From Statewide Visions to Local Decisions: Implementing Big Picture Sea Level Rise Goals in South San Diego Bay

Annie Roberts
Master of Advanced Studies, Marine Biodiversity and Conservation
Scripps Institution of Oceanography, UC San Diego

Capstone Advisory Committee:

Laura Engeman (Chair)
Coastal Resilience Extension Specialist, Center for Climate Change Impacts and Adaptation (CCCIA)/California Sea Grant
Scripps Institution of Oceanography, UC San Diego

Signature: Laura Engeman Date: 6/23/2022

Angelica Rodriguez, PhD
Scientist, Naval Information Warfare Center
Chula Vista Sustainability Committee Member

Signature: RODRIGUEZ.ANGELICA.RITA.1395797936 Digitally signed by RODRIGUEZ.ANGELICA.RITA.1395797936 Date: 2022.06.10 16:39:20 -07'00' Date: _____

Heather Kramp
Senior Environmental Specialist, Port of San Diego

Signature: Heather Kramp Date: 6/10/2022

Executive Summary

Sea level rise (SLR) is accelerating due to human-caused greenhouse gas emissions and climate change. South San Diego Bay is susceptible to SLR impacts, including infrastructure flooding, loss of bayfront access, and loss of wetland habitat. Faced with the challenge of future SLR risks, communities in south San Diego Bay are developing plans to adapt to SLR and are guided by state, regional, and local SLR and land use policies. These policies prioritize the protection of coastal access, natural habitat, vulnerable communities and infrastructure. However, sometimes addressing all of these priorities within one coastal adaptation project is complex and challenging, or lack of funds makes it difficult to prioritize all at once.

The objective of this project is to identify the opportunities and challenges of implementing state and local SLR policies using two case studies in south San Diego Bay to support cohesive, integrated, and equitable SLR adaptation planning. This case study analysis is intended to support stakeholders with regional collaboration through enhancing the understanding of the unique project needs for adapting to SLR, identifying opportunities for stakeholders to work together towards common visions, and promoting the understanding of the area's equity and environmental justice challenges.

Background

South San Diego Bay has a unique background. The region is historically diverse and houses many lower income communities. Much of the Bay has been dredged, the shoreline was developed to support historic industrial uses, and dumping led to polluted waters and sediment. However, today there is a significant emphasis on public access and habitat restoration. The bay's shoreline is traced by the Bayshore Bikeway, a 24-mile bike route that provides coastal access. The San Diego Bay National Wildlife Refuge covers more than 2,600 acres of south San Diego Bay, and provides important habitat for threatened and endangered species. Development projects in the area range from building a 1600-room hotel and convention center to restoring habitat and enhancing bike paths. SLR threatens existing and planned development, as well as habitats in the area.

Approach

The following steps were taken to carry out this analysis:

1. Policy literature review. A literature review of state and local policies related to SLR was conducted. Policy priorities were identified and classified into four categories: Equity and Environmental Justice, Coastal Access/Recreation, Natural Resource Conservation, and Community Infrastructure/Economic Resilience.
2. Case study analysis. Two case studies of projects in south San Diego Bay were evaluated. For each case study, the methods in which the project addresses the various SLR priorities were identified, as well as the challenges of planning and implementing the project.

3. Discussion/Recommendations. The discussion uses the case study evaluation to identify considerations that could inform communities and regional collaborative efforts and support the planning and implementation of cohesive, integrated, and equitable SLR adaptation projects in a timely manner.

Policy Review

SLR planning and adaptation is informed by state and local policies. The California Coastal Act, the Public Trust Doctrine, and several other state laws and executive orders provide the framework for SLR policies. State agencies such as the California Ocean Protection Council (OPC) and the California Coastal Commission (CCC) are the leaders in providing policy documents, and focus on utilizing the best available science, creating partnerships and alignments across jurisdictions, and providing lines of communication to share information. Regional and local authorities use and build upon State policy guidance when creating coastal land use and development plans including Local Coastal Programs (LCPs). In south San Diego Bay, the primary regional and local jurisdictions include the Port of San Diego and the Cities of Imperial Beach and Chula Vista.

Policy priorities include four categories: Equity and Environmental Justice, Coastal Access/Recreation, Natural Resource Conservation, and Community Infrastructure/Economic Resilience. Some of the equity and environmental justice priorities include providing early and consistent public engagement and incorporating social implications in the planning process. Coastal access priorities include protecting public trust lands and providing maximum public access. Natural resource priorities include minimizing shoreline armoring and maximizing nature-based adaptation. Infrastructure and economic resilience policies include minimizing hazards to infrastructure and including economic analyses in SLR planning.

Case Study 1: Imperial Beach Bayshore Bikeway Resiliency Project

The Bayshore Bikeway Resiliency project is led by the City of Imperial Beach, and the goals are to retrofit 1.2 miles of bike path to provide flood protection, SLR resilience, enhanced coastal access, and ecosystem resilience. The project is located in Imperial Beach, which is a historically underserved community. The Bayshore Bikeway runs along the extent of the project, bordered to the north by wetland habitat and to the south by residential, public, and commercial development. With SLR and no intervention, some of the impacts can include overtopping of the Bayshore Bikeway, inundation of coastal habitats, and flooding of properties near 7th Street and Bayside Elementary School.

The project relates to each of the following for policy priorities:

- Equity and Environmental Justice:
    - Outreach opportunities throughout the project process
    - Efforts to incorporate public feedback
    - Pursuing grants to take the funding burden off of the community
- Coastal Access/Recreation:

    - Protecting and improving the bike path
    - Enhancing coastal trails
    - Providing a separated walking path from the bike path to ensure safety
- Natural Resource Conservation:
    - Enhancing historically degraded habitat
    - Providing ecotone slopes on the elevated bike path
- Infrastructure/Economic Resilience:
    - Protecting vulnerable housing

While SLR projects like this one in Imperial Beach have many benefits, several challenges exist to planning and implementation. The overlapping regulatory and property jurisdictions within a project area require collaboration between multiple stakeholders, which can cause challenges when different stakeholders have different priorities for the project area. As sea levels rise and wetlands experience coastal squeeze, these regulatory authorities may overlap even more, requiring additional cross-jurisdictional collaboration. Differences in priorities between regulating bodies lead to delays in permit approvals. Lack of funding poses another challenge. The benefits from the project extend beyond the reach of the community because it will provide a space for all, yet the community is tasked with finding funding for the project. With accelerating SLR, there is a need to come to solutions to these challenges quickly to stay ahead of the rising tides.

<u>Case Study 2: Chula Vista Bayfront Redevelopment Project</u>

The Chula Vista Bayfront Redevelopment Project is led by a partnership between the Port of San Diego and the City of Chula Vista, with the goal to provide a residential and waterfront resort destination. The project includes redeveloping 497 acres of land and 59 acres of water with a resort and convention center, hotels, apartments, commercial and mixed-use business space, RV parks, active and passive parks and approximately 120 acres of open space, including salt marsh and upland coastal habitat restoration and ecological buffers. Existing uses of the project area are primarily recreational, with a park, marina, recreational vehicle park, and portions of the Bayshore Bikeway. Sediment and water quality in the area has been historically degraded from industrial use. Under existing site conditions, some of the impacts from SLR include inundation of beaches, parks, boat launches, pathways, and the stormwater system. Natural habitats are also susceptible to inundation from SLR, including nesting habitat for the endangered California Least Tern.

The project relates to each of the following for policy priorities:

- Equity and Environmental Justice:
    - Outreach efforts and public participation throughout the project process
    - Constructing and opening Sweetwater Park prior to opening the resort and convention center
- Coastal Access/Recreation:
    - Creating 70 acres of parks
    - Improving segments of bike path

- Natural Resource Conservation:
    - Establishing Habitat Buffer Areas adjacent National Wildlife Refuge habitat, restoring native habitat, removing invasive species, and improving wetland hydrology
- Infrastructure/Economic Resilience:
    - Building hotels and commercial buildings that create jobs and generate revenue

Challenges involved with this project include collaboration across jurisdictions, the extensive regulatory process, and the need to incorporate community equity. The challenge of cross-jurisdictional collaboration for this project comes from making sure that voices are included to provide diverse perspectives on the project. To address this concern, a Wildlife Advisory Group (WAG) and Bayfront Cultural and Design Committee (BCDC) were required to be formed following a Settlement Agreement between the Port, the City, and a coalition of community groups. A challenge of the regulatory process is that permitting approval takes a long time, and is up against a ticking clock of rising sea levels. The equity challenge comes from reconnecting residents to the historically-degraded shoreline, and ensuring that coastal access is maintained or improved as sea levels rise.

Discussion

The two case studies emphasize that SLR will need to be integrated into all planning along the coastline. Policy priorities coming from the state are designed to lead this effort and provide grand visions that provide many benefits in concept, but are often difficult to implement in practice. The case studies show that there is no “one size fits all” SLR adaptation strategy, and state policy priorities often need to be adapted to fit the needs of the project. Additionally, land ownership and authority play a significant role in project planning and implementation. All of the entities along the south Bay shoreline are in charge of the Public Trust, but each entity has different priorities on how the land should be managed. As the landward extent of the public trust changes with SLR, there will be additional need to collaborate across jurisdictions.

Historical pollution and inequities have led to a lack of community connection in some areas of south San Diego Bay, including Imperial Beach and the Chula Vista Bayfront. Planning for SLR provides an opportunity to examine inequities caused by past and present actions and incorporate solutions to these challenges in future planning efforts.

These findings can help inform regional efforts to address SLR that already exist in San Diego, such as the San Diego Regional Climate Collaborative SLR Working Group, or the Port-led Integrated Natural Resources Management Plan. By providing a deep dive into the ways that policies are considered in on-the-ground planning efforts, this analysis is intended to help foster dialogue between local and regional jurisdictions and California state government about how to overcome these challenges. Through thoughtful collaboration, jurisdictions can work towards successfully implementing SLR adaptation projects that provide multiple economic, environmental, and socially equitable outcomes that provide enjoyment of the coastline by all over generations.

Introduction

Globally-averaged sea level rise (SLR) is accelerating due to human-caused greenhouse gas emissions and climate change. The global mean rate of sea level rise is 3.4 millimeters per year.[1] This phenomenon occurs because of increased ocean temperatures causing thermal expansion, as well as melting ice sheets and glaciers. SLR impacts include coastal erosion and flooding, impacting the integrity of natural and manmade structures, flooding critical infrastructure such as storm drains and roads, and inundating tidal habitats including salt marsh and intertidal mudflats. Flooding associated with storm events and high tides[2] will also increase in frequency and duration as sea levels rise, exacerbating the damages caused by these events.

South San Diego Bay is a unique coastal shoreline area in Southern California that is projected to be susceptible to the impacts of SLR. In San Diego Bay, sea levels are projected to rise 1.4 feet by 2050 and 4.5 feet by 2100.[3,4] With these rising sea levels, the shoreline is expected to experience infrastructure flooding, loss of bayfront access, and loss of wetland habitat.[5,6]

Faced with the challenge of future SLR risks, California coastal communities such as those in south San Diego Bay are developing plans to adapt to SLR. To assist and guide these planning efforts, state, regional, and local governments have been developing SLR guidance and updating coastal land use policies to explicitly prioritize the protection of coastal access, natural habitat, vulnerable communities and infrastructure.[7] However, sometimes addressing all of these priorities within one coastal adaptation project is complex and challenging, or lack of funds makes it difficult to prioritize all at once. Additionally, the main priorities of one stakeholder may differ from another. As sea levels rise, many areas will likely experience coastal squeeze (intertidal habitat loss due to hardened infrastructure causing a barrier to landward habitat migration), and there is likely to be a greater need to consider critical infrastructure services, equitable uses and access of the coast, and protection of endangered habitats and species.

