



Chapter 5. Addressing Sea Level Rise in Local Coastal Programs

The Coastal Act requires that the 61 cities and 15 counties in coastal California prepare Local Coastal Programs (LCPs) to govern land use and development in the coastal zone inland of the mean high tide. LCPs become effective only after the Commission certifies their conformity with the policies of Chapter 3 of the Coastal Act.

LCPs contain the ground rules for future development and protection of resources in the coastal zone. Each LCP includes a Land Use Plan (LUP) and an Implementation Plan (IP). The LUP specifies the kinds, locations, and intensity of uses, and contains a required Public Access Component to ensure that maximum recreational opportunities and public access to the coast is provided. The IP includes measures to implement the LUP, such as zoning ordinances. LCPs are prepared by local governments and submitted to the Coastal Commission for review for consistency with Coastal Act requirements.³³

Once an LCP's certification becomes effective, the local government becomes responsible for reviewing most Coastal Development Permit (CDP) applications. However, the Commission retains continuing permit authority over some lands (for example, over tidelands, submerged lands, and public trust lands) and authority to act on appeals for certain categories of local CDP decisions.

To be consistent with the Coastal Act hazard avoidance and resource protection policies, it is critical that local governments with coastal resources at risk from sea level rise certify or update Local Coastal Programs with policies that provide a means to prepare for and mitigate these impacts. Since many existing LCPs were certified in the 1980s and 1990s, it is important that future amendments of the LCPs consider sea level rise and adaptation planning at the project and community level, as appropriate. The overall LCP update and certification process has not changed. Now, however, the impacts of accelerated sea level rise should be addressed in the hazard and coastal resource analyses, alternatives analyses, community outreach, public involvement, and regional coordination. This Guidance is designed to complement and enhance the existing LCP certification and update steps. Although the existing LCP certification and update processes are still the same, sea level rise calls for new regional planning approaches, new strategies, and enhanced community participation.

Similarly, local governments should strongly consider adopting LCP policies to guide and inform the analysis of environmental justice issues as they relate to sea level rise impacts. Adopting policies and standardized protocols will save time and resources for planning departments, applicants, and the public, while providing transparency about expectations that can build trust with environmental justice communities over time.

³³ In addition, there are other areas of the coast where other plans may be certified by the Commission, including Port Master Plans for ports governed by Chapter 8 of the Coastal Act, Long Range Development Plans for state universities or colleges, and Public Works Plans for public infrastructure and facilities. Following certification of these types of plans by the Commission, some permitting may be delegated pursuant to the Coastal Act provisions governing the specific type of plan.

For general guidance on updating LCPs, see the LCP Update Guide, available on the Coastal Commission’s [Resources for Local Governments website](#). For general guidance on how to incorporate environmental justice principles into LCP updates (including to address topics in addition to sea level rise), see the Commission’s Toolkit on [Resources for Addressing Environmental Justice through Local Coastal Programs](#).

SENATE BILL 272 AND LCP UPDATES TO ADDRESS SLR

LCPs are essential tools to fully implement sea level rise adaptation efforts. The importance of LCPs in resilience planning has been highlighted by a variety of statewide efforts in the past, and both the [California Climate Adaptation Strategy](#) (CNRA 2021) and the [State Agency Sea-Level Rise Action Plan for California](#) (OPC 2022) specifically identify LCPs as a critical mechanism for adaptation planning along the California coast. Most recently, the passage of Senate Bill 272³⁴ (Laird, 2023) will, for the first time, *require* local governments within the Coastal Zone to develop a sea level rise plan as part of an LCP by January 1, 2034, further emphasizing the importance of integrating sea level rise adaptation planning into LCPs.

A summary of SB 272 requirements and a link to the full text of the bill is below. The rest of this chapter provides general guidance for incorporating sea level rise into LCPs and calls out the specific requirements as well as best practices and recommendations for complying with SB 272. As with the rest of this Guidance, the Coastal Commission recognizes that there will be variability in how local governments approach sea level rise adaptation planning and will continue to work with jurisdictions and other stakeholders to update LCPs in a manner that ensures local flexibility and consistency with the Coastal Act.

SB 272 (PRC Section 30985) Summary

[Senate Bill 272](#) (Laird, 2023) added Division 20.6.9 (Section 30985 et seq.) to the California Public Resources Code, and requires local governments lying in whole or in part within the coastal zone to develop a sea level rise plan as part of an LCP that is subject to approval by the Coastal Commission.^{35,36} This sea level rise plan must include, at a minimum, the following:

³⁴ SB 272 added Division 20.6.9 (Section 30985 et seq.) to the California Public Resources Code. This document uses “SB 272” and “Section 30985 et seq.” interchangeably.

³⁵ Note that Section 30985.6 of SB 272 states that “the operation of this division is contingent upon an appropriation for its purposes by the Legislature in the annual Budget Act or another statute.” Currently, LCP Local Assistance and OPC SB 1 grant funds, both appropriated by the Legislature in 2021, are available to support this planning work. The Coastal Commission will continue to coordinate with state agencies, local governments, and the Local Government Working Group to support additional funding opportunities.

³⁶ 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 McAteer-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](#).

1. Use of best available science
2. A vulnerability assessment that includes efforts to ensure equity for at-risk communities
3. SLR adaptation strategies and recommended projects
4. Identification of lead planning and implementation agencies
5. An economic impact analysis of, at a minimum, costs to critical public infrastructure.³⁷
6. A timeline for updates, as needed, based on SLR projections, local conditions, identified adaptation strategies/projects, and other locally relevant factors (as determined by a local government in coordination with the Coastal Commission)

SB 272 requires local governments subject to its requirements to develop these SLR LCP plans by January 1, 2034. The legislation also allows for jurisdictions with approved plans meeting these requirements to be prioritized for funding for the implementation of sea level rise adaptation strategies and recommended projects in the approved LCP SLR plan.³⁸ The mechanism by which the Coastal Commission will approve these plans and determine consistency with SB 272 requirements will be certification of the LCP (through the LCP approval and certification processes as defined by the Coastal Act), and as such, local jurisdictions will need to complete this certification process to be prioritized for funding.

Importantly, SB 272 applies to both the *process* of developing or updating an LCP as well as to the *policy content* of an LCP. The minimum requirements listed above relate to planning process stages that typically result in documents (e.g. vulnerability assessments, adaptation plans, economic analyses) that inform LCP development but are not, themselves, reviewed and certified by the Coastal Commission. While full consistency with SB 272 will require completion of these documents (by January 2034), as stated above, the mechanism by which the Commission will determine consistency with SB 272 requirements will be review and certification of the LCP itself. Thus, jurisdictions will need to undertake these planning processes and then submit new or updated LCPs that have policies consistent with the Coastal Act that reflect, allow for, or otherwise reference the findings of these other documents. For example, development of a vulnerability assessment is a stage in the development or update of an LCP (as described in Steps 2-4 in this chapter), and the LCP itself must include policies that relate to, and address, vulnerabilities identified in the assessment (as described in Step 6).

Relatedly, while SB 272 requires the components listed above, it does not provide additional required standards for those components, and the Commission will continue to allow for flexibility in these efforts provided they are consistent with the requirements of the Coastal Act. In other words, considering the vulnerability assessment example again, SB 272 does not list or

³⁷ Critical public infrastructure is defined in SB 272 as including but not limited to “...transit, roads, airports, ports, water storage, and conveyance, wastewater treatment facilities, landfills, powerplants, and railroads.” Other critical infrastructure types that should be considered include sewer lines, stormwater facilities, gas lines, and other utility infrastructure.

³⁸ Pub. Res. Code § 30985.5.

require specific details beyond using best available science and including efforts to ensure equity for at-risk communities. The Commission will continue to work with local jurisdictions to support vulnerability assessment efforts that are tailored to meet local needs, capacity, planning stages, and other factors while also considering Coastal Act resources and topics.

Lastly, as discussed later in this chapter, while the above listed components constitute the minimum requirements for an LCP to satisfy SB 272's mandates and be prioritized for funding for implementation of sea level rise adaptation strategies, the Coastal Commission remains committed to supporting phased LCP updates that reflect varying levels of detail. These LCP sea level rise plans must be completed by January 1, 2034, and, in order to be prioritized for funding, must be certified by the Coastal Commission; however, jurisdictions do not need to complete every requirement at once. The Coastal Commission will coordinate with local governments to support phased planning efforts and LCP policies that, in combination with an identified timeline for updates, will meet the SB 272 requirements by the 2034 deadline. For example, the Commission would support an approach whereby an LCP update could initiate compliance with the requirements of SB 272 by including baseline sea level rise policies and an explicit timeline for completing any of the missing components referenced in SB 272 (e.g., vulnerability assessment, adaptation plan, list of adaptation projects). By January 1, 2034, jurisdictions will need to have completed the six components identified in SB 272 and new or updated LCPs must reflect that greater level of detail, with background information, maps, policies, and so on that identify and address SLR vulnerabilities and allow for or require implementation of identified adaptation strategies and projects.

Steps 1-7 of this chapter provide more detail on recommendations and best practices for vulnerability assessments, adaptation planning, and LCP policy development to address sea level rise in a manner that is consistent with the Coastal Act, SB 272, and other relevant statewide approaches. Language highlighting the minimum requirements for consistency with SB 272 is also included. A summary of the minimum components for consistency with SB 272, and the related minimum requirements that must be reflected/addressed in each component is included at the end of this chapter.

Steps for Addressing Sea Level Rise in Local Coastal Programs and Other Plans

The Commission recommends the following seven steps to address sea level rise through development of a vulnerability assessment, adaptation plan, and as part of an LCP, LCP Amendment, or other plan.³⁹ These steps can be modified and adapted to fit the needs of individual planning efforts or communities and to address the specific coastal resource and

³⁹ This Guidance uses the term 'LCP process' to refer to the LCP process, but many of the concepts included here are applicable to other planning processes, including Long Range Development Plans, Public Works Plans, and Port Master Plans. For example, recommendations for how to analyze sea level rise impacts and perform a vulnerability assessment are broadly applicable. Many adaptation strategies may also be applicable, though in all cases, individual actions taken will vary based on relevant policies, local conditions, feasibility, and other factors.

development issues of a community, such as addressing bluff erosion or providing for effective redevelopment, infill, and concentration of development in already developed areas.

The steps of this process are illustrated in [Figure 11](#) and described below. They are similar to the standard steps of a long-range planning process and should be familiar to local planners. Steps 2-4 are often referred to as a “sea level rise vulnerability assessment” in other sea level rise planning contexts and therefore are similar to other sea level rise-related resources. Steps 5-7 cover the adaptation planning phase and incorporating vulnerability assessment and adaptation planning information into the LCP. As summarized above, this general process is consistent with the requirements of SB 272.

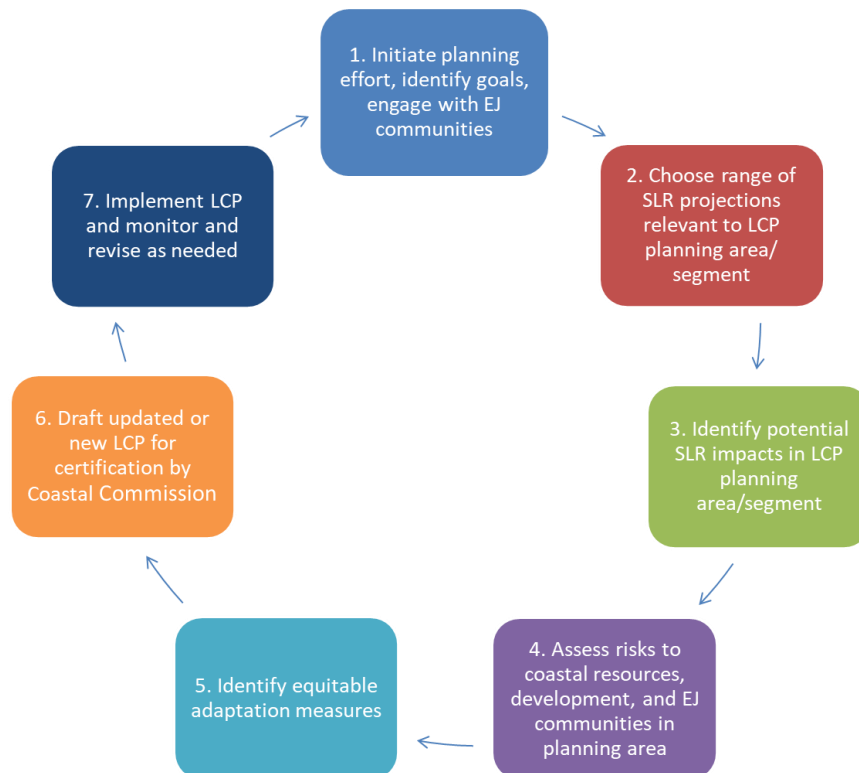


Figure 11. Sea level rise adaptation planning process for new and updated Local Coastal Programs

The Coastal Commission also offers a [Local Coastal Program \(LCP\) Update Guide](#) (2013b) that outlines the broad process for amending or certifying an LCP, and there is naturally some overlap between the content of that document and this Sea Level Rise Policy Guidance document. The general LCP amendment steps are outlined below, in a flow chart (see [Appendix D](#)), and in the [LCP Tips/Best Practices document](#) (2013c), which is available in the [Resources for Local Governments](#) section of the Commission’s website (which also contains informational resources for addressing a variety of other LCP-related topics such as housing). Local governments should contact the Coastal Commission planner for their area when pursuing a new LCP or LCP amendment.

