

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904-5200
FAX (415) 904-5400
TDD (415) 597-5885



W7d

DATE: October 19, 2018

TO: Commissioners and Interested Parties

FROM: John Ainsworth, Executive Director
Susan Hansch, Chief Deputy Director
Madeline Cavalieri, Statewide Planning Manager
Kelsey Ducklow, Coastal Program Analyst

SUBJECT: Briefing and possible action on recommended updates to the Coastal Commission Sea Level Rise Policy Guidance to reflect new scientific information and recommendations from the Ocean Protection Council.

SUMMARY OF STAFF RECOMMENDATION

In August 2015, the Coastal Commission unanimously adopted its *Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits*, to assist the Commission, local governments, and members of the public when evaluating how to respond to sea level rise.

At the time of its adoption, and in line with recommendations from the Ocean Protection Council, the CCC Sea Level Rise Policy Guidance identified the 2012 National Research Council Report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*, as best available science on sea level rise. However, sea level rise science has continued to evolve since the adoption of the 2015 CCC Guidance, and recent scientific studies prompted Governor Brown to direct the Ocean Protection Council to synthesize the state of sea level rise science and to update the State Sea-Level Rise Guidance as necessary. In 2017, a working group of OPC's Science Advisory team released [*Rising Seas in California: An Update on Sea-Level Rise Science*](#). This report provides a summary of the scientific updates since the 2012 NRC Report, and adds to our understanding of sea level rise by including probabilistic sea level rise projections, and describing the potential for extreme sea level rise.

The new findings on sea level rise presented in the Rising Seas report prompted the update to the State's sea level rise guidance document. The [*State Sea-Level Rise Guidance: 2018 Update*](#) was adopted by the Ocean Protection Council in March 2018, and, among other information, it provides new projections recommended for use in planning, permitting, investment, and other decisions.

W7d (Science updates to the CCC SLR Policy Guidance)

Taken together, the 2018 OPC Guidance and the Rising Seas science report account for the current best available science on sea level rise for California. Focused updates to the 2015 CCC Sea Level Rise Policy Guidance, as summarized below, are recommended to remain reflective of the most up-to-date science and statewide guidance.

Staff is recommending **adoption** of the proposed 2018 Science Update to the CCC Sea Level Rise Policy Guidance.

TABLE OF CONTENTS

I. MOTION AND RESOLUTION	3
II. BACKGROUND	3
III. SUMMARY OF REVISIONS to the 2015 GUIDANCE	5
IV. RESPONSE TO COMMENTS	7

EXHIBITS

[Exhibit 1 – Recommended science updates to the CCC SLR Policy Guidance](#)

I. MOTION AND RESOLUTION

Motion:

*I move that the Commission **adopt** the 2018 Science Update to the Sea Level Rise Policy Guidance pursuant to the staff recommendation.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in the Commission's adoption of the 2018 Science Update to the Sea Level Rise Policy Guidance as interpretive guidelines.

Resolution:

The Commission hereby adopts the 2018 Science Update to the Sea Level Rise Policy Guidance as interpretive guidelines pursuant to Public Resources Code section 30620.

II. BACKGROUND

In August 2015, the Coastal Commission unanimously adopted its *Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits*. As interpretive guidelines, and pursuant to Public Resources Code section 30620, this document is intended to assist the Commission, local governments, and members of the public when evaluating how to respond to sea level rise, but it is not a regulatory document.

In general, the Guidance presents information and recommendations for how to incorporate sea level rise adaptation into various Coastal Commission planning and permitting processes. It includes:

- Guiding Principles for addressing sea level rise in California's coastal zone
- A discussion of the best available science on sea level rise and its possible impacts
- Step-by-step guidance for addressing sea level rise in Local Coastal Programs and the Coastal Development Permit process
- Descriptions of a variety of possible adaptation strategies
- A discussion of the legal context of sea level rise adaptation planning
- Detailed appendices with technical information and additional resources

The CCC Sea Level Rise Policy Guidance was developed through an extensive process involving numerous rounds of public review and comment. It also fit into an active state effort to address sea level rise and climate change, and was designed to incorporate, reflect, and complement various statewide guidance and recommendations. Specifically, the Guidance reflects the broad concepts and strategies in *Safeguarding California* – the statewide climate adaptation plan developed by the California Natural Resources Agency – and complements it by providing information more specific to the Coastal Act. The CCC Guidance was also written to reflect the recommendations of the Ocean Protection Council's *State Sea-Level Rise Guidance (2013 Update)*, notably recommending that stakeholders utilize the projections presented in the

2012 National Research Council (NRC) report *Sea-Level Rise for the Coasts of California, Oregon and Washington: Past, Present, and Future*.