The objective of this case study analysis is to examine local implementation of state and local SLR policies using two coastal development projects in south San Diego Bay. The goal of this analysis is to identify opportunities and challenges for supporting cohesive, integrated, and equitable SLR adaptation planning in south San Diego Bay. It is important to identify what is being prioritized in the area and by whom, determine where priorities overlap and where they differ, and identify where jurisdictional misalignment may be occurring. This case study analysis is intended to support stakeholders with regional collaboration through enhancing the

---

[1] NASA (2022). *Sea Level Change: Observations from Space.* https://sealevel.nasa.gov/. Accessed May 30, 2022.
[2] Thompson, P.R., Widlansky, M.J., Hamlington, B.D. et al. (2021). Rapid increases and extreme months in projections of United States high-tide flooding. Nat. Clim. Chang. 11, 584–590. https://doi.org/10.1038/s41558-021-01077-8.
[3] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report.*
[4] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance.*
[5] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report.*
[6] City of Imperial Beach (2016). *Sea Level Rise Assessment*.
[7] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance.*

understanding of the unique project needs for adapting to SLR, identifying opportunities for stakeholders to work together towards common visions, and promoting the understanding of the area's equity and environmental justice challenges.

Overview of South San Diego Bay

San Diego Bay is within the historical territory of the Kumeyaay. Spanish colonization and the creation of the mission system in 1769 significantly impacted Kumeyaay culture.[8] A nautical chart (Figure 1) shows the extent of San Diego Bay in the year 1859, prior to large development projects along the coastline. Much of San Diego Bay has been dredged and a significant amount of the shoreline was developed to support historic uses including shipyards, lumberyards, and canneries.[9] With an increasing population following California's statehood, south San Diego Bay became a dumping ground for garbage and wastewater.[10] In 1870, the South Bay Salt Works (salt works) began operating salt evaporation ponds to produce salt and other minerals in south San Diego Bay. By 1916, diked salt ponds stretched across approximately 1,000 acres of south San Diego Bay, replacing the historic salt marshes and mudflats.[11] Construction of Lower Otay Dam along the Otay River in 1897 and Sweetwater Dam in 1888 also altered freshwater flows and sediment inputs into the Bay.[12]

Although much of the shoreline has historically been altered, today there is a significant emphasis on restoration and cleanup. Many of the dikes of the historic salt ponds are still present, and the salt works continues to lease lands from the U.S. Fish and Wildlife Service to operate several evaporation ponds. In 1999, approximately 1400 acres of the salt works was restored to coastal wetland habitat and designated as the South Bay Unit of the San Diego Bay National Wildlife Refuge.[13] The bay's shoreline is traced by the Bayshore Bikeway, a 24-mile bike route that consists of bike paths and on-street bike routes, starting in Coronado and ending in downtown San Diego.[14] Along the south San Diego bayfront are scattered marshlands, industrial development, maritime facilities, parks, a marina, and several areas of undeveloped land.[15] The current extent of the San Diego Bay shoreline can be seen in Figure 2.

---

[8] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan*.

[9] Canada, L. (2006). "Sitting on the Dock of the Bay": 100 Years of Photographs from the San Diego Historical Society. *The Journal of San Diego History, 52*(1&2), 1-17.

[10] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan*.

[11] Ibid.

[12] Kondolf, G. M. et al. (2014), *Sustainable sediment management in reservoirs and regulated rivers: Experiences from five continents*. Earth's Future, 2. https://doi.org/10.1002/2013EF000184.

[13] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*

[14] Keep San Diego Moving (2022). "Bayshore Bikeway." Regional Bikeway Projects. https://www.keepsandiegomoving.com/RegionalBikeProjects/bayshore_bikeway_intro.aspx. Accessed May 27, 2022.

[15] City of Chula Vista (2017). *Chula Vista Bayfront Local Coastal Program Land Use Plan.*

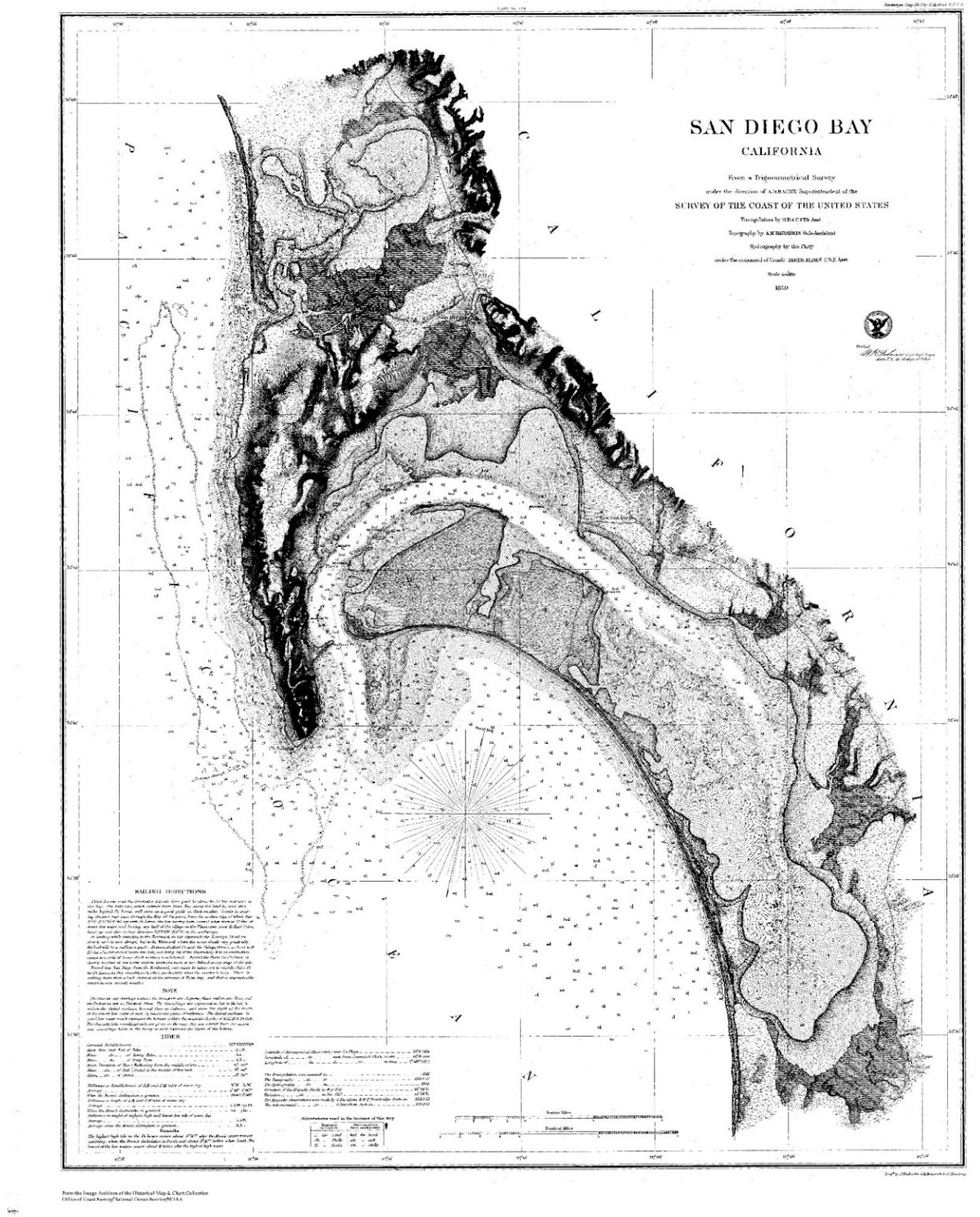

Figure 1: Nautical chart (1859) showing the extents of San Diego Bay prior to significant shoreline alterations.[16]

[16] U.S. Coast Survey (1859). Navigation Chart of San Diego Bay. *NOAA Historical Map & Chart Collection.* https://historicalcharts.noaa.gov/#searchInput. Accessed May 27, 2022.

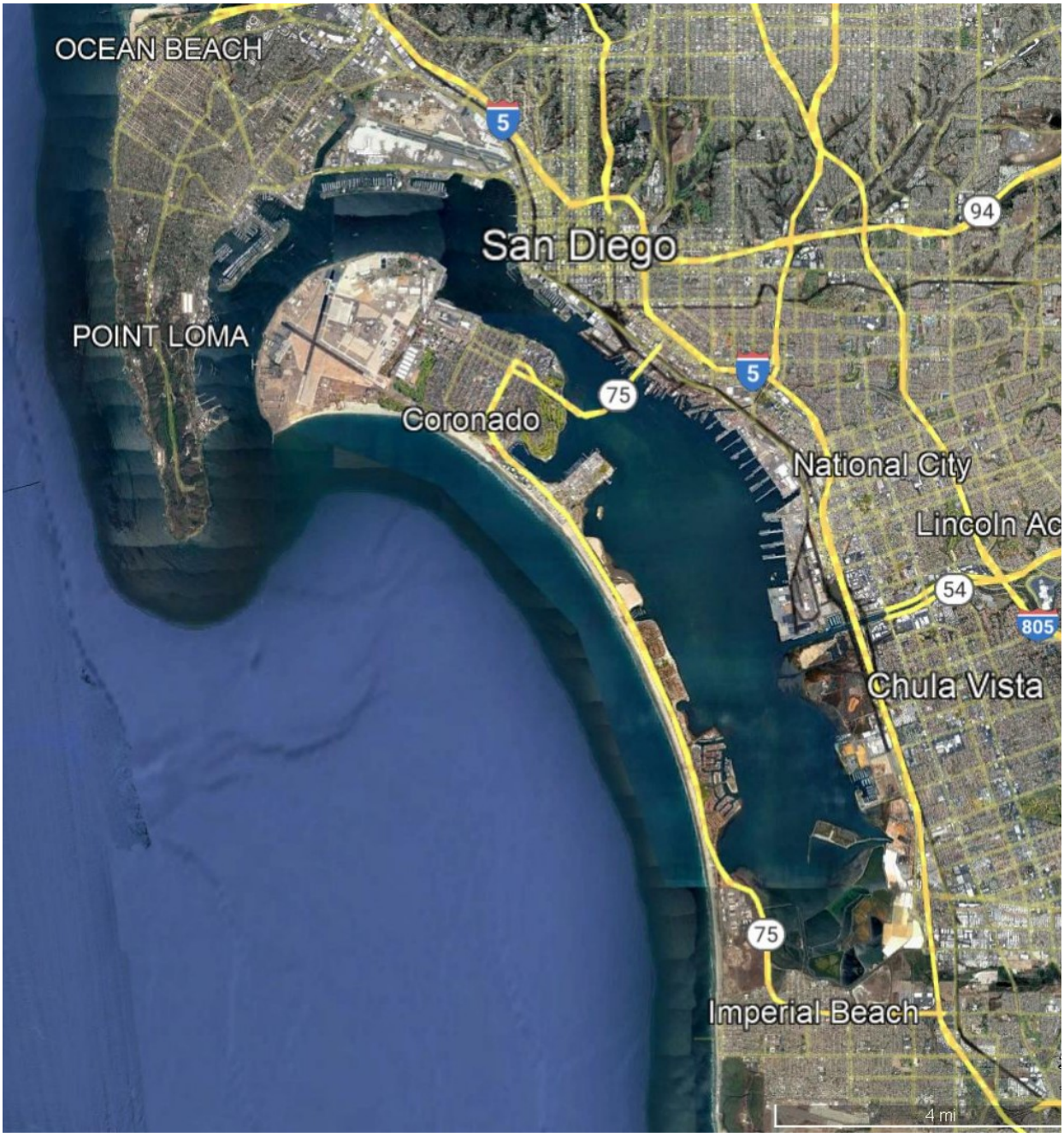

Figure 2: Satellite view of San Diego Bay in 2022.[17]

[17] Google Earth (2022). Captured May 25, 2022.