- **Initial Amendment scoping and development:** Conduct issues assessment, identify need for amendment, prepare preliminary draft, coordinate with Commission staff, and share early drafts
- **Local Amendment process:** Notify public, conduct local outreach and hearings, meet with Commission staff to discuss any issues, and adopt LCP at the local level
- **Prepare Submittal:** Assemble LCP materials, discuss with Commission staff prior to submittal, transmit to Coastal Commission, and make available to public
- **Process Amendment at Coastal Commission:** Commission staff will review submittal within 10 working days for completeness; will address outstanding information needs; will prepare and write staff report; hold public hearing and vote; and transmit action to local government
- **Effectuate Amendment:** Local acceptance of any modifications or resubmittal within 6 months, finalize local approval, and complete Coastal Commission Executive Director check-off
- **Implement LCP Amendment, monitor, and revise as necessary.**

The step-by-step process for incorporating sea level rise into LCPs outlined in the rest of this chapter fits into these broader LCP amendment steps. Local government planners should use the LCP Update Guide in conjunction with the Sea Level Rise Policy Guidance to inform the LCP.

Use scenario-based analysis

The Guidance recommends using a method called “scenario-based analysis” (described in [Chapter 3](#) of this Guidance). Since sea level rise projections are not exact, but rather presented in ranges, scenario-based planning includes examining the consequences of multiple sea level rise amounts, plus extreme water levels from storms and El Niño events. The goal of scenario-based analysis for sea level rise is to understand where and at what point sea level rise, and the combination of sea level rise and storms, pose risks to coastal resources or threaten the health and safety of a developed area. This approach allows planners to understand the full range of possible impacts that can be reasonably expected based on the best available science, and build an understanding of the overall risk posed by potential future sea level rise. For example, if there are large changes in the hazard zones between two sea level rise amounts, additional analyses may help determine the tipping points when viable land uses will change. In general, scenario-based analyses can help determine the long-term compatibility of certain areas with certain land uses. For further description of this method, see [Chapter 3](#).

Include other topics as applicable or desired

This Guidance recommends a number of analyses that will generate useful information related to sea level rise and other environmental vulnerabilities. Performing these analyses (and the overall planning process) may provide a useful opportunity to include other studies that will complement the goals of Local Coastal Programs and provide valuable insights for community

concerns. For example, when considering lower cost visitor serving facilities, planners should consider social equity and environmental justice in the analyses by determining how climate hazards or the adaptation measures might differentially impact various demographics. It may also be appropriate to consider other sustainability or Climate Action Plan goals in the context of any sea level rise adaptation strategies that are developed as well as strategies to mitigate climate change (such as local options to reduce greenhouse gas emissions). Important topics such as these may be incorporated into the analyses already underway for the sake of efficiency.

Leverage analyses and share information with other planning-related processes and documents

Sea level rise is addressed in many other planning-related documents and by many other agencies and organizations. The Governor’s Office of Planning and Research (OPR) published the [Coastal Resilience Compass Plan Alignment Guide](#) to describe plans applicable to coastal resilience planning (e.g., LCPs, Local Hazard Mitigation Plans, General Plans, Climate Adaptation Plans) and how they can be aligned. A [memo](#) from the Coastal Commission staff includes a summary of key takeaways from the Compass and recommendations for its application to LCP amendments.

Planners should be aware of these various documents and the on-going work of state and federal agencies as well as neighboring regional and local efforts. They should make an effort to share information in cases where analyses required for some of these documents may overlap with the studies appropriate for sea level rise planning in LCPs. Additionally, these agencies, organizations, and planning efforts may be good resources from which to gather information when performing these analyses for LCP updates.

For example, there is overlap between the required elements of a Local Hazard Mitigation Plan (LHMP) and Local Coastal Programs, and the Commission recommends coordinating an LHMP update with an LCP update if possible. As part of an LHMP, local governments identify the natural hazards that impact their community, identify actions to reduce the losses from those hazards, and establish a coordinated process to implement the plan.⁴⁰ In order to be eligible for certain types of non-emergency disaster assistance, including funding for hazard mitigation projects, local governments are required by FEMA to complete an LHMP and to update the plan every five years. Any sea level rise hazard avoidance strategies included in an LCP certification or update, such as relocation of critical facilities, must be included in the LHMP narrative to be eligible for funding from FEMA to implement those future projects. If a local government has recently updated their LHMP, the city or county can add narrative information on sea level rise

⁴⁰ <https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/create-hazard-plan/process>

strategies through an addendum to the plan, referred to by FEMA as an annex.⁴¹ Relatedly, FEMA also coordinates the Community Rating System, a voluntary program that encourages National Flood Insurance Program (NFIP) member communities to exceed minimum floodplain management standards in exchange for flood insurance discounts. A variety of actions that would qualify for such discounts are strategies that help to address anticipated sea level rise and which could be incorporated into an LCP.⁴²

In many cases, the analyses and adaptation options identified in this Guidance could be used for hazard mitigation plans or vice versa, as the goal of each of these planning processes is to minimize or avoid impacts from coastal hazards. As a result, there may be opportunities to leverage funding and share work efforts.

A number of other similar planning processes and documents are listed in [Figure 12](#), and planners may be able to use these studies in the LCP planning process, or, alternatively, share analyses and information performed for LCP planning with the groups working on related projects. Additionally, the State of California's [Adaptation Clearinghouse](#) is a searchable database that includes resources and examples relevant to climate adaptation planning, including coastal resilience planning. It allows users to search for past and/or ongoing actions that stakeholders have implemented to address sea level rise. This Guidance highly recommends leveraging these resources to promote efficiency.

Coordinate regionally as appropriate

Many impacts of sea level rise will transcend jurisdictional boundaries, necessitating regional collaboration. Similarly, the adaptation decisions made by coastal communities could themselves have consequences that affect areas outside the local jurisdiction. For these reasons, regional coordination will often enhance the effectiveness of local adaptation decisions. For example, restoration efforts, sediment management, and other similar approaches will likely benefit from consideration at cross-jurisdictional, watershed, littoral, or similarly regional scales. Indeed, many of the types of projects identified in [Figure 12](#) have taken this regional approach. Furthermore, mechanisms such as Joint Powers Authorities or financing districts can support climate resilience efforts on a regional scale. Planners should keep this concept in mind as they work through these steps and coordinate regionally where appropriate and possible.

⁴¹ For more information on how to complete or update an LHMP, visit the Cal OES [Hazard Mitigation website](#) or contact the Cal OES Local Planning Unit at MitigationPlanning@caloes.ca.gov and a hazard mitigation technical expert can assist local governments with the planning process.

⁴² For more information, see FEMA's Community Rating System [website](#).

Representative Adaptation Planning Stakeholders

Agencies	<p><u>Local/Regional:</u></p> <ul style="list-style-type: none"> • City/county governments • Tribal governments • League of Cities • Association of Counties • Regional entities (e.g. air districts, water boards, metropolitan planning orgs., regional transportation planning agencies) 	<p><u>State:</u></p> <ul style="list-style-type: none"> • Ocean Protection Council • State Coastal Conservancy • State Lands Commission • Bay Conservation and Devel. Commission • Natural Resources Agency • Office of Planning & Research • CalTrans • Office of Emergency Svcs. • CalFire • CA Geologic Survey • Dept. of Parks and Recreation • Dept. of Fish and Wildlife • Dept. of Water Resources • SWRCB • Air Resources Board • CA Native American Heritage Commission 	<p><u>Federal:</u></p> <ul style="list-style-type: none"> • FEMA • EPA • US Fish and Wildlife Service • NOAA • Gulf of the Farallones NMS • Monterey Bay NMS • SF Bay NERR • Elkhorn Slough NERR • Tijuana River NERR • USGS • USACE • BOEM, BSEE • NPS • Sea Grant
Partner Organizations	<ul style="list-style-type: none"> • Non-Government Organizations (environmental, social etc.) • Community- or Faith-Based Organizations • Neighborhood Councils • Professional organizations (agricultural, fisheries, communications etc.) • Science organizations • School Districts, Universities • Private consultants/industry <p><i>Examples include:</i></p> <ul style="list-style-type: none"> • Central Coast Alliance United for a Sustainable Economy (CAUSE) • Environmental Health Coalition • Brightline Defense • The Nature Conservancy • Surfrider Foundation • Coastkeeper Alliance • Point Blue Conservation Science • American Society of Adaptation Professionals 	Coordinated Planning Efforts	<p><u>Local & Regional Plans/ Planning Efforts</u></p> <ul style="list-style-type: none"> • Local Hazard Mitigation Plans • General Plans • Climate Action Plans • Capital Improvement Plans/Programs • Caltrans Corridor Plans • SLR/Climate Change Adaptation Plans • Integrated Regional Water Management Plans • Regional Sediment Management Plans • Sustainable Community Plans • Regional climate collaboratives • Working groups • Technical and stakeholder advisory groups

Figure 12. Agencies, organizations, and planning efforts related to sea level rise adaptation

Step 1 – Initiate planning effort, identify key goals and stakeholders, and engage with environmental justice communities

A key first step for initiating the development of, or an update to, an LCP is to complete a variety of tasks related to defining the scope of the planning project. This includes things like identifying the goals of the planning effort, setting up the project team, identifying key stakeholders, and engaging with environmental justice communities.

As discussed later in this chapter, efforts to develop or update an LCP to address sea level rise can come in a variety of shapes and sizes. For example, a comprehensive update to an LCP (or development of a new LCP), will address sea level rise as well as other Coastal Act topics. In other cases, an LCP amendment may solely focus on updating a coastal hazards chapter or developing a new chapter on sea level rise adaptation. Furthermore, the level of detail associated with sea level rise planning efforts may vary. Some LCP updates may initially include a more general set of baseline sea level rise policies such as requirements to use best available science or calling for the development of an adaptation plan while other LCPs may go into greater detail related to policies or zoning designed to implement specifically identified adaptation responses. Defining the goals of an LCP planning effort at the outset will help both the planning team and members of the public understand the overall scope of the work; timing, information, expertise, funding, and other needs; what the range of outcomes may be; how potential future planning phases could relate to the project, and so on.

Initiating an LCP planning effort also includes setting up the planning team. While LCPs are typically developed by local jurisdiction planning departments, a variety of other City/County departments may be important partners in sea level rise planning efforts. For example, Public Works and Parks and Recreation departments, or other asset and resource managers, will be key partners that can both provide important data and context for understanding potential impacts of sea level rise as well for the implementation of specific adaptation projects. A city or county may choose to establish an interdepartmental sea level rise team of City/County staff representatives. In some cases, such a team may have been formed previously for a climate change or sea level rise planning effort that an LCP update effort can tap into and build from.

Similarly, it is important to identify a variety of key external stakeholders. At the start of an LCP update to address sea level rise or a new LCP project, local government planners should contact their local Coastal Commission district office to discuss the LCP goals and to establish a plan for Coastal Commission staff coordination throughout the process. A variety of other state agencies or regional partners such as Caltrans, State Parks, Ports, harbor districts, community services districts, transit agencies, and so on may also be important partners. Members of the public – including both residents of a City/County and those who work in or visit the coastal zone – are also critical partners who should be incorporated into LCP planning efforts. Coordination with external partners can include establishing technical and community stakeholder advisory committees, as well as planning for robust public outreach. LCP planning efforts should include a variety of means for gathering feedback, including a project website,

FAQs/general explainers, social media, mailings, and public meetings in addition to the required public hearings on the LCP.

Critically, local governments should identify and engage with environmental justice communities, early and often. As discussed in Chapter 4, many environmental justice communities have been overlooked or systemically barred from participating in community planning decisions. Overcoming these injustices requires an intentional effort, and public involvement should center meaningful engagement with environmental justice and tribal communities within and surrounding the local jurisdiction. The following section describes steps for meaningfully including these communities in an LCP planning effort.

MEANINGFUL ENGAGEMENT WITH ENVIRONMENTAL JUSTICE COMMUNITIES

The Coastal Commission’s Environmental Justice Policy expressly recognizes that environmental justice communities have coastal assets and are valuable stakeholders in the protection of the coast. Furthermore, addressing environmental justice in the coastal zone should reflect the intent of PRC Section 30604(h) and incorporate input from environmental justice communities affected by coastal development in the local jurisdiction. Proactively engaging with environmental justice communities, and organizations that serve them and have shared interests, early on or prior to initiating development of a new or updated LCP lays the groundwork for meaningful collaboration and fosters trust between local governments and affected communities. This approach not only streamlines project communication but also ensures that environmental justice concerns are identified and addressed from the outset, aligning with SB 272 and overarching Coastal Commission and statewide objectives for inclusive coastal management. As such, this step aims to recognize and set the stage to engage with these communities that have been historically excluded from decision-making processes and from accessing the benefits of coastal development and resources. Further, identification and engagement with environmental justice communities will better inform the CDP application and analysis process, as explained in detail in [Chapter 6](#).

Note that, as discussed in [Chapter 4](#), environmental justice is inclusive of tribal and indigenous communities, but these communities also experience distinct and unique challenges. The rest of this section touches on broader environmental justice concerns. Local governments are encouraged to consult the Commission’s [Tribal Consultation Policy](#) and coordinate with the California Native American Heritage Commission for support with engaging with tribal communities in and around their LCP planning area.

Use quantitative and qualitative data to identify environmental justice communities

Identifying environmental justice communities in and around the LCP planning area is a core step in the outreach and engagement process and for ensuring that vulnerability assessments, adaptation planning, and LCP updates will be developed in ways that consider and address locally-relevant environmental justice issues. Further, as detailed in SB 272, local governments are required to develop a vulnerability assessment that includes efforts to ensure equity for at-

risk communities. The Commission recognizes the term environmental justice communities as an umbrella designation that refers to low-income communities, communities of color, and other historically marginalized communities that have been disproportionately burdened by, or less able to prevent, respond to, and recover from, adverse environmental impacts and discriminatory land use practices. This may include communities and groups that are located a distance from the coast but have an important connection with the area.

There are several data tools available that can aid in this step, including quantitative information from resources such as the Commission’s Coastal California EJ Mapping Tool, the State’s CalEnviroScreen tool, U.S. EPA’s EJScreen, Cal EPA’s SB 535 Disadvantaged Communities map, California State Parks’ Outdoor Equity Program Community FactFinder, and U.S. Census data.

