



Chapter 1. Introduction

Climate change is happening now. Rapidly melting ice caps, rising sea levels, floods, extreme heat waves, droughts, and fires are just a few of the effects of climate change. These effects are having profound impacts on our coast and are changing coastal management planning and decision making at global, national, state, regional, local, and individual scales.

Given current trends in greenhouse gas emissions, sea levels are expected to rise at an accelerating rate in the future, and scientists project an increase in California’s sea level in coming decades. Until mid-century, the most damaging events for the California coast will likely be dominated by large El Niño-driven storm events in combination with high tides and large waves. Eventually, sea level will rise enough that even small storms will cause significant damage, and large events will have unprecedented consequences (Caldwell *et al.* 2013; Vitousek *et al.*, 2017).

With a 1,270-mile coastline, adequately planning for sea level rise in California is a challenging but vital task. Underlying this complexity are generations of discriminatory land use practices and policies and loss of native sacred lands and cultural resources, which has resulted in an inequitable distribution of environmental burdens and benefits among different groups of people (US EPA, 2022). At its core, the California Coastal Act of 1976 is a statute inherently grounded in the principle of equality. Yet, despite numerous victories, the statute’s vision of coastal protection and access for all people has not been fully realized. Further, the long-term legacy of institutional racism in land use planning, public policy, lending institutes, and policing continues to be reflected in the built environment and demographic and socioeconomic make-up of the California coast today. As a result, sea level rise will affect different communities throughout California disproportionately based on several factors such as geography, geology, hydrology, ecology, land use, and social characteristics.

This Guidance provides a framework for addressing sea level rise in Local Coastal Programs (LCPs) and Coastal Development Permits (CDPs). Importantly, environmental justice and equity principles, as described in the Commission’s Environmental Justice Policy, have been integrated into this Guidance with the goal that the impacts of climate change are addressed in a way that is fair and equitable, particularly for communities that have been disproportionately impacted by climate-related hazards. The intended audience for this document includes the Commission and Commission staff, local governments, other public agencies, permit applicants, community-based organizations, environmental justice communities, tribal governments, members of the public, and others who are interested in how to implement and comply with the California Coastal Act (Coastal Act) while taking steps to address sea level rise.

ENVIRONMENTAL, ECONOMIC, AND SOCIAL IMPACTS OF SEA LEVEL RISE

Environmental Impacts: The environmental impacts of sea level rise in California are both extensive and multifaceted, demanding a nuanced understanding to inform effective land use and conservation strategies. As sea level rise continues, key habitats such as coastal wetlands and beach ecosystems face significant threats, which in turn affect the biodiversity and

ecological services they provide. Coastal wetlands, for example, serve as crucial buffers against storm surges and flooding, while also acting as vital carbon sinks. Similarly, beaches, which offer vital nesting grounds for wildlife and recreational spaces for communities, risk severe erosion and habitat degradation due to encroaching seas, undermining their protective and ecological functions. However, rising sea levels could inundate these areas, leading to habitat loss and diminished capacity to support wildlife and mitigate climate impacts.

The degradation of coastal habitats due to rising sea levels poses a direct threat not only to California's ecological systems but also forecasts broader economic and social repercussions. The erosion of beaches and the inundation of wetlands, which provide critical ecosystem services, foreshadow potential disruptions across various sectors reliant on these natural resources. The looming threats extend beyond environmental loss, predicting significant impacts on tourism, recreation, and the livelihoods of communities that depend heavily on these coastal resources.

Economic and Social Impacts: The potential economic and social impacts of sea level rise in California underscore the importance of addressing the issue in land use planning and regulatory work. According to the NOAA Office for Coastal Management, just over 26 million people lived in California's coastal counties as of 2015. In 2020, California's marine economy supported over 26,000 businesses employing over 470,000 people, which accounted for \$23.1 billion in wages and \$41.9 billion in gross domestic product (NOAA, 2023).

Many aspects of the coastal economy, as well as California's broader economy, are at risk from sea level rise, including coastal-related tourism, beach and ocean recreational activities, transfer of goods and services through ports and transportation networks, coastal agriculture, and commercial fishing and aquaculture facilities. Importantly, many of these industries include historically marginalized groups that are reliant on coastal resources for their livelihood, and safeguards for their job security are critical for the coastal economy.