Today, portions of south San Diego Bay are protected habitat. The San Diego Bay National Wildlife Refuge covers more than 2,600 acres of south San Diego Bay, and includes the Sweetwater Marsh and South San Diego Bay units.[18] The Chula Vista Wildlife Reserve extends into the bay between the Chula Vista bayfront and the saltworks. Habitats that make up these areas include salt marsh,[19] subtidal habitat (including eelgrass beds), and intertidal mudflats, and support an abundance of bird, fish, and invertebrate species, as well as Eastern Pacific green sea turtles.[20] These areas are also home to several sensitive species, including the federal and state endangered California least tern[21] and light-footed Ridgway's rail, the State endangered Belding's savannah sparrow, and salt marsh bird's beak, a federally endangered marsh plant.[22]

Several development projects are currently being planned in south San Diego Bay. The largest of these projects is the Chula Vista Bayfront Redevelopment, which includes parks, open space, a hotel and convention center, and commercial use and mixed-use space to support restaurants, retail, marina operations, and other recreational uses.[23] A second project is the Bayshore Bikeway project, which has the goal of improving segments of bike path to create a continuous separated bike path around the entire 24-mile Bikeway loop of San Diego Bay (Figure 3).[24] Other projects include habitat restoration within Pond 20, a former salt evaporation pond within the saltworks, to create a wetland mitigation bank,[25] and installation of a native oyster living shoreline pilot project to support restoration of native oyster reefs that provide both habitat value and shoreline protection.[26]

[18] U.S. Fish & Wildlife Service (2022). *San Diego Bay National Wildlife Refuge.* https://www.fws.gov/refuge/san-diego-bay. Accessed May 30, 2022.
[19] U.S. Fish & Wildlife Service (2022). *Habitat & Wildlife at Sweetwater Marsh Unit.* https://www.fws.gov/story/habitat-wildlife-sweetwater-marsh-unit. Accessed May 25, 2022.
[20] U.S. Fish & Wildlife Service (2022). *Habitat & Wildlife at South San Diego Bay Unit.* https://www.fws.gov/story/habitat-wildlife-south-san-diego-bay-unit. Accessed May 25, 2022.
[21] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report.*
[22] U.S. Fish & Wildlife Service (2022). *Habitat & Wildlife at Sweetwater Marsh Unit.* https://www.fws.gov/story/habitat-wildlife-sweetwater-marsh-unit. Accessed May 25, 2022.
[23] Port of San Diego (2022). *Chula Vista Bayfront Redevelopment.* https://www.portofsandiego.org/projects/chula-vista-bayfront. Accessed May 30, 2022.
[24] SANDAG (2006). *Bayshore Bikeway Plan*.
[25] Port of San Diego (2022). *Wetland Mitigation Bank at Pond 20.* https://www.portofsandiego.org/projects/wetland-mitigation-bank-pond-20. Accessed May 25, 2022.
[26] Southern California Wetlands Recovery Project (2022). *San Diego Bay Native Oyster Living Shoreline.* https://scwrp.org/projects/san-diego-bay-native-oyster-living-shoreline/. Accessed May 25, 2022.

Figure 3: Bayshore Bikeway.[27]

[27] Keep San Diego Moving, TransNet (2022). *Bayshore Bikeway.* https://www.keepsandiegomoving.com/RegionalBikeProjects/bayshore_bikeway_intro.aspx. Accessed June 8, 2022.

The cities in the South Bay that are the focus of this analysis include Chula Vista and Imperial Beach, which are diverse communities. Chula Vista's population is 60% Hispanic, 17% White (non-Hispanic), 15.2% Asian, 4% Black, and 3% multiple/other.[28] Household income in Chula Vista is consistent with the San Diego region, but varies geographically, with households with incomes lower than the County's median typically residing in the western part of Chula Vista, and those with higher-incomes residing to the east of I-805.[29] In Imperial Beach, 52% of the population is Hispanic, 31% White, 7% Asian, 4% Black, 1% American Indian and Alaska Native, and 4% other races.[30] Between 2013-2017, approximately 60% of households in Imperial Beach had lower incomes (defined as earning up to 80% of the Area Median Income (AMI) of San Diego County).[31]

South San Diego Bay is susceptible to impacts from SLR. Sea levels are projected to rise 1.4 feet by 2050 and 4.5 feet by 2100,[32,33] threatening increased coastal flooding and future permanent inundation of habitat, coastal access, and infrastructure. High tides and storm-driven waves can exacerbate these impacts. Some of the impacts include damage to shoreline parks, beach erosion, and inundation and nuisance flooding of residential neighborhoods, beaches, boat launches, pathways, and stormwater systems.[34,35] Rising sea levels and high tides can also elevate groundwater tables, which can cause localized flooding and inundation of stormwater infrastructure in low-lying areas of south San Diego Bay, including Imperial Beach. Additionally, SLR can flood salt marsh and upland habitat, which may be restricted on inland migration, reducing the overall amount and type habitat available for sensitive species, such as the salt marsh bird's beak.[36]

[28] City of Chula Vista (2021). *Housing Element of the General Plan, Year 2021-2029.*
[29] Ibid.
[30] City of Imperial Beach (2021). *Housing Element of the General Plan, Year 2021-2029.*
[31] Ibid.
[32] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report*.
[33] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance*.
[34] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report.*
[35] City of Imperial Beach (2016). *Sea Level Rise Assessment.*
[36] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report.*

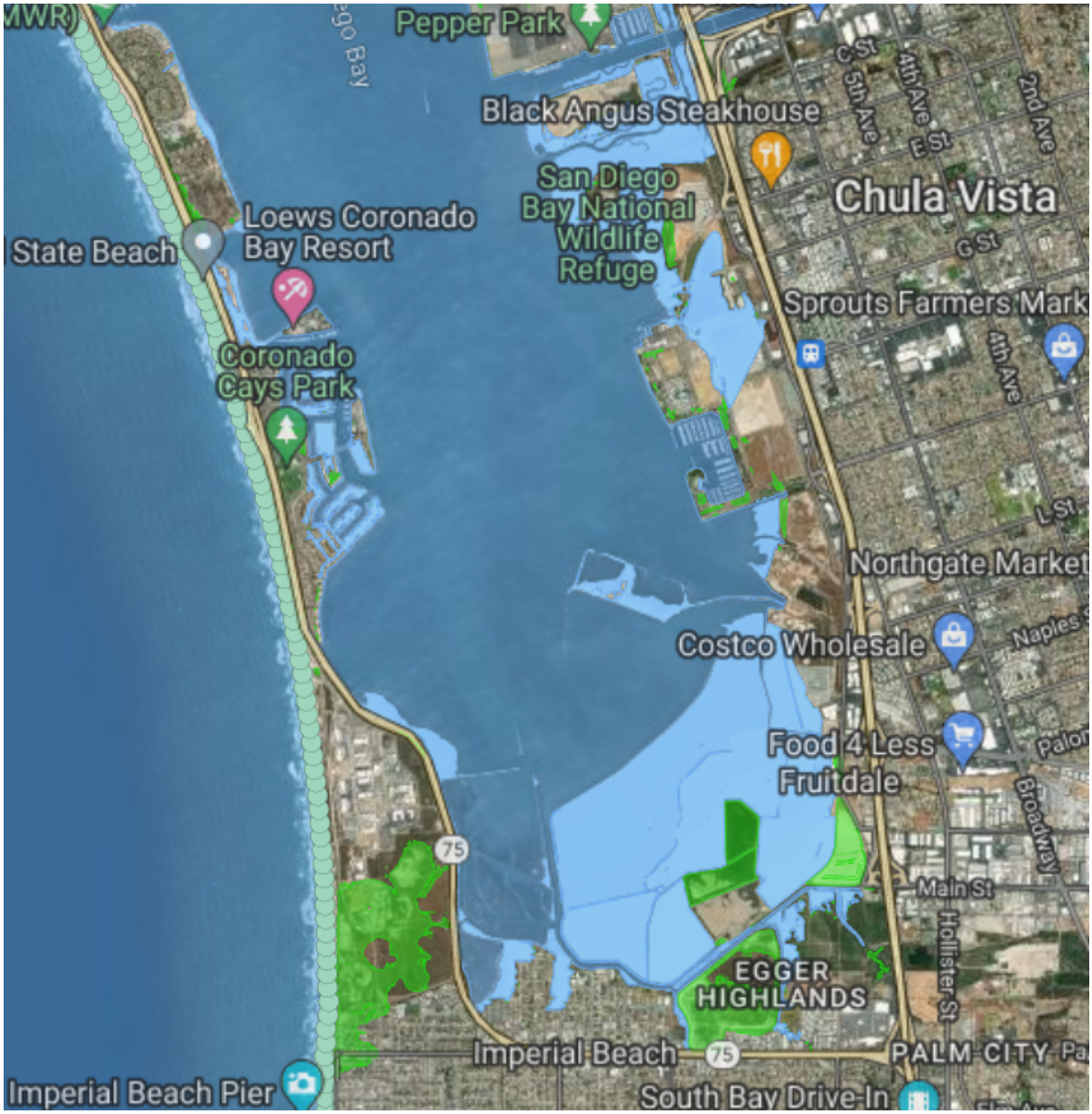

Figure 4: Extent of flooding from 3.3 feet of SLR in south San Diego Bay. Light blue indicates the flood extent, and green indicates flood-prone, low lying areas.[37]

[37] Our Coast Our Future (2022). *Hazard Map*. USGS Coastal Storm Modeling System (CoSMoS). https://ourcoastourfuture.org/hazard-map/. Accessed May 31, 2022.

Approach

The following steps were taken to carry out this analysis:

4. Policy literature review. A literature review of state and local policies related to SLR was conducted. Policy priorities were identified and classified into four categories: Equity and Environmental Justice, Coastal Access/Recreation, Natural Resource Conservation, and Community Infrastructure/Economic Resilience. A table of the relevant policy priorities is included at the end of the following section.
5. Case study analysis. Two case studies of projects in south San Diego Bay were evaluated. For each case study, the methods in which the project addresses the various SLR priorities were identified, as well as the challenges of planning and implementing the project.
6. Discussion/Recommendations. The discussion uses the case study evaluation to identify considerations that could inform communities and regional collaborative efforts and support the planning and implementation of cohesive, integrated, and equitable SLR adaptation projects in a timely manner.