However, sea level rise science has continued to evolve since the adoption of the 2013 OPC Guidance and the 2015 CCC Guidance, and recent scientific studies prompted Governor Brown to direct the Ocean Protection Council to synthesize the state of sea level rise science and to update the State Sea-Level Rise Guidance as necessary. In 2017, a working group of OPC's Science Advisory team (comprised mainly of climate researchers at various academic institutions in California and throughout the country) released [Rising Seas in California: An Update on Sea-Level Rise Science](#). This report provides a summary of the scientific updates since the 2012 NRC Report, including information contained within the IPCC 5th Assessment Report (2014) as well as recently published research that expands our understanding of ice sheet dynamics. It includes seven key findings (each described in greater detail in the report):

1. Scientific understanding of sea level rise is advancing at a rapid pace
2. The direction of sea level change is clear
3. The rate of ice loss from the Greenland and Antarctic ice sheets is increasing
4. New scientific evidence has highlighted the potential for extreme sea level rise
5. Probabilities of specific sea level increases can inform decisions
6. Current [*greenhouse gas emissions*] policy decisions are shaping our coastal future
7. Waiting for scientific certainty is neither a safe nor prudent option

The new findings on sea level rise presented in the Rising Seas report, particularly the probabilistic sea level rise projections and increased understanding of ice sheet dynamics, prompted the update to the State's sea level rise guidance document. The [State Sea-Level Rise Guidance: 2018 Update](#) was adopted by the Ocean Protection Council in March 2018, and provides both state agencies and local governments with a science-based methodology to assess sea level rise risks.

Most significantly, OPC utilized the information provided in the Rising Seas report to develop new projections that they recommend evaluating for planning, permitting, investment, and other decisions. Projection tables are included for 12 tide gauges along the California coast, and each table presents projections for every 10 years from 2030 to 2150. Further, OPC has highlighted three specific scenarios that they recommend evaluating based on the type of project and the level of risk associated with the development type (or planning area). These projection scenarios include:

- *Low risk aversion scenario*: the upper value for the "likely range" (which has approximately a 17% chance of being exceeded); may be used for projects that would have limited consequences or a higher ability to adapt.
- *Medium-high risk aversion scenario*: the 1-in-200 chance (or 0.5% probability of exceedance); should be used for projects with greater consequences and/or a lower ability to adapt.
- *Extreme risk aversion (H++)*: accounts for the extreme ice loss scenario (which does not have an associated probability at this time); should be used for projects with 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.

Taken together, the 2018 OPC Guidance and the Rising Seas science report account for the current best available science on sea level rise for California. Focused updates to the 2015 CCC Sea Level Rise Policy Guidance, as summarized below, are recommended to remain reflective of the most up-to-date science and statewide guidance.

III. SUMMARY OF REVISIONS TO THE 2015 GUIDANCE

Focused updates to the 2015 CCC Sea Level Rise Policy Guidance have been developed to incorporate evolving science, up-to-date sea level rise projections tailored to the State of California, and recent statewide guidance. New/updated language is shown in the July 2018 Draft Updates version of the SLR Policy Guidance ([Exhibit 1](#)) in **bold underline**. The main updates include the following:

Throughout the Entire Document:

- Any reference to the 2012 NRC Report as best available science has been updated to refer instead to the 2018 OPC Guidance
- The CCC-developed tables in the main body of the document presenting the NRC projections have been removed and replaced with an adapted version of the projection table for the San Francisco tide gauge from the 2018 OPC Guidance (projection tables for the 12 California tide gauges are all included in a new Appendix G)
- Efforts have been made to check and update hyperlinks

Chapter 2: Principles for Addressing SLR in the Coastal Zone

- Some changes to Principle 4 to clarify what projections to analyze as it relates to using a precautionary approach, as well as to add language regarding “adaptation pathways” as described in the 2018 OPC Guidance

Chapter 3: Sea Level Rise Science

- Detailed discussion of the 2012 NRC report has been replaced with discussion of the Rising Seas science report and 2018 OPC Guidance
- Language related to the possibility for extreme sea level rise resulting from rapid ice sheet loss (from the Rising Seas report) has been added to the section on “abrupt change”
- References and key points from the 4th California Climate Assessment (August 2018) and the IPCC Special Report (October 2018) have been added

Chapter 4: Consequences of SLR

- Minor updates to reference recent state guidance on climate and environmental justice

W7d (Science updates to the CCC SLR Policy Guidance)

Chapter 5: Addressing SLR in LCPs

- Language related to identifying and choosing appropriate sea level rise projections to analyze (Step 1) has been added/updated to reflect the recommendations in the 2018 OPC Guidance
- Updates have been made to Table 5 (SLR Mapping tools) to reflect current resources

Chapter 6: Addressing SLR in CDPs

- Language related to identifying and choosing appropriate sea level rise projections to analyze (Step 1) has been added/updated to reflect the recommendations in the 2018 OPC Guidance
- Language related to “adaptation pathways”, as described in the 2018 OPC Guidance, has been added to Step 4.