- [Coastal California Environmental Justice Mapping Tool](#): Commission staff developed the Coastal California Environmental Justice Mapping Tool, which can be used to assist in the identification and analysis of environmental justice communities and future sea level rise scenarios. This mapping tool compiles public information (including some information available on CalEnviroScreen and EPA EJScreen) such as socioeconomic data, sea level rise projections, Coastal Zone Boundary, LCP segments, and coastal public access points.
- [CalEnviroScreen](#): A mapping tool created by CalEPA Office of Environmental Health Hazards Assessment to identify California communities most affected by multiple sources of pollution. CalEnviroScreen uses environmental, health, and socioeconomic information to produce scores for every census tract in California, which are mapped to compare how pollution burden varies among communities.
- [Cal EPA’s SB 535 Disadvantaged Communities map](#): This map shows the disadvantaged communities designated by CalEPA for the purpose of [SB 535](#). These areas represent the 25% highest scoring census tracts in CalEnviroScreen 4.0.
- [EPA EJScreen](#): EJScreen is an EPA’s environmental justice mapping and screening tool that provides EPA with a nationally consistent dataset and approach for combining environmental and demographic socioeconomic indicators.
- [CA State Parks’ Outdoor Equity Program Community FactFinder](#): A mapping tool created by California State Parks to identify and visualize communities’ access to parks and open spaces, using environmental, health, and socioeconomic data to highlight areas with the greatest need for improved outdoor equity and access.
- [U.S. Census Data](#): The U.S. Census Bureau provides data about the nation’s people and economy. Every 10 years, it conducts a census counting every resident in the United States. The Census Bureau provides a variety of tools (including the EPA EJScreen) to identify environmental justice communities.

It is critical to note that members of environmental justice communities affected by development and land use planning activities in the coastal zone may live outside of a city or

county boundary and outside of the coastal zone, but they may travel into or through the jurisdiction for work or to visit coastal resources and recreational opportunities. Therefore, planners should identify environmental justice communities that exist in proximity to, or have a connection with, the LCP planning area.

Characterize historic and current environmental burdens of environmental justice communities

It is important to not only identify where environmental justice communities exist, but to also understand the specific historic and current burdens experienced by these communities. This understanding will better inform how to approach meaningful engagement plans, vulnerability assessments, and adaptation planning. For example, identifying where legacy injustices—such as redlining and restrictive racial covenants that prevented people of color from buying homes in certain neighborhoods or learning about health issues from living near oil refineries, ports, and other industries—can inform changes in land use and development policies. Similarly, acknowledging the historical land theft and displacement of indigenous people from coastal areas, along with ongoing cultural and environmental impacts, can provide additional insights. And, qualitative data such as community testimony, interviews, and outreach can ground-truth quantitative datasets and provide further context to inform resilient coastal planning. Asking communities about their relationship to the coast provides an understanding of how people experience environmental benefits or burdens along the coast. Do their families visit the coast to fish for recreation or for subsistence? Do they visit the coast for work or recreation? If they live along the coast, what health and environmental issues are relevant in their area and important to them? How have historical tribal events and displacement influenced their connection to and use of coastal areas? Understanding the specific factors that distinguish an environmental justice community from other populations will ultimately drive more equitable strategies and outcomes.

Create a meaningful engagement plan

Once a planner has identified environmental justice communities and characterized the environmental burdens these communities experience, they should develop a meaningful engagement plan that will guide how outreach with environmental justice communities will be conducted throughout the LCP planning (see [Chapter 4](#) for an in-depth discussion on meaningful engagement). Without adequate and meaningful engagement, sea level rise policies will lack credibility with the affected community that can result in adverse outcomes later in the process. Direct outreach and engagement with environmental justice communities throughout the LCP scoping and amendment process will ground the foundation of sea level rise policy development in authentic experiences. Within each jurisdiction, there will be opportunities to create nuanced policies that reflect the local context and priorities of environmental justice communities. While each local government might take different approaches to meaningful engagement, generally, they should evaluate whether their engagement efforts achieve the following goals:

- Environmental justice communities and the public receive clearly written/communicated information early on and continuously throughout the process to create a new or amend an existing LCP.
- Individuals of different backgrounds and/or abilities have equitable access to information because informational materials are ADA-compliant, account for language barriers, are culturally appropriate, and include meeting times and locations.
- Environmental justice communities receive responses from local government and their feedback is incorporated into the process to create a new or amend an existing LCP.

Two practices that can help local government planners develop their meaningful engagement plan is through connecting or partnering with community-based organizations (CBOs) working in or with environmental justice communities and developing community surveys. Community organizations can include local nonprofits, faith-based organizations, school associations, and clubs. Planners can begin building trust with these organizations by attending existing community meetings and getting to know organization leaders and members. CBOs often have already gained the community's trust and know who the community members are, who needs to be in the room, and how to reach them. They can have staff that know how to facilitate specific meaningful conversations and discussions, and they continue to be in contact with the community, thus providing an ongoing pathway for communication between local governments and the community. Establishing a relationship with these trusted groups can help a local government to engage a broader audience, dismantle some distrust that communities may have with government entities, and identify a more unified vision of community needs that can be incorporated into an LCP. Conducting community surveys among environmental justice communities can help local governments understand the priorities and problems that their communities currently face regarding land use and development. The greater burdens and barriers that environmental justice communities contend with may shape different priorities and concerns regarding climate change, coastal access, public recreation, and resource protection compared to wealthier communities, as well as other identities of power, race, religion, and culture.

An important part of a meaningful engagement plan includes identifying any unique barriers that environmental justice communities may encounter during the public participation process, including multilingual and technical language access, meeting times, childcare, transportation access, and technology access. These barriers create disproportionate burdens on community members who have less financial flexibility, may be transit-dependent, do not understand English very well, have limited access to technology, or have more constrained schedules and capacities. Some best practices for addressing these barriers can include:

- Translating written materials in languages predominantly spoken among residents including surveys, flyers, notices, and website announcement and providing oral interpretation services for speakers at public meetings.
- Allowing opportunities for pre-recorded public comments via live video stream or phone calls for public meetings.

- Partnering with a community organization to help provide childcare services or holding public meetings at sites where children can go during the meeting, such as recreation centers.
- Holding meetings near public transportation services, within walking distance from where people live, or providing other methods for participation that do not require individuals to physically attend meetings.
- Identifying meeting times that occur during more accessible time ranges so that communities have the opportunity to attend and meaningfully engage while minimizing constraints to their day-to-day schedules.

The Commission’s Toolkit on [Resources for Addressing Environmental Justice through Local Coastal Programs](#) provides a lot more information regarding participation barriers for environmental justice communities, best practices for creating a meaningful engagement plan, and conducting outreach with environmental justice communities.

SB 272 Consistency: SB 272 requires local governments to update LCPs to address sea level rise. As discussed at the beginning of this chapter and throughout the following steps, this includes completing a vulnerability assessment, identifying adaptation strategies, identifying lead planning and implementation agencies, and ensuring equity for at-risk communities. This step discusses best practices for initiating a planning effort, including identifying key goals, internal and external partners, and environmental justice communities.

Expected outcomes from Step 1: Initiation of the planning process, including identification of planning goals, key stakeholders, and environmental justice communities in or near the LCP planning area/segment. During this step, the planner should work to create a connection with environmental justice communities and develop a meaningful engagement plan that establishes how outreach will be conducted with them throughout the LCP planning process.

Step 2 – Determine range of sea level rise scenarios relevant to LCP planning area/segment

The first step in incorporating sea level rise into the LCP planning process is to identify locally relevant sea level rise scenarios that may occur at given time points in the future. These scenarios will be carried through the rest of the steps in the sea level rise LCP planning process. Follow these steps to determine the locally relevant sea level rise scenarios to use in the subsequent steps:

- **Determine planning horizons of concern:** The Coastal Commission recommends taking a long-term view when analyzing sea level rise impacts because the land use decisions made today will affect what happens over the long-term. For example, development constructed today is likely to remain in place over the next 75-100 years, or longer. After the original publication of this guidance in 2015, many jurisdictions completed assessments that look at sea level rise vulnerabilities through approximately 2100; however, it may be prudent for future assessments to look out to at least 2130. Understanding short-term vulnerabilities is also important, and the Coastal Commission also recommends assessing vulnerabilities in intermediate planning horizons. For example, many jurisdictions have assessed sea level rise scenarios that correspond to nearer-term horizons (e.g., in 2030, 2050, and so on) as these horizons may provide valuable details for implementing priority or short-term adaptation strategies. These time periods may be used, or local governments may identify other relevant planning horizons for their plans and development scenarios, as long as the sea level rise scenarios for those time frames are based on the best available and relevant scientific projections.
- **Determine the full range of sea level rise scenarios from the best available science:** Using best available science, currently the 2024 [State Sea Level Rise Guidance](#) (or other comparable study, provided that it is peer reviewed, widely accepted within the scientific community, and locally relevant), determine the range of sea level rise for the planning horizons of concern. The statewide sea level rise scenarios from the 2024 State Sea Level Rise Guidance are presented in [Table 5](#) below (scenario tables for all 14 California tide gauges are presented in [Appendix F](#)).⁴³ See below for a discussion of scenario-based planning in the LCP context.

⁴³ More detailed refinement of sea level rise projections is not considered necessary at this time, as variations from the nearby tide gauges will often be quite small, and may be insignificant compared to other sources of uncertainty. However, the Coastal Commission recognizes that other studies exist with localized data, for example those completed in the Humboldt Bay region, which may also be appropriate for use.

Table 5. Sea Level Rise Scenarios for California ⁴⁴

Projected SLR Amounts (in feet)					
	Low	Intermediate-Low	Intermediate	Intermediate-High	High
2030	0.3	0.4	0.4	0.4	0.4
2040	0.4	0.5	0.6	0.7	0.8
2050	0.5	0.6	0.8	1.0	1.2
2060	0.6	0.8	1.1	1.5	2.0
2070	0.7	1.0	1.4	2.2	3.0
2080	0.8	1.2	1.8	3.0	4.1
2090	0.9	1.4	2.4	3.9	5.4
2100	1.0	1.6	3.1	4.9	6.6
2110	1.1	1.8	3.8	5.7	8.0
2120	1.1	2.0	4.5	6.4	9.1
2130	1.2	2.2	5.0	7.1	10.0
2140	1.3	2.4	5.6	7.7	11.0
2150	1.3	2.6	6.1	8.3	11.9

- **Choose multiple sea level rise amounts based on range of sea level rise scenarios.** The Coastal Commission recommends that communities evaluate the impacts from multiple sea level rise amounts that cover the range of SLR scenarios for the identified long-term plan horizon. In practice, assessing impacts from several specific SLR amounts (e.g., 1, 3, 6, and 10 feet) can account for multiple possible futures when compared to the time horizons associated with different SLR scenarios. In other words, evaluating 3 feet of SLR can generally tell us what to expect in 2070 under a worst-case future (the High SLR scenario) or around 2100 or later in better-case scenarios (Intermediate or higher certainty scenarios).

In general, communities should account for, at a minimum, the full range of sea level rise associated with the Intermediate-High scenario for the identified planning horizon

⁴⁴ This table provides median values for sea level scenarios for California, in feet, relative to a year 2000 baseline. These statewide values all incorporate an average statewide value of vertical land motion – a negligible rate of 0.1 mm (0.0003 ft) per year uplift (OPC 2024). The red box highlights the three scenarios that the *State Sea Level Rise Guidance* and this guidance recommend for use in various planning and project contexts.

(e.g., up to about 7 feet for a 100-year planning horizon). The Commission also continues to recommend incorporating the High scenario to evaluate the vulnerability of planned or existing assets like critical infrastructure that have little to no adaptive capacity, that would be irreversibly destroyed or significantly costly to repair, and/or would have considerable public health, public safety, or environmental impacts should that level of sea level rise occur.⁴⁵ Evaluating the lower scenarios (those with a higher certainty) allows planners to gain an understanding of what is likely to be vulnerable under more likely future climate conditions.

In addition to evaluating the higher end/worst-case scenarios, it is helpful to understand the minimum amount of sea level rise that will cause impacts for a community, and how these impacts will change over time, with different amounts of sea level rise. Planners should evaluate enough scenarios to be able to answer the following:

- What are the impacts from the most likely/near-term amounts of sea level rise? What about from the worst-case scenario/longer-term sea level rise?
- How would elevated water levels from King tides, El Niño, a 100-year storm, and other factors exacerbate the impacts of SLR on the community?
- What is the minimum amount of sea level rise that causes inundation, flooding, or erosion concerns?
- How do inundation, flooding, and erosion concerns change with different amounts of sea level rise?
- Are there any tipping points where sea level rise impacts become more severe? (For example, is there a point at which seawalls or levees are overtopped or where beaches or public access are lost?)

There is no single accepted sea level rise mapping methodology for the state of California. Local governments can choose whether to use existing sea level rise tools or to develop their own scenarios and maps. Some existing models and tools provide maps by sea level rise amount that can then be linked to the relevant time period, as described in the box below.

⁴⁵ For more information on sea level rise planning for critical infrastructure, see also the Coastal Commission's [Critical Infrastructure at Risk](#) planning guidance.

Choosing Scenarios with Existing Sea Level Rise Modeling Tools

A number of jurisdictions throughout California have completed vulnerability assessments using Our Coast Our Future (CoSMoS) or other existing SLR modeling/mapping and visualization tools. Oftentimes, these tools include numerous SLR amounts in regular increments (e.g., for CoSMoS, generally 25 centimeter increments and for the NOAA SLR Viewer, one-foot increments). These types of tools allow users to identify and evaluate SLR amounts, and then relate those amounts to the anticipated time horizons over which they may occur based on current best available science. For example, a jurisdiction may use CoSMoS to evaluate 1m of SLR (approximately 3.3ft), which, based on the 2024 State SLR Guidance, could occur as soon as 2070-2080 under the High and Intermediate-High scenarios, or around 2100 under the Intermediate scenario.