Policy Review

SLR planning and adaptation is informed by state and local policies. The following section describes these policies and classifies the identified policy priorities into four categories: Equity and Environmental Justice, Coastal Access/Recreation, Natural Resource Conservation, and Community Infrastructure/Economic Resilience. A table of the classified policy priorities can be found at the end of this section.

State Policies

Several State-level laws and guidance documents exist that inform sea level rise adaptation. The California Coastal Act, the Public Trust Doctrine, and several other state laws and executive orders provide the framework for SLR policies. State agencies such as the California Ocean Protection Council (OPC) and the California Coastal Commission (CCC) are the leaders in providing policy documents, and are supported by other state agencies including the California State Coastal Conservancy, California Department of Transportation (CalTrans), California Department of Fish and Wildlife (DFW), California State Lands Commission (SLC), California Department of Parks and Recreation (State Parks), and several others. Policies at the state level focus on providing and utilizing the best available science, creating partnerships and alignments across jurisdictions within the state, and providing lines of communication to share and disseminate information.

State Laws

The primary state laws that govern SLR adaptation are the California Coastal Act and the Public Trust Doctrine. The following are brief descriptions of the two laws.

California Coastal Act: The Coastal Act, signed in 1976, establishes the Coastal Zone along the coast of California and is enforced by the California Coastal Commission. The Coastal Act prioritizes preservation and enhancement of coastal access, conservation of natural resources, and balance of coastal development.[38]

Public Trust Doctrine: The Public Trust Doctrine establishes that all tidelands, submerged lands, and beds of natural, navigable waterways are "held in trust by the State for the benefit of the people of California."[39] The ordinary high-water mark is the landward extent of the Public Trust Lands, which is expected to shift inland over time as sea levels rise.[40]

Ocean Protection Council Sea Level Rise Guidance and Associated Documents

California's Ocean Protection Council (OPC) is one of the leading state agencies providing SLR guidance for state and local jurisdictions in California. In 2018, the OPC released high-level SLR guidance to help decision-makers and planners approach SLR adaptation. The OPC also released principles and actionable items for state agencies to utilize to support SLR planning.

State of California SLR Guidance (2018)

In 2018, California's OPC released guidance to help state and local jurisdictions begin planning for SLR. This guidance was an update to earlier guidance, originally released in 2010 and updated in 2013, based on significant new advances in scientific understanding and several new policy directives and mandates. The guidance includes an explanation of the best available science on SLR in California, a step-by-step approach for evaluating and using SLR science in decision-making, and a description of preferred coastal adaptation approaches. The guidance is intended to be used as a high-level guiding framework.[41]

The final section of the OPC's SLR guidance includes several recommendations for planning and adapting to SLR. The first recommendation is to prioritize social equity, environmental justice, and the needs of vulnerable communities. This includes early public engagement, addressing contamination risks, preserving coastal access, protecting local jobs and housing costs, and incorporating social and economic implications into the evaluation of adaptation strategies. The second recommendation of the guidance is to prioritize public access and coastal habitats. This

[38] Diamond, J., Doremus, H., Manupipatpong, M., Frank, R., Oh, S., Hecht, S., Sivas, D., Armsby, M., Herbert, J. (2016). *The Past, Present, and Future of California's Coastal Act: Overcoming Division to Comprehensively Manage the Coast*. UC Berkeley. https://www.law.berkeley.edu/wp-content/uploads/2017/08/Coastal-Act-Issue-Brief.pdf. Accessed May 26, 2022.
[39] California State Lands Commission (2022). *Public Engagement* https://www.slc.ca.gov/public-engagement/. Accessed May 27, 2022.
[40] California Coastal Commission (2021). *Critical Infrastructure at Risk: Sea Level Rise Planning Guidance for California's Coastal Zone.*
[41] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance*.

includes prioritizing natural infrastructure and minimizing shoreline armoring, considering managed retreat, and prioritizing public access while protecting natural resources.[42]

Principles for Aligned State Action (2020) and State Agency Sea-Level Rise Action Plan (2022)

Following the release of the 2018 guidance, the OPC released two additional documents, the first outlining Principles for Aligned State Action,[43] and the second describing a State Agency Sea-Level Rise Action Plan for California.[44] While these documents focus on prescribing ways the state agencies should align and support sea-level rise planning, both reflect important principles relevant to both San Diego Bay and local-regional sea-level rise planning efforts. These include: building interagency partnerships, regional collaboration, education and outreach, consulting and partnering with tribes, supporting local leadership and addressing local conditions, prioritizing the protection of and building capacity for vulnerable populations to engage in SLR planning, and prioritizing nature-based adaptation.[45,46]

California Coastal Commission Sea Level Rise Guidance Documents

The California Coastal Commission (CCC) is another State agency that has provided a considerable amount of California's SLR policy guidance. In 2018, the CCC released SLR Policy Guidance, which provides principles for addressing SLR, recommendations for incorporating SLR in Local Coastal Programs, and descriptions of recommended adaptation strategies. The CCC has also released planning guidance for residential development and critical infrastructure along the coastline in the face of SLR.

Sea Level Rise Policy Guidance (2018)

CCC's Sea Level Rise Policy Guidance provides recommendations for applying the Coastal Act through Local Coastal Programs (LCPs) and Coastal Development Permits (CDPs). The Guidance provides fundamental guiding principles based on the requirements of the Coastal Act, including: minimizing coastal hazards through planning and development standards, maximizing protection of public access, recreation, and sensitive coastal resources, and maximizing agency coordination and public participation.[47]

[42] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance*.
[43] Ocean Protection Council (2020). *Making California's Coast Resilient to Sea Level Rise: Principles for Aligned State Action.*
[44] Ocean Protection Council (2022). *State Agency Sea-Level Rise Action Plan for California.*
[45] Ocean Protection Council (2020). *Making California's Coast Resilient to Sea Level Rise: Principles for Aligned State Action.*
[46] Ocean Protection Council (2022). *State Agency Sea-Level Rise Action Plan for California.*
[47] California Coastal Commission (2018). *Sea Level Rise Policy Guidance.*

Coastal Adaptation Planning Guidance: Residential Development (2018 Draft)

The Residential Development draft guidance released in 2018 provides suggestions of policies that cities and counties can implement into LCPs specifically related to residential development. Some suggested policies include disclosing risks of development to property owners and requiring property owners to assume those risks, minimizing hazard risks through siting and design, planning for future removal if development is threatened, and regulating redevelopment to limit ways that a property owner can rebuild in a sea level rise hazard zone. One of the challenges identified in the guidance is engaging all stakeholder groups in the public process, including inland residents who travel to local beaches for recreation, and those of low-income and underserved communities. To address this challenge, the guidance suggests conducting sustained education and outreach regarding sea level rise science, risks, and possible adaptation strategies.[48] Since November 2019, the CCC has not provided an update on when this guidance will be finalized.[49]

Critical Infrastructure at Risk: Sea Level Rise Planning Guidance for California's Coastal Zone (2021)

The CCC's Critical Infrastructure guidance document provides policy and planning information for local governments and stakeholders to guide sea level rise adaptation decisions for critical transportation and water infrastructure. The guidance highlights six key considerations for critical infrastructure adaptation planning, including coordinated planning across jurisdictions, public outreach and mitigation of impacts in environmental justice communities, outreach and consultation with California Native American Tribes, phased adaptation, use of cost-effective strategies including protective land-use planning and relocation, and use of nature-based adaptation strategies.[50]

Regional and Local Policies and Guidance

Regional and local authorities use and build upon State policy guidance when creating coastal land use and development plans including Local Coastal Programs (LCPs). In south San Diego Bay, the primary regional and local jurisdictions relevant to this analysis include the Port of San Diego and the Cities of Imperial Beach and Chula Vista.

Port of San Diego Master Plan Update (2020 Revised Draft)

The San Diego Unified Port District (Port) manages approximately 14,000 acres of state and submerged lands (tidelands) across 35 miles of waterfront in and around San Diego Bay. The governing body of the Port is the Board of Port Commissioners, which is made up of seven

[48] California Coastal Commision (2018). *Coastal Adaptation Planning Guidance: Residential Development.*
[49] California Coastal Commission (2019). *Sea Level Rise Coastal Adaptation Planning Guidance for Residential Development.* coastal.ca.gov/climate/slr/vulnerability-adaptation/residential/. Accessed June 10, 2022.
[50] California Coastal Commission (2021). *Critical Infrastructure at Risk: Sea Level Rise Planning Guidance for California's Coastal Zone.*

appointed Commissioners from the Board's five member cities, one Commissioner each from the Cities of Coronado, Imperial Beach, Chula Vista, and National City, and three Commissioners from the City of San Diego. The Port is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine. These public trust uses promote and balance navigation, commerce, fisheries, recreation, and environmental stewardship. The Port is in the process of updating its Master Plan, which provides a description of the Port's vision and plan for its jurisdictional area of San Diego Bay. The Port's vision is to "promote the Bay as a central environmental, economic, and recreational resource for all people of California," while reinforcing differences in character and culture and equitably balancing available resources.[51]

The Master Plan includes several different elements, and each element includes goals, objectives, and policies. Some of the relevant elements and associated goals include: enhancing public access, conserving and restoring biodiversity, pursuing collaborative stewardship for the ecological health of the Bay, promoting inclusive public participation and meaningful engagement with disadvantaged and indigenous communities, and pursuing a financially secure and sustainable Port District. The Master Plan also recognizes the need to adapt to SLR and proposes an adaptive management framework for planning, implementing, and modifying SLR adaptation strategies.[52]

Imperial Beach General Plan/Local Coastal Program

The City of Imperial Beach provides coastal planning guidance through a combined General Plan and Local Coastal Program, due to the fact that eighty-seven percent of the City lies within the Coastal Zone. The most recent draft of the General Plan/LCP was released in September 2019 and describes the goals and policies for the City. Some of the SLR relevant policies include adopting SLR adaptation approaches that both preserve public access and public and private infrastructure, consider impacts to biological resources when evaluating adaptation strategies, and engaging community residents by using accessible channels, including language services, child care, and participatory facilitation techniques.[53]

Chula Vista Local Coastal Program, Chula Vista Bayfront Development Plan

The City of Chula Vista provides planning guidance for City jurisdictional parcels located along the Chula Vista Bayfront through the Chula Vista Local Coastal Program. Several of the parcels along the bayfront are within the jurisdiction of the Port of San Diego, and therefore fall under the Port's planning guidelines. The City's LCP provides several policy objectives relevant to SLR, including to provide continuous open space, increase mobility for residents and visitors, create recreational opportunities that protect natural beauty and improve access, provide for the

[51] Port of San Diego (2020). *Port Master Plan (Revised Draft, October 2020)*.
[52] Ibid.
[53] City of Imperial Beach (2019). *City of Imperial Beach General Plan/Local Coastal Program Land Use Plan (Final Draft - Revised, September 2019).*

long-term protection of natural resources, and encourage development activities that provide employment, recreational opportunities, and energy utility needs.[54]

[54] City of Chula Vista (2017). *Chula Vista Bayfront Local Coastal Program Land Use Plan.*