Glossary

- A definition for “adaptation pathways”, taken from the 2018 OPC Guidance, was added

Appendix A: SLR Science and Projections for Future Change

- Detailed discussion of the 2012 NRC report has been replaced with discussion of the Rising Seas science report and 2018 OPC Guidance

Appendix B: Developing Local Hazard Conditions

- Sections on how to develop temporally and spatially appropriate SLR projections (Step 1) have been simplified because they are less relevant, given that the 2018 OPC Guidance includes projections for 12 tide gauges along the California coast and for every 10 years from 2030 to 2150.
- Tables have been updated to reflect current resources (though updates may not be exhaustive)

Appendix C: Resources for Addressing SLR

- Tables have been updated to reflect current resources (though updates may not be exhaustive)

Appendix E: Funding Opportunities for LCP Planning and Implementation

- Updated to reflect current resources (though updates may not be exhaustive)

Appendix G: SLR Projections for 12 California Tide Gauges

- NEW APPENDIX – contains the projection tables for the 12 California tide gauges, adapted from the 2018 OPC Guidance

IV. RESPONSE TO COMMENTS

A total of seven comment letters have been received regarding the Draft Science Update, which are included in the [Correspondence](#) for this item. All commenters were generally supportive of the proposed science updates and made recommendations regarding clarifying certain language and/or suggesting that certain topics be added or discussed in greater detail. Specific responses to comments are included in [Table 1](#) below. As an overarching response to these comments, because the proposed update is limited in scope to updating sea level rise science and incorporating the new recommendations from the Ocean Protection Council, some of the comments did not result in changes to the guidance at this time. However, Coastal Commission staff will continue to work with stakeholders through other avenues on topics such as environmental justice, analyzing impacts from sea level rise, considering extreme sea level rise scenarios, and identifying appropriate adaptation options designed to protect the broad range of coastal resources present along the California coast. Such avenues include providing additional guidance (*e.g.*, the Residential Adaptation Policy Guidance, and forthcoming critical infrastructure guidance); working with local jurisdictions on LCP updates (including in particular through the LCP Grant Program); working with individual project applicants on CDPs; and coordinating with other Local, State, and Federal agencies.

Table 1: Responses to comments received on the Draft Science Update to the CCC SLR Policy Guidance

Commenter	Comment	Response
CA Association of Realtors (Jeli Gavric, Legislative Advocate)	"...using a pre-January 1, 1977 age to establish an 'existing structure' lacks legal justification and would be ruinous and unfair to coastal landowners who currently need or will need to protect their existing homes and have time to plan and prepare for rising sea levels"	The language in Chapter 8 relevant to this comment was unanimously adopted by the Commission in August 2015 and has not been changed in this Science Update
CA State Coastal Conservancy (Carrie Boyle, Sea Grant Fellow)	The update references the latest research on rapid ice sheet melt, but never provides specifics or citations (<i>e.g.</i> page 56)	Description of these findings on page 56 (and elsewhere in the main body of the Guidance) is from the Rising Seas report and the 2018 OPC Guidance (cited as Griggs et al. 2017 and OPC 2018, respectively). These sources describe and cite the original studies/references. Additionally, Appendix A describes these findings in greater detail, and references some of the original studies (<i>e.g.</i> DeConto and Pollard 2016)

W7d (Science updates to the CCC SLR Policy Guidance)

