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January 14, 2011

The Honorable John Laird, Chair and Council Members
California Ocean Protection Council
1330 Broadway, 13th Floor
Oakland, CA 94612-2530

VIA ELECTRONIC MAIL: *COPCpublic@resources.ca.gov and adoherty@scc.ca.gov*

Re: Comments on Resolution of the Ocean Protection Council on Sea-Level Rise

Dear Chair Laird and Council Members:

On behalf of California Coastkeeper Alliance (CCKA), Natural Resources Defense Council, Sierra Club California, Surfrider Foundation, Heal the Bay, Environmental Health Coalition, Wild Equity Institute, San Diego Coastkeeper, Ventura Coastkeeper, Orange County Coastkeeper, Inland Empire Waterkeeper, Russian Riverkeeper, San Francisco Baykeeper, and Coastal Environmental Rights Foundation, we welcome the opportunity to submit these comments on the Resolution of the California Ocean Protection Council on Sea-Level Rise (Resolution) and the recommendations referenced in the Sea-Level Rise Task Force Interim Sea-Level Rise Guidance Document (Guidance).

Sea level rise is an issue of prime importance to our organizations. The United States Geological Survey's Coastal Vulnerability Index rates Humboldt, San Francisco, and Monterey Bays, as well as most of the Southern California coast, as "highly vulnerable" to coastal change due to sea level rise.[1] Accordingly, the Ocean Protection Council (OPC) Resolution, and the speed with which its guidance is implemented, directly impacts our organizations and the hundreds of thousands of Californians that we represent.

The OPC is charged with coordinating not only the California Coastal Commission, the lead coastal land use regulatory and permitting agency in California, but all state coastal management agencies, including the San Francisco Bay Conservation Development Commission (BCDC), State Lands Commission, State Coastal Conservancy, the State and Regional Water Quality Control Boards, and the State Parks Commission.[2] The OPC therefore has both tremendous opportunity and considerable responsibility to adopt a strong, meaningful Resolution. Accordingly, we request that the OPC amend the Resolution so that the final version clearly guides state coastal management agencies and local municipal and county governments to:

- restrict new development in hazard zones and evaluate existing vulnerable developments;
- prioritize funding for non-structural adaptation strategies that enhance ecosystems' natural adaptive capacity;
- restrict the use of sea walls and other structural protective barriers where a less environmentally damaging alternative exists;
- protect and buffer critical habitats so that they can migrate inland as sea level rises; and
- ensure the protection of public access to coastal areas.

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[1] *See* E. Hanak and G. Moreno, Public Policy Institute of California, "California Coastal Management with a Changing Climate," at p. 4 (November 2008) ("The US Geological Survey's Coastal Vulnerability Index (CVI) 'combines the coastal system's susceptibility to change with its natural ability to adapt to changing environmental conditions.'").
[2] Cal. Pub. Res. Code § 35615(a)(1).

We describe each of these requests below, and urge the OPC to revise the Resolution as delineated in Attachment 1 in order to protect California communities and ecosystems from the mounting threats posed by sea level rise. Additionally, we ask OPC to improve the public's access to and involvement in the Sea Level Rise Task Force.

THE RESOLUTION SHOULD PROVIDE CLEAR GUIDANCE TO STATE AGENCIES BASED ON PRINCIPLES ESPOUSED IN THE CALIFORNIA CLIMATE ADAPTATION STRATEGY.

We commend OPC for embracing the first principle espoused in the California Climate Adaptation Strategy,[3] that California must begin *now* to adapt to the current and future impacts of climate change by convening a Sea Level Rise Task Force and releasing a draft Resolution and Guidance well in advance of the deadline set by the Governor's Executive Order S-13-08.[4] However, the OPC needs to make significant amendments and additions to the Resolution in order to provide clear guidance to state and local agencies not only on which sea level rise estimates to use, but also on *how* to use these estimates to develop adaptation strategies and policies.