Importantly, this approach for choosing and evaluating SLR amounts generally allows for vulnerability assessments to remain relevant even as best available science changes over time. While the time horizon associated with specific SLR amounts may change with evolving science, the visualization of those associated SLR effects will not. For example, past vulnerability assessments that evaluated 1m of SLR using CoSMoS would have associated those impacts with approximately 2065 (medium-high risk aversion scenario from the 2018 Guidance). That vulnerability assessment doesn't need to be re-done now, but users should understand that that amount of SLR is likely to occur slightly later than previously expected.

Note too that there is often a slight mismatch between exact SLR amounts in the scenario tables and the SLR amounts in the available tools (e.g., 3.3ft is a CoSMoS scenario while the SLR scenarios in [Table 5](#) include 3.0 and 3.1ft). In general, given the uncertainties and ranges associated with sea level rise science, minor differences like these will not matter much, particularly in the context of general vulnerability assessment efforts. Users could also interpolate between the decadal SLR amounts shown in the scenario tables. For example, one could use [Table 5](#) to approximate that 4ft of sea level rise could occur by approximately 2095 under the Intermediate-High scenario.

More information on sea level rise modeling and mapping tools is available in [Table 6](#). Technical information for incorporating other hazards (such as storms, erosion, or waves) can be found in [Appendix B](#).

SB 272 Consistency: SB 272 requires local governments to develop a vulnerability assessment using best available science. This step identifies the 2024 OPC State SLR Guidance (or other comparable, peer-reviewed, widely scientifically accepted, and locally-relevant study) as the current best available science, and provides general recommendations for how to go about choosing sea level rise scenarios to use in a vulnerability assessment.

Expected outcomes from Step 2: Upon completing this step, a range of regionally- or locally-relevant sea level rise scenarios for the time periods of concern should be established. Based on this range, planners will have identified several SLR scenarios that span the planning horizon, including lower/nearer-term, medium/mid-term, and higher/long-term amounts. These sea level rise scenarios will be carried through the rest of the planning process.

Step 3 – Identify potential physical sea level rise impacts in LCP planning area/segment

The next step is to identify the physical hazards and impacts (referred to comprehensively as sea level rise impacts) associated with current and future sea level. As described in Section C of [Chapter 3](#) of this Guidance, broad categories of sea level rise impacts may include inundation, flooding, groundwater rise, wave impacts, erosion, and saltwater intrusion. In this step, planners should analyze these physical impacts and their various sub-components in order to understand current and future local hazard conditions. The analysis should answer the following basic questions:

- What are the existing hazard conditions that threaten the planning area?
- What is the projected change in hazard conditions due to locally appropriate sea level rise scenarios and planning horizons of concern?

This analysis should include the following topics, as applicable (See [Appendix B](#) for detailed technical information):

- Coastal Erosion
 - Current trends or dynamics in beach change and evaluation of how sea level rise may change current trends or dynamics
 - Consideration of beach change attributed to extreme events, seasonal change, and decadal forcings such as Pacific Decadal Oscillation or El Niño Southern Oscillation
 - Historic and future bluff erosion, considering the effects of sea level rise
 - Identification of existing dune areas and evaluation of potential erosion from storm events and long-term beach erosion
- Coastal Wetland Change
 - Current trends in wetland change (e.g., erosion or accretion) and evaluation of how sea level rise may change current trends through changes to water levels and exposure to currents or waves

- Analysis of how changes to tidal inundation may change coastal wetland habitats
- Coastal Flooding
 - Current tidal datums⁴⁶ and future inundation
 - Extreme static water levels from a combination of high tides, atmospheric forcing (e.g., storm surge), and oceanographic forcing (e.g., El Niño and Pacific Decadal Oscillation)
 - Wave impacts (runup and/or overtopping), including impacts from a 100-year event considering worst case beach and bluff conditions
- Fluvial/Riverine Flooding
 - Identification of existing fluvial flood control infrastructure and systems
 - Current and future fluvial flooding for 100-year flood events as worsened by sea level rise and climate change
- Pluvial/Stormwater Flooding
 - Identification of existing stormwater systems
 - Current flood risk from intense rainfall events and consideration of how sea level rise and climate change will change or worsen performance of existing stormwater infrastructure
- Shallow or Emergent Groundwater, Saltwater Intrusion
 - Current and future areas of shallow or emergent groundwater or areas subject to saltwater intrusion
 - Identification of current or future potential water quality issues due to saltwater intrusion, inundation of contaminated soils, or mobilization of contaminants from rising water tables and increases in nonpoint source pollution
- Tsunamis
 - Current and future flood risk from extreme tsunamis

Use existing models, tools, reports, historic records, and other materials ([Table 6](#)) to develop or double check the identified hazard areas. Document the current and future hazard areas in the Land Use Plan using maps, GIS products, graphics, tables, charts, figures, descriptions, or other means. This process should be repeated for each planning horizon and/or sea level rise scenario defined in Step 2.

⁴⁶ Tidal datums are based on the latest National Tidal Datum Epoch (NTDE) published by NOAA and are the mean of the observed sea levels over a 19-year period. The latest published epoch is 1983-2001. This tidal epoch can be considered roughly equivalent to the year 2000 baseline for the OPC projections.

SB 272 Consistency: SB 272 requires local governments to develop a vulnerability assessment using best available science. This step provides basic recommendations for the types of hazards to evaluate to understand the physical impacts projected to occur as sea levels rise. [Appendix B](#) provides greater technical detail on methodologies for projecting changes in coastal hazards.

Expected outcomes from Step 3: Upon completing this step, the potential current and future impacts to the planning area from sea level rise hazards should be identified based on the various sea level rise scenarios chosen. Maps, GIS layers, graphics, figures, charts, tables, descriptions, or another system should be developed to communicate the impacts of current and future hazards.



Figure 13. Example of analysis of SLR impacts. Hazards predicted from the CoSMoS mapping of 3.3 feet (100 cm) of sea level rise in Venice, CA. (Source: [Venice Sea Level Rise Vulnerability Assessment 2018](#)).

Resources for Sea Level Rise Mapping

[Table 6](#) includes a list of sea level rise mapping tools. The tools vary in their complexity: some are considered “bathtub models,” because they show future inundation with simple rise in sea level (and no changes to the shoreline caused by other forces). Others include factors like erosion, storms, and fluvial inputs. These tools provide a useful first look at possible sea level rise impacts, but may need to be supplemented with additional, site- or topic-specific analyses, depending on the region. See [Appendix B](#) for additional information on determining hazard impacts and tools for mapping sea level rise.

Table 6. Sea Level Rise Mapping Tools

Tool	Description	Link
Our Coast Our Future (CoSMoS)	The USGS’s Coastal Storm Modeling System (CoSMoS) provides maps of various SLR-related hazards under half-meter incremental SLR scenarios. CoSMoS provides more detailed predictions of coastal flooding due to both future sea level rise and storms integrated with long-term coastal evolution (i.e., beach changes and cliff/bluff retreat) over large geographic areas (100s of kilometers). While projections of groundwater rise are available statewide, other hazards are available from Point Arena to the Mexico border and will be available statewide in the coming years.	Access the online viewer at ourcoastourfuture.org Download GIS data layers at the USGS website (Data is also hosted on the 30x30 California Climate Explorer)
Hazard Exposure Reporting and Analytics (HERA) (CoSMoS data)	The USGS’s CoSMoS data is hosted on both ourcoastourfuture.org (above) and on HERA, the Hazard Exposure Reporting and Analytics website. HERA allows users to overlay the SLR hazard data layers of CoSMoS with a host of different spatial datasets on communities, residents, employees, land types and habitats, parcels, various types of critical infrastructure, and other critical facilities. It provides users the number of people and assets within any give hazard zone.	HERA website
NASA Flooding Analysis Tool	This tool describes the frequency of high-tide flooding will change under various SLR scenarios. Users can view sea-level observations and assess past high-tide flooding frequency, view future changes in high-tide flooding frequency under various SLR scenarios, and view statistics and inflection points that support decision making. The tool was developed with funding from the NASA	Flooding Analysis Tool

	Sea Level Change Team by scientists at the University of Hawaii Sea Level Center and is based on the methods of Thompson <i>et al.</i> , 2021.	
NOAA Sea Level Rise Viewer	An example of a “bathtub model,” this viewer shows areas that are hydrologically connected to the ocean that would become inundated with 1-foot increments of sea level rise up to 10 feet. Storms, waves, erosion, and other coastal processes are not represented.	NOAA SLR Viewer
Cal-Adapt – Exploring California’s Climate	<p>Cal-Adapt hosts two datasets on sea level rise hazards: CoSMoS data and CalFloD3D-TFS. The CoSMoS data is the same as the dataset described above. The CalFloD3D-TFS assesses potential coastal flooding exposure to areas of interest to the Transportation Fuel Sector (TFS) over five 20-year planning horizons and the Fourth Assessment scenarios using a 3D hydrodynamic model during extremely high sea level events (72 hour storm event). Due to the inclusion of aboveground objects such as buildings and levees, CalFloD-3D depicts detailed land surface details. Details are described in Radke <i>et al.</i>, 2018.</p> <p>Cal-Adapt Analytics Engine provides the foundational climate and environmental data that underpins the California Climate Change Assessment, including sea level rise information.</p>	<p>Cal-Adapt</p> <p>Cal-Adapt Analytics Engine</p>
Humboldt Bay Sea Level Rise Mapping	A variety of mapping efforts have been completed in and around Humboldt Bay to characterize the existing shoreline condition and vulnerabilities under the current tidal regime and, through hydrodynamic modeling, to develop maps of areas vulnerable to inundation from existing and future sea levels.	<p>Mapping and numerous related vulnerability assessment reports available at:</p> <p>humboldtslri.org</p>

Step 4 – Assess potential risks from sea level rise to coastal resources, development, and environmental justice communities in LCP planning area/segment

After environmental justice communities are identified in Step 1 and sea level rise impacts are identified and mapped in Step 2, the next Step is to determine whether sea level rise poses risks to coastal resources, development, and if there is a disproportionate impact on environmental justice communities in the LCP planning area (refer to [Chapter 4](#) for a description of the potential consequences of sea level rise for coastal resources and environmental justice communities). Part of this step includes assessing whether the LCP planning area's current and planned land uses are appropriate or consistent with Coastal Act or LCP policies given those impacts, or if those land uses should be revised. Importantly, this step should also identify whether any environmental justice communities (such as those identified in Step 1) may be disproportionately affected by the impacts of sea level rise on coastal resources, development, and any current and planned land uses.

This step requires an understanding of several characteristics of the coastal resources and development typically found within various land use types as well as how the public, including environmental justice communities, interact or relate to the coastal resource or development. This information can be qualitatively and quantitatively described, and should be included in a vulnerability assessment, as required by SB 272. These assessments should account for potential impacts to coastal resources and development, including but not limited to the following, as well as how such impacts may differentially impact environmental justice communities.

- Existing and planned development, such as housing anticipated by a local government's certified Housing Element
- Coastal-dependent development and uses such as harbors, wharfs, ports, marinas, and commercial and recreational fishing areas and facilities
- Critical infrastructure⁴⁷ such as water and wastewater facilities and infrastructure, transportation infrastructure, and some power plants and energy transmission infrastructure
- Public accessways, beaches and other recreation areas, and the California Coastal Trail
- Highways 1, 101, and other state and local roads that provide access to the coast
- Wetlands, environmentally sensitive habitat area (ESHA), and other coastal habitats and sensitive species

⁴⁷ Critical infrastructure can vary widely from community to community, and may also include fire stations, police stations, and hospitals. For planning purposes, a jurisdiction should determine criticality based on the relative importance of its various assets for the delivery of vital services, the protection of special populations, and other important functions, as well as the social, environmental, and economic risks associated with loss of or damage to such assets.

- Agricultural areas
- Tribal cultural sites and archaeological or paleontological resources
- Visitor-serving development and uses

Conduct the following tasks for each sea level rise amount identified in Step 2. These tasks should be carried out with identified environmental justice communities as well as their defining characteristics in mind. Sharing the information developed in these steps, and gathering feedback on findings, is an important component of meaningful engagement for developing a vulnerability assessment to inform adaptation planning.

1. For the sea level rise amount of interest, determine what development, coastal resources, and environmental justice communities may be subjected to the sea level rise impacts expected for that time period. Map the coastal resources, development, and environmental justice communities that lie within the sea level rise impact areas for the given sea level rise amount. (Remember to address the wide range of resources listed above, including both natural resources and development.)
2. Determine if sea level rise impacts are a problem or benefit for each resource/development, and if so, when and to what degree the resource/development will be impacted. In some instances, sea level rise may result in the creation of new habitat areas that could help to alleviate impacts from the loss of similar habitat in other locations. However, it is more likely, especially in heavily urbanized areas, that sea level rise will result in a net loss of habitat unless steps are taken to preserve these systems. Similarly, determine if sea level rise impacts on the resource are a problem or benefit to identified environmental justice communities.

To accomplish this, consider a wide range of characteristics of each resource/development, including the following. The questions listed under each characteristic might help guide the consideration of each. These questions are meant to be suggestions rather than a standardized approach, and planners may use scientific literature, best professional judgment, communication and outreach with asset managers, environmental justice communities, or other interested parties, or a variety of other resources to gain a conceptual understanding of the important resources/development and vulnerabilities in their jurisdictions.

- a. **Exposure.** Will sea level rise impacts affect the resource/development at all?
 - i. Are coastal resources and community assets exposed to sea level rise impacts?
 - ii. Is the resource/development already exposed to hazards such as waves, flooding, erosion, or groundwater rise? If it is, will sea level rise increase hazard exposure?

