



## CALIFORNIA OCEAN PROTECTION COUNCIL

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Item 3

### ACTION ITEM

**TO:** California Ocean Protection Council  
**FROM:** Jenn Eckerle, Deputy Director  
**DATE:** March 14, 2018  
**RE:** Adoption of Updated State of California Sea-Level Rise Guidance

**RECOMMENDED ACTION:** Staff recommends that the Ocean Protection Council adopt the following resolution pursuant to Sections 35500 *et seq.* of the Public Resources Code:

“The California Ocean Protection Council hereby adopts the updated State of California Sea-Level Rise Guidance (Exhibit A) to help state and local governments prepare for, and adapt to sea-level rise.”

**STRATEGIC PLAN OBJECTIVE(S):** Climate Change, Science-Based Decision-Making

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### EXHIBITS

Exhibit A: State of California Sea-Level Rise Guidance, March 2018 update

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**SUMMARY:** The updated State of California Sea-Level Rise Guidance (Guidance), provides a bold, science-based methodology to help state and local governments analyze the risks associated with sea-level rise and incorporate sea-level rise into their planning, permitting, and investment decisions. The Guidance provides: 1) a synthesis of the best available science on sea-level rise projections and rates for California; 2) a step-by-step approach for state agencies and local governments to evaluate those projections and related hazard information in decision making; and 3) preferred coastal adaptation approaches.

**BACKGROUND:** In 2010, the Coastal and Ocean Working Group of California’s Climate Action Team (CO-CAT) finalized the [State of California Sea-Level Rise Interim Guidance](#) (Interim Guidance), which provided guidance for state agencies to incorporate sea-level rise projections into planning and decision making in California. On March 11, 2011, the Ocean Protection Council (OPC) adopted a [Resolution](#) stating that state agencies should follow the Interim Guidance as well as future guidance documents developed by CO-CAT. On March 15, 2013, OPC staff presented an [update](#) to the Guidance to reflect the best available science at that time, as summarized in a 2012 National Research Council report summarizing sea-level rise projections along the West Coast.<sup>1</sup>

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<sup>1</sup> National Research Council. 2012. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future: <https://www.nap.edu/read/13389/chapter/1>

In April 2017, catalyzed by direction from Governor Brown and the need to ensure that best available science continued to inform sea-level rise planning decisions in California, a Working Group of the California Ocean Protection Council's Science Advisory Team (OPC-SAT) released a report, entitled "[Rising Seas in California: An Update on Sea-Level Rise](#)." The Rising Seas Report was prepared and peer-reviewed by some of the nation's foremost experts in coastal processes, climate and sea-level rise science, observational and modeling science, the science of extremes, and decision-making under uncertainty. The report synthesized the current state of sea-level rise science, including advances in modeling and improved understanding of the processes that could drive extreme global sea-level rise as a result of ice loss from the Greenland and Antarctic ice sheets. The report found that:

- Scientific understanding of sea-level rise is advancing at a rapid pace.
- The direction of sea-level change is clear; sea levels are rising.
- The rate of ice loss from the Greenland and Antarctic ice sheets is increasing, and California is particularly vulnerable to sea-level rise caused by ice loss from West Antarctica.
- New scientific evidence has highlighted the potential for extreme sea-level rise.
- Probabilities of specific sea-level increases can inform decisions.
- Current policy decisions are shaping our coastal future.
- Waiting for scientific certainty is neither a safe nor prudent option.

The increased understanding of sea-level rise projections and polar ice sheet loss warranted an update to the State's sea-level rise guidance document to ensure decisions were based on the best available science. Additionally, an increased policy focus requiring state and local governments to incorporate climate change into decision making merited an update to address the needs of both state *and* local audiences.

#### **What Has Changed Since the 2013 Update to the Guidance?**

***New policy context and expanded audience.*** State agencies were the target audience for the earlier versions of the Guidance. However, over the past five years, there has been a multitude of policy and legislative directives and mandates focused on improving climate adaptation and resiliency in California at both the state and local level, including:

- Governor Brown's Executive Order B-30-15 directing state agencies to factor climate change into their planning and investment decisions;
- Senate Bill 379 (Jackson) requiring local governments to incorporate climate adaptation and resiliency strategies into their General Plans; and
- Senate Bill 246 (Wieckowski), which established the Governor's Office of Planning and Research's Integrated Climate Adaptation and Resiliency Program to coordinate local and state climate adaptation strategies.

With this increased policy direction and improved understanding of possible impacts, the 2018 update to the Guidance responds to the needs for guidance that can help cities, counties and the State prepare for, and adapt to, sea-level rise.

**Significant advances in the scientific understanding of sea-level rise.**

- Scenario-based versus probabilistic sea-level rise projections. The 2013 version of the State’s sea-level rise guidance provided *scenario-based* sea-level rise projections based on a 2012 National Research Council report; these scenario-based projections were partially but not fully tied to specific emissions scenarios presented in the Intergovernmental Panel on Climate Change’s Fourth Assessment Report but do not include a likelihood of occurrence. Since the 2013 Guidance, the scientific community has made significant progress in producing probabilistic projections of future sea level rise, and the team of scientists advising OPC on the Guidance update strongly recommended that decision-makers use probabilistic projections to understand and address potential sea-level rise impacts and consequences. The updated Guidance thus incorporates *probabilistic* sea-level rise projections, which associate a likelihood of occurrence (or probability) with sea-level rise heights and rates, and are directly tied to a range of emissions scenarios.
- H++ scenario. The probabilistic projections may underestimate the likelihood of extreme sea-level rise (resulting from loss of the West Antarctic ice sheet), particularly under high emissions scenarios. Therefore, the 2018 update to the Guidance also includes an extreme scenario called the H++ scenario. The probability of this scenario is currently unknown<sup>2</sup>, but its consideration is important, particularly for high-stakes, long-term decisions.