To date, the California Climate Adaptation Strategy (CAS) is the best source of guidance for both state and local entities developing sea level rise strategies. The development of the Ocean and Coastal Resources Section of the CAS was led by OPC, and reflects the collective input of other member agencies of the Coastal and Oceans Working Group: California Coastal Conservancy, California Coastal Commission, State Lands Commission, Department of Fish and Game, State Parks, and the Bay Conservation and Development Commission. The Strategy is also instructive for local governments who are developing climate adaptation strategies. The California Attorney General's Office instructs local governments to refer to the California Climate Adaptation Strategy in order to develop "reasonable and rational risk reduction strategies."[5] Thus, it is both expected and proper that the OPC Resolution on Sea Level Rise reflect coastal adaptation principles contained in the CAS.

The Ocean and Coastal Resources Section of the CAS identifies six key principles to guide coastal adaptation decisions. The first of these principles relates to timeliness and is being implemented through OPC's actions, as described above. We urge OPC to ensure that the Resolution clearly reflects and reiterates the remaining five CAS principles:

1. *California must protect public health and safety and critical infrastructure.*
2. *California must protect, restore, and enhance ocean and coastal ecosystems, on which our economy and well-being depend.*
3. *California must ensure public access to coastal areas and protect beaches, natural shoreline, and park and recreational resources.*
4. *New development and communities must be planned and designed for long-term sustainability in the face of climate change.*

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[3] California Natural Resources Agency, "2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2006" (Dec. 2009) (California Climate Adaptation Strategy).

[4] Governor Arnold Schwarzenegger, Executive Order S-13-08 (November, 14, 2008).

[5] California Attorney General's Office, *Straightforward Answers to Some Frequently Asked Questions*, (Recommendation 9: "Communities with General Plans and Local Coastal Plans should begin when possible to amend their Plans to assess climate change impacts, identify areas most vulnerable to these impacts, and to develop reasonable and rational risk reduction strategies using the California Adaptation Strategy as guidance."). *See also* Bay Area Conservation and Development Commission, "Update on Guidance for Addressing Climate Change Impacts in California Environmental Quality Act Review," available at http://www.bcdc.ca.gov/planning/climate_change/adaptation/CEQA_climate_impacts.pdf.

5. *California must look for ways to facilitate adaptation of existing development and communities to reduce their vulnerability to climate change impacts over time.*[6]

The Ocean Protection Council led agency development of these principles, as well as a number of correlating implementation strategies in the CAS referenced herein and in Attachment 1.[7] Much of this guidance reiterates long-understood coastal planning and development best practices that have become strictly necessary in light of projected sea level rise. Despite this, in the more than one full year since the CAS was released, state agencies with coastal planning and permitting authority, notably the California Coastal Commission and BCDC, have struggled to implement uniform policies and procedures that reflect key CAS principles.

Actions to modify coastal development patterns in light of sea level rise have thus far occurred on a sporadic, piecemeal basis, largely in response to proposed coastal development projects. Necessarily, this subjects county and city development of coastal development policies, through Local Coastal Plans (LCPs) and other regulatory tools, to significant, well-funded pressure from developers and other stakeholders who have narrow interests in specific projects. This dynamic undermines the development of uniform, science-based sea level rise policies and plans that serve the broader public's best interest.

This point is clear from an ongoing effort to develop a sea level rise adaptation policy in the San Francisco Bay Area. In April of 2009, BCDC released a staff report entitled *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline*.[8] This report provided the basis for a proposed amendment to the San Francisco Bay Plan[9] that delineates guidance and sea level rise adaptation strategies for areas within BCDC's jurisdiction.[10] In the nearly two years since the BCDC staff report was released, the public process has been delayed and derailed by development interests, including those with interests in a controversial multi-billion dollar development in a low-lying area of the South San Francisco Bay. Three progressively weaker versions of the proposed amendment have been circulated for public review as a result of the hijacked public process, and the timeline to finalize and adopt an amendment remains unset.

Agencies must develop coastal development policies that ensure public safety and make good sense for the communities that they will protect, including the affected environment. Policies are also necessary to provide clarity and certainty for future investments in developed areas and future development proposals in light of near-term and longer-term projected rises in sea level. A strong, instructive OPC Resolution could provide guidance to support agency efforts—such as the initial 2009 proposal by BCDC—to provide recommendations, advice and guidance to local governments, which they desperately need.