- b. **Sensitivity.** If resources/development are exposed, to what degree will coastal resources/development be affected by sea level rise impacts? A simple way to think about this concept is to consider *how easily affected* the resource or development is in regard to sea level rise impacts.
- i. How quickly will the resource/development respond to the impact from sea level rise?
 - ii. Will the resource/development be harmed if environmental conditions change just a small amount? What are the physical characteristics of the resource/asset (e.g., geology, soil characteristics, hydrology, coastal geomorphology, topography, bathymetry, land cover, land use)? Do any of those characteristics make the resource especially sensitive?
 - iii. Can the resource/development withstand certain impacts? Can natural resources recover from occasional impacts? Can development be easily repaired from minor impacts?
 - iv. Are there thresholds or tipping points beyond which sensitivity to sea level rise increases?
- c. **Adaptive Capacity.** How easily can the resource/development successfully adapt to sea level rise impacts?
- i. How well can the resource/development accommodate changes in sea level over time?
 - ii. Is the rate of change faster than the ability of the resource/development to adapt?
 - iii. How easily can development be modified to cope with flooding, inundation, and/or erosion? Can structures be elevated or relocated?
 - iv. Are there adaptation efforts already underway? Are there any factors that may limit the success of adaptation efforts in the near, mid, or long term?
 - v. Do beaches, wetlands, and other coastal habitats have room to migrate inland? What is the overall health of existing wetlands and coastal habitats?
 - vi. Are there any other climate change-related impacts to consider? Are there any non-climate stressors that could impair ability to adapt to sea level rise?
 - vii. Is there potential for habitat creation as a result of sea level rise?
 - viii. What are the options to protect, redesign (e.g., elevate), or relocate inland any existing public accessways, recreational beaches, and segments of the Coastal Trail to cope with rising sea levels? Is lateral access compromised with sea level rise?

- d. **Consequences.** When sea level rise and/or sea level rise adaptation measures have impact(s) upon a resource/development, what are the economic, ecological, social, cultural, and legal consequences?
 - i. How severely could each resource/development be affected? At what scale?
 - ii. Are there cumulative consequences?
 - iii. Are there ripple effects, or secondary consequences to consider? For example, would damage to critical infrastructure result in environmental impacts, such as water quality impacts from spills of hazardous substances?
 - iv. Will environmental justice communities be disproportionately affected by changes to or loss of coastal resources/development? For example, would loss of beaches adversely affect communities who use these areas as no or low-cost recreational opportunities? Would loss of agricultural lands or coastal-related industry impact low-income workers?
 - v. What are the economic costs associated with damage to or loss of coastal resources and development? How will continued damage and repair and maintenance costs compare to costs associated with adaptation options? Note that SB 272 requires an economic impact analysis of, at a minimum, costs to critical public infrastructure.
 - vi. Will adaptive responses cause further adverse impacts?

- e. **Land Use Constraints.** Given the location of sea level rise impacts and the coastal resources and development currently located in those areas, should the types and intensities of land use be altered to minimize hazards and protect coastal resources?
 - i. What is the current pattern of development? Is the area largely developed or does it have significant areas of undeveloped land?
 - ii. Is the area served by infrastructure that is vulnerable to sea level rise impacts?
 - iii. Are large areas of land under common ownership or is land mostly subdivided into smaller lots in separate ownership?
 - iv. What conditions are required for the land use type, development, or resource to either exist or fulfill its intended purpose?
 - v. Are there coastal-dependent uses? What are their ideal proximities to the coast?

- vi. For potential new development, what is the expected lifespan? Is it economically feasible to locate it in a sea level rise impact area for a certain period of time before it is removed or relocated? Can a phased plan be undertaken to address any changes over time?
- vii. For existing development, what are the options available to minimize hazards to the development while protecting coastal resources? Note that in certain situations, the Coastal Act allows existing structures to be protected (Coastal Act Section 30235). What are the coastal resource impacts of shoreline armoring? Could feasible alternatives that avoid negative impacts associated with shoreline armoring, such as nature-based adaptation strategies, be implemented instead? Are there options to provide incentives to property owners to relocate or remove at-risk structures?
- viii. For a natural resource or habitat, what conditions are required for it to persist?
- ix. Where would resources/development ideally be located (or relocated to) over time as sea level rise causes environmental conditions to shift?
- x. What changes to existing LCP requirements or other land use restrictions are necessary to maximize opportunities for avoiding hazards or relocating threatened existing development?

After going through the questions listed above, and others that may be relevant to the planning exercise, synthesize the information and determine where sea level rise impacts currently pose problems for coastal resources, development, and environmental justice communities, what problems may develop over time as sea level rises, and how urgent the problems are. Create maps illustrating the location and extent of vulnerable land uses, such as critical facilities, wastewater infrastructure, and State Highway 1 and other coastal access roadways. This information should also be summarized in narrative form. The analysis should identify resources and development likely to be impacted by sea level rise at various periods in the future, and thus the issues that need to be resolved in the adaptation and LCP planning process, including in a phased manner as appropriate.

Remember that these assessments are not static; existing risks will change and new risks will arise with changes in a community, changes to coastal resources, the emergence of new threats, new information, and the implementation of adaptation actions. For this reason, the analysis should be updated as needed to reflect changes in sea level rise projections, changes in land use patterns, or new threats.

SB 272 Consistency: SB 272 requires local governments to develop a vulnerability assessment. This step provides recommendations on the types of coastal resources and land uses that are important to consider from a Coastal Act perspective, and provides direction for how to understand the implications of sea level rise depending on factors such as exposure, adaptive capacity, and impacts for environmental justice communities. SB 272 also requires economic impact analyses of, at a minimum, costs to critical public infrastructure. Assessing costs associated with exposure to and impacts from sea level rise over time, and beginning to understand the costs associated with repair and maintenance versus proactive adaptation actions can begin in this step.

Expected outcomes from Step 4: Descriptions of the characteristics that influence risk, including exposure, sensitivity, and adaptive capacity of each coastal resource to sea level rise impacts under each sea level rise scenario identified in Step 2 at the selected planning horizons, along with the expected consequences of those impacts for the resource, environmental justice community, and broader community. Maps of resources and/or land uses at risk could be produced.

Example for Step 4

To illustrate the process described in Step 4, consider a hypothetical planning area that includes multiple coastal resources and land use types, including a coastal wetland, bluff-top residential development with a fronting beach, and a wastewater treatment facility, that need to be addressed in the planning process. After Steps 1-3, portions of the planning area are found to be subject to current and future sea level rise impacts.

Step 4.1: Map the coastal resources and development (in this case the wetland, residential development, and wastewater treatment facility) for the range of time periods and sea level rise scenarios.

Step 4.2

a. **Exposure**

- *Wetland:* The wetland is highly exposed to flooding and inundation from sea level rise. By the year 2030, portions of the wetland will trap sediment at a rate such that the elevation keeps pace with sea level rise. By 2050, a portion of the wetland will become inundated and converted to open water, and by 2100 the entire area will be converted to open water. The wetland will be completely lost by this time period if it is not able to move inland.
- *Bluff-top Residential Development:* Houses in the residential development are not exposed to sea level rise impacts in 2030. However, a high rate of retreat along the fronting beach and bluff will put front-line houses in danger of being undermined by

the year 2050, and the entire development may be lost by 2100 unless adaptation measures are implemented.

- *Wastewater Treatment Facility:* Given that the wastewater treatment plant is set back somewhat from the shoreline, it will not be exposed to impacts from sea level rise until 2050. By 2050, however, portions of the infrastructure will be exposed to impacts from elevated water levels due to 100-year storm events and El Niño occurrences. By 2100, significant portions of the below-grade and above-grade infrastructure will be exposed to groundwater rise and flooding as the surrounding area is eroded and inundated.

b. Sensitivity

- *Wetland:* The wetland has high sensitivity to changes in sea level because its functioning is highly-dependent on local physical parameters such as water flow, tidal fluctuation, sediment supply, and water quality. Although it currently has good sediment supply, good water quality, and a number of other characteristics, small changes in sea level rise by 2050 may alter the function of the wetland. In addition, there are concerns that beyond 2050 the wetland will not be able to keep up with accelerated sea level rise, thus increasing sensitivity to further changes in sea level.
- *Bluff-top Residential Development:* The residential development has moderate to high sensitivity to longer-term sea level rise changes. Absent adaptation strategies, by 2050, the front-line houses will no longer be safe enough for occupancy. Moreover, infrastructure such as roads, sewage systems, and power networks may be damaged as the bluff-face erodes.
- *Wastewater Treatment Facility:* The facility is moderately sensitive to sea level rise. Flooding, groundwater rise, and erosion from sea level rise could cause damage to the facility, pumps and other equipment, but the facility was initially built to withstand a high degree of storm and related impacts. Associated damage to the facility could lead to a potential increase in rates for local ratepayers, which could disproportionately impact low-income and environmental justice communities.

c. Adaptive Capacity

- *Wetland:* Unlike many wetlands in the State of California, this particular wetland has a moderate-high adaptive capacity because it has the ability to both accumulate sediment and grow upwards, and, given that the land upland of the wetland is preserved as open space, it can migrate inland. However, by 2050, a part or all of the existing wetland area could be converted to open water if the wetland is not able to migrate inland or accumulate sediment at a rate that keeps pace with sea level rise. In this case, for example, a public trail will need to be relocated to allow inland migration of the new intertidal zone. Additionally, adaptive capacity may be reduced if pollution increases (e.g., as a result of damage to adjacent development) and disrupts the normal functioning of the wetland.
- *Bluff-top Residential Development:* The residential development has a moderate adaptive capacity. As houses become threatened over time, a scenario of managed

retreat would allow houses to be removed incrementally and eventually be relocated to safer areas. The feasibility of managed retreat can depend upon lot sizes, ownership patterns, land use restrictions in the safer areas, and the availability of public or private financing. If a protective structure such as a seawall is approvable under the LCP or Coastal Act, it would minimize threats to the residences due to erosion, though if the development is protected by shoreline structures, the fronting beach will eventually be lost.

- *Wastewater Treatment Facility:* The wastewater treatment facility has a very low adaptive capacity. It is large and has expensive and below-grade infrastructure so it cannot be entirely elevated, and relocation is costly and difficult. In order to be protected in its current location, new structures will need to be built and below-grade infrastructure will need to be repaired and maintained.

d. Consequences

- *Wetland:* In many situations, the loss of wetland area is a high risk since wetlands provide flood protection, water quality enhancement, carbon sequestration, and essential habitat for plant, fish, bird, and other species. However, in this case, wetland migration is not restricted by inland development, so the risks for this wetland are slight to moderate, depending upon the suitability of the inland area for establishment of wetland plants and potential changes in water temperature and water quality. In the short term, the wetland will likely continue to function at normal levels. However, if it eventually can't keep up with sea level rise or if there are barriers to migration, loss of the habitat will result in a loss of important ecosystem services.
- *Bluff-top Residential Development:* The housing development has medium to high risk through 2100. The option to either relocate houses or protect them with a seawall means that they could continue to exist. Importantly, a system of managed retreat would allow for the continued existence of the fronting beach and all of its social, economic, and environmental benefits, whereas the construction of a seawall would result in the accelerating loss of the beach and these benefits over time.
- *Wastewater Treatment Facility:* Given its low adaptive capacity and high sensitivity to higher levels of sea level rise, the wastewater treatment facility is at high risk. Loss or damage to the facility could result in serious social, economic, and environmental consequences. Flooding of the facility and surrounding areas will cause damage to infrastructure and loss of facility function. This could lead to discharge of untreated sewage, which would have adverse impacts to water quality and could impair the health of nearshore ecosystems and local communities. Sea level rise could also cause outflow pipes to back up with seawater, and groundwater rise can infiltrate collection pipes, leading to sewage backups, overflows, and additional water quality problems. Due to the legacy of environmental injustices in land use planning (see [Chapter 4](#)), environmental justice communities are often located near and/or adjacent to industrial facilities, such as wastewater treatment plants, and are thus more likely to be exposed to a higher rate of such environmental toxins and subsequent public health impacts including if such structures are damaged by sea

level rise (Cushing *et al.*, 2023). However, efforts to protect the structure may have unintended consequences including loss of surrounding habitat areas. Costs associated with damages to this facility or implementation of adaptation responses could also impact local ratepayers, which could disproportionately impact low-income and environmental justice communities if special rates or protections are not in place.

e. **Land Use Constraints (discussed further in Step 5)**

- *Wetland*: The high adaptive capacity of the wetland means that minimizing risk to this resource may be accomplished by ensuring that there is space available for it to migrate into. Land use policies designed to protect uplands or areas inland of the current wetland area will be necessary.
- *Bluff-top Residential Development*: The area in question will eventually become incompatible with the current use. Development will not begin to be exposed to sea level rise impacts until 2050, but it is important to start planning now about how best to address the risks to the houses. Phased retreat would necessitate identifying feasible locations into which houses could be moved or a plan to abandon and remove houses. Such a plan might include a Transfer of Development Rights program in which homes are encouraged in less hazardous areas. If a managed retreat strategy is not in place, existing structures may qualify for shoreline protection. Shoreline protection would likely exacerbate beach erosion, degrade public access, impair shoreline habitat, and alter visual character.
- *Wastewater Treatment Facility*: It should be determined how likely it is that the facility will be able to be protected throughout the rest of its expected lifespan under even the highest sea level rise scenarios. It may be that the wastewater treatment facility becomes an incompatible use under future conditions. If so, plans should be made to relocate at-risk portions of the facility, as feasible, or to phase out the facility.

Note that this is a simplified example used to demonstrate the process described in Step 4. Decisions about how to address various challenges presented by sea level rise will be more complex than those illustrated above and may require prioritizing the different resources based on Coastal Act and LCP requirements taking into account the goals and circumstances of the community and the various characteristics of each resource. An understanding of the exposure, sensitivity, adaptive capacity, consequences, and land use constraints for the particular resources and scenarios will need to be kept in mind as planners move into Step 4 to identify possible adaptation strategies. Updated LCP policies and ordinances should be considered to support strategy implementation over the long term.