**Extended stakeholder engagement in Guidance development.** The 2018 update to the Guidance was developed by OPC, in close coordination with a Policy Advisory Committee with representation from the California Natural Resources Agency, the Governor’s Office of Planning and Research, and the California Energy Commission. To improve coordination and consistency in sea-level rise planning, OPC also collaborated closely with state coastal management agencies and other member agencies of CO-CAT. In addition, OPC, with assistance from the Ocean Science Trust and engagement experts, solicited input from coastal stakeholders including local governments, regional agencies, federal agencies, coastal consultants, environmental groups, Tribes, and others to better understand the needs and concerns related to planning for sea-level rise and related risks across the state.

**Sea-level rise risk analysis and decision framework.** The Guidance provides a step-wise approach to help decision makers assess risk by evaluating a range of sea-level rise projections and the impacts or consequences associated with these projections. Depending on the finite factors of a proposed project’s location and lifespan, decision makers can evaluate the potential impacts and adaptive capacity of the project across a spectrum of sea-level rise projections. This analysis will enable state agencies and local governments to incorporate the latest sea-level rise projections and related hazard information to consider in different types of decisions across California. This step-wise approach provides a decision framework to evaluate the consequences and risk tolerance of various planning decisions. The decision framework should be used to guide selection of appropriate sea-level rise projections, and, if necessary, develop

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<sup>2</sup> Because of the high level of uncertainty associated with physical processes that would trigger the H++ scenario and the emerging nature of the science, the authors of the Rising Seas report chose to not include ice sheet dynamics associated with the extreme into the model ensemble used to generate probabilistic projections.

adaptation pathways that increase resiliency to sea-level rise and include contingency plans if projections are exceeded or prematurely reached.

**Preferred coastal adaptation planning approaches.** The Guidance expands the preferred coastal adaptation planning approaches identified in OPC's previous guidance, incorporating existing law, expressed policy preferences by the Governor and Legislature, and the goal of fostering consistency across coastal and ocean government agencies. The following is a summary of the new recommendations:

- Adaptation strategies should prioritize protection of vulnerable communities and take into consideration social equity and environmental justice.
- Coastal habitats and public access should be protected and preserved.
- Adaptation strategies should consider the unique characteristics, constraints and values of water-dependent infrastructure, ports and Public Trust uses.
- Acute increases in sea-level rise caused by storm surges, El Niño events, king tides, or large waves should be considered. These events could produce significantly higher water levels than sea-level rise alone and will likely be the drivers of the strongest impacts to coastal communities, ecosystems, and infrastructure.
- Cross-jurisdictional coordination and consistency among permitting entities should be sought in selecting sea-level rise projections. These entities should also prioritize implementation of consistent or complementary adaptation strategies.
- Local conditions, including the diversity of shoreline types, natural conditions, and community characteristics, should be evaluated to inform risk tolerance and adaptation decisions.
- Adaptive capacity should be built into project design and planning.
- Risk assessment and adaptation planning efforts should be conducted at community and regional levels, when possible.

**Mapping Tools.** The Guidance also describes and provides links to a variety of geospatial and visualization tools to assist decision makers in understanding the impacts of sea-level rise. The document will be accompanied by a library and database of additional resources -- hosted on the State Adaptation Clearinghouse and OPC's website -- to help visualize change, access funding opportunities, gather policy and scientific background related to specific jurisdictions, and provide additional support to address a challenge of this nature and magnitude. This library and database will be released in mid-2018 when the State Adaptation Clearinghouse is publicly launched.

***How Often Will the State of California Sea-Level Rise Guidance be Updated?***

Based on recommendations from OPC's Scientific Working Group, OPC anticipates updating the Guidance periodically, and at a minimum of every five years, to reflect the latest scientific understanding of climate change sea-level rise in California. Rapid advances in sea-level rise and climate science, and subsequent release of relevant, peer-reviewed studies from the Intergovernmental Panel on Climate Change, state and national climate assessments, and equivalently recognized sources may generate the need for more frequent updates. By incorporating periodic updates at least every five years, the Guidance will establish a

strong foundation for sea-level rise planning and decision making at both local, regional, and statewide scales that can be perpetuated in future updates to sea-level rise projections.

In developing the updated Guidance, the State took intentional action to engage users and decision makers to ensure that the scientific information and policy direction was understandable and useful for sea-level rise planning and adaptation efforts. Going forward, OPC will continue to prioritize opportunities for co-production of future decision-support products by scientists, practitioners, and policy and decision makers to further improve the translation of sea-level rise science into action.

**CONSISTENCY WITH THE CALIFORNIA OCEAN PROTECTION ACT:**

The proposed action is consistent with the California Ocean Protection Act (Division 26.5 of the Public Resources Code). Section 35615(a) specifically directs the Council to coordinate activities of state agencies to improve the effectiveness of state efforts to protect ocean resources and establish policies to coordinate the collection of scientific data related to the ocean. It is also consistent with Section 35615(5) which directs the Council to transmit the results of research and investigations to state agencies to provide information for policy decisions.

**CONSISTENCY WITH THE OPC'S STRATEGIC PLAN:**

The updated Guidance implements Focal Area A: Science-based decision making and Focal Area B: Climate change. Specifically, the Guidance provides a framework to ensure that state and local sea-level rise planning and adaptation decisions are based on the best available science. The Guidance also establishes a precautionary approach and recommended adaptation strategies that will help safeguard California's communities, habitats and critical infrastructure.