<u>We urge the Ocean Protection Council to ensure that the Final Sea Level Rise Resolution provides clear direction to state agencies with coastal management authority and to local governments, and implements the principles and strategies outlined below.</u>

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[6] California Climate Adaptation Strategy at p. 72.
[7] *See id.* at pp. 72-80.
[8] San Francisco Bay Conservation and Development Commission, *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline* (2009) (Living With a Rising Bay), available at http://www.bcdc.ca.gov/proposed_bay_plan/bp_1-08_cc_draft.pdf.
[9] San Francisco Bay Conservation and Development Commission, *San Francisco Bay Plan* (2008 Reprint), available at http://www.bcdc.ca.gov/pdf/planning/plans/bayplan/bayplan.pdf.
[10] *See generally*, Living with A Rising Bay.

A. The OPC Resolution should advise agencies to restrict new development in hazard zones and evaluate existing vulnerable developments.

Approximately 85% of California's residents live or work along bay or coastal areas and face sea level rise without the means to adjust to expected impacts.[11] As higher sea levels, high tides, storm surges, and inland flooding coincide, projected inundation will impact homes, workplaces, water supply canals, wastewater treatment plants, power plants, hospitals, airports, and other critical public infrastructure and facilities throughout California.[12] Increasing rates of coastal erosion, beach loss, salinity intrusion into estuaries, and saltwater intrusion into groundwater are occurring now and are projected to worsen over time.[13]

CAS Principle 1: "California must protect public health and safety and critical infrastructure."[14]
CAS Principle 5: "California must look for ways to facilitate adaptation of existing development and communities to reduce their vulnerability to climate change impacts over time."[15]

It is critical that OPC's Resolution facilitate statewide and local planning, zoning, and permitting changes that protect public health and safety and critical infrastructure from sea level rise. Accordingly, OPC should ensure that the Resolution does not underestimate potential sea level rise, but rather employs a sound "precautionary principle" to address any potential uncertainty. A Resolution that emphasizes uncertainty could cause further delay in implementation of critical measures to protect vulnerable areas at the state and local levels.

OPC assistance to local planning authorities is also essential to enable these authorities to take needed action. Local planning authorities do not typically retain in-house expertise sufficient to assess, on a case-by-case basis, whether a specific project is located within areas subject to sea level rise; uniform statewide practices and assistance would help address this gap. For example, existing maps and models of projected sea level rise, and information about related public safety hazards, provide enough information for the California Coastal Commission, BCDC, and other state agencies to change how they regulate coastal development in hazard zones. The Pacific Institute has developed maps depicting the impact of sea level rise on coastal flooding, erosion hazards, and the inundation of infrastructure.[16] Additionally, thanks in large part to the leadership of OPC, new maps will be available in the summer of this year that use detailed shoreline and seafloor indices to depict how sea level rise will impact different areas of the coast.[17]

As described herein, some state agencies are already using sea level rise projections and maps to modify their coastal land use regulatory practices. An OPC Resolution that clearly delineates and reiterates principles to guide coastal development in light of sea level rise would lend additional support for these efforts and promote consistent agency policy and practices.

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[11] "Considering sea level rise as a coastal hazard," Proceedings of Coastal Zone '07 Portland, OR (July 22-26, 2007); California Climate Adaptation Strategy at p. 3.
[12] *See* California Climate Change Center, "The Impacts of Sea-Level Rise on the California Coast," (May 2009), available at www.pacinst.org/reports/sea_level_rise/report.pdf (Impacts of Sea-Level Rise on the California Coast); CA Climate Adaptation Strategy at pp. 65, 68.
[13] California Climate Adaptation Strategy at p. 69.
[14] California Climate Adaptation Strategy at p. 72.
[15] *Id.*
[16] *See* Pacific Institute, Sea-Level Rise Maps (Google Map, Hazard Maps, Thematic Maps): http://www.pacinst.org/reports/sea_level_rise/maps/.
[17] *See* http://www.opc.ca.gov/2010/01/mapping-californias-coastal-areas/.

