



## Chapter 2. Principles for Addressing Sea Level Rise in the Coastal Zone

This chapter summarizes the Coastal Commission’s framing principles for addressing sea level rise, many of which derive directly from the requirements of the Coastal Act. These principles broadly lay out the common ideas and a framework by which sea level rise planning and permitting actions can be assessed, and as such, represent the goals to which actions should aspire. Individual actions and outcomes may vary based on a variety of factors, including applicable policies and location- or project-specific factors that may affect feasibility. There are five categories of principles: using science to guide decisions; minimizing coastal hazards through planning and development standards; maximizing protection of public access, recreation, and sensitive coastal resources; maximizing agency coordination, meaningful engagement, and public participation; and prioritizing environmental justice communities. Each category groups important and related concepts that are central to addressing the challenge of rising sea levels. Building on the cumulative knowledge and experience of the Commission, subsequent chapters of this Guidance use these principles to frame practical guidance for addressing sea level rise through planning and permitting decisions in the coastal zone, consistent with the statewide policies of the California Coastal Act and SB 272, and the vision of climate resilience outlined in the [State Sea Level Rise Guidance](#) (OPC 2024), the [California Climate Adaptation Strategy](#) (2021), [Making California’s Coast Resilient to Sea Level Rise: Principles for Aligned State Action](#), and the [State Agency Sea-Level Rise Action Plan for California](#) (2022), among other guiding state documents.

## **USE SCIENCE TO GUIDE DECISIONS [Coastal Act Sections 30006.5; 30335.5; 30270]**

### **1. Recognize and address sea level rise as necessary in planning and permitting decisions.**

Address sea level rise science in all applicable coastal management and decision-making processes, including Local Coastal Programs (LCPs), Port Master Plans (PMPs), Public Works Plans (PWP), Long Range Development Plans (LRDPs), Coastal Development Permits (CDPs), federal consistency reviews, and other Coastal Act decision processes. Sea level rise should be addressed in both hazard analyses and identification of adaptation strategies/alternative analyses, consistent with the policies of the Coastal Act and LCPs as applicable.<sup>16</sup>

---

<sup>16</sup> This Guidance document is intended to help implement the Coastal Act and LCPs in the context of sea level rise concerns. However, the standard of review for Commission actions remains the California Coastal Act or applicable certified LCPs. In particular, the recommendations of this Guidance do not constitute “enforceable policies” for purposes of CZMA federal consistency reviews. The enforceable policies for conducting federal consistency reviews will remain the policies of Chapter 3 of the Coastal Act. Also, for federal agency activities, the standard is consistency “to the maximum extent practicable,” with Chapter 3, i.e., federal agency activities must be fully consistent unless existing law applicable to the federal agency prohibits full consistency. See 15 CFR. §§ 930.32 and 930.43(d). However, the Commission looks at sea level rise as one part of determining the coastal effects from an activity through CZMA federal consistency reviews and the use of this Guidance by all parties should help determine what those coastal effects may be or how effects from sea level rise may be mitigated. Pursuant to 15 CFR § 930.11(h), implementation of this guidance would not be grounds for an objection (because it is not an “enforceable policy”) but it might be one means that “would allow the activity to be conducted consistent with the enforceable policies of the program” in order to avoid an objection. Implementation of this guidance would not be grounds for an objection (because it is not an “enforceable policy”) but it might be one means that “would allow

2. **Use the best available science to determine locally relevant (context-specific) sea level rise scenarios and potential impacts for all Coastal Act planning processes, project design, and permitting reviews.** Sea level rise science continues to evolve, and some processes that are not fully understood (e.g., ice sheet dynamics) could potentially have large effects on future sea level rise. At the time of this 2024 update, the best available science on sea level rise in California is the [State of California Sea Level Rise Guidance: 2024 Science and Policy Update](#) (OPC 2024) (See [Table 2](#) and [Appendix F](#)). As discussed in greater detail in [Chapter 3](#) of this Guidance, these scenarios should be used in a scenario-based analysis to identify potential local impacts from sea level rise, incorporating storms, extreme water levels, and shoreline change. Other authoritative sea level rise science and projections may also be used, in part or in full, provided they are peer-reviewed, widely accepted within the scientific community, and locally relevant. The Commission will re-examine the best available science periodically and as needed with the release of new information on sea level rise.<sup>17</sup>
3. **Recognize and address scientific uncertainty using scenario planning and adaptive management techniques.** Given the uncertainty in the magnitude and timing of future sea level rise, particularly over longer time periods, planners and project designers should use scenario-based analysis to examine a range of possible shoreline changes and sea level rise risks to shape LCPs and other plans and project development designs. As appropriate, development projects, resource management plans, and LCP and other planning updates should incorporate an adaptive, or phased, management framework with regular monitoring, reassessments, and dynamic adjustment in order to account for uncertainty.
4. **Use a precautionary approach by analyzing, planning, and providing adaptive capacity for the higher end of the range of possible sea level rise.** LCPs and CDPs should analyze the Intermediate, Intermediate-High, and/or High sea level rise scenarios, as appropriate, in order to understand the implications of a worst case scenario.<sup>18</sup> In some cases, it may be appropriate to *design* for the local hazard conditions that will result from more moderate sea level rise scenarios, as long as decision makers and project applicants *plan* for adaptation pathways that would allow for the implementation of alternative strategies if conditions change more than anticipated in the initial design. Looking at both high and low scenarios allows users to build an understanding of the overall risk sea level rise poses to the region or site. Chapters [3](#), [5](#), and [6](#) have additional detail regarding how to choose appropriate sea level rise scenarios.