Table 1: State, Regional, and Local Policy Documents and Associated Priorities

Policy Document	Equity and Environmental Justice	Coastal Access/Recreation	Natural Resource Conservation	Community Infrastructure/ Economic Resilience
OPC SLR Guidance[1]	• Early public engagement • Address contamination risks for communities adjacent to toxic sites • Educate communities about emergency response procedures • Incorporating social and economic implications into the evaluation of adaptation strategies	• Preserve coastal access • Prioritize public access while protecting natural resources	• Prioritize natural infrastructure for SLR adaptation and minimizing shoreline armoring • Consider managed retreat as an adaptation strategy	• Prevent displacement by investing in projects that protect local jobs and housing costs
CCC SLR Policy Guidance[2]	• Account for the social and economic needs of the people of the state • Provide for maximum public participation in planning and regulatory processes	• Protect public trust lands and resources, including as sea level rises	• Maximize natural shoreline values and processes; minimize the perpetuation of shoreline armoring	
CCC Residential Development Guidance[3]	• Maximum public participation in decision-making • Capture input of both inland residents who recreate at local beaches and local shoreline property owners • Include all relevant stakeholders, particularly those who are typically isolated, such as residents of underserved communities • Provide sustained education and outreach	• Maximum public access • Prioritize coastal-dependent and coastal-related development over residential and other uses		• Disclose risks and require property owners to assume risks • Avoid and minimize hazard risks through siting and design • Plan for future removal of threatened development • Regulate redevelopment • Evaluate adaptation approaches according to their impact on coastal resources, effectiveness at reducing risk, cost, and feasibility
CCC Critical Infrastructure Guidance[4]	• Early outreach and consistent engagement • Maximizing public participation opportunities • Identifying adverse impacts, and avoiding and mitigating impacts • Early outreach and continued consultation with California Native American Tribes		• Prioritize nature-based adaptation strategies	• Reduce costs through proactive and protective land-use planning • Relocation of critical infrastructure as a cost-effective solution • Pursue potential funding and investment opportunities at federal, state, regional, and local levels
Port of San Diego Master Plan (2020 Draft)[5]	• Ensure tidelands are accessible through diverse mobility options, safe recreational opportunities, and protecting coastal access near disadvantaged communities • Promote inclusive public participation	• Enhance access to the public realm • Preserve and enliven the public realm • Expand the collection of	• Enhance, conserve, restore, and maintain biodiversity • Provide clean, healthy waters and landside areas	• Pursue a financially secure and sustainable District • Provide infrastructure to support existing and future industry needs, as well as the environment

	through increased awareness and meaningful engagement for disadvantaged and indigenous communities ● Promote healthy, thriving communities	lower cost visitor and recreational facilities ● Maintain, enhance, expand modes of travel available on water and land	● Pursue collaborative stewardship for the ecological health of San Diego Bay	● Retain and encourage a diverse mix of coastal-dependent and coastal-related industries and businesses
Imperial Beach General Plan/ Local Coastal Program[6]	● Encourage and utilize community input in ongoing adaptation strategy planning and implementation ● Pursue grant funding for investments that increase the climate resiliency and adaptive capacity of low-income households and communities ● Proactively engage community residents by using accessible channels, including: appropriate language services, child care, meetings, focus groups, and participatory facilitation techniques ● Consult with California Native American tribes ● Ensure that public facilities and community services are equitably distributed	● Pursue funding for pilot projects that protect assets from SLR, enhance natural and recreational resources and improve public access ● Continue to evaluate opportunities for increased public access and recreation on the San Diego Bayfront ● Provide free and lower cost opportunities to enjoy the coastal environment ● Protect right-of-ways to navigable waters	● Require all land use proposals to respect, preserve and enhance, to the extent feasible, San Diego Bay as one of the most important natural resources of Imperial Beach ● Consider impacts to biological resources when evaluating adaptation strategies ● Design trails and manage public access to minimize adverse impacts to sensitive biological resources	● Adopt SLR adaptation approaches that both preserve public access and public and private infrastructure ● Incorporate resiliency measures into capital improvement planning ● Allow for the repair and enhancement of existing shoreline protective devices that do not result in negative impacts and are necessary to protect structures ● Encourage redevelopment of buildings to meet building codes that would reduce SLR hazard risks and increase resiliency ● Consider SLR in the location of public facilities
Chula Vista Bayfront Local Coastal Program[7]	● Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided ● Develop and implement an environmental education program to educate residents and workers about the natural condition of the Bay, ecological importance of the area and the public's role in the restoration and protection of wildlife resources	● Increase mobility for residents and visitors ● Create park and recreational opportunities that protect area's natural beauty and improve access and usage ● Provide good regional access to encourage visitors to the Bayfront ● Provide opportunities for public coastal access, open space, park and recreational uses adjacent to natural resources	● Provide a continuous open space network ● Provide for natural open space conservation ● Provide for the long-term protection of important natural resources, including within the National Wildlife Refuge ● Encourage development activities that minimize impacts to environmentally sensitive lands ● Protect and enhance scenic resources	● Encourage development activities that will provide employment and energy utility needs

[1] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance*.
[2] California Coastal Commission (2018). *Sea Level Rise Policy Guidance.*
[3] California Coastal Commision (2018). *Coastal Adaptation Planning Guidance: Residential Development.*
[4] California Coastal Commission (2021). *Critical Infrastructure at Risk: Sea Level Rise Planning Guidance for California's Coastal Zone.*
[5] Port of San Diego (2020). *Port Master Plan (Revised Draft, October 2020)*.
[6] City of Imperial Beach (2019). *City of Imperial Beach General Plan/Local Coastal Program Land Use Plan (Final Draft - Revised, September 2019).*
[7] City of Chula Vista (2017). *Chula Vista Bayfront Local Coastal Program Land Use Plan.*

Case Studies

Two case studies of projects in south San Diego Bay were evaluated. For each case study, the methods in which the project addresses the various SLR priorities were identified, as well as the challenges with planning and implementing the project. The first case study is the Bayshore Bikeway Resiliency Project in Imperial Beach, and the second is the Chula Vista Bayfront Redevelopment project.

Case Study 1: Imperial Beach Bayshore Bikeway Resiliency Project

Project Description

The Imperial Beach Bayshore Bikeway Resiliency Project is located in the City of Imperial Beach along the southernmost shoreline of San Diego Bay. Existing uses of the project area include residential, commercial, public utility, recreational, and natural habitat. The Bayshore Bikeway runs along the extent of the south coast of the bay, bordered to the north by wetland habitat and to the south by residential, public, and commercial development. A significant portion of the wetland area is within the South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge. The refuge consists of 2,620 acres of intertidal mudflats, eelgrass beds, salt marshes, and submerged tidelands. These habitats support endangered and threatened species including the Belding's savannah sparrow and light-footed Ridgway's rail.[55] The area also provides habitat for waterfowl, seabirds, and shorebirds, and is an important stop on the Pacific Flyway, a chain of habitats along the west coast of North America that supports over a billion migratory birds each year.[56]

The project area is anticipated to be impacted by SLR. With SLR and no intervention, some of the impacts can include overtopping of the Bayshore Bikeway, inundation of coastal habitats, and flooding of properties near 7th Street and Bayside Elementary School.[57] Figure 5 below shows the extent of flooding with 3.3 feet of SLR. SLR can also cause low-lying storm drains to become flooded, which impacts stormwater drainage by preventing stormwater from flowing into San Diego Bay.[58]

[55] U.S. Fish & Wildlife Service (2022). *Habitat & Wildlife at South San Diego Bay Unit*. https://www.fws.gov/story/habitat-wildlife-south-san-diego-bay-unit. Accessed May 25, 2022.
[56] City of Imperial Beach (2019). *City of Imperial Beach General Plan/Local Coastal Program Land Use Plan (Final Draft - Revised, September 2019).*
[57] Our Coast Our Future (2022). *Hazard Map.* USGS Coastal Storm Modeling System (CoSMoS). https://ourcoastourfuture.org/hazard-map/. Accessed May 31, 2022.
[58] City of Imperial Beach (2016). *Sea Level Rise Assessment.*

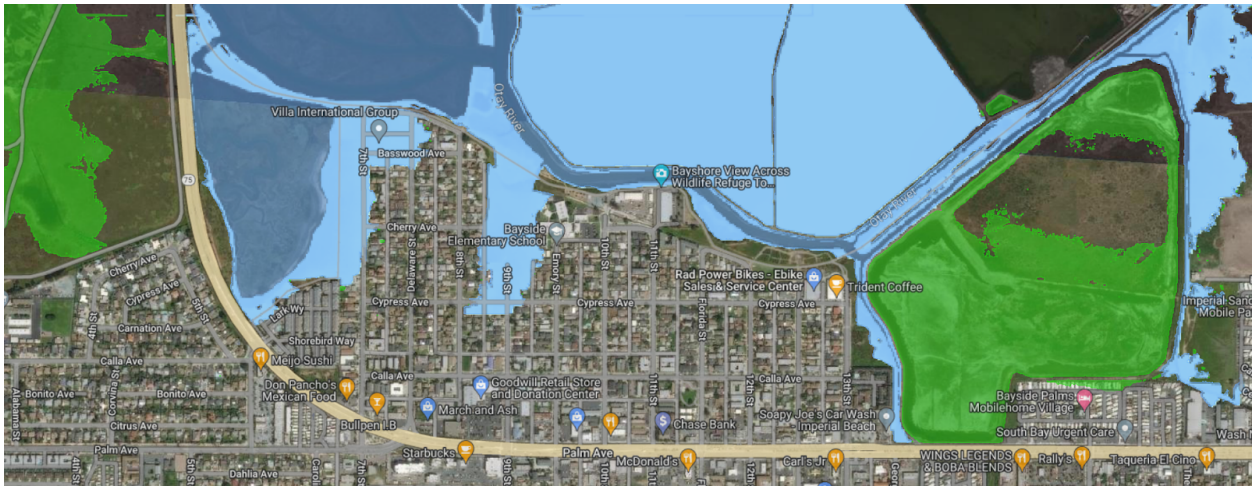

Figure 5: Extent of flooding from 3.3 feet of SLR in the Imperial Beach Bikeway Resiliency project area. Light blue indicates the flood extent, and green indicates flood-prone, low lying areas.[59]

The lead for this project is the City of Imperial Beach. Land owners and managers in the project area include the Cities of Imperial Beach and San Diego, the San Diego Unified Port District, the San Diego Metropolitan Transit System (MTS), U.S. Fish and Wildlife Service (USFWS), and private landowners.

The goals of the Bikeway Resiliency project are to retrofit 1.2 miles of bike path to provide flood protection, SLR resilience, enhanced coastal access, and ecosystem resilience.[60] The project is currently in the concept development and feasibility phase, with various designs being considered to meet these goals. Outreach is being conducted to solicit feedback on these designs through the summer of 2022.[61] The project extent can be seen in Figure 6.

[59] Our Coast Our Future (2022). *Hazard Map.* USGS Coastal Storm Modeling System (CoSMoS). https://ourcoastourfuture.org/hazard-map/. Accessed May 31, 2022.
[60] Ocean Protection Council (2021). *Consideration of Authorization to Disburse Proposition 68 Funds for Projects Advancing Statewide Coastal Resilience.* Staff Recommendation. https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20210216/Item_5_Prop_68_Coastal_Resilience_Projects_StaffRec_FINAL.pdf. Accessed May 31, 2022.
[61] Bayshore Bikeway Resiliency Project (2022). https://www.ibbayshorebikeway.com/. Accessed June 8, 2022.