To the extent that scientific uncertainty persists in the sea level rise projections and maps at California's disposal, OPC's Resolution should provide guidance on how to move forward through uncertainty with the use of the precautionary principle, rather than simply citing the existence of uncertainty and leaving local authorities to guess how best to move forward. The 1998 Wingspread Statement on the Precautionary Principle states that "when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically … the proponent of an activity, rather than the public, should bear the burden of proof… ."[18]

Because some level of uncertainty will likely persist with sea level rise projections, the OPC should advise state and local decision-makers to take precautionary measures that place the burden of proof on those who propose action or inaction that is at odds with addressing the threats posed by sea level rise. A precautionary approach with respect to sea level rise is also warranted because storm surges and other extreme weather events will cause episodic flooding sooner and to more areas than would be evident from assuming gradual sea level rise.[19]

Additionally, the Resolution should encourage agencies to begin identifying which coastal areas and infrastructure will receive protection from sea level rise, such as those that are vital to public safety and services. Arguably, situations occur where the protection of critical infrastructure warrants coastal and watershed armoring. But too often we witness: permits issued for coastal armoring of non-essential projects; development near coastal bluffs, eroding beaches and floodplains that result in "after the fact" permits for protective armoring, lost or stalled opportunities for managed retreat; and, lost or stalled elimination of impaired natural sand replenishment through the removal of non-essential inland structures such as dams and stormwater channels.

A clear list of areas and projects vital to public health and safety is mandatory if California is to limit the loss of our beaches and coastal areas. The OPC Resolution should encourage state agencies to develop and implement policies for managed retreat and/or removal of existing non-essential development in hazard prone areas, as well as public projects that impede natural sand replenishment on our coast.

CAS Principle 4: "New development and communities must be planned and designed for long-term sustainability in the face of climate change."[20]

As the Resolution recognizes, an estimated 480,000 people and $100 billion worth of property in California—approximately half of which are located in the San Francisco Bay Area—are already at risk from sea level rise compounded by shifting precipitation and extreme weather events.[21] If California does not take action to mitigate sea level rise impacts and other projected climate impacts, the costs will be crippling. If no adaptation actions are taken in California, damages across sectors could result in "tens of billions of dollars per year in direct costs and expose trillions of dollars of assets to collateral risks."[22]

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[18] *See* Science & Environmental Health Network Precautionary Principle Webpage: http://www.sehn.org/precaution.html.

[19] Impacts of Sea-Level Rise on the California Coast at p. 2 ("The issue is not simply one of impacts from a gradual rise in the average water levels; higher averages also imply more frequent and more powerful storms and wave attacks, which will exacerbate erosion and shoreline retreat.").

[20] California Climate Adaptation Strategy at 72.

[21] Heberger, Matthew, Heather Cooley, Pablo Herrera, Peter H. Gleick, and Eli Moore, "The Impacts of Sea Level Rise on the California Coast," (2009) PIER Research Report, CEC-500-2009-024-D, Sacramento, CA: California Energy Commission.

[22] California Climate Adaptation Strategy at p. 3, citing D. Roland-Holst and F. Kahrl, U.C. Berkeley "California Climate Risk and Response," (November 2008), available at: http://www.next10.org/research/research_ccrr.html.

Climate adaptation strategies and policies should be designed to limit existing risk to people, property, and ecosystems, and to prevent development that subjects the state and its people to additional financial and public safety dangers.

The Ocean and Coastal Resources Section of the CAS emphasizes that the top priority near-term action of state policy is "to avoid establishing or permitting new development inside future hazard zones in most cases if new protective structures would be necessary." Additionally, the CAS makes clear that "state agencies should generally not plan, develop, or build any new significant structure in a place where that structure will require significant protection from sea-level rise, storm surges, or coastal erosion during the expected life of the structure."[23] Currently, there is not one single clear statement in the Resolution communicating this point.

The Resolution must advise state and local agencies to conduct sea-level rise impact analyses for any new development proposed in areas that are vulnerable to sea level rise, and to use extreme caution when considering permitting in such vulnerable areas. The Resolution should also advise the California Coastal Commission, BCDC, and other state agencies that any permitted developments in areas that are vulnerable to sea level rise should contain permit conditions to ensure that property owners and developers will never apply for, or receive, armoring privileges.[24]

The OPC should employ an approach that advises state and local coastal planning bodies to immediately analyze sea level rise projections in permitting and management decisions, amend their regulations and ordinances to ensure that their processes uniformly address public safety issues posed by developments in areas that are vulnerable to sea level rise, and periodically update guidance documents as new information becomes available.