In addition to potential losses in revenue, the U.S. Geological Survey's Hazard Exposure Reporting and Analytics ([HERA](#)) tool estimates that parcels valued at \$176 billion total are at risk from 2 meters of sea level rise, which represents almost 200,000 housing units, over 440,000 residents, and over 470,000 employees (Wood et al., 2020). This property also includes over 3,500 miles of roads, 289 miles of railroad, 24 wastewater treatment plants, 32 drinking water plants, and 18 solid waste landfills (Wood et al., 2020). The Fourth California Climate Assessment found that statewide damages could reach nearly \$17.9 billion from inundation of development with ~20 inches of sea level rise, and those damages would double with the addition of a 100-year flood (Bedsworth et al., 2018). Furthermore, a USGS study found that in Southern California alone, sea level rise of 3 to 6 feet could cause up to two-thirds of beaches to disappear (Vitousek et al., 2017) if no actions are taken. Some common adaptation actions include armoring with seawalls and revetments, which have commonly been employed to protect infrastructure. Other strategies include implementing nature-based adaptation strategies such as restoring coastal wetlands and using native vegetation that could mitigate erosion and enhance the resilience of coastal ecosystems.

Sea level rise will also have far-reaching effects for coastal communities and populations beyond direct economic impacts. This is particularly true for communities dependent on at-risk industries that are reliant on being adjacent to the coastline, those already facing economic hardship, and populations with limited capacity to adapt, including lower-income, linguistically isolated, elderly, and other vulnerable populations. Sea level rise presents paramount environmental and social justice challenges in a manner that may unequally burden different communities, and it is important to examine social vulnerability to fully understand the community and human livelihood components of climate change and sea level rise vulnerability.

Social vulnerability focuses on the susceptibility of a given community or population to harm from exposure to a hazard and affects the ability of that population to prepare for, respond to, and recover from the hazard (Cutter *et al.*, 2009). This is partly influenced by existing social inequities among various groups of people (Cutter *et al.*, 2003). Socially vulnerable communities experience heightened risk and increased sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. These disproportionate effects are caused by physical (built and environmental), social, political, and/or economic factor(s), such as race, class, sexual orientation and identification, national origin, and income inequality, and disability (Governor’s Office of Planning and Research, 2024). For example, low-income residents in the coastal zone or those who reside in affordable housing near the coast may have a higher vulnerability to sea level rise and coastal flooding as they have fewer financial resources to protect against and recover from flood damage or property loss (US EPA, 2021).

Discussed further in [Chapter 4](#), the loss of coastal areas will also adversely affect tribal communities for whom these lands support ancestral and cultural practices. The projected impacts of rising seas threaten to inundate sacred sites and disrupt traditional activities, exacerbating historical injustices faced by these communities. Addressing sea level rise in areas significant to tribal communities requires tailored strategies that prioritize the protection of these culturally significant sites and support the continuation of traditional ecological knowledge and practices. This nuanced approach is essential for ensuring that adaptation efforts respect and integrate the unique needs and rights of tribal communities within broader environmental justice frameworks.

Environmental justice is inclusive of tribal and indigenous communities due to their disproportionate exposure to environmental burdens, lack of access to environmental benefits, and systemic oppression. However, it is imperative to recognize both the overlap and the distinction between environmental justice and tribal issues, especially since the lack of meaningful involvement, accountability, and transparency from government has resulted in inequities for both groups. The Commission’s [Tribal Consultation Policy](#) provides guidance to Commission staff for maintaining effective communication with tribes, including for LCPs and CDPs that may have a sea level rise component affecting tribal communities and tribal cultural resources. It outlines procedures for government-to-government consultation and meaningful engagement between staff and tribes to strengthen the agency’s relationships with California

Native American Tribes, while encouraging further outreach and collaboration. It is highly recommended and encouraged that local governments and project applicants review the Tribal Consultation Policy for specific information regarding meaningful engagement, outreach, and inclusion of tribal communities.

Proactive steps are needed to prepare for sea level rise and to protect the coastal economy, California livelihoods, and coastal resources and the ecosystem services they provide. The magnitude of the challenge is clear – not only might the impacts of sea level rise be severe, the costs, complexity, and time associated with planning for them can be daunting. The [third National Climate Assessment](#), released in May 2014, notes that there is strong evidence to suggest that the costs of inaction are 4 to 10 times greater than the costs associated with proactive adaptation and hazard mitigation (Moser *et al.* 2014). It is critical for California to take proactive steps, with a concerted focus on equity and justice, to address the impacts sea level rise may have on the state’s economy, natural systems, built environment, human health, and ultimately, its way of life.

SEA LEVEL RISE AND THE CALIFORNIA COASTAL ACT

The potential impacts of sea level rise fall directly within the Coastal Commission’s (and coastal zone local governments’) planning and regulatory responsibilities under the Coastal Act. Sea level rise increases the risk of flooding, coastal erosion, and saltwater intrusion into freshwater supplies, which have the potential to threaten many of the resources⁸ that are integral to the California coast, including coastal development, coastal access and recreation, habitats (e.g., wetlands, coastal bluffs, dunes, and beaches), coastal agricultural lands, water quality and supply, cultural resources, community character, and scenic quality. In addition, many possible responses to sea level rise, such as construction of barriers or armoring, can have adverse impacts on coastal resources. For example, beaches, wetlands, and other habitat backed by fixed or permanent development will not be able to migrate inland as sea level rises, and will become permanently inundated over time, which in turn presents serious concerns for future public access and habitat protection.