Step 5 – Identify equitable adaptation measures

In Steps 1-4, planners will have analyzed several possible sea level rise scenarios, and this analysis will have revealed the areas, communities, and specific coastal resources that are vulnerable to sea level rise hazards. The results should show areas that are particularly resilient to future change and trigger points at which sea level hazards will become particularly relevant to certain areas. Under Step 4, tasks 2d (identifying the *Consequences* of sea level rise impacts) and 2e (considering the *Land use constraints*) will be particularly useful in thinking through what resources are particularly vulnerable and what the local priorities may be.

In Step 5, planners should weigh information from the previous steps, keeping in mind the hazard avoidance, resource protection, and environmental justice policies of the Coastal Act, and begin identifying, choosing, and developing adaptation strategies. In practice, this may be its own iterative and multi-step process that starts with more general outreach and communication efforts about a range of adaptation concepts, followed by more specific and detailed identification of adaptation projects that will be implemented. While there is no single best approach for how to identify and begin to implement adaptation strategies, a few key stages and considerations may be helpful in guiding an adaptation planning process:

- **Meaningful Engagement:** Education and outreach efforts are critical components of adaptation planning exercises and can help generate information on and support for various adaptation approaches. It is important to coordinate with partners and include all relevant stakeholders in these processes, including providing education on these topics, to help community members understand the consequences of sea level rise and to take an active role in planning processes. As discussed elsewhere in this Guidance and in the Commission’s [Resources for Addressing Environmental Justice through LCPs Toolkit](#), outreach and engagement is an important step in rectifying historical injustices with environmental justice communities. Some equitable engagement best practices include establishing two-way communications where both local governments and environmental justice communities communicate via an equal and mutually beneficial partnership, establishing a shared understanding of expectations and limitations, and clearly explaining decisions and outcomes regarding sea level rise planning made by the local government. Local governments can also continue to improve engagement efforts by setting measures to track and evaluate engagement progress. Documenting efforts can also be helpful to share with environmental justice partners to help increase trust and transparency in the process.
- **Community Visioning:** Understanding sea level rise science, possible impacts, uncertainty, and trade-offs among various approaches can be a challenging and complex topic for many community stakeholders. Stepping back to recognize that coastal communities are dynamic places that will change over time and thinking through what a community’s long-term goals are or what its vision of the future is can be a helpful first step to provide context for how to consider more specific adaptation strategies. For example, a community with a key priority of protecting recreational beach space will

likely be interested in a different set of adaptation approaches than a community with a key priority of ensuring the continuation of a vibrant harbor or working waterfront. Such visioning, when grounded in Coastal Act principles, can start to lay the foundation for how to consider different trade-offs and how to guide a holistic and balanced approach to protecting various coastal resources and development across a community and over time.

- **Consider a full range of adaptation options:** Adaptation planning processes should initially consider a wide array of options and evaluate the various trade-offs associated with each. Communities should consider how those trade-offs would relate to identified vulnerabilities, community goals, environmental justice concerns, Coastal Act requirements, and other relevant state or federal laws. The options available to minimize risks from sea level rise and protect coastal resources are dependent upon the specifics of the local community and will vary widely depending on whether the area is an urban, fully-developed waterfront, or a rural, undeveloped coastline. In undeveloped areas, the options may be clear: strictly limit new development in sea level rise hazard zones and allow natural processes to continue. In urban areas, sea level rise can present unprecedented challenges, and the options are less clear. The Coastal Act allows for protection of certain coastal-dependent development and existing structures. However, armoring can pose significant impacts to coastal resources, including public access. To minimize impacts, innovative, alternative options will be needed, such as the use of nature-based adaptation strategies to protect existing infrastructure, restrictions on redevelopment of properties in hazardous areas, managed retreat, partnerships with land trust organizations to convert at-risk areas to open space, or transfer of development rights programs. [Chapter 7](#) describes a number of adaptation options and the types of coastal resource issues they can help address.
- **Identify preferred adaptation approaches:** After considering an array of possible options, communities should begin to identify a more specific adaptation plan for what strategies will be implemented. In practice, it is likely that a variety of adaptation options will be chosen to respond to different vulnerabilities throughout a jurisdiction as well as to reflect the different needs and goals of different types of development and different coastal resources. Overall, strategies will need to be tailored to the specific needs of each community based on the resources and development at risk, should reflect an understanding of possible impacts to coastal resources and environmental justice communities, should consider feasibility of implementation (e.g., economic and regulatory constraints), and should be developed through a public process, in close consultation with the Coastal Commission and in line with the Coastal Act.

Note too that Section 30604(h) of the Coastal Act and the Commission's Environmental Justice Policy directs the Commission to consider environmental justice in all planning and permitting decisions, including with respect to all coastal resource issues. Oftentimes, protecting and preserving coastal resources will benefit environmental justice communities. For example, protecting coastal access and habitats benefits

environmental justice communities who rely on those spaces for lower cost recreational opportunities, cultural practices, mental health and wellness, and more. In another example, coastal agricultural lands provide important places for workers (who are often people of color who lack proper health coverage, have limited incomes, and experience higher rates of poverty and unstable housing conditions in California) to earn income, health coverage, and housing.⁴⁸ However, there may be instances in which the protection of coastal resources may create or exacerbate burdens to environmental justice communities. For example, relocation of at-risk critical infrastructure such as a wastewater treatment plant may ensure the continued functionality of that facility but may result in rate payer increases that typically come in the form of a flat rate increase due to legislation limiting utility rates. This will disproportionately burden low-income ratepayers. Identification and engagement with affected environmental justice communities is imperative to ensure that these conflicts are addressed in a manner that maximizes protection of coastal resources and uplifts environmental justice communities.

- **Consider phased adaptation options:** More detailed adaptation planning may begin to specify how different adaptation strategies and projects could be phased over time to address evolving vulnerabilities, reflect community goals, and protect coastal resources in line with the Coastal Act. Sometimes referred to as “adaptation pathways,” this type of approach can provide a more defined plan for what adaptation projects will be implemented at what time periods or under what conditions. Depending on the specific context, pathways can be fairly straightforward – such as one in which near term beach nourishment or nature-based adaptation strategies are implemented before long-term retreat options that prioritize natural processes – or more complex with multiple decision points and changing approaches – such as use of multiple nature-based strategies, armoring, and realignment or retreat over different time scales. Defined triggers can specify when new strategies or specific projects should be implemented and can be based on a variety of characteristics such as sea level rise amounts, changing conditions (e.g., certain beach widths), or social aspects (e.g., number of days a Coastal Trail segment is flooded and inaccessible). Triggers can also reflect the lead times necessary for planning and implementing next steps.

Note that phased approaches can also account for economic and feasibility factors, particularly for complex, interconnected assets like critical infrastructure. As discussed in the Coastal Commission’s [Critical Infrastructure Guidance](#), the time and complexity associated with adaptation planning, and the need to ensure that the public services provided by these assets are protected over time, will often necessitate a mix of different approaches phased over time. For example, in different situations, it may be

⁴⁸ California Department of Housing and Community Development. (2023). *Farmworkers*. <https://www.hcd.ca.gov/planning-and-community-development/housing-elements/building-blocks/farmworkers>., California Research Bureau. (2013). *Farmworkers in California: A Brief Introduction*. California State Library. <https://latinocaucus.legislature.ca.gov/sites/latinocaucus.legislature.ca.gov/files/CRB%20Report%20on%20Farmworkers%20in%20CA%20S-13-017.pdf>.

appropriate to maintain status quo repair and maintenance activities, to allow for protective armoring or nature-based strategies, to upgrade, elevate, or realign certain components, or to remove and re-site facilities over time. Economic analyses like a life cycle analysis can evaluate the costs associated with routine repair and maintenance, normal replacement/upgrades of components, and repairs and/or adaptation options associated with anticipated hazard exposure as compared to larger-scale retreat options to help determine when assets cannot function without substantial investment in new infrastructure, protective measures, or relocation. Similarly, these analyses can identify where prioritizing retreat in certain cases may help minimize long-term costs and impacts, ensuring sustainable and equitable investments. SB 272 emphasizes the need for this type of information by requiring economic impacts analyses of, at a minimum, costs to critical public infrastructure.

- **Identify specific adaptation projects:** Once a preferred adaptation approach (or set of adaptation strategies) has been identified, communities should begin to identify specific adaptation projects. In contrast with preferred adaptation approaches which may be more general—such as allowing for armoring in certain areas/for certain development, encouraging phased retreat over time, or calling for development of a beach nourishment program—this stage calls for identifying more concrete and implementable projects. Examples of these might include seeking funding for and constructing a living shoreline for a certain area, buying out properties for removal of development, acquiring land for realignment of a section of Coastal Trail, or upgrading an armoring structure to better integrate lateral or vertical public shoreline access. Identified projects can be ranked by priority, taking into consideration factors such as timing, vulnerability, and cost as well as identifying projects that are more easily achieved as compared to more complex challenges that will necessitate more planning and financial resources. This stage may also help local governments identify those strategies or projects for which additional analysis is needed, such as more detailed technical feasibility or design studies. Identifying specific adaptation projects is called out as a requirement in SB 272 and can be aligned with other planning processes such as Capital Improvement Plans or Local Hazard Mitigation Plans to further prompt on the ground implementation of these adaptation actions. Importantly, identifying specific projects, and completing more detailed feasibility/design studies for such projects, can allow jurisdictions to more easily capitalize on funding that becomes available, as new or one-time funding options often prioritize “shovel-ready” projects.

As mentioned above, identifying adaptation strategies, developing preferred approaches, and narrowing in on specific projects to be implemented will in many cases be a continuous and iterative process. This means that it is not always going to be necessary (or even possible) to have a fully-formed, perfectly defined approach before updating an LCP or starting to take certain adaptation actions. Furthermore, it is likely that adaptation strategies will be updated over time with new information, new understanding of sea level rise projections and impacts, new community goals, and so on. The Commission is supportive of working with local governments and their community partners at all stages of an adaptation planning process to

identify opportunities to integrate sea level rise into LCPs with varying levels of detail. As discussed in the next step, the Coastal Commission Local Government Working Group is supportive of taking a phased approach to LCP updates whereby initial updates could include more basic policies and future updates could include greater detail on, for example, more developed adaptation information.

SB 272 Consistency: SB 272 requires local governments to develop equitable adaptation approaches and specific, recommended projects that reflect identified vulnerabilities. This step provides recommendations for how to evaluate adaptation strategies in the context of the Coastal Act, discusses how to incorporate important topics like meaningful engagement and development of adaptation pathways, and recognizes that developing adaptation approaches and specific projects is an iterative process that can be done over time and with varying levels of detail.

Expected outcomes from Step 5: Identification of adaptation approaches and projects in adaptation plans, reports, or similar that reflect vulnerabilities, account for local goals and environmental justice communities, are consistent with the Coastal Act, and can be incorporated into an LCP in Step 6.

Step 6 – Draft updated or new LCP for certification with the California Coastal Commission

Once potential adaptation strategies have been identified, LCP policies that address sea level rise should be incorporated into a new LCP or LCP amendment. Whether as part of a new LCP or as part of an amendment to update an existing LCP, coastal planners should work with the Coastal Commission, environmental justice communities, and relevant stakeholders at all steps, but particularly to develop new or revised land use designations, policies, standards, or ordinances to implement the adaptation strategies identified in Step 5 in the LCP.

For jurisdictions that currently do not have a certified LCP, the sea level rise policies will be part of the development of a new LCP. In areas without a certified LCP, the Coastal Commission generally retains permitting authority, and the standard of review for development is generally Chapter 3 of the California Coastal Act. An LCP as certified by the Commission should already have land use policies, standards, and ordinances to implement Coastal Act Chapter 3 policies, including policies to avoid and mitigate hazards, and to protect coastal resources. However, in older LCPs, many of these policies do not address changing conditions adequately enough to protect coastal resources over time as sea level rises. Similarly, policies to protect resources and address coastal hazards may not reflect new techniques that can be utilized to adaptively manage coastal resources in a dynamic environment. Furthermore, many older LCPs likely do not have policies relating directly to environmental justice and meaningful engagement. As

such, the LCP should be evaluated, with consideration and inclusion of environmental justice community concerns, to identify the land use designations, policies, and ordinances that need to be amended to address the vulnerabilities identified in Steps 2-4 and to integrate the adaptation approaches and projects identified in Step 5.

General approaches for updating LCPs to address SLR:

There are a number of overarching approaches and general recommendations for updating or developing an LCP to address sea level rise, as described below. The Commission recognizes that not all LCPs will integrate SLR adaptation approaches in the same ways or with the same level of detail. As discussed in Step 5, adaptation options should be chosen to reflect local conditions, vulnerabilities, and goals, and LCPs will in turn reflect this variation. Furthermore, it is understood that LCP adaptation policies will be developed and implemented in such a way as to be flexible and adaptive enough that they can be changed or updated as conditions change or if sea level rise impacts are significantly different than anticipated. At the same time, LCPs must be consistent with the Coastal Act and reflect the minimum requirements of SB 272. This interplay between allowing for local flexibility and maintaining a level of statewide consistency has and will continue to be a challenge. The Coastal Commission, including through its work with the Local Government Working Group, will continue to coordinate with local governments to identify opportunities, recommendations, and guidance for addressing sea level rise in LCPs in a way that meets local, Commission, and statewide goals.

- **Update or add baseline sea level rise policies:** In 2021, the Coastal Commission Local Government Working Group developed and adopted a set of baseline sea level rise policy topics that the group considered to be appropriate for a first-round sea level rise LCP update. These policy topics include: 1) using best available science, 2) committing to developing or updating vulnerability assessments and adaptation plans, 3) incorporating risk disclosures/assumption of risk, and 4) committing to a phased LCP update approach. The Working Group believes that these policy topics can lay a foundation that both substantively addresses sea level rise in the near term (even for jurisdictions that have not completed more detailed adaptation planning) and allows for the incorporation of greater amounts of detail now or in the future. These baseline policies also align with and help to implement the requirements of SB 272.
- **Update or add policies to implement identified adaptation approaches and projects:** In addition to baseline SLR policies, LCP policies should be developed that lay the foundation for, require, or otherwise implement the adaptation strategies and specific projects identified in Step 5. In some cases, updating land use designations and zoning ordinances or updating siting and design standards, as discussed below, will directly or indirectly implement identified strategies by regulating future development actions. In other cases, more specific policy language, including programmatic policies as also described below, will be needed to implement specific approaches. [Chapter 7](#) describes a number of specific adaptation policies and strategies that can be integrated into an

LCP and is organized by resource type to allow users to easily identify the types of policies that may be relevant to local resource vulnerabilities.