New York State's recently-adopted Sea Level Rise Task Force Report advises their Legislature to "require state agencies responsible for the management and regulation of resources, infrastructure, and populations at risk from sea level rise to factor the current and anticipated impacts into all relevant aspects of decision making." The Report goes on to provide specific guidance on this point, stating that "agencies should consider storm and sea level rise impacts over the lifespan of proposed projects or actions and the time horizon of any associated impacts to the proposed projects or actions in all state operational, permitting and/or funding decisions. Relevant agencies should regularly update, modify, and refine guidance documents and plans based on the most current information on sea level rise."[25] The OPC Resolution should build in similar language to provide guidance and assistance to state agencies and local planning authorities.

B. The OPC Resolution should prioritize adaptation strategies that enhance an ecosystem's natural adaptive capacity and discourage the use of structural protective barriers such as sea walls, groins, breakwaters and other "coastal armoring" structures.

CAS Principle 2: "California must protect, restore, and enhance ocean and coastal ecosystems, on which our economy and well-being depend."

As the ocean moves inland, coastal ecosystems will undergo changes of enormous magnitude. Salt water will intrude into estuaries and groundwater basins, impacting ecosystem health and fresh-water

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[23] California Climate Adaptation Strategy at 73.

[24] *See* M. Caldwell; "No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access Along the California Coast," *34 Ecology L.Q. 533, 562-567* (2007) (No Day at the Beach).

[25] New York State Sea Level Rise Task Force, *Report to the Legislature*, (December 31, 2010) at p.60, available at: http://www.dec.ny.gov/docs/administration_pdf/slrtffinalrep.pdf (New York Sea Level Rise Report).

supplies. Moreover, 350,000 acres of California's dwindling and critically important coastal wetlands face flooding from sea-level rise.[26] A recent study by scientists at San Diego State University found that 25 percent of San Diego's inland fresh-water marshes could be lost to a rising sea.[27]

Decisions about how to deal with rising sea level, inundation, and associated impacts will have a profound impact on the future of the California coast. Coastal managers and policymakers will consider both environmentally-destructive strategies such as coastal armoring, and more sustainable, "soft" protection solutions such as barrier beaches and wetlands.[28] If harmful armoring structures, such as sea walls and levees, become the default approach to deal with sea level rise, it would significantly alter the functioning of coastal habitats, which could in turn decrease the overall adaptive capacity of coastal ecosystems.

Instead of focusing solely on reducing the vulnerability of existing shoreline developments, the OPC could direct agencies to focus on "coastal resilience"[29] as the overriding goal of adaptation strategies. The CAS specifies that activities that bolster resilience should be a focus: "the state should pursue activities that can increase natural resiliency, such as restoring tidal wetlands, living shoreline, and related habitats; managing sediment for marsh accretion and natural flood protection; and maintaining upland buffer areas around tidal wetlands."[30] A resilient ecosystem is measured by "the capacity of a system to absorb and utilize or even benefit from perturbations and changes that attain it, and so persist without a qualitative change in the system's structure."[31]

With clear direction from the OPC, and with adequate time, data, and resources, coastal managers could pursue adaptation strategies that achieve coastal resilience by protecting coastal areas from sea level rise with strategies that benefit coastal ecosystems. Low-impact development techniques such as permeable pavement and vegetated buffers will slow and sink storm-water runoff, mitigating flooding from storm surges and rises in sea level. Creating buffers of open space around beaches and wetland areas similarly increases the amount and diversity of coastal habitats and allows beaches and wetlands to migrate inland as the ocean advances. Restoring tidal wetlands, eelgrass beds, oyster beds and other natural coastal ecosystems both creates aquatic habitats for threatened species and establishes a natural buffer against extreme weather. As described below, the OPC's Resolution should communicate support for coastal resilience in the face of sea level rise, and specify those practices that state and local entities can employ in order to achieve it.