The Coastal Act mandates the protection of public access and recreation along the coast, coastal habitats, and other sensitive resources, as well as providing priority visitor-serving and coastal-dependent or coastal-related development while simultaneously minimizing risks from coastal hazards. This Guidance document has been created to help planners, project applicants, and other interested parties continue to achieve these goals in the face of sea level rise by addressing its effects in Local Coastal Programs and Coastal Development Permits. Although the focus of the Guidance is on LCPs and CDPs, much of the information contained herein can be

⁸ The term “coastal resources” is used throughout this Guidance and is meant to be a general term for those resources addressed in Chapter 3 of the California Coastal Act including but not limited to beaches, wetlands, agricultural lands, and other coastal habitats; coastal development; public access and recreation opportunities; cultural, archaeological, and paleontological resources; and scenic and visual qualities.

useful for other planning documents such as Port Master Plans,⁹ Long Range Development Plans, and Public Works Plans. For example, the science applies regardless of the planning documents, and the discussions of how to analyze sea level rise impacts as well as a number of adaptation options may be applicable. In all cases, specific analyses performed and actions implemented will vary based on relevant policies, local conditions, feasibility, and other factors as described throughout the rest of this document.

Coastal Commission reports and briefings on sea level rise: Sea level rise is not a new concern for the Commission. The Coastal Act policies on hazard avoidance and coastal resource protection provide the basis for the Commission to consider the impacts of sea level rise (see [Appendix E: Coastal Act Policies Relevant to Sea Level Rise and Coastal Hazards](#)), and the Commission has long considered sea level rise, erosion rates, and other effects of a dynamic climate in its analysis of permits and LCPs, staff recommendations, and Commission decisions. In 1992, Section 30006.5 was added to the Coastal Act which, among other things, directs the Commission to both develop its own expertise and interact with the scientific community on various technical issues, including coastal erosion and sea level rise. In 2021, the California legislature added Section 30270 to the Coastal Act, which requires the Commission to take into account the effects of sea level rise in its policies and activities. The Commission's staff also coordinates its work on sea level rise with other state and federal agencies, local governments, academic institutions, non-profit organizations, citizen groups, permit applicants, property owners, and others.

The Commission has documented its sea level rise adaptation and climate change efforts in numerous papers and briefings, including:

- 1989 Report: [Planning for Accelerated Sea Level Rise along the California Coast](#)
- 2001 Report: [Overview of Sea Level Rise and Some Implications for Coastal California](#)
- 2006 Briefing: [Discussion Draft: Global Warming and the California Coastal Commission](#)
- 2008 Briefing: [A Summary of the Coastal Commission's Involvement in Climate Change and Global Warming Issues for a Briefing to the Coastal Commission](#)
- 2008 White Paper: [Climate Change and Research Considerations](#)
- 2010 Briefing: [A Summary of the Coastal Commission's Involvement in Sea Level Rise Issues for a Briefing to the Coastal Commission](#)¹⁰
- 2016 Report: [CCC Statewide Sea Level Rise Vulnerability Synthesis](#)

⁹ Ports are generally subject to Chapter 8 of the Coastal Act. The policies of Chapter 8 acknowledge the special role and needs of ports and differ in significant ways from the Chapter 3 policies of the Act. Significant categories of development in ports, however, remain subject to Chapter 3, including categories of development listed as appealable pursuant to Section 30715 and development located within specified wetlands, estuaries, and recreation areas.

¹⁰ Verbal presentation to the Coastal Commission on December 17, 2010 by Susan Hansch (Item 4.5). This presentation can be viewed at the Cal-Span [website](#) from approximately minute 22:00 to 24:30.