---

the activity to be conducted consistent with the enforceable policies of the program” in order to avoid an objection.

<sup>17</sup> Major scientific reports include the release of National and State Climate Assessments, IPCC Assessment Reports, and/or State guidance.

<sup>18</sup> The High scenario in the 2024 OPC State Sea Level Rise Guidance is considered a reasonable worst case scenario to inform adaptation planning. While even higher SLR projections are possible, as reflected in the IPCC’s Sixth Assessment Report, those projections rely on a combination of assumptions about the climate future that are deemed too unlikely to inform planning at this time.

- Design adaptation strategies according to local conditions and existing development patterns, in accordance with the Coastal Act.** Design adaptation strategies using best management practices for adaptation, and tailor the design to the specific conditions and development patterns of the area, in accordance with the Coastal Act and certified LCPs. LCPs should continue to serve as a key implementing mechanism for these adaptation strategies. Adaptation strategies should be evaluated for their ability to both minimize hazards and protect coastal resources.

Table 2. Sea Level Rise Scenarios for California <sup>19</sup>

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

<sup>19</sup> 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.

## **MINIMIZE COASTAL HAZARD RISKS THROUGH PLANNING AND DEVELOPMENT STANDARDS [Coastal Act Sections 30253, 30235, 30270, 30001, 30001.5]**

6. **Avoid significant coastal hazard risks to new development where feasible.** Section 30253 of the Coastal Act requires new development to minimize risks to life and property in areas of high geologic and flood hazard. Read together with Section 30270, the Act requires that sea level rise is accounted for when risks are assessed and minimized. The strongest approach for minimizing hazards is to avoid siting new development within areas vulnerable to flooding, inundation, and erosion over the full life of the development, thus ensuring stable site conditions without the need for long-term financial and resource commitments for protective devices. Methods to direct new development away from hazardous locations are included in [Chapter 7](#) of this Guidance.
7. **Minimize hazard risks to new development over the life of the authorized development.** Coastal Act Section 30253 requires that new development minimize coastal hazard risks without the use of bluff retaining or shoreline protection devices that would substantially alter natural landforms along bluffs and cliffs. When hazards from sea level rise cannot be avoided, new development should include provisions to ensure that hazard risks are minimized for the life of the development without shoreline protection, including through future modification, relocation, or removal when development becomes threatened by natural hazards, including as exacerbated by sea level rise.
8. **Minimize coastal hazard risks and resource impacts when making redevelopment decisions.** LCPs should encourage and require, as applicable, existing at-risk structures to be brought into conformance with current standards when redeveloped. Improvements to existing at-risk structures should be limited to basic repair and maintenance activities and not extend the life of such structures or expand at-risk elements of the development, consistent with the Coastal Act.
9. **Account for the social and economic needs of the people of the state, including environmental justice and tribal priorities; assure priority for coastal-dependent and coastal-related development over other development.** In planning and project development concerning sea level rise, assure that the social and economic needs of the people of the state are accounted for in accordance with Coastal Act Section 30001.5(b), with special consideration for working persons employed within the coastal zone (Coastal Act Section 30001(d)). Recognize that environmental justice and tribal communities are less equipped to prepare for and respond to the impacts of sea level rise. Ensure that LCP and CDP decisions account for environmental justice and tribal concerns and engage with these communities early, often, and meaningfully in planning efforts.
10. **Ensure that property owners understand and assume the risks and mitigate the coastal resource impacts of new development in hazardous areas.** Property owners should assume the risks of developing in a hazardous location (often referred to as internalizing risk). They should be responsible for modifying, relocating or removing new development if it is

threatened or damaged in the future. Any actions to minimize risks to new development should not result in current and/or future encroachment onto public lands or in impacts to coastal resources inconsistent with the Coastal Act and Public Trust Doctrine. LCPs and Coastal Development Permits should require recorded assumptions of risk, “no future seawall” conditions, and/or other appropriate mitigation measures to internalize risk decisions with the private landowner.