1. <u>Prioritize funding for non-structural protection measures that enhance an ecosystem's natural adaptive capacity.</u>

Currently, OPC's Resolution does not contain any language that emphasizes the inherent value and importance of natural shoreline areas. It also does not articulate the need for adaptation strategies that utilize natural ecosystems processes and make shoreline areas more resilient to sea level rise and other

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[26] New York Sea Level Rise Report at pp. 10, 60.
[27] Dr. Rick Gersberg, Graduate School of Public Health, San Diego State University "Application of SLAMM 5.1 to San Diego County, CA," (May 26, 2009). Dr. Gersberg's lab modeled how San Diego coastal habitats might change based on different climate change scenarios.
[28] California Climate Adaptation Strategy at p. 75.
[29] *See generally* Beatley, Timothy, *Planning for Coastal Resilience: Best Practices for Calamitous Times*. Washington DC: Island Press (2009) (Planning for Coastal Resilience).
[30] *See* California Climate Adaptation Strategy at p. 74 (recommendation include preservation of natural areas that contain critical habitat for tidal wetland restoration, habitat migration, or buffer zones).
[31] Holling, Crawford Stanley, "Resilience and Stability of Ecological Systems," *Annual Review of Ecology and Systematics* 4:1-23 (1973).

climate change driven-dynamics. The Resolution should directly reference CAS language on protecting natural shoreline features and identifying habitat restoration opportunities.

OPC should also explain in the Resolution the merits of non-structural protective measures, and specifically delineate what techniques are available so that agencies can pass this guidance along to local governments and stakeholders as they develop sea level rise plans and policies.[32] The U.S. National Oceanic and Atmospheric Administration (NOAA) has been restoring natural ecosystem features, or "Living Shorelines," such as eelgrass beds to stabilize coastal ecosystems for more than two decades on the East Coast and in areas of the Gulf Coast, with a project currently being explored on the San Francisco Bay.[33] New York's recent Sea Level Rise Report to their Legislature also provides some instructive language on the importance of natural adaptive capacity in light of sea level rise: "natural shoreline features … currently provide large-scale services, such as flood protection, storm buffering, fisheries habitat, recreational facilities and water filtration, at almost no cost. These services would be prohibitively expensive to replicate with human-built systems.[34]

2. Protect and buffer critical habitats so that they can migrate inland as sea level rises.

To preserve coastal ecosystem functions, natural features must be allowed to respond naturally or migrate inland as sea level rises. The CAS advises that "the state should identify priority conservation areas and recommend lands that should be considered for acquisition and preservation. The state should consider prohibiting projects that would place development in undeveloped areas already containing critical habitat, and those containing opportunities for tidal wetland restoration, habitat migration, or buffer zones. The strategy should likewise encourage projects that protect critical habitats, fish, wildlife and other aquatic organisms and connections between coastal habitats." The City of Solana Beach is currently considering such a plan as a way to restore the natural coastline and remove the large number of seawalls present.

New York's proposed regulatory framework to consider sea level rise in proposals for development and infrastructure in high-risk coastal areas is guided by four clear rules:

1) restrict hard structural shoreline protective measures and development in priority areas for wetland, dune, and beach migration;
2) prioritize and incentivize the use of non-structural and soft shoreline protection measures to reduce risk;
3) provide larger buffers or setbacks between natural protective features and new development;
4) require local and regional planning efforts to establish areas for migration of natural protective features.[35]

Both the CAS and the New York State Sea Level Rise Report contains readily adaptable text on this point, as provided above. The OPC Resolution should include equivalent findings and declarations as described in Attachment 1.

3. Restrict the use of sea walls and other structural protective barriers where a less environmentally damaging alternative exists.

"A fortified coast comes with major financial, social, and ecological costs."[36]

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[32] *Id.* at 11.
[33] *See* National Oceanic and Atmospheric Administration (NOAA), Habitat Conservation and Restoration Center, Living Shorelines Webpage, available at http://www.habitat.noaa.gov/restoration/techniques/livingshorelines.html.
[34] New York Sea Level Rise Report at p. 9.
[35] New York Sea Level Rise Report at p. 33.

Sea walls, levees and barriers have serious environment impacts to the beaches and coastal areas where they are placed. Armoring structures fix the back of the beach, stopping natural shoreline erosion that would otherwise cause beaches to migrate inland as sea level rises. As a result, the rising water covers the existing beach and no new beach is created; this dynamic is known as "passive erosion."[37] Sea walls, levees, and other structures also interrupt the sediment transport process. While 70 to 90 percent of beach sand comes from rivers and streams, the majority of the remainder comes from eroding bluffs and cliffs.[38] With upstream dams capturing river sediment and coastal armoring reducing coastal erosion, sediment supply to beaches has been appreciably reduced.[39] When combined with sea level rise, armored bluffs gradually allow the sandy beaches below them to become subsumed by the ocean. This process has resulted in the disappearance of many beaches throughout California's coastline where coastal armoring is pervasive, such as the Ocean Beach community in San Diego and in Santa Cruz.