- 2016 Briefing: [Implementation of the Adopted Sea Level Rise Policy Guidance](#)
- 2019-2020 Commission Sea Level Rise Briefing Series: A series of presentations on the status of local sea level rise adaptation planning efforts at Commission meetings ([August 2019](#), [September 2019](#), [October 2019](#), [November 2019](#), [March 2020](#), [September 2020](#))
- 2021 Report: [Critical Infrastructure at Risk: Sea Level Rise Planning Guidance for California’s Coastal Zone](#)
- 2023 Report: [Public Trust Guiding Principles and Action Plan: Carrying out the California Coastal Act and Public Trust Doctrine in an era of climate change and sea level rise](#)

THE IMPORTANCE OF ADDRESSING SEA LEVEL RISE IN LOCAL COASTAL PROGRAMS

The impacts of sea level rise will be felt at the local level, and therefore local responses will necessarily be part of effective management of these impacts. Fortunately, the California Coastal Act lays out a legal and planning framework for community climate preparedness and resiliency planning. LCPs, in combination with Coastal Development Permits (CDPs), provide the implementing mechanisms for addressing many aspects of climate change within coastal communities at the local level. Notably, the State recognized the importance of both sea level rise adaptation planning and the role of LCPs with the passage of SB 272 (Laird) in 2023. This bill requires local governments in the coastal zone to develop (and submit to the Commission) a sea level rise plan as part of an LCP by January 1, 2034.¹¹ Specific requirements and guidance for ensuring consistency with SB 272 are highlighted in [Chapter 5](#).

The goal of updating or developing a new LCP to prepare for sea level rise is to ensure that adaptation occurs in a way that protects both coastal resources and public safety and allows for sustainable economic growth. This process includes identifying how and where to apply different adaptation mechanisms based on Coastal Act requirements, SB 272 and other relevant laws and policies, acceptable levels of risk, and community priorities. LCP and Coastal Act policies are also reflected in CDPs, which implement sea level rise management measures and adaptation strategies through individual development decisions. By planning ahead, communities can reduce the risk of costly damage from coastal hazards, can ensure the coastal economy continues to thrive, and can protect coastal habitats, public access and recreation, and other coastal resources for current and future generations.

The Coastal Commission has continued to make it a priority to support the update of LCPs to address climate change, as demonstrated by Goals 4 and 6 of the Commission’s [Strategic Plan](#) (CCC 2021), which are to “support resilient coastal communities in the face of climate change

¹¹ Note that SB 272 also includes a requirement for local jurisdictions within San Francisco Bay to develop plans that are subject to review by the Bay Conservation and Development Commission (BCDC). The basic requirements are the same for both agencies/plan types, and Commission and BCDC staff have coordinated to develop guidelines pursuant to the requirements of SB 272; however, some specific details and best practices will vary based on differences between relevant enacting legislation (the Coastal Act versus the McAttee-Petris Act) and planning contexts. More information on BCDC’s work to implement SB 272 can be found through the BCDC [Regional Shoreline Adaptation Plan](#).

and sea level rise” and to “continue to enhance LCP planning program and refine implementation of regulatory program.” Specifically, Objective 4.1 directs the Commission to “address climate change risks in the Commission’s planning and permitting work through stakeholder collaboration and integration of sea level rise hazards into Local Coastal Programs (LCPs).”

In furtherance of these goals, the Coastal Commission has been working with a Local Government Working Group (LGWG) since 2019 to develop solutions to better address sea level rise adaptation planning and LCP updates. In November 2020, the LGWG, which consists of representatives from the California State Association of Counties (CSAC), the League of California Cities (Cal Cities), Coastal Commission staff, and a Coastal Commission subcommittee including two Coastal Commissioners, presented (and the Commission adopted) a [Joint Statement on Adaptation Planning](#). The Joint Statement includes a set of guiding principles, challenges, opportunities, and actions associated with proactive and effective sea level rise adaptation for California’s coastal communities. In December 2021, the Commission adopted [deliverables](#) related to specific requests for tools and coordination improvements (including a “Quick Links” guide and an “Elevation and Concurrence Process”) as well as broader-scale recommendations and guidance for LCP updates (including a call for “Regional Approaches to Resiliency and Adaptation” and a “Framework for a Phased Approach to SLR LCP Updates”). The LGWG is continuing to work to better understand the policy conflicts and other challenges facing communities as they attempt to update LCPs to address sea level rise, and developing possible approaches for addressing some of these challenges.

LCPs are also an important tool to help local governments formally acknowledge environmental justice through development of local policies to address equity-related issues in land use planning and in analyses of proposed development in the coastal zone. However, taking steps to consider and address environmental justice requires institutions to challenge the status quo, which can be uncomfortable but crucial if government is to shift its role from perpetuating systemic inequities to addressing them and building a more just and equitable society. Building awareness of and implementing environmental justice principles, proactively engaging with and including environmental justice communities in decision making, and thinking about ways to modify current approaches to land use planning and environmental analysis as it relates to sea level rise are all necessary to achieve environmental justice. The Commission and local governments have an opportunity to act on this by updating LCPs with policies to address environmental justice principles and concerns. Proactive planning can provide decision makers and the public with a framework for talking about and addressing these issues up front, which can significantly reduce conflicts later in the process. Given this, the Commission strongly encourages local governments to develop environmental justice policies and amend their LCPs accordingly.