## **MAXIMIZE PROTECTION OF PUBLIC ACCESS, RECREATION, AND SENSITIVE COASTAL RESOURCES** [Coastal Act Chapter 3 policies]

- 11. Provide for maximum protection of coastal resources in all coastal planning and regulatory decisions.** New and existing development, redevelopment, and repair and maintenance activities as well as associated sea level rise adaptation strategies should avoid or minimize impacts to coastal resources, including public access, recreation, marine resources, agricultural areas, sensitive habitats, archaeological resources, and scenic and visual resources in conformity with Coastal Act requirements. Impacts from development and related activities should be avoided or minimized; unavoidable impacts should be mitigated as necessary.
- 12. Maximize natural shoreline values and processes; avoid expansion and minimize the perpetuation of shoreline armoring.** If existing development (both private and public) is threatened by sea level rise hazards, it should employ the least environmentally damaging feasible adaptation alternatives and minimize hard shoreline protection. Priority should be given to options that enhance and maximize coastal resources and access, including innovative nature-based approaches such as living shoreline techniques or managed/planned retreat. If traditional hard shoreline protection is necessary and allowable under the Coastal Act, use the least-environmentally damaging feasible alternative, incorporate projections of sea level rise into the design of protection, and limit the time-period of approval, for example, to the life of the structure the device is protecting. Major renovations, redevelopment, or other new development should not rely upon existing shore protective devices for site stability or hazard protection. Where feasible, existing shoreline protection that is no longer being relied upon in this way, or no longer needed otherwise, should be phased out.
- 13. Recognize that sea level rise will cause the public trust boundary to move inland. Protect public trust lands and resources, including as sea level rises. New shoreline protective devices should not result in the loss of public trust lands.** Where allowed under the Coastal Act or the relevant LCP, shoreline protective devices should be sited, designed, and conditioned to ensure that they do not result in the loss of public trust lands<sup>20</sup> or encroach

---

<sup>20</sup> The State holds and manages all tidelands, submerged lands, and beds of navigable waterways for the benefit of all people of the State for statewide purposes consistent with the common law Public Trust Doctrine (“public trust”). In coastal areas, the landward location and extent of the State's trust lands are generally defined by reference to the ordinary high water mark, as measured by the mean high tide line. Public trust uses include such

onto public trust lands without the permission of the appropriate trustee agency. When sea level rise causes the public trust boundary to move inland such that a protective device that was located on uplands becomes subject to the public trust, the permittee should either obtain permission from the appropriate trustee agency for the encroachment or apply for a permit to remove any encroachments.

14. **Address potential secondary coastal resource impacts (to wetlands, habitat, agriculture, scenic and visual resources, etc.) from hazard management decisions, consistent with the Coastal Act.** Actions to address sea level rise in LCPs or permits should not exacerbate other climate-related vulnerabilities or undermine conservation/protection goals and broader ecosystem sustainability. For example, siting and design of new development should not only avoid sea level rise hazards, but also ensure that the development does not have unintended adverse consequences that impact sensitive habitats or species in the area.
15. **Address the cumulative impacts and regional contexts of planning and permitting decisions.** Sea level rise will have impacts at both the site-specific and regional scales. In addition to the evaluation of site-specific sea level rise impacts, LCPs and projects should include an evaluation of the broader region-wide impacts, in two different contexts. First, the LCP or project should consider how sea level rise impacts throughout an entire littoral cell or watershed could affect the LCP jurisdiction or project. Second, the LCP or project should consider how options to adapt to sea level rise could result in cumulative impacts to other areas in the littoral cell or watershed. Actions should be taken to minimize any identified impacts.
16. **Require mitigation of unavoidable coastal resource impacts related to permitting and shoreline management decisions.** Require mitigation for unavoidable public resource impacts over the life of the structure as a condition of approval for the Coastal Development Permit. For example, for impacts to sand supply or public recreation due to armoring and the loss of sandy beach from erosion in front of shoreline protection devices, require commensurate in-kind mitigations, a sand mitigation fee, and other necessary mitigation fees (for example, public access and recreation mitigation). Because the longer term effects can be difficult to quantify, especially given uncertainty about the exact rate of future sea level rise, consider requiring periodic re-evaluation of the project authorization and mitigation for longer term impacts.
17. **Consider best available information on resource valuation when planning for, managing, and mitigating coastal resource impacts.** Planning, project development, and mitigation planning should evaluate the societal and ecosystem service benefits of coastal resources at risk from sea level rise or actions to prepare for sea level rise. These benefits can include flood protection, carbon sequestration, water purification, tourism and recreation

---

uses as maritime commerce, navigation, fishing, boating, water-oriented recreation, and environmental preservation and restoration.

opportunities, and community character. Resource values can be quantified through restoration costs or various economic valuation models.

