other associated systems would be affected by changing climate conditions.[29]

Socially vulnerable communities: Communities that have special needs, such as, but not limited to, people without vehicles, people with disabilities, older adults, and people with limited English proficiency.

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23 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.

24 San Francisco Bay Conservation and Development Commission, Laws and Regulations.

25 Adapting to Rising Tides, Adaptation Roadmap, 11.

26 FEMA, Introduction to Hazardous Materials (IS-393.a), Lesson 3.

27 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.

28 NASA, "Sea Level," Global Climate Change Vital Signs of the Planet, (July 2021), https://climate.nasa.gov/vital-signs/sea-level/.

29 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).

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.[30]

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[31]

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.[32]

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.[33]

Suisun Marsh Preservation Act: The Act gives BCDC permitting and enforcement responsibilities for the Marsh. BCDC shares these responsibilities with other agencies and local governments.[34]

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).[35]

Vulnerability: The exposure of human life and property to damage from natural and human-made hazards.[36]

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

30 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.

31 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.

32 Adapting to Rising Tides, Adaptation Roadmap.

33 Bay Adapt, Regional Shoreline Adaptation Plan: Overview (2023), https://www.bayadapt.org/wp-content/uploads/2023/10/BCDC_RegionalShorelineAdaptationPlan_Overview_2023.pdf.

34 San Francisco Bay Conservation and Development Commission, Laws and Regulations.

35 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).

36 California Governor's Office of Emergency Services, California Adaptation Planning Guide (June 2020).

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.[37]

37 Law Insider, Water-Dependent Uses, https://www.lawinsider.com/dictionary/water-dependent-uses.

San Francisco Bay Conservation and Development Commission (BCDC)

Regional Shoreline Adaptation Plan