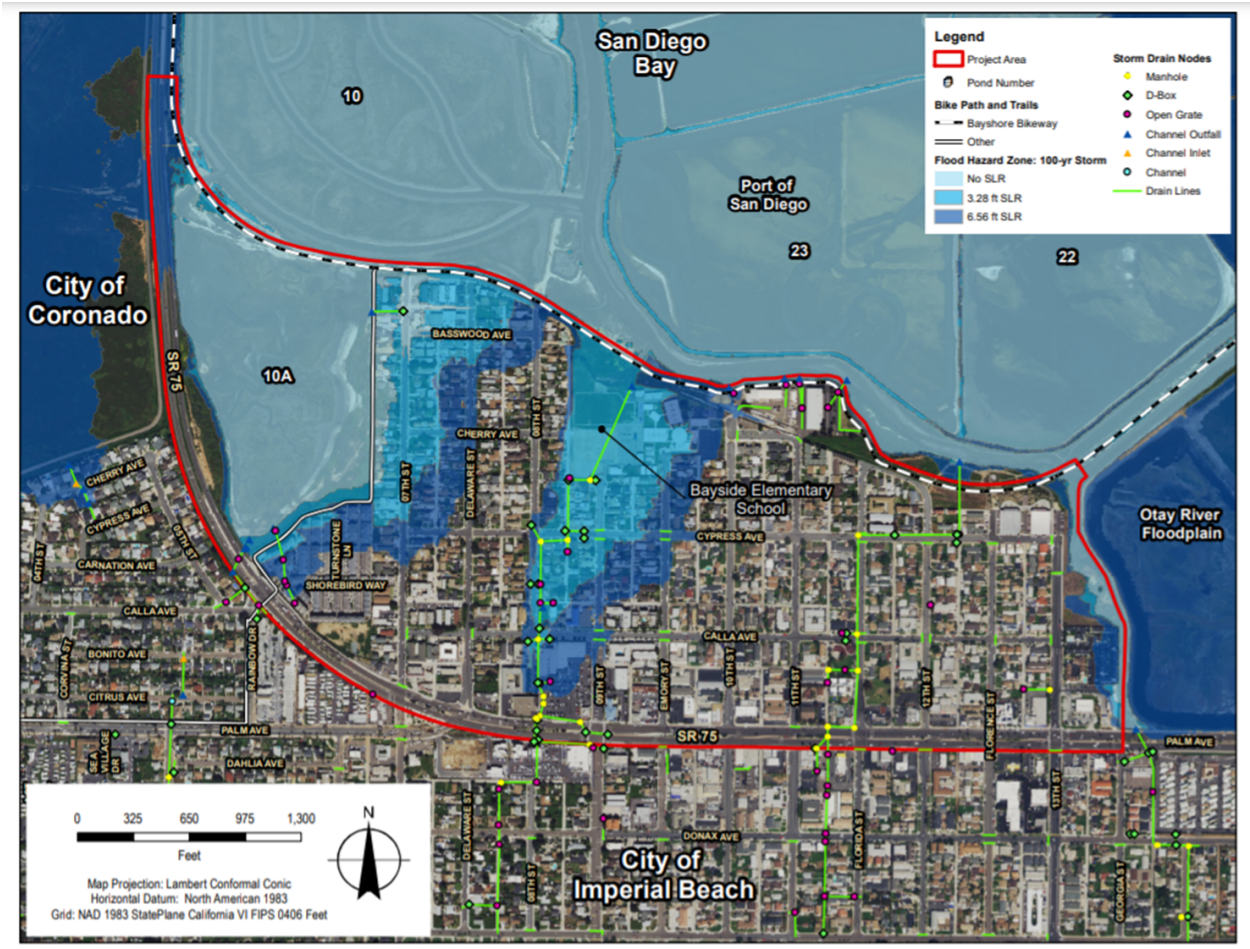

Figure 6: Project extent shown in red.[62]

SLR Policy Priorities Applicable to the Project

In developing this project, community infrastructure, bayfront access, and natural habitat were all considered to be project priorities. The project was seen as an opportunity to provide multiple benefits to the community that meet policy priorities.[63] The following are descriptions of project elements and how they relate to the policy priorities.

[62] Ocean Protection Council (2021). *Imperial Beach Coastal Resilience Map.* https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20210216/5d1_Project_Map_Imperial_Beach_Coastal_Resilience_Corridor.pdf. Accessed May 25, 2022.

[63] Ocean Protection Council (2021). *Prop 68 Climate Resilience Miniseries Episode 9: Bayshore Bikeway Resiliency Project.* https://www.opc.ca.gov/2021/09/prop-68-climate-resilience-miniseries-episode-9-bayshore-bikeway-resiliency-project/. Accessed June 1, 2022.

Equity and Environmental Justice

The project is located in Imperial Beach, which is a historically underserved community.[64] Therefore, it was a priority of the project to address the needs of the community, as SLR can put low-income housing immediately adjacent to the project site at risk. There have also been outreach opportunities throughout the project process, and efforts to incorporate public feedback, such as the addition of a separated walking path from the bikeway to address public safety.

The City pursued, and was awarded, funding from OPC's Proposition 68 Grant Program, which is focused on coastal resilience projects, to develop this project.[65] As a small city with limited resources, Imperial Beach has many other investment priorities on top of SLR, such as upgrading the parks and recreation facilities[66] or providing scholarships for the junior lifeguard program, a program that provides an opportunity for local youth to experience the coast and learn ocean safety.[67] The Proposition 68 funding provides the opportunity for the City to use City funding for other pressing community needs.

Coastal Access/Recreation

The project provides the opportunity to use SLR resiliency to increase access and open space.[68] The project provides enhanced coastal access by improving the bike path and enhancing coastal trails.[69] The driver behind doing the project is the need to adapt to sea level rise and protect the community. In doing so, the project aim was to maintain bayfront access, then incorporate environmental elements as much as possible. Another aspect of the project that is important to the community is the provision of a separated walking path from the bike path to ensure safety and multiple uses. The project also addresses the goal of prioritizing public access while protecting natural resources in the preliminary designs by providing habitat in the form of living

[64] Parks for All Californians (2021). *Community FactFinder, 2020 Edition*. https://www.parksforcalifornia.org/communities/?overlays=parks. Accessed June 8, 2022.
[65] Ocean Protection Council (2021). *Consideration of Authorization to Disburse Proposition 68 Funds for Projects Advancing Statewide Coastal Resilience.* Staff Recommendation. https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20210216/Item_5_Prop_68_Coastal_Resilience_Projects_StaffRec_FINAL.pdf. Accessed May 31, 2022.
[66] Murga, T. (2021, April 18). Imperial Beach is rebuilding its Parks and Recreation Department 'from scratch.' *The San Diego Union Tribune.* https://www.sandiegouniontribune.com/communities/south-county/imperial-beach/story/2021-04-18/imperial-beach-is-rebuilding-parks-and-recreation-department-from-scratch. Accessed June 10, 2022.
[67] Anderson, E. (2019, May 2). Imperial Beach Officials Planning For Sea Level Rise. *KPBS*. Accessed June 10, 2022.
[68] Ocean Protection Council (2021). *Prop 68 Climate Resilience Miniseries Episode 9: Bayshore Bikeway Resiliency Project.* https://www.opc.ca.gov/2021/09/prop-68-climate-resilience-miniseries-episode-9-bayshore-bikeway-resiliency-project/. Accessed June 1, 2022.
[69] Ocean Protection Council (2021). *Consideration of Authorization to Disburse Proposition 68 Funds for Projects Advancing Statewide Coastal Resilience.* Staff Recommendation. https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20210216/Item_5_Prop_68_Coastal_Resilience_Projects_StaffRec_FINAL.pdf. Accessed May 31, 2022.

levees (elevated land that is sloped gently enough to support tidal marsh habitat along the slope) adjacent to the bike path.[70]

Natural Resource Conservation

Coastal wetland habitats are conserved and enhanced with this project design. Several portions of the project area were degraded from past development activities.[71] Therefore, in designing the resiliency project, the City has the opportunity to improve these degraded areas and provide restored wetland habitats. Shoreline armoring is still a portion of this project through the elevated bike path, but is minimized in design considerations that include living levees that provide natural habitat.[72]

Community Infrastructure/Economic Resilience

The project involves avoiding risks to housing infrastructure by elevating the bikeway to protect vulnerable housing from SLR. This project is an opportunity to provide the necessary housing protection while also being able to enhance the adjacent coastal habitat.

Key Challenges

While SLR projects like this one in Imperial Beach have many benefits, several challenges exist to planning and implementation. The overlapping regulatory and property jurisdictions within a project area require collaboration between multiple stakeholders, which can cause challenges when different stakeholders have different priorities for the project area.

The Bayshore Bikeway Resiliency project sits within lands managed by the Cities of Imperial Beach and San Diego, the San Diego Unified Port District, the San Diego Metropolitan Transit System (MTS), U.S. Fish and Wildlife Service (USFWS), and private landowners. The Port has jurisdiction over the tidelands within San Diego Bay and the USFWS manages the San Diego Bay National Wildlife Refuge. The California Coastal Commission regulates all land within the coastal zone, which includes a significant portion of the City of Imperial Beach. The California Coastal Commission requires that the coastline continues to have access as part of the Public Trust.[73] Each of these regulating bodies have different priorities when it comes to SLR planning. The City of Imperial Beach represents the needs of residents in the City, which includes prioritizing the protection of people's homes. The USFWS prioritizes the conservation, management and restoration of fish, wildlife, and plant resources and their habitats.[74] The differing priorities of different groups poses challenges because the development of a SLR resiliency project requires

[70] City of Imperial Beach, Unrecorded Public Outreach Event (March 15, 2022).
[71] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[72] City of Imperial Beach, Unrecorded Public Outreach Event (March 15, 2022).
[73] California Coastal Commission (2018). *Sea Level Rise Policy Guidance.*
[74] USFWS (2022). *National Wildlife Refuge System*. https://www.fws.gov/program/national-wildlife-refuge-system/about-us. Accessed June 8, 2022.

collaboration and agreement across jurisdictions. As sea levels rise and wetlands migrate inland, these regulatory authorities may overlap even more, requiring additional cross-jurisdictional collaboration.

The permitting for this project is complex, and will require: a U.S. Army Corp of Engineers permit; a San Diego Regional Water Quality Control Board Clean Water Act Section 401 Water Quality Permit; consultation with National Marine Fisheries Service and/or U.S. Fish and Wildlife Service; and potential consultation with California Department of Fish and Wildlife. If the project impacts the Federal Emergency Management Agency (FEMA)'s flood zone then consultation or permitting from FEMA may also be required.[75] These permits and consultations will take significant time to apply for and acquire, can be costly, and require expertise in navigating federal and state agencies and permitting processes that a small city like Imperial Beach may not have.

Cross-jurisdictional collaboration difficulties, as well as a disconnect between the State policies and on-the-ground implementation, increases the length of time from project idea to implementation, and can also influence project costs. Differing priorities between regulating bodies lead to delays in permit approvals. At the state level, the recommendations for SLR adaptation do not fully align with the needs for Imperial Beach and particularly the Bayshore Bikeway project, making project implementation challenging. For example, there is a push by state agencies to minimize shoreline armoring and prioritize natural infrastructure when planning for SLR.[76,77] However, in Imperial Beach, elevating the bike path (as a form of shoreline armoring) prevents vulnerable housing from flooding and simultaneously provides continued coastal access. The City is already beginning to see the impacts of SLR, and can find benefit in developing short to midterm SLR adaptation strategies that will provide time for future planning.