**MAXIMIZE AGENCY AND TRIBAL COORDINATION, MEANINGFUL ENGAGEMENT, AND PUBLIC PARTICIPATION** [Coastal Act Chapter 5; Sections 30006; 30320; 30339; 30500; 30503; 30711]

- 18. Coordinate planning and regulatory decision making with other appropriate local, state, and federal agencies; support research and monitoring efforts.** Given the multitude of sea level rise planning, research, and guidance efforts occurring in California, it is critical for agencies and organizations to share information, coordinate efforts, and collaborate where feasible to leverage existing work efforts and improve consistency. Additionally, since many sea level rise hazards affect multiple jurisdictions, their management may also need to be coordinated through multi-agency reviews and coordinated decision making. The Commission will continue to meet this goal through coordination, engagement with stakeholders, and trainings. However, ongoing financial support for these Commission efforts is critical.
- 19. Collaborate with local governments to plan for and adapt to sea level rise.** Implementation of sea level rise adaptation strategies will largely happen at the local level, and local governments are critical partners in adaptation planning. Ensuring adequate protection of coastal resources across the California coast and over time will require development of adaptation strategies that are flexible and responsive to unique local contexts as conditions change, while still ensuring statewide consistency. The Commission will continue to work with local governments and the Local Government Working Group to support sea level rise adaptation planning efforts through technical and policy guidance, funding, and other means.
- 20. Coordinate with tribes to address tribal priorities and concerns when making planning decisions.** The Commission will, and local governments should, consult with tribes to evaluate and address tribal cultural resources, practices, and traditions that may be affected as a result of sea level rise. The Commission's [Tribal Consultation Policy](#) (2018) provides recommendations for government-to-government coordination with tribes and a more specific process to work cooperatively, communicate effectively, and consult with tribes for the mutual benefit of protecting coastal resources.
- 21. Consider conducting vulnerability assessments and adaptation planning at the regional level.** Where feasible, local governments should coordinate vulnerability assessments and adaptation planning with other jurisdictions in the region that face common threats from sea level rise. A regional vulnerability assessment provides an opportunity to evaluate impacts that span multiple jurisdictions, assess and implement regional adaptation strategies, coordinate responses, and leverage research and planning funds.



**22. Provide for maximum public participation and meaningful engagement in planning and regulatory processes.** The Coastal Commission will continue to provide avenues for maximum public participation in planning and regulatory processes, and will continue to establish and/or expand non-traditional alliances (e.g., between/among public and private resource managers, tribes, community-based organizations, non-profits, environmental justice leaders, scientists, decision makers), share knowledge openly and actively, and regularly and clearly communicate to the public on the science as well as on a range of solutions to prepare for sea level rise.

### **PRIORITIZE ENVIRONMENTAL JUSTICE COMMUNITIES**

[California Coastal Commission Environmental Justice Policy; Coastal Act Sections 30006, 30013, 30320, 30339, 30500, 30503, 30604(h), 30711]

**23. Consider environmental justice when making planning decisions.** The Commission will, and local governments should, evaluate and address any disproportionate environmental and public health burdens these communities may experience as a result of sea level rise impacts. This includes identifying potentially impacted environmental justice communities and conducting meaningful engagement with these communities throughout the planning process.

This document and its guiding principles both reflect and complement the priorities outlined in the [California Climate Adaptation Strategy](#) (2021), [Making California’s Coast Resilient to Sea Level Rise: Principles for Aligned State Action](#) (2021), and the [State Agency Sea-Level Rise Action Plan for California](#) (2022), among other guiding state documents. While this Guidance specifically focuses on the California Coastal Act and the regulatory work of the Coastal Commission, it also echoes key concepts in these statewide documents. For example, a central goal of the California Climate Adaptation Strategy is to strengthen protections for climate vulnerable communities (Goal A) and Principle 7 of the Principles for Aligned State Action on sea level rise is to integrate and prioritize equity and environmental justice, which is addressed here in Guiding Principle #9. Similarly, this Guidance, the Climate Adaptation Strategy, and the Principles for Aligned State Action all emphasize the use of best available science (Guiding Principle #2, Priority 5, and Principle 1, respectively) and the need for communication, outreach, and public participation to increase understanding of climate risks and adaptation options (Guiding Principle #22 and Principle 3, respectively).

These guiding principles, and the document as a whole, are also aligned with the Shared Principles to Guide Adaptation Planning and Projects that are included in the Coastal Commission and Local Government Working Group’s 2020 [Joint Statement on Adaptation Planning](#). Those principles include concepts related to using best available science, developing creative solutions and phased adaptation approaches, addressing impacts in a flexible manner that reflects local goals while ensuring statewide consistency, working together with a range of stakeholders to ensure equitable planning and decision-making, striving for agency procedures that support efficient planning and encourage progress, and similar ideas, all of which are woven throughout this Guidance.