<p>Some titles of sections make it seem like they recommend using the highest scenario (e.g. page 37, Principle #4), but in the text they are actually recommending using both low and high scenarios. We suggest that the writers either change the titles or modify the text to focus on high scenario, since the probabilities are already likely underestimates.</p>	<p>Updates have been added to Guiding Principle 4 (pg. 15, 37) and to the description of how to choose SLR projections in the context of CDP applications (pg. 102-103) to explain that for most development, CCC recommends evaluating the medium-high risk aversion scenario.</p>
<p>There are several references to new studies in Southern California showing some dire erosion/flooding problems, but what are the planning consequences of this? Should Southern California beaches thus use the "medium high risk" scenario instead of "low"?</p>	<p>These studies are included to note the potential impacts related to sea level rise. Other sections of the Guidance describe how to choose SLR scenarios for LCP planning and CDP applications, and potential options for addressing SLR impacts. In general, adaptation strategies will need to be chosen on a case-by-case basis in a way that reflects Coastal Act requirements and site specific characteristics and goals.</p>
<p>It is a bit confusing that it recommends to use both NRC & OPC; it states that OPC is the most up-to-date science, but then there are several locations where NRC is recommended (e.g. first bullet page 74)</p>	<p>As noted on page 2, the NRC report still contains valuable information, so only those references to the NRC Report as best available science on SLR projections have been removed. Other information from the NRC report remains applicable. Page 74 uses the NRC report as an example for what planning horizons communities may want to study, but notes other planning horizons may also be useful.</p>
<p>On page 102 it states that critical infrastructure should include a "very long project life" – how long is that? Earlier in the document, it advises typical infrastructure projects to use 75-100 years.</p>	<p>Clarifying language has been added</p>
<p>The report uses San Francisco Bay's projection table at least 3 times, with all other regions shown in the appendices. If the purpose of this is to highlight examples in the document, it would be helpful to provide other regions such as Los Angeles.</p>	<p>The SF tide gauge is used throughout the report for ease and consistency when explaining sea level rise projections. In each place, it is noted that applicants, planners, and others should utilize projections from the tide gauge closest to their location.</p>

W7d (Science updates to the CCC SLR Policy Guidance)

<p>Heal the Bay (Karen Vu, Beach Water Quality Analyst)</p>	<p>While we agree that protecting public access is an important pillar of the Commission through the California Coastal Act, other impacts associated with sea level rise need to be fully considered, including the threat of displacement. Coastal planning decisions need to consider how displacement and relocation will affect environmental justice. Appropriate relocation compensation, proper support services to look for new housing, and buying and rental prices are examples of what needs to be evaluated by those who will have to relocate due to sea level rise. Consequently, low-income communities may face greater obstacles in securing these resources if they become displaced. We recommend that the Commission provide more context and specific guidance to address the issues stated above for LCP and CDP planning to better incorporate environmental justice and social equity.</p>	<p>Because this update is focused on science updates, significant changes to the environmental justice section are out of the scope of this work at this time. The Coastal Commission and Commission staff agree that these are important issues, however, and will address these topics through other avenues, including the Environmental Justice Policy and related work.</p>
<p>Ocean Protection Council (Tinya Hoang, Climate Change Program Manager)</p>	<p>The current CCC Guidance and draft update talk about adaptive management, triggers and approaches that are or are related to adaptation pathways. We think it might be helpful to include the term “adaptation pathways” or reference the “adaptation pathways” in the OPC Guidance, so that there can be consistency or a link between CCC’s and OPC’s Guidances.</p>	<p>Some additional language has been added to Guiding Principle 4, Step 4 of Chapter 6 (addressing SLR in CDPs); and the glossary related to adaptation pathways.</p>
	<p>The draft update states on page 44: “Although the Commission believes that the OPC Guidance projections can be used without modification, it recognizes that other studies exist with localized data, for example those completed in the Humboldt Bay region, which may also be appropriate for use.” In the OPC Guidance, we recognize other studies that are “authoritative peer-reviewed science (as long as not less precautionary than the foundation set for by the Rising Seas Report)...”. Do you see any value in using this language?</p>	<p>Coastal Commission staff believes this concern is adequately addressed in its discussion of choosing appropriate sea level rise scenarios for planning and analysis.</p>
	<p>In the Appendix E table with grant funding opportunities, do you want to include anything about the OPC Prop 68 grants that are coming soon? We have \$21.2 million that is not currently available, but our first solicitation will be around next spring or summer of 2019.</p>	<p>Change made as suggested</p>

W7d (Science updates to the CCC SLR Policy Guidance)