Funding for LCP updates: Several funding programs are available to support California local governments in updating LCPs to address sea level rise. These grant programs have partially overlapping objectives, as described below.

- **Coastal Commission LCP Local Assistance Grant Program:** This grant program provides funding to local governments to complete the certification of new and updated LCPs, with an emphasis on addressing impacts from sea level rise and climate change. Grant-funded work has included the completion of sea level rise vulnerability assessments, technical studies, economic analyses, adaptation planning and reports, public outreach and engagement, and LCP policy development. Importantly, the evaluation criteria and program priorities for this grant program have been refined over time to recognize environmental justice as its own criterion. Specific changes have clarified that while public outreach and environmental justice are sometimes related, they are not one and the same, and grant changes encourage grant applicants to address environmental justice issues beyond outreach and engagement. Between 2013 and 2024, this program awarded approximately \$20 million in grants to over 40 jurisdictions. As of the publication of this guidance, the program has significant funding available to continue supporting local government work. For up-to-date information regarding this program, including program priorities, eligibility, and selection criteria, please visit the [Local Assistance Grant Program](#) page on the Coastal Commission website.
- **Ocean Protection Council SB1 Grant Program:** OPC's SB 1 SLR Adaptation Planning Grant Program (SB 1 Grant Program) aims to provide funding for coastal communities to develop consistent SLR adaptation plans and projects to build resilience to SLR along the entire coast of California and San Francisco Bay. One track funds projects in the pre-planning, data collection, and planning phases, and another funds projects in the implementation phase. For more information, please visit the OPC SB 1 grant program [website](#).
- **State Coastal Conservancy Grant Programs:** The Coastal Conservancy has a variety of grant programs to support increased public access to and along the coast, protection and restoration of natural lands and wildlife habitat, preservation of working lands, and increased community resilience to climate change. Funding can support a variety of project stages including feasibility studies, property acquisition, community engagement, environmental review, and monitoring. More information on Conservancy grants can be found on their [website](#).

COASTAL RESILIENCY AND PREPARING FOR SEA LEVEL RISE: THE FEDERAL AND STATE CONTEXT

Sea level rise planning efforts are currently taking place at the local, regional, state, and national levels. Framing the efforts in California is a federal strategy to address climate change by both reducing greenhouse gas emissions and adapting to climate change impacts. In January 2015, President Obama's Executive Order 13960 modified Executive Order 11988, Floodplain Management, by expanding the federal approach for establishing flood risk to include the consideration of climate change. Specifically, it recommends using a new flood standard that accounts for climate change in establishing flood elevation and hazard areas when federal funds are used to build, significantly retrofit, or repair structures.

Additionally, Governor Brown, Supervisor Carbajal (Santa Barbara County), Mayor Garcetti (Los Angeles), and Mayor Johnson (Sacramento) were on President Obama’s State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience, which gave [recommendations](#) in 2014 for how to modernize programs and policies to incorporate climate change.¹² The Coastal Commission’s Guidance document implements many of the Task Force’s recommendations by providing tools and assistance to support sea level rise decision making, by establishing a framework for state, local, and federal partnership and coordination on sea level rise, and by providing guidance on how to improve the resilience of California’s coastal infrastructure, natural resources, human communities, and coastal industries.

The State of California has long been a leader in preparing for sea level rise, and in 2008, Governor Schwarzenegger issued an Executive Order (S-13-08) directing state agencies to prepare guidance on sea level rise and to address sea level rise in any state projects located in vulnerable areas. Since then, state agencies have worked collaboratively to accomplish a variety of different actions related to sea level rise adaptation, many of which are listed below. Ten state and federal agencies¹³ also commissioned the National Research Council’s report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012), to improve understanding of sea level rise projections for California.

In April 2015, Governor Brown’s Executive Order B-30-15 addressed climate change and sea level rise adaptation, stating that state agencies shall take climate change into account in their planning and investment decisions. The order requires agencies to ensure that priority is given to actions that build climate preparedness and reduce greenhouse gas emissions, provide flexible and adaptive approaches, protect the state’s most vulnerable populations, and promote natural infrastructure solutions. Additionally, AB 2516, authored by Assemblymember Gordon and approved in September 2014, established a Planning for Sea Level Rise Database, now called the [Adaptation Clearinghouse](#). The database provides the public with a searchable library of resources from which to learn about the actions taken by cities, counties, regions, and various public and private entities to address sea level rise and other climate change impacts.