Beach habitat loss due to coastal armoring also triggers a cascade of ecological impacts to dependent species. A recent study comparing armored and unarmored Southern California beaches found that armored beaches had significantly fewer and smaller intertidal macro-invertebrates, three times less shorebirds, and four to seven times less gulls and other birds.[40]

Additionally, sea-walls often fail to protect shoreline properties and are costly to build and maintain. An analysis from 1999 found that heavy revetments cost as much as $2,000 per linear foot and full seawalls ran to as much as $4,500 per square foot.[41] New York's Sea Level Rise Task Force Report found that "over the long term, cumulative environmental and economic costs associated with structural protection measures, such as seawalls, dikes, and beach nourishment, may be more expensive and less effective than non-structural measures, such as elevation of at-risk structures and planned relocation away from the coastal shoreline, especially in less urbanized areas."[42]

Coastal armoring, through the construction of sea walls, revetments, and other concrete barriers, is at odds with CAS Principle 2, which recognizes the protection, restoration, and enhancement of coastal ecosystems as an essential component of adapting to climate change. The application of a California Coastal Act provision requiring that "conflicts be resolved in a manner which on balance is the most protective of significant coastal resources," also weighs against the use of structural measures where a less environmentally damaging alternative exists.[43]

Some state agencies with coastal permitting authority are already limiting the approval of structures that would require sea walls and limiting the permitting of sea walls. However, over the next 50 years, the pressure on coastal agencies to approve permits for sea walls and levees will increase exponentially as sea levels rise and extreme weather and coastal erosion accelerate.[44] <u>It is crucial that OPC's Resolution reflect the core principle that armoring structures should be discouraged where a less</u>

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[36] No Day at the Beach at 538.
[37] *Id.*
[38] Michael Slagel & Gary Griggs, "Cumulative Loss of Sand to the California Coast by Dam Impoundment" (2006), available at http://www.dbw.ca.gov/csmw/ PDF/Slagel&Griggs CA Dam Manuscript.pdf.
[39] *Id.* ("As much as 50 percent of the sand originally delivered to the coast in Southern California, 31 percent in Central and 5 percent in Northern California has been lost, the great majority of this impounded behind dams in reservoirs.")
[40] Dugan, J. E., Hubbard, D. M., Rodil, I. F., Revell, D. L. and Schroeter, S., "Ecological effects of coastal armoring on sandy beaches," *Marine Ecology*, 29: 160–170 (2008), doi: 10.1111/j.1439-0485.2008.00231.x.
[41] *See* Lesley Ewing *et al.*, "Procedural Guidance Document: Beach Erosion and Response" 39 (1999).
[42] New York Sea Level Rise Report at p. 9.
[43] Cal. Pub. Res. Code § 30007.5.
[44] No Day at the Beach at 534 ("As sea level rises, pressure to armor the coast will grow.").

environmentally damaging alternative exist, in order to secure the uniform implementation of this policy as sea level rise increases pressure on state and local agencies.

C. The Resolution must ensure the protection of public access to coastal areas and beaches.

CAS Principle 3: California must ensure public access to coastal areas and protect beaches, natural shoreline, and park and recreational resources.

Shoreline and coastal views, beaches, parks, and other open spaces are integral to California's coastal communities, the quality of life for residents and visitors, and to our economy. These defining coastal resources are seriously at risk of inundation from projected sea level rise, unless our state prioritizes continued public access to coastal areas and the protection of beaches, parks, and other recreational resources on the coast. These access issues have significant economic implications for our state. California's beach and ocean-dependent economy generates an estimated $46 billion per year.[45] Direct spending at the beach through tourism and recreation contributes one-third of this amount.[46]

Public access to coastal areas would also be significantly diminished if the construction of sea walls and revetments accelerates on pace with sea level rise, as is feared without clear policy directives. Rather than being able to scramble down bluffs and dunes, beach-goers encounter would vertical concrete walls or riprap fields, making it difficult or impossible to safely reach the sand below.[47] Armoring structures can also directly occupy the beach; a rock revetment may cover 30 to 40 feet of beach width, as it must slope outward from the cliff top, replacing sandy public beach area for recreation with a boulder field.[48] And, as described above, sea walls and other armoring structures prevent natural erosion and migration inland, decreasing the amount of beach available for the public to access.[49] Much of the Ventura County shoreline is already lined with revetments protecting the Pacific Coast Highway, completely restricting access where the beach has narrowed to the point there is no remaining dry sand.