Note that many adaptation strategies, and particularly the more specific adaptation projects that have been identified, will be implemented in a coordinated way through both the LCP and individual CDPs. For example, it may be necessary to update land use designations to allow for a specific adaptation project (e.g., changing zoning to open space or allowing for recreational uses/amenities), and constructing a project (e.g., dune restoration or realignment of the Coastal Trail) will then need a CDP. Identifying the appropriate level of detail in LCP policies to lay the foundation for specific adaptation projects can be challenging, especially if there are not yet the type of detailed technical studies and alternatives analyses that are typically associated with CDPs. The Coastal Commission will continue to work with local governments to develop LCP policies that integrate adaptation approaches.

- **Update land use designations and zoning ordinances:** One of the most common methods of regulating land use is through zoning designations and ordinances, and updating these policies is one of the most fundamental ways of responding to sea level rise impacts. Planners may address particular vulnerabilities and local priorities by updating land use designations and zoning ordinances to protect specific areas and/or resources. For example, areas that are particularly vulnerable to sea level rise impacts can be designated as hazard zones, and specific regulations can be used to limit new development and/or to encourage removal of existing development in such zones. Similarly, open space areas can be designated as conservation zones in order to protect and provide upland areas for beach, wetland, and habitat migration or for additional agricultural land.
- **Update siting and design standards:** Updated siting and design standards may go hand in hand with updated land use designations and zoning ordinances, in that specific standards may be required for development or projects in certain zones. For example, development in hazard zones may require additional setbacks, elevation of first floor habitable space, innovative stormwater management systems, special flood protection measures, mitigation measures for unavoidable impacts, relocation and removal triggers and methodologies, and so on. Siting and design standards may also guide or inform specific adaptation approaches. For example, many LCPs include detailed design standards for shoreline armoring, where approvable, that address methods for minimizing impacts to coastal resources (such as ensuring armoring can blend into natural bluffs or can be integrated with public access features).
- **Establish policies to minimize hazards to current development:** Under the Coastal Act, certain improvements and repairs to existing development are exempt from CDP requirements. Non-exempt improvements and any repairs that involve the replacement of 50% or more of a structure, however, generally require a CDP and must conform to

the standards of the relevant Local Coastal Program or Coastal Act.⁴⁹ Redevelopment, therefore, should minimize hazard risks from sea level rise. For structures currently sited in at-risk locations, the process of redeveloping the structure may require the structure to be moved or modified to ensure that the structure and coastal resources are not at risk due to impacts from sea level rise. As described in Guiding Principle 6, sequential renovation or replacement of small portions of existing development should be considered in total. LCPs should include policies that specify that multiple smaller renovations that amount to alteration of 50% or more of the original structure should require a CDP, and require that the entire structure to be brought into conformance with the standards of the LCP or Coastal Act.⁵⁰

- **Identify a timeline for updates:** Both SB 272 and the CCC Local Government Working Group baseline SLR policies refer to a need to continue to update LCPs and to identify a specific timeline for doing so. As described throughout this chapter, it is understood that adaptation strategies will change over time to reflect evolving science, changing conditions, new and innovative approaches, and other factors, and LCPs will similarly need to be updated to reflect these changes. Additionally, the Local Government Working Group has emphasized the need to consider more routine and phased LCP updates not only to address evolving adaptation needs, but also to reflect different phases of adaptation planning and differing levels of detail and analysis that local governments have been able to complete. Identifying a specific timeline for updates can help to ensure that necessary next steps are completed.

Timelines for updates should reflect a variety of factors, including how far along a jurisdiction is in their planning process, identified vulnerabilities, and any specific adaptation approaches. For example, a jurisdiction that has not completed a vulnerability assessment or adaptation plan may include a policy calling for the development of such documents within 5 years, with an LCP update to follow based on the findings of that work. A jurisdiction that has completed more detailed adaptation planning or has developed specific adaptation pathways may have a policy (or policies) that require LCP updates following implementation of certain projects, or when certain identified triggers have been met. A timeline for updates may also be informed by economic analyses, such as the analysis SB 272 requires for critical public infrastructure.

There are also a variety of policy approaches for incorporating timelines for updates. A general planning horizon could be associated with the overarching LCP (such as a 30-year horizon typical for General Plans) with a stated intent to comprehensively update

⁴⁹ Section 13252(b) of the Commission’s regulations states that “unless destroyed by natural disaster, the replacement of 50 percent or more of a single family residence, seawall, revetment, bluff retaining wall, breakwater, groin or any other structure is not repair and maintenance under Coastal Act Section 30610(d) but instead constitutes a replacement structure requiring a Coastal Development Permit.”

⁵⁰ In addition, for structures located between the first public road and the sea or within 300 feet of the inland extent of a beach or mean high tide line, improvements that increase the height or internal floor area by more than 10% normally require a CDP. (14 Cal. Code Regs §§13250(b)(4), 13253(b)(4).) Depending upon the location of the structure, smaller improvements may also require a CDP. (14 Cal. Code Regs. §§ 13250(b), 13253(b).)

the LCP at the end of the identified timeframe. More specific timeframes associated with specific adaptation strategies could be generally identified in programmatic policies, or could have specific sunset provisions (or similar provisions) that would result in different policies taking effect unless an LCP has been further updated.

Like with developing adaptation strategies, the Commission recognizes that there will be variability in how timelines for updates are developed and implemented through an LCP, as well as the extent to which minor changes or updates to Vulnerability Assessments, Adaptation Plans, or other planning documents will necessitate LCP updates. The Commission will work with local governments to identify appropriate timelines that reflect local contexts. In general, having more vulnerabilities that are left unaddressed, a lack of specificity about adaptation approaches, and/or more controversial short-term adaptation strategies may necessitate nearer term or stricter requirements for updating the LCP. It will also be important to include timelines that allow jurisdictions to fulfill the basic requirements of SB 272 by January 1, 2034, and to obtain LCP certification.

- **Update resource inventories, maps, and information on SLR impacts and environmental justice issues:** LCPs themselves can be an important place to summarize the findings of the planning documents that were developed to support the LCP update process. For example, background sections can summarize vulnerability findings, outreach efforts, and general adaptation planning work. This should also include a description of the environmental justice communities that were identified in Step 1 and how they may be more sensitive to sea level rise hazards. Specific documents could be included as LCP appendices, though the LCP should be clear that the LCP policies (not other documents) are the standard of review. Hazards maps developed as part of a vulnerability assessment may also form the basis for hazards overlay or other zoning ordinance information. Local governments may also seek to compile a set of maps that clearly show the current locations of the coastal resources present in an LCP jurisdiction (e.g., beaches and public accessways; agricultural land, wetlands, ESHA, and other coastal habitats; energy, wastewater, transportation, and other critical infrastructure; and archaeological and paleontological resources), as well as existing and future hazard areas and conditions.
- **Incorporate “programmatic” policies that reflect adaptation planning work:** In some cases, LCPs may include broader programmatic policies that don’t apply to specific development or permitting actions, but which encourage or require the City/County to undertake continued study or to approach adaptation planning in certain ways. These types of policies may be helpful ways of memorializing both past and ongoing/planned adaptation work. Examples may include:
 - **Identify lead or coordinating partners:** Policies may be included that direct certain city/county departments to carry out identified adaptation strategies (e.g., Public Works or Parks and Recreation) or may call for coordinating with state agency asset managers like Caltrans or State Parks.

- **Identify next steps for adaptation planning:** Policies may call for completion of (or updates to) vulnerability assessments and adaptation plans or for development/analyses of more specific adaptation programs/strategies such as sub-area adaptation plans, a beach nourishment program, a Transfer of Development Credit program, or regional sediment management programs.
- **Establish methods to monitor local changes from sea level rise:** Policies may seek to establish actions to conduct long-term sea level rise monitoring, MHTL surveys, and/or monitoring and tracking of shoreline changes, flooding extent/frequency, or efficacy of different adaptation approaches. In some cases, monitoring and MHTL surveys may also be included as a Coastal Development Permit requirement for specific projects.
- **Research and data collection:** Similarly, policies may call for continued research to address key data gaps and to collaborate with other local, regional, and state partners to pursue new research to better understand sea level rise, baseline shoreline conditions, ecosystem responses to sea level rise, potential impacts and vulnerabilities, and the efficacy of adaptation tools.
- **Outreach and education:** Other policies may call for continued education and outreach efforts related to sea level rise and adaptation. Continued outreach with all relevant stakeholders can help generate support for ongoing adaptation planning, and continued implementation of (and refinements to) the meaningful engagement plan developed in Step 2 can help ensure that environmental justice communities continue to be fully engaged in implementation of adaptation strategies. More information on environmental justice engagement best practices is discussed in Step 1 of this Chapter and in the [Resources for Addressing EJ through LCPs Toolkit](#).

As stated above, a more extensive and detailed list of possible adaptation strategies, including as related to specific to coastal resources and environmental justice can be found in [Chapter 7](#). The above list and those strategies discussed in Chapter 7 should neither be considered a checklist from which all options need to be added to an LCP nor an exhaustive list of all possible adaptation strategies. Sea level rise adaptation is an evolving field and decision makers will need to be innovative and flexible to respond to changing conditions, new science, community feedback, and new adaptation opportunities. The important point is to analyze current and future risks from sea level rise, determine local priorities and goals for protection of coastal resources and development, and identify what land use designations, zoning ordinances, and other adaptation strategies can be used to meet those goals within the context of the Coastal Act and in consideration of environmental justice principles.

Local government staff should work closely with Coastal Commission staff, environmental justice communities, and other relevant stakeholders to ensure there is opportunity for early and routine public input in developing the new LCP or LCP amendments. Once the updates and plans are complete, local governments will submit them to the Commission for certification.

The Commission may either certify or reject the LCP or LCP amendment as submitted, or it may reject it but suggest modifications. If the Commission adopts suggested modifications, the local government may adopt the modifications for certification or refuse the modifications and resubmit a revised LCP for additional Commission review. More information on the LCP amendment process can be found on the Commission’s webpage of [Materials & Resources for Coastal Jurisdictions](#).

SB 272 Consistency: As discussed at the beginning of this chapter, SB 272 includes a set of requirements that relates to both the process of updating an LCP and the content of LCP policies themselves. This step provides general recommendations for the LCP sections and types of LCP policies that should be updated to reflect identified vulnerabilities, environmental justice concerns, and adaptation approaches. While the content and specific policies will vary in each LCP, for consistency with SB 272, the LCP should:

- Require the use of best available science
- Require risk disclosures/assumptions of risk
- Reflect and address identified vulnerabilities in an equitable manner
- Allow for/require the implementation of identified adaptation approaches for specific areas/development types
- Lay the foundation for implementation of identified adaptation projects, recognizing that CDPs for such projects will include more detail
- Identify lead agencies or departments responsible for implementing identified projects
- Identify next steps, such as highlighting topics or strategies for which additional analysis is needed (in combination with the timeline for updates)
- Identify a timeline for completion of, or updates to, the vulnerability assessment, adaptation plan, and LCP (or specific LCP policies) that reflects current information on vulnerabilities, identified adaptation strategies, and an economic impact analysis for critical public infrastructure

Note that these types of policies reflect the minimum requirements of SB 272 to be included in an LCP by January 2034. Importantly, the Coastal Commission is committed to working with local governments to support a phased approach to LCP updates in which initial updates may be built upon and further developed in future updates. The Commission will consider appropriate LCP policies and timelines for updates that reflect where in the process different jurisdictions are, and will coordinate with funding agencies to prioritize funding for appropriate next steps. For example, a more basic initial LCP update may call for (and include a timeline for) completing an adaptation plan, and funding to support such a planning effort should be prioritized.

Expected outcomes from Step 6: Certified/updated LCP with policies and land use designations that address sea level rise and related hazards and ensure protection of coastal resources and communities consistent with the Coastal Act.

Step 7 – Implement LCP and monitor and revise as needed

Upon certification of the new or updated LCP, sea level rise adaptation strategies will be implemented through the certified implementing ordinances and related processes and actions (e.g., local review of CDPs, proactive action plans). Additionally, an important component of successful adaptation is to secure funds for implementation, regularly monitor progress and results, continue engagement with environmental justice communities, and update policies, approaches, and projects as needed and in line with the identified timeline for updates. Sea level rise projections should also be re-evaluated and updated as necessary.

- **Secure resources for implementation:** SB 272 calls for funding for implementation of identified adaptation strategies and projects to be prioritized for those jurisdictions that have completed an LCP update consistent with the relevant guidelines described in this document. As highlighted above, the Commission will work with funding agencies to prioritize funding for implementation of next steps identified in certified LCPs, including funding for continued planning, analysis, and construction of identified adaptation strategies.

Currently, there are a number of different sources of funds available to help local governments plan and implement adaptation strategies. For example, the Coastal Commission, the Ocean Protection Council, and the Coastal Conservancy have grant programs designed to support local adaptation efforts (see [Appendix C](#) for additional details on each of these programs), including significant funds for efforts such as sea level rise vulnerability assessments, adaptation planning, more specific studies such as feasibility assessments and preliminary designs, and implementation of adaptation projects.

As described previously, there may also be overlap between LCP planning and Local Hazard Mitigation planning. FEMA’s Hazard Mitigation Assistance (HMA) grant programs provide significant opportunities to reduce or eliminate potential losses to State, Indian Tribal governments, and local assets through hazard mitigation planning and project grant funding. Currently, there are several programs that provide funding resources for local communities: the [Hazard Mitigation Grant Program \(HMGP\)](#); [Pre-Disaster Mitigation \(PDM\)](#); [Flood Mitigation Assistance \(FMA\)](#); and the [Building Resilient Infrastructure and Communities program \(BRIC\)](#).⁵¹ Cal OES administers the HMA and

⁵¹ Each HMA program was authorized by separate legislative action, and as such, each program differs slightly in scope and intent.