In the 2010s, much of the state’s climate change adaptation work was coordinated with the Coast and Ocean Workgroup of the Climate Action Team (CO-CAT), of which the Commission was a member. In addition, Commission staff has been involved in the State Coastal Leadership Group on Sea-Level Rise (now the California Sea Level Rise State and Regional Support Collaborative), which was established in early 2014 to develop and implement coordinated approaches to address sea level rise across state agencies. The partnership includes staff from the Coastal Zone Management Agencies (Coastal Commission, San Francisco Bay Conservation

¹² <https://obamawhitehouse.archives.gov/administration/eop/ceq/initiatives/resilience/taskforce>

¹³ The assessment of sea level rise was commissioned by California Department of Water Resources, California Energy Commission, California Department of Transportation, California State Water Resources Control Board, California Ocean Protection Council, Oregon Watershed Enhancement Board, Washington Department of Ecology, National Oceanic and Atmospheric Administration (NOAA), US Army Corps of Engineers (USACE), and US Geological Survey (USGS).

and Development Commission, and State Coastal Conservancy) and land management agencies (State Lands Commission and State Parks) along with the Ocean Protection Council and Natural Resources Agency and others. Under CNRA’s leadership, this group co-developed [Making California’s Coast Resilient to Sea Level Rise: Principles for Aligned State Action](#) (2020) and the [State Agency Sea-Level Rise Action Plan for California](#) (2022).

The content of this Guidance is also aligned with several key concepts in the [California Climate Adaptation Strategy](#), including hazard avoidance for new development, increasing meaningful engagement and partnerships with underserved communities to develop adaptation strategies, encouraging innovative designs and nature-based adaptation strategies for areas vulnerable to sea level rise hazards, and addressing climate impacts in coastal adaptation plans, Local Coastal Programs, and General Plan updates, among many others. As the [Climate Adaptation Strategy](#) promotes, this Guidance will be a living document that will be updated and revised as sea level rise science advances and new insights are gained regarding adaptation.

State agency policies and guidance on climate change and sea level rise: As a result of the Executive Order S-13-08 and agency needs for guidance, many state agencies have developed climate change and sea level rise policies and guidance documents. For example:

- The California Natural Resources Agency (CNRA) developed the 2009 [California Climate Adaptation Strategy](#) and the [2014](#), [2018](#), and [2021](#) updates
- CNRA and the Governor’s Office of Emergency Services (Cal OES) collaboratively developed and updated the [California Climate Adaptation Planning Guide](#) (2020)
- The Governor’s Office of Planning and Research developed and updated its [General Plan Guidelines](#) (2023) to address climate change
- The Ocean Protection Council established *State Sea-Level Rise Guidance* ([interim](#), 2010, [2013](#), [2018](#), and [2024](#)) and developed both the [Making California’s Coast Resilient to Sea Level Rise: Principles for Aligned State Action](#) (2020) and the [State Agency Sea-Level Rise Action Plan for California](#) (2022)
- The San Francisco Bay Conservation and Development Commission (BCDC) amended the [San Francisco Bay Plan](#) (1968) to update its policies regarding sea level rise (2011) and to integrate environmental justice and social equity considerations (2019). The agency’s [San Francisco Bay Plan Climate Change Policy Guidance](#) was adopted in 2021. The agency has also been working on actions to reduce vulnerability to sea level rise throughout the San Francisco Bay through the [Adapting to the Rising Tides](#) (ART) program, the [Adaptation Roadmap](#), and the [Bay Adapt Joint Platform](#). BCDC is also developing a [Regional Shoreline Adaptation Plan which will provide information on complying with SB 272 within BCDC’s jurisdiction](#).
- The California State Coastal Conservancy (Conservancy) established [climate change policies](#) (2011), a [sea level rise vulnerability assessment checklist](#) (2019), and a number of [grant programs](#).
- Cal OES updated the [California State Hazard Mitigation Plan](#) in 2023.

- The California Department of Transportation (Caltrans) developed a number of resources and reports available [here](#) and [here](#), including a Caltrans Climate Change Vulnerability Assessment Summary Report (2021) and [Climate Change Vulnerability Assessments](#) (2019) and [Adaptation Priorities Reports](#) (2020) for each Caltrans District (which will be updated in 2024 along with the District Adaptation Priorities Investment Strategy (DAPIS) for each District). Caltrans also produced the [State Climate Resilience Improvement Plan for Transportation](#) (2024), [Adaptation Strategies for Transportation Infrastructure](#) (2023), [Climate Change Emphasis Area Guidance for Corridor Planning](#) (2022), as well as guidance on incorporating sea level rise risk analysis into the planning documents and project designs (2011, with an update coming soon). The California State Transportation Agency (CalSTA) also published the [Climate Action Plan for Transportation Infrastructure](#) (CAPTI, 2021). The 2023 [State Highway System Management Plan](#) (SHSMP) (Caltrans 2023) also includes a sea level rise adaptation needs assessment for roadways and bridges which estimates a need for \$15.4 billion by 2033 and \$56 billion by 2100 to address impacts. To begin to address these needs, an investment of \$1.8 billion was made within this ten-year plan for the state highway system.
- The California State Lands Commission offers resources for addressing SLR [here](#), including an [AB 691 Synthesis Report](#) (2022) and individual [Sea Level Rise Impact Assessments](#) by local trustees, and has adopted a report entitled, [Shoreline Adaptation and the Public Trust: Protecting California's Public Trust Resources from Sea Level Rise](#) (2023).
- California Department of Parks and Recreation have adopted a Sea Level Rise Adaptation Strategy and provide a number of other resources [here](#).
- The California Department of Fish and Wildlife, the Division of Boating and Waterways, and the Department of Water Resources are all actively addressing sea level rise and have taken steps to conduct research on sea level rise impacts, integrate sea level rise into planning documents, and educate staff on climate change impacts.