The project cost for developing SLR adaptation strategies is a significant challenge for Imperial Beach. Imperial Beach is a historically underserved community[78] with limited City funding and resources. The need to adapt quickly to SLR is critical in coastal communities across California, but poses much more of a challenge for underserved communities like Imperial Beach. The community has a small budget compared to nearby cities such as Coronado or Del Mar. With the impending impacts of SLR, the City has to decide where to spend money, and often looks to the state to support and fund these types of projects.[79] State policies encourage the

[75] H. Kramp, Port of San Diego (personal communication, June 10, 2022).
[76] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance*.
[77] California Coastal Commission (2018). *Sea Level Rise Policy Guidance.*
[78] Parks for All Californians (2021). *Community FactFinder, 2020 Edition*. https://www.parksforcalifornia.org/communities/?overlays=parks. Accessed June 8, 2022.
[79] Ocean Protection Council (2021). *Prop 68 Climate Resilience Miniseries Episode 9: Bayshore Bikeway Resiliency Project.* https://www.opc.ca.gov/2021/09/prop-68-climate-resilience-miniseries-episode-9-bayshore-bikeway-resiliency-project/. Accessed June 1, 2022.

development of trigger-based[80] or incremental[81] adaptation plans, but communities with low funding and more immediate concerns benefit more from planning for near-term or midterm solutions, which can provide an additional time buffer to plan for future SLR adaptation. The benefits from the project extend beyond the reach of the community because it will provide a space for all, yet the community is tasked with finding funding for the project.

Several areas in the project footprint were historically modified, causing damage to the coastal environment. The City sees these areas as places with opportunity to improve the environment, enhance access, and provide resiliency.[82] A coastal development permit is often required for minor changes to the shoreline,[83] even if the area has been historically impacted. This shifted baseline causes a disconnect between state policies and actual on-the-ground issues, as historically impacted cities with lower resources are less able to make coastline improvements. The disconnect can cause delays in project development if the City does not have the funding. With accelerating SLR, there is a need to come to solutions quickly to stay ahead of the rising tides.

Case Study 2: Chula Vista Bayfront Redevelopment Project

Project Description

The Chula Vista Bayfront Redevelopment Project is located along the shoreline of San Diego Bay in the City of Chula Vista and will redevelop approximately 497 acres of land and 59 acres of water.[84] Existing uses of the project area are primarily recreational, with a park, marina, recreational vehicle park, and portions of the Bayshore Bikeway. Immediately adjacent to the project area are several commercial and industrial buildings, including aerospace manufacturing facilities, as well as a boat repair facility within the project footprint. Also adjacent and to the north of the project area is the Sweetwater Marsh Unit of the San Diego Bay National Wildlife Refuge. To the south is the former South Bay Power Plant site, now vacant, and the J Street Marsh and Chula Vista Wildlife Reserve, both salt marsh habitat areas. Mudflats exist along the northern and southern shorelines, interspersed with areas of hard shoreline in the middle. Marsh habitat is present in four main areas, Sweetwater Marsh, F&G Street Marsh, J Street

[80] Ocean Protection Council (2018). *State of California Sea-Level Rise Guidance*.
[81] California Coastal Commission (2018). *Sea Level Rise Policy Guidance.*
[82] Ocean Protection Council (2021). *Consideration of Authorization to Disburse Proposition 68 Funds for Projects Advancing Statewide Coastal Resilience.* Staff Recommendation. https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20210216/Item_5_Prop_68_Coastal_Resilience_Projects_StaffRec_FINAL.pdf. Accessed May 31, 2022.
[83] California Coastal Commission. *When do you Need a Coastal Development Permit?* https://www.coastal.ca.gov/enforcement/cdp_pamphlet.pdf. Accessed June 10, 2022.
[84] San Diego Unified Port District (2010). *Findings of Fact and Statement of Overriding Considerations for the Chula Vista Bayfront Master Plan.* Chula Vista Bayfront Master Plan and Port Master Plan Amendment Final Environmental Impact Report (3), 520-896. https://pantheonstorage.blob.core.windows.net/ceqa/Final-Environmental-Impact-Report-EIR-for-the-Chula-Vista-Bayfront-Master-Plan-and-Port-Master-Plan-Amendment-Volume-1-1.pdf. Accessed June 6, 2022.

Marsh, and the Chula Vista Wildlife Reserve. These habitat areas are an important home for migratory bird species, juvenile fishes, and other invertebrates.[85]

The project area has been historically developed and degraded. Industrial uses included the South Bay Power Plant,[86] Rohr Aircraft Facilities,[87] and the Hercules Powder Plant (a facility that harvested kelp to help make gunpowder).[88] These and other industrial uses led to contaminated sediment within the Bay, including elevated levels of lead, mercury, cadmium, zinc, dioxins, and total recoverable petroleum hydrocarbons.[89]

SLR is anticipated to have impacts on portions of the project area, and was considered in the planning of this project. Under existing site conditions, some of the impacts from SLR include inundation of beaches, parks, boat launches, pathways, and the stormwater system.[90] Figure 7 below shows the extent of flooding with 3.3 feet of SLR. High tides combined with storm surge has the potential to flood buildings in the area. Natural habitats are also susceptible to inundation from SLR, including habitat for the endangered light-footed Ridgway's rail.[91]

[85] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[86] Harvey, K. (2013, Feb. 2). Boom! Power plant destroyed in implosion. *The San Diego Union Tribune.* Accessed June 10, 2022.
[87] Schoenherr, S. (2016). Rohr in Chula Vista. *South Bay Historical Society*. http://sunnycv.com/history/exhibits/rohr.html. Accessed June 10, 2022.
[88] Schoenherr, S. (2018). Gunpowder Point History. *South Bay Historical Society*. http://sunnycv.com/history/exhibits/gunpowder.html. Accessed June 10, 2022.
[89] San Diego Unified Port District (2017). *Restoration and Enhancement Alternatives for the Chula Vista Bayfront.*
[90] Port of San Diego (2019). *Sea Level Rise Vulnerability Assessment & Coastal Resiliency Report.*
[91] Ibid.

Figure 7: Extent of flooding from 3.3 feet of SLR in the Chula Vista Bayfront Development project area. Light blue indicates the flood extent, and green indicates flood-prone, low lying areas.[92]

[92] Our Coast Our Future (2022). *Hazard Map.* USGS Coastal Storm Modeling System (CoSMoS). https://ourcoastourfuture.org/hazard-map/. Accessed May 31, 2022.

The leads for this project are the Port of San Diego and the City of Chula Vista. Lands within the project area are managed by these two entities, with portions of the land owned by private entities. The USFWS manages land immediately adjacent to the project area at the Sweetwater Unit of the San Diego Bay National Wildlife Refuge.

The project, as stated on the City of Chula Vista's website, will provide a "thriving residential and world-class waterfront resort destination" on the Chula Vista Bayfront.[93] The Port designed this project with their overall mission in mind, which is to "protect the Tidelands Trust resources by providing economic vitality and community benefit through a balanced approach to the maritime industry, tourism, water and land recreation, environmental stewardship, and public safety."[94] The project includes developing approximately 497 acres of land and 59 acres of water with a resort and convention center, hotels, apartments, commercial and mixed-use business space, RV parks, active and passive parks and approximately 120 acres of open space, including salt marsh and upland coastal habitat restoration and ecological buffers.[95] Portions of the project have been completed, including a Class I protected bike path and habitat restoration project, funded by the California Natural Resources Agency's Urban Greening Grant Program; relocation of the existing RV park facility to the northeast to make way for expansion of the current shoreline park and construction of a resort and convention center; and planning and design for a 29-acre passive park focused on native habitat restoration, which will begin construction in early 2023.[96] The project was designed for SLR with new elevation designs that are protective of building pads, streets, and drainage systems through the end of the century.[97] The project extents can be seen in Figure 8 below.

[93] City of Chula Vista (2018). *Chula Vista Bayfront.* https://www.chulavistaca.gov/residents/chula-vista-bayfront. Accessed June 10, 2022.
[94] Port of San Diego (2020). *Port Master Plan (Revised Draft, October 2020).*
[95] Port of San Diego (2022). *Chula Vista Bayfront Redevelopment*. https://www.portofsandiego.org/projects/chula-vista-bayfront. Accessed June 8, 2022.
[96] Port of San Diego (2022). *Chula Vista Bayfront Redevelopment*. https://www.portofsandiego.org/projects/chula-vista-bayfront. Accessed June 8, 2022.
[97] San Diego Unified Port District (2010). *Final Environmental Impact Report (EIR) for the Chula Vista Bayfront Master Plan*. Chula Vista Bayfront Master Plan and Port Master Plan Amendment Final Environmental Impact Report (2).

Figure 8: Chula Vista Bayfront Redevelopment project components and extents.[98]

SLR Policy Priorities Applicable to the Project

Instead of considering tradeoffs between natural resources, hard infrastructure, and access for the entire site, the Port took a land- and water-use based approach, sectioning off portions of land to address various coastal land use priorities.[99] Using this approach, the project was divided into three districts: Sweetwater District, Harbor District, and Otay District. For each district, it was determined how each area should be used or developed and/or protected. The Sweetwater District was designed as more nature-based with no high-rise buildings due to its proximity to the San Diego Bay National Wildlife Refuge's Sweetwater and F&G Street Marshes, the Harbor District is more developed because it is separated from the NWR, and the Otay District is primarily business park areas.[100] Coastal access was considered a priority for all areas.[101] The project designs are protective in the sense that they simultaneously protect access and infrastructure. For example, raising rip rap around Harbor Park protects park infrastructure, which allows continued public use of the park while simultaneously protecting the adjacent

[98] McAllister, T. (2018). Public to Weigh In on Parks for Massive Chula Vista Bayfront Project. *Times of San Diego*. https://timesofsandiego.com/business/2018/09/21/public-to-weigh-in-on-parks-for-massive-chula-vista-bayfront-project/. Accessed June 8, 2022.
[99] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[100] San Diego Unified Port District (2010). *Chula Vista Bayfront Master Plan Settlement Agreement*.
[101] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*

buildings. Project priorities include the goal of no net loss of habitat within the project area in the face of climate change.[102]

Equity and Environmental Justice

As a former industrial use area, the redevelopment area has historically been environmentally degraded and developed, making the area inaccessible to Chula Vista residents. The project has incorporated significant outreach efforts and public participation, including over 100 stakeholder outreach meetings on the overall redevelopment plan, as well as community meetings specifically focused on the public park designs and recreational elements. One safeguard required within the project's Settlement Agreement, is the requirement to construct and open Sweetwater Park (within the Sweetwater District) prior to the resort and convention center (within the Harbor District) receiving its certificate of occupancy.[103] This measure ensures that the public park must be fully constructed and open to the community. By providing parks and open space to the public, the project has the opportunity to build upon actions that address the historical industrial use and environmental degradation that has led to underutilization of the area.