	<p>On pages 102 and 103, in Step 1 of establishing the projected SLR range for a proposed project, there is language that was kept from the original version of the CCC Guidance that references “higher sea level rise projections,” and “one or more intermediate rise scenarios.” It is unclear if “higher” projections means the medium-high risk aversion and what “one or more intermediate” refers to with the new projection tables.</p>	<p>Clarifying language has been added</p>
<p>West Marin Environmental Action Committee (Morgan Patton, Executive Director and Ashley Eagle-Gibbs, Conservation Director)</p>	<p>The link on page 80 to Cal-Adapt needs to be updated. The correct link, as included in other parts of the CCC SLR Guidance Update, is: http://cal-adapt.org/tools/slrcalflod-3d/</p>	<p>Change made as suggested</p>
	<p>We suggest adding in additional examples of critical infrastructure such as fire stations, police stations, hospitals, wastewater treatment plants, etc. (e.g. page 102)</p>	<p>Some additional language has been added to the footnote on page 82 describing "critical infrastructure".</p>
<p>San Diego Unified Port District (Jason Giffen, Asst. Vice President, Planning and Green Port)</p>	<p>The District has serious concern regarding the recommended application of the probabilistic projections for planning and design. The 2018 Draft Science Update recommends that all communities evaluate the impacts from the “medium-high risk aversion” scenario (p. 76). The District suggested to OPC, during the comment period on the OPC SLR Guidance, that the definitions of risk aversion should not be limited to specific probabilities of sea level rise. Rather, risk aversion should be a range of probabilities to allow decision-makers to determine their own definition of risk aversion. We request that the Coastal Commission allow the local agency to define its level of risk and apply SLR projections accordingly, rather than recommending communities (or local agencies) evaluate impacts based on a prescriptive risk scenario.</p>	<p>As is explained in both the CCC Guidance and the OPC Guidance, decision-makers should take a precautionary approach by analyzing the impacts associated with SLR projections from the high end of the ranges, up to and including the H++ scenario in certain cases. However, applicants may choose to site and design proposed development to be safe from more moderate amounts of SLR, based on varying levels of risk aversion, provided that adaptation pathways that would address higher amounts of SLR have been identified.</p>
	<p>We request that the Coastal Commission not require communities (or local agencies) to evaluate impacts based on the H++ scenario until more probabilities associated with the scenario becomes available</p>	

W7d (Science updates to the CCC SLR Policy Guidance)

	<p>To improve the Update, the Organizations suggest that Chapter 5: Addressing Sea Level Rise in LCPs strongly encourage communities to proactively consider managed retreat programs for development with little or no adaptive capacity, especially critical infrastructure under the extreme SLR projection... should elaborate on suggested strategies in Step 4 under General Adaptation Strategies. We suggest the Update include a recommendation to include the projection scenarios based on adaptive capacity within LCPs (not only CDPs).</p>	<p>The focus on this Science Update is to add new information regarding sea level rise science, and specifically new projections from the Ocean Protection Council. Changes related to these new projections have been made to both Chapter 5 (Addressing SLR in LCPs) and Chapter 6 (Addressing SLR in CDPs). Adaptation strategies are described in Chapter 7, and Coastal Commission staff will continue to work with local jurisdictions as well as project applicants to develop appropriate adaptation options.</p>
<p>Surfrider Foundation (Mandy Sackett)</p> <p>Natural Resources Defense Council (Joel Scata)</p> <p>CA Coastal Protection Network (Susan Jordan)</p>	<p>The Organizations suggest incorporating specific recommendations for preserving and increasing the adaptive capacity for coastal habitats, in addition to the projection scenarios set forth for development in the Update. To do so, the CCC should consider adding a new principle to Chapter 2: Principles for Addressing SLR in the Coastal Zone that reflects the need to preserve and increase the adaptive capacity of coastal habitats. This principle should reflect the recently adopted Resolution on Sea Level Rise and Shoreline Protection.</p>	<p>The focus on this Science Update is to add new information regarding sea level rise science, and specifically new projections from the Ocean Protection Council. Adding a new principle as recommended is out of the scope of this update, but Coastal Commission staff will continue to address coastal habitat protection through other avenues, including as highlighted in the adopted August resolution.</p>
<p>Environmental Center of San Diego (Pam Heatherington);</p> <p>Sierra Club California (Dave Grubb)</p>	<p>The Organizations are happy to see the incorporation of recent groundwater and saltwater intrusion research, “Sea level rise can also result in higher groundwater, presenting another source of flood rise” in Chapter 3: Sea Level Rise Science. We suggest the CCC take this one step further and consider the risk of daylighting from rising groundwater and seawater interfaces as a result of sea level rise. Cities should be encouraged to map their groundwater levels to help identify the risks associated with daylighting. The Organizations recommend expanding on this topic in Appendix B by adding another step for analysis – e.g. “Step 7. Estimate elevated groundwater levels and determine potential for groundwater daylighting”.</p>	<p>Understanding the impacts associated with changing groundwater conditions are addressed in multiple locations throughout the Guidance. Additional changes are out of the current scope of this update, but Commission staff will continue to work with stakeholders on understanding the implications of changing groundwater dynamics, including daylighting.</p>