FEDERAL AND STATE ACTION ON ENVIRONMENTAL JUSTICE AND SEA LEVEL RISE PLANNING

There is a growing body of literature examining the disproportionate burdens that climate change places on environmental justice communities throughout the United States. Simultaneously, there is an increase in the frequency of water-related natural disasters such as hurricanes, heavy rainstorms, and coastal flooding. This has led to an increased awareness of the intersection of environmental justice and sea level rise in the United States' political and regulatory landscape. The federal government's recognition of this issue area has resulted in additional studies, policy recommendations, mapping and other digital tools, and increased allocation of funding to environmental justice communities.

In 2021, the Biden Administration signed [Executive Order 14008](#) on Tackling the Climate Crisis at Home and Abroad, which marked a watershed moment for the environmental justice movement and its integration into the federal government. Executive Order 14008 highlights

that all Americans deserve to live in healthy, thriving communities, but that many people lack the ability to access safe places to live, work, play, grow, and learn (The White House, 2021). It also established a White House Environmental Justice Interagency Council (IAC), the first-ever advisory committee on environmental justice called the White House Environmental Justice Advisory Council (WHEJAC), and a government-wide environmental justice initiative called Justice40 (The White House, 2022). [Justice40](#) establishes a goal that 40% of the overall benefits of certain federal climate, clean energy, affordable and sustainable housing, and other investments flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution. In 2023, the Biden Administration reaffirmed its commitment to environmental justice and its intersection with climate change by signing [Executive Order 14096](#), Revitalizing Our Nation's Commitment to Environmental Justice for All. This executive order includes an emphasis on building climate resiliency within vulnerable populations (The White House, 2023). Major funding opportunities to increase climate resilience within underserved populations, including separate funding for tribal communities, continue to come online to support the capacity building of these communities.

In California, government officials and agencies have taken many steps to elevate and prioritize the issue of environmental justice and sea level rise. In 2017, the Climate Justice Working Group, including environmental justice, public health, and climate equity leaders, convened to develop recommendations for ensuring that the 2017 update of Safeguarding California — California's climate change adaptation strategy — is responsive to environmental justice and climate equity concerns. The final report, [Advancing Climate Justice in California: Guiding Principles and Recommendations for Policy and Funding Decisions](#), includes a number of recommendations regarding sea level rise, such as ensuring that environmental justice communities are actively involved in the development process to identify adaptation co-benefits related to sea level rise, and defining and identifying where environmental justice communities are along the coast in relation to the location of major energy facilities such as power plants, refineries, toxic facilities, and oil drilling sites that may release toxic pollution to surrounding neighborhoods (Climate Justice Working Group, 2019).

Notably, [Senate Bill 1](#) (Atkins), which was signed into state law in 2021, expands funding to assist additional disadvantaged communities along the coast that are vulnerable to the impacts of sea level rise and are actively working to address environmental justice issues related to sea level rise impacts.^{14,15} This same bill also added Section 30270 to the Coastal Act, directing the Coastal Commission to take sea level rise into account in its planning, policies, and activities, and established the California Sea Level Rise State and Regional Support Collaborative, a cross-government group tasked with educating the public and advising local, regional, and state government on feasible sea level rise mitigation efforts. Most recently, SB 272 (Laird, 2023), which requires local governments to incorporate a sea level rise plan into an LCP, recognizes

¹⁴ See Senate President pro Tempore Toni G. Atkins' [statement](#) on Senate Bill 1.

¹⁵ Senate Bill 1 uses the same definition for disadvantaged communities as [California Health and Safety Code § 39711](#).

the importance of environmental justice by explicitly calling for considerations of equity in developing vulnerability assessments and adaptation strategies.