Coastal Access/Recreation

One of the project goals is to provide an area that is accessible to all. The project prioritizes public access through three parks, including Sweetwater Park, Harbor Park, and an unnamed park in the Otay District. The project involves the creation of 70 acres of parks, significantly increasing park space from the current Bayside Park, which is approximately 5 acres. In Sweetwater Park, however, the public is restricted from direct access to the shoreline in some areas due to the proximity to sensitive habitats.[104] The project also involves improving segments of the Bayshore Bikeway.[105]

Natural Resource Conservation

The project goals include preserving natural resources and providing natural spaces that are accessible to all. The natural resources project goals are outlined in the Chula Vista Bayfront Master Plan: Natural Resources Management Plan (NRMP),[106] along with a Restoration and Enhancement Alternatives Plan that outlines additional restoration projects to restore and improve habitat connectivity, improve hydrology, and adapt to sea level rise.[107] One of the

[102] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[103] San Diego Unified Port District (2010). *Chula Vista Bayfront Master Plan Settlement Agreement*.
[104] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[105] Port of San Diego (2022). *Chula Vista Bayfront Redevelopment*. https://www.portofsandiego.org/projects/chula-vista-bayfront. Accessed June 8, 2022.
[106] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[107] San Diego Unified Port District (2017). *Restoration and Enhancement Alternatives for the Chula Vista Bayfront.*

project goals described in the NRMP is no net loss of habitat due to climate change in the project area. The project also includes the establishment of Habitat Buffer Areas (No-Touch, Limited Use, and Transitional Use) to protect adjacent National Wildlife Refuge habitat areas. A significant portion of the natural habitat areas are within the Sweetwater District.[108]

Community Infrastructure/Economic Resilience

The project development includes hotels and commercial buildings, which create jobs and generate revenue to the Port and the City of Chula Vista.[109]

Key Challenges

Similar to the Imperial Beach Bayshore Bikeway Resiliency project, SLR challenges involved with this project include collaboration across jurisdictions, the extensive regulatory process, and the need to incorporate community equity. However, the nature of these challenges differs from the Bayshore Bikeway Resiliency project. As a vast portion of land co-managed by the Port and the City of Chula Vista,[110] the project does not include as much jurisdictional overlap, but has the space to accommodate input from neighboring jurisdictions. A necessary component of the project was input and support from the USFWS, due to the proximity of the project to the Sweetwater Unit of the San Diego Bay National Wildlife Refuge, which led to the design of the Sweetwater District as a primarily park and habitat area.[111] Due to the lack of jurisdictional overlap within the project area, the Port and City were required to follow several procedures to ensure that the project impacts were considered and mitigated. The Port is also a large entity with several sources of revenue and extensive experience in real estate and permitting, so the project's equity challenges have less to do with budgeting and more to do with addressing the historical underutilization of the bayfront by Chula Vista residents.

To compare to the Bayshore Bikeway Resiliency Project, the Chula Vista Bayfront Redevelopment will require significantly less environmental permitting. Most components of the project will not require regulatory permits, though San Diego Regional Water Quality Control Board 401 Certification and U.S. Army Corp of Engineers permits are required for projects that are directly adjacent to the bay or navigable waters. The Port has extensive experience with applying for these permits, which is helpful when moving through the permitting process.[112] Also, the NRMP specifically outlines all required mitigation, monitoring,

[108] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[109] Port of San Diego (2022). *Chula Vista Bayfront Redevelopment*. https://www.portofsandiego.org/projects/chula-vista-bayfront. Accessed June 8, 2022.
[110] City of Chula Vista (2017). *Chula Vista Bayfront Local Coastal Program Land Use Plan.*
[111] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[112] H. Kramp, Port of San Diego (personal communication, June 10, 2022).

and reporting requirements associated with the development and habitat restoration projects.[113]

Similar to the Bayshore Bikeway Resiliency project in Imperial Beach, the extensive regulatory process was identified as a challenge for accomplishing projects along the coastline, particularly regarding SLR. Permitting approval can be a lengthy, complicated process, particularly for ecological restoration projects.[114] As sea levels rise, there is a need to obtain permitting approval for beneficial SLR adaptation projects so that the projects can be implemented before they are met with rising tides.

The challenge of cross-jurisdictional collaboration for this project does not come from differing priorities between overlapping jurisdictions within the project area, but rather from making sure that voices are included to provide diverse perspectives on the project. The Port and City have jurisdiction over the project area, but without input from other entities, the project runs the risk of solely serving specific groups and excluding others. To address this concern, a Wildlife Advisory Group (WAG) and Bayfront Cultural and Design Committee (BCDC) were required to be formed following a Settlement Agreement between the Port, the City, and the Bayfront Coalition, which includes the Environmental Health Coalition, San Diego Audubon Society, San Diego Coastkeeper, the Coastal Environmental Rights Foundation, Southwest Wetlands Interpretive Association, the Surfrider Foundation (San Diego Chapter), and Empower San Diego.[115]

For this project, the equity challenge comes from ensuring that residents feel safe and welcome along the coastline, and ensuring that connection and access to the coastline within the project area is maintained or improved over time as sea levels rise. Past industrial actions and ocean dumping led to inaccessibility and pollution of the bayfront. The existing Bayside Park provides connections and access for Chula Vista residents, and the project has the opportunity to continue building these connections. However, providing these connections while also restoring habitat in historically degraded areas can require tradeoffs. The project includes a direct tradeoff between coastal access and natural resources through the establishment of Habitat Buffer Areas that restrict access to provide natural habitat protection.

As sea levels rise, some of the planned parks and habitat will be threatened by inundation. Similar to Imperial Beach, the proximity of development to the coastline means that these areas may also be susceptible to coastal squeeze as sea levels draw closer to the buildings and other hard infrastructure. However, a key difference is that a large portion of the infrastructure on the Chula Vista bayfront has not been built yet. Incorporating SLR as part of the project will need to include maintaining coastal access as a right to be enjoyed by all members of the public,

---

[113] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*
[114] California Natural Resources Agency (2018). *Cutting Green Tape.* https://resources.ca.gov/Initiatives/Cutting-Green-Tape. Accessed June 10, 2022.
[115] City of Chula Vista and Port of San Diego (2016). *Chula Vista Bayfront Master Plan: Natural Resources Management Plan.*

protected by the Public Trust Doctrine. A continued effort is necessary to make sure those connections to parks and natural habitats are maintained and improved over time, and that SLR resiliency measures do not just protect the hard infrastructure.

Discussion/Recommendations

The two case studies emphasize the fact that SLR will need to be integrated into all planning along the coastline. Policy priorities coming from the state are designed to lead this effort and provide grand visions that provide many benefits in concept, but are often difficult to implement in practice. The challenges identified for the two case studies above highlight the fact that each coastal adaptation project is unique, and there is no "one size fits all" solution to SLR. It is important to consider SLR at the project level and recognize the unique characteristics of the ecological setting, surrounding community, and SLR impacts. At the same time, the actions of one project can impact the adjacent areas. Therefore, there is a need for regional collaboration to address these separate but integrated projects and ensure that the policies support holistic project implementation.

The case studies show that state policy priorities often need to be adapted to fit the needs of the project. In the Chula Vista Bayfront Redevelopment project, the creation of three districts within the project area helps distinguish where areas may be more successful as protected habitat, public park, or revenue-generating infrastructure. But in the Imperial Beach Bayshore Bikeway Resiliency Project, adaptation strategies are more complex and integrated. A blend of natural shoreline and hard infrastructure can create multiple benefits. Raising the bike path to provide infrastructure protection could open up more tidal flow into the wetland area which helps to sustain these habitats and restores natural connection to the bay. Both projects will be challenged by coastal squeeze as sea levels rise, and will need to incorporate future efforts to address this challenge.

Although each case study has unique jurisdictional challenges, both show that land ownership and authority play a significant role in project planning and implementation. In Imperial Beach, several different jurisdictions overlap within a project area, creating collaboration challenges. In Chula Vista, the Port and City have jurisdiction over a large area of land, and can make coastal decisions that impact a large group of people. All of the entities along the south Bay shoreline are in charge of the Public Trust, but each entity has different priorities on how the land should be managed. As the landward extent of the public trust changes with SLR, there will be more of a need to collaborate across jurisdictions.

Another finding, though unique to each case study, is the need to promote equity. In Imperial Beach, lack of funding challenges project implementation. At the state level, the focus must be on equitably distributing funds to support underserved communities whose challenges extend beyond coastal inundation. Regional efforts can support the need to prioritize lower income communities by providing regional assessments of social vulnerability to SLR. This data can then be used to inform state funding decisions.

In Chula Vista, historical pollution and inequities has led to a lack of community connection with San Diego Bay. Many of the state-level policies emphasize the need to address environmental justice through public engagement, education, and outreach, including all relevant stakeholders, consulting with California Native American Tribes, accounting for social and economic needs, and ensuring accessibility to the coast. However, there is a lack of specificity and tangible actions in these policies. The policies tend to focus on providing future equity, but do not address the historical and current factors that have led to these inequities.

Planning for SLR provides an opportunity to examine inequities caused by past and present actions and incorporate solutions to these challenges in future planning efforts. These efforts should be ongoing and can include providing opportunities to invite community members to the coast and engage in activities to show that the bayfront is a safe space that belongs to all members of the public. One such effort that already exists in Chula Vista is the Living Coast Discovery Center, which provides an immersive education space for members of the public to learn and experience the natural resources of the Chula Vista bayfront.[116] Other efforts include providing amenities that would make the shoreline a more inviting space. These amenities can include adequate bathrooms, parking, multilingual and educational signage, usable trails for strollers, and multiple and strategic access points. By providing a space that is truly inviting and accessible to all, these efforts can promote public engagement and generate stewardship that can last over generations.

These findings can help inform regional efforts to address SLR that already exist in San Diego. One existing effort is the San Diego Regional Climate Collaborative SLR Working Group, which consists of public agencies, scientists, non-profit organizations, and business and community leaders working together to provide resources across jurisdictions.[117] The Port has also helped lead regional efforts through the development of the Integrated Natural Resources Management Plan[118] and planned Shoreline Atlas, an effort to map the infrastructure and habitats along the entire bay and assess potential living shoreline projects and green or gray solutions to shoreline armoring.[119] As SLR projects in south San Diego are relatively new (the Imperial Beach Bayshore Bikeway Resiliency project is one of the first of its kind), identifying the unique project aspects can help build on these existing regional efforts and support collaborative planning.

Conclusion

The projects and unique challenges identified in this analysis are representative of one specific area that will be impacted by SLR. However, these challenges are likely not exclusive to the

[116] Living Coast Discovery Center (2022). https://www.thelivingcoast.org/. Accessed June 8, 2022.
[117] University of San Diego (2022). *San Diego Regional Climate Collaborative*. https://www.sandiego.edu/soles/hub-nonprofit/initiatives/climate-collaborative/. Accessed June 8, 2022.
[118] U.S. Department of the Navy, Naval Facilities Engineering Command Southwest and Port of San Diego. (2013). *San Diego Bay Integrated Natural Resources Management Plan, Final September 2013*. San Diego, California. Prepared by Tierra Data Inc., Escondido, California.
[119] H. Kramp, Port of San Diego (personal communication, June 8, 2022).

South Bay region. By providing a deep dive into the ways that policies are considered in on-the-ground planning efforts, this analysis is intended to help foster dialogue between local and regional jurisdictions and California state government about how to overcome these challenges. Through thoughtful collaboration, jurisdictions can work towards successfully implementing SLR adaptation projects that provide multiple economic, environmental, and socially equitable outcomes that provide enjoyment of the coastline by all over generations.