FMA programs. More information can be found at the Cal OES HMGP [website](#) and the FEMA HMA [website](#).

The Commission recognizes that funding opportunities are constantly evolving, that demand for funding is increasing, and that there is a significant need for the development of additional funding opportunities.

- **Identify key conditions, resources, and other factors to monitor:** Implementation of certain strategies and future updates to the LCP may be triggered by changing conditions or other identified factors. As discussed previously, these could include characteristics such as sea level rise amounts, changing conditions (e.g., certain beach widths), economic considerations (e.g., damage repair costs), or social aspects (e.g., number of days a Coastal Trail segment is flooded and inaccessible). Certain species can also be indicators of whether and when sea level rise is affecting an ecosystem, such as the presence of certain plant species indicating the salinity of soils. Monitoring programs should ensure that these triggers are recognized and responded to at the appropriate time.
- **Continue engagement with environmental justice communities:** Continued engagement with environmental justice communities will maintain a level of ongoing trust and relationship building even after the adoption of an LCP. Increased trust and partnership between environmental justice communities and the local government can be widely beneficial and can potentially streamline future outreach regarding specific projects or additional updates. Examples of ongoing outreach practices include periodic calls or emails and participation in neighborhood workshops and events to provide updates and an outlet for continuous feedback. Such feedback evaluations can be used as a resource for planners to learn what communication methods work for particular groups and what can be adjusted.
- **Periodically update LCPs:** As discussed in previous steps, local governments should review their vulnerability and risk assessments and adaptation plans on a regular basis as significant new scientific information becomes available, as conditions change, and as various strategies are implemented, and they should propose amendments as appropriate. Given the evolving nature of sea level rise science, policies may need to be updated as major scientific advancements are made, changing what is considered the best available science. It will likely be important to modify maps of current and future hazard areas on a five- to ten-year basis or as necessary to allow for the incorporation of new sea level rise science, monitoring results, and information on coastal conditions. Regular evaluation of LCPs is important to make sure policies and adaptation strategies are effective in reducing impacts from sea level rise.

SB 272 Consistency: SB 272 requires local governments to identify a timeline for updates to the LCP. This step reiterates the importance of periodically updating the LCP and describes implementation of the LCP and identified adaptation strategies.

Expected outcomes from Step 7: Implementation of the LCP and identified adaptation projects; a plan to monitor the LCP planning area for changing conditions and effectiveness of various adaptation strategies; ongoing communication and coordination with environmental justice communities and organizations that serve them; and a plan to update and revise the LCP (and relevant vulnerability assessments and adaptation plans) based on an identified timeline.

The box below provides a summary of the components needed for consistency with SB 272 and a description of the minimum requirements for each component, as discussed throughout this chapter. Following this summary box is a flowchart ([Figure 14](#)) that illustrates the seven-step process discussed in this chapter. Notice that the process is circular. Because sea level rise science and adaptation approaches will be refined and updated in the future, planners should periodically, and in line with the identified timeline, repeat this seven-step process to update and improve their LCPs.

For additional resources and examples of ways to incorporate sea level rise into the LCP, see [Appendix C](#).

Summary of Minimum Requirements for Consistency with SB 272

SB 272 requires local governments in the coastal zone to develop a sea level rise plan as part of a new or updated LCP that includes, at a minimum, the following components:

1. Use of best available science
2. A vulnerability assessment that includes efforts to ensure equity for at-risk communities
3. Sea level rise adaptation strategies and recommended projects
4. Identification of lead planning and implementation agencies
5. An economic impact analysis of, at a minimum, costs to critical public infrastructure
6. A timeline for updates, as needed, based on sea level rise projections, local conditions, identified adaptation strategies/projects, and other locally relevant factors

SB 272 applies to both the *process* for updating an LCP as well as the *policy content* of the LCP itself. Although the Coastal Commission does not certify documents such as vulnerability assessments and adaptation plans, for the Commission to certify an LCP as consistent with the requirements of SB 272, the LCP must include policies that reflect, allow for, or otherwise reference the findings of these other documents. Therefore, both the LCP and the associated planning documents must meet certain minimum requirements. These minimum requirements are summarized below. Information on LCP policies and options that would reflect a phased approach to LCP updates is included at the end of this box.

To be fully consistent with SB 272, by January 1, 2034, local governments must complete the six components listed above. More detail on and minimum requirements for each of the six components are summarized below, along with links to additional relevant discussion throughout this chapter. Jurisdictions must then incorporate that greater level of detail in a new or updated LCP. Minimum requirements for LCP policies/zoning that reflect these six components are highlighted following the details for the six components.

Component #1: Best Available Science

- LCP policies must require the use of best available science, currently identified as the 2024 [California State Sea Level Rise Guidance](#), to guide land use planning and permitting decisions and inform risk disclosures/assumptions of risk.
- Other key resources for sea level rise information, including mapping tools, are highlighted throughout the Guidance (see, e.g., [Chapter 3](#); [Table 6](#); Appendices [B](#) and [C](#)).

Component #2: SLR Vulnerability Assessment

- Use of best available science (**Component #1**) (see [Chapter 3](#)).
- Consideration of multiple sea level rise scenarios that cover a long-term planning horizon (through ~2130) (see [Step 2](#)).
- Analysis of the physical impacts of sea level rise, including assessing coastal hazards that will be exacerbated by sea level rise (e.g., flooding, erosion, groundwater change) (see [Step 3](#); [Appendix B](#)).
- Analysis of how sea level rise and changing coastal hazards will impact coastal resources and development, including but not limited to coastal-dependent development, critical infrastructure, public accessways, the Coastal Trail, beaches, wetlands, agricultural lands, cultural sites, and archaeological resources (see [Step 4](#)).
- Identification of EJ communities that may be impacted by sea level rise and consideration of how sea level rise may differentially impact EJ communities (see [Chapter 4](#); Steps [1](#) and [4](#)).

- Discussion of the findings of the vulnerability assessment including, maps, tables, descriptions, and other quantitative and qualitative information.
- Public outreach, engagement, and education regarding impacts from sea level rise (see [Chapter 4](#); [Step 1](#)).
- **Beyond the minimum requirements** – topics for more detailed analyses or refinements to the Vulnerability Assessment:
 - Development of additional technical information to fill specific data gaps, such as more detailed groundwater analyses or consideration of impacts exacerbated by other climate change stressors.
 - Analysis of additional sea level rise scenarios.

Component #3: Adaptation Plan with Strategies and Recommended Projects (see [Step 5](#))

- Use of best available science (**Component #1**) (see [Chapter 3](#)).
- Consideration of a range of sea level rise adaptation options. Such options may include, but are not limited to, nature-based adaptation options, retreat and realignment, armoring, elevation, stormwater management, and conservation of open space (see [Chapter 7](#)).
- Analysis and discussion of the pros and cons of different adaptation strategies, including a discussion of the consistency of adaptation options with the Coastal Act and other relevant laws/policies and how various strategies will have differential impacts to different types of coastal resources.
- Analysis and discussion of how different adaptation strategies may differentially impact EJ communities (see [Chapter 4](#); [Steps 1](#) and [4](#)).
- Analysis and discussion of the applicability of different adaptation options for the jurisdiction (or for various sub-areas, development types, habitat areas, assets, etc.), and what the consequences/results for implementing different strategies would be for the jurisdiction. Analysis/discussion may initially be high-level or conceptual, with more detailed analysis subject to future planning efforts, which may be reflected in an identified timeline for updates, per **Component #6**.
- Identification of conceptual preferred approach (or combination of approaches) and discussion of how such an approach will ensure equity and balanced protection of coastal resources.
- Identification of specific adaptation projects. Unlike higher level, conceptual ideas, this list should include more concrete and implementable projects or next steps that are geared for completion in the near term (e.g., 10 years), such as constructing a living shoreline for a certain area, buying out properties for removal of development, acquiring land for realignment of a section of Coastal Trail, or upgrading an armoring

structure. Identification of specific adaptation projects may be the subject of a future planning effort (reflected in an identified timeline for updates, per **Component #6**).

- Identification of lead agencies, asset managers, or other entities responsible for carrying out adaptation approaches and identified projects (**Component #4**).
- Public outreach, engagement, and education regarding sea level rise adaptation strategies (see [Chapter 4](#); [Step 1](#)).
- **Beyond the minimum requirements** – topics for more detailed analyses or refinements to the Adaptation Plan:
 - Development of a vision/goal statement(s) and analysis and discussion of how different adaptation strategies may support the identified vision/goals.
 - Completion of feasibility studies or other planning/assessment work to aid in refining preferred adaptation approaches.
 - Development and identification of adaptation strategies relevant to certain sub-areas, neighborhoods, assets, development types, etc. based on shared characteristics.
 - Identification of additional, specific adaptation projects or prioritization of various identified projects.
 - Development of phased adaptation approaches or adaptation pathways, along with relevant triggers and threshold conditions for implementing new strategies.

Component #4: Identification of lead planning and implementation agencies ([Step 1](#))

- While SLR planning processes may be initiated or led by a variety of local government departments/individuals, LCPs are developed by local government planning departments, and planning department staff should be an integral part of any planning team.
- LCP policies related to specific adaptation projects, other next steps, or which address City/County-owned assets should identify the lead agency, asset manager, or other entity responsible for carrying out adaptation approaches/identified projects. This information may also be included in the Adaptation Plan (**Component #3**).

Component #5: Economic Analysis

- Economic analysis for, at a minimum, critical public infrastructure, defined in SB 272 as including but not limited to “...transit, roads, airports, ports, water storage and conveyance, wastewater treatment facilities, landfills, powerplants, and railroads.” Other critical infrastructure types that should be considered include sewer lines, stormwater facilities, gas lines, and other utility infrastructure.

- Analysis of the costs associated with damage to such critical infrastructure assets from the coastal hazards and SLR scenarios included in the vulnerability assessment, and the subsequent required repairs (see [Step 4](#)).
- Analysis of costs associated with adaptation options or specifically identified adaptation projects for such assets (see [Step 5](#)).
- Information may be incorporated into the Vulnerability Assessment or Adaptation Plan, or as a standalone document(s). Analyses may also be completed by relevant asset managers.
- **Beyond the minimum requirements** – topics for more detailed analyses or refinements to the Economic Analysis:
 - Completion of an economic analysis that addresses other coastal resources.
 - Assessment of the costs of each of the identified adaptation projects (**Component #3**)
 - Incorporation of more detailed economic information, such as non-market valuation of public trust and natural resources or valuation of lost revenues or tax base associated with changing land uses.
 - Coordination with asset managers to complete life cycle analyses for individual assets/facilities that evaluates the costs associated with routine repair and maintenance, normal replacement/upgrades of components, and repairs and/or adaptation options associated with anticipated hazard exposure as compared to larger-scale retreat options to help determine when assets cannot function without substantial investment in new infrastructure, protective measures, or relocation.

Component #6: Timeline for updates (Steps [6](#) and [7](#))

- LCP policies must identify an explicit timeline(s) for updates to completed vulnerability assessments, adaptation plans, other relevant materials, and LCP provisions, as necessary to reflect changing conditions, updated science, and evolving best practices.
- Continued consistency with SB 272 will require local governments to meet the identified deadlines.

As discussed above, to be consistent with SB 272, jurisdictions are required to complete/develop each of the six components identified above by January 1, 2034. Thereafter, they must obtain CCC certification of a new or updated LCP that reflects this greater level of detail for the plans to become effective and to be prioritized for adaptation funding. Minimum requirements for the LCP certification for this purpose include ([Step 6](#)):

- LCP policies that require use of best available science.
- LCP policies that require risk disclosures/assumptions of risk.

- LCP policies/zoning that reflect and address identified vulnerabilities in an equitable manner.
- LCP policies/zoning that allow for/require the implementation of identified adaptation approaches for specific areas/development types.
- LCP policies/zoning that lay the foundation for implementation of identified adaptation projects, recognizing that CDPs for such projects will include more detail.
- LCP policies that identify lead agencies or departments responsible for implementing identified projects.
- LCP policies that identify next steps, such as highlighting topics or strategies for which additional analysis is needed (in combination with the timeline for updates).
- LCP policies that identify a timeline for updates to the vulnerability assessment, adaptation plan, economic analysis, and other relevant studies to reflect, for example, new information on sea level rise science, vulnerabilities, changing conditions, new adaptation options, and completion of specific adaptation projects, as well as for subsequent updates to the LCP (or specific LCP policies).

The Coastal Commission supports a phased approach towards LCP updates. A number of jurisdictions have initiated planning and have completed some but not all of the six components required by SB 272. Rather than waiting for completion of all six components, the Commission encourages jurisdictions to complete phased LCP updates that reflect completed work. Examples of LCP policies that could be included in a phased LCP update include:

- Baseline sea level rise policies, similar in nature to those recommended by the Coastal Commission Local Government Working Group, including requirements to use best available science (**Component #1**) and to incorporate risk disclosures/assumptions of risk.
- Policies like those included in the section above that reflect information that has already been developed. For example, if a jurisdiction has completed a vulnerability assessment but not an adaptation plan, additional policies/zoning should address and reflect the identified vulnerabilities.
- LCP policies that include explicit timelines (**Component #6**) for completion of a vulnerability assessment, adaptation plan, economic analysis, or related document/study that addresses the six minimum components (or any combination thereof that has not yet been completed and/or will be the subject of continued, more detailed planning). Such timelines should account for completion of these components by January 1, 2034, and the subsequent LCP certification that reflects the more detailed information.

Planning Process for Local Coastal Programs and Other Plans



Figure 14. Flowchart for addressing sea level rise in Local Coastal Programs and other plans