COASTAL COMMISSION ACTION ON ENVIRONMENTAL JUSTICE

In 2016, Governor Brown signed Assembly Bill 2616, authored by former Assembly Member Autumn Burke and co-authored by former Assembly Member Mark Stone, enabling the Coastal Commission and local governments to consider environmental justice in permits and appeals by adding several new provisions to the Coastal Act. The bill cross-referenced existing civil rights and environmental justice laws (Public Resources Code (PRC) section 30013) in the Coastal Act, added the existing state definition of “environmental justice” in PRC section 30107.3, and required the governor to appoint one environmental justice commissioner to the Coastal Commission. The bill also authorized the Commission and local governments to consider environmental justice in coastal development permit (CDP) decisions (PRC section 30604(h)).

30604(h) *When acting on a coastal development permit, the issuing agency, or the commission on appeal, may consider environmental justice, or the equitable distribution of environmental benefits throughout the state.*

In 2019, the Coastal Commission adopted an Environmental Justice Policy to provide guidance for its Commissioners, staff, and the public on how the Commission will implement its environmental justice authority under the Coastal Act. The Environmental Justice Policy contains a set of guiding principles, including on evaluating and addressing the disproportionate environmental and public health burdens environmental justice communities experience from climate change. With the adoption of this policy in 2019, the Commission has continued to fold the foundations of environmental justice and equitable planning into its sea level rise adaptation work through LCP policies and CDP findings. Since adopting the Environmental Justice Policy, the Commission has been evaluating project proposals for potential impacts that may disproportionately harm overburdened communities or exacerbate long-standing inequities previously overlooked in Coastal Act analyses. By proactively considering potential impacts, the Commission has been able to identify and address environmental justice concerns associated with new development, as appropriate, through the addition of environmental justice findings in staff reports, working with applicants to modify project proposals, and conducting outreach and engagement with environmental justice partners.

LOOKING AHEAD: PLANNING AND PROJECT DESIGN WITH SEA LEVEL RISE

The coast has always been a place of change due to land modifications such as erosion and vertical land motion, and to water variability such as tides, waves, and storms. Despite this dynamic nature, many areas of the California coast have been developed with an expectation that there will be some permanence to the land area and site safety. Development efforts have used such techniques as setbacks, avoidance of existing floodplain areas, elevation above some base flood level, and compliance with design standards to reduce or minimize coastal risks and to ensure an acceptable level of safety.

However, hazards are rarely eliminated or avoided completely. Sea level rise will exacerbate existing hazards and reduce the period of time over which some existing development can remain relatively safe. As noted in [Governing California through Climate Change](#), “The notion of stable, predictable geography in which to live, work and build permanent buildings will be off the table in decades ahead” (Little Hoover Commission 2014, p. 2). Locations that might have seemed relatively safe from erosion or flooding 20 or 30 years ago may now be shown to have greater vulnerability due to sea level rise. Sites that might have seemed safe for 80 or 100 years might now only be safe for 40 or 50 years.

As coastal change accelerates, it will become more apparent that development close to the coast cannot be treated in the same way as more inland development, where hazardous conditions may be less dynamic. Coastal dynamics have long been part of land use planning considerations and project design; however, the focus on this change will grow in importance with rising sea level. This may mean that as properties are evaluated for proposed development, the type and intensity of the proposed development may need to change to address the dynamic nature of the property and changing nature of the hazards. As coastal areas erode, the carrying capacity of the area may need to be revised. The trend of redeveloping with additions and larger structures may need to change to one of maintaining what is there or redeveloping with smaller structures that better suit site constraints. A variety of nature-based adaptation strategies and other more innovative adaptation strategies must be considered as well. The changing expectations are an important aspect of sea level rise adaptation and are an important part of the following discussions on how to include sea level rise in Local Coastal Programs, applications for Coastal Development Permits, and adaptation planning.

Sea level rise is one of many climate change effects that will have impacts on coastal resources and development along the California coast. Accelerated coastal erosion, changing precipitation patterns, increasing temperatures, and more extreme storms will pose planning challenges in concert with sea level rise. There are other climate change impacts in the coastal zone, such as changes in water supply, terrestrial habitats, and fire hazards, that are also important to consider in decision making, and the Commission intends to provide guidance on a range of anticipated climate change impacts in the future.

Beyond these physical changes, sea level rise poses a significant threat to human livelihoods. Decades of racism, discrimination, and exclusionary policies and practices mean environmental justice communities will face an inequitable burden from sea level rise impacts (Roos, 2018). Planning for sea level rise and coastal resilience should include environmental justice communities as part of the planning and decision-making process to ensure that environmental burdens and benefits in their communities are properly considered and addressed in an equitable manner. Recognizing the need to integrate environmental justice and equity into sea level rise adaptation planning, the Coastal Commission will continue to work with environmental justice communities and leaders to improve and uplift these communities in coastal resilience planning efforts.