The current draft of the Resolution does not contain a single statement on the topic of public access and sea level rise. The OPC must ensure that the final Resolution provides guidance to agencies on how to preserve public access to the beach and coast, as well as protect other coastal recreational resources, as described below and in Attachment 1.

In order to mitigate projected sea level rise impacts to the public's enjoyment of coastal areas, OPC's Resolution should advise state and local entities to immediately commence an assessment of vulnerable coastal state and county parks, beaches, and shoreline areas. Subsequently, state and local agencies should consider and apply strategies to retain natural coastal areas such as managed retreat, and the purchase of conservation easements behind existing public natural areas to allow for inland migration. Given the public's considerable interest—and legal right—to continue accessing coastal areas as sea level rises, the Resolution must include specific guidance on how to reduce coastal armoring and other impediments to public access.[50]

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[45] *See* review of economic assessments of the value of beaches in Pendleton, Linwood, Philip King, Craig Mohn, D. G. Webster, Ryan K. Vaughn, and Peter Adams, "Estimating the Potential Economic Impacts of Climate Change on Southern California Beaches," (2009) PIER Research Report, CEC-500-2009-033-D, Sacramento, CA: California Energy Commission.
[46] *Id.*
[47] *See* Garry Griggs, "California's Retreating Coastline: Where Do We Go From Here?," Proc. Am. Meteorological Soc. Ann. Meeting (San Diego) 83,244 (2005).
[48] *Id.*; No Day at the Beach at 540.
[49] *See* No Day at the Beach at 540.
[50] For a comprehensive analysis of potential law and policy tools to secure public access threatened by coastal armoring and sea level rise, see No Day at the Beach.

THE OPC MUST IMPROVE PUBLIC ACCESS TO AND INPUT ON THE SEA LEVEL RISE TASK FORCE

In addition to improving the content of the Resolution, we ask OPC to improve public access to and involvement in OPC processes to create coastal adaptation guidance and policies. For example, the Ocean and Coastal Resources section of the California Climate Adaptation Strategy identified public outreach as a key component of near-term actions to support local and regional planning for addressing sea level rise: "The Ocean Protection Council (OPC) in close coordination with other state ocean resource agencies should (beginning in 2010) conduct public meetings within coastal communities to examine adaptive strategies available to state and local agencies to prepare for potential sea-level rise impacts."[51] This recommendation has yet to be implemented.

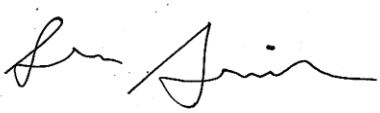
The interest and knowledge of local stakeholders cannot be overstated. Local community groups, representatives from municipal and county government, and others hold important knowledge that can inform the best decision-making. For example, in San Diego County, with leadership provided by the Tijuana River National Estuary Research Reserve, the San Diego Foundation, and Local Governments for Sustainability (ICLEI), a coalition of stakeholders has already begun to craft a strategy that will inform decision-makers about the most appropriate sea level rise adaptation strategies for San Diego Bay. This stakeholder group has already provided key information to the planning group—information that would otherwise not have been accessible to the planning team.

We request that public and local decision-maker representatives be appointed to inform the work of the Sea Level Rise Task Force. Currently, the Task Force is comprised solely of staff from state entities. OPC does call on experts from their Science Advisory Team to bolster and support the development of sea level rise policies. OPC should similarly call on local coastal stakeholders to improve the development of sea level rise policies. The participation of local coastal stakeholders would add a critical missing perspective to the dialogue, and so could significantly strengthen the process to develop sea level rise policies and the policies themselves. Coastal community members, local government and planning staff, non-governmental organizations working on the ground, and other members of the public all have a serious stake in how we address sea level rise.

***

OPC's guidance about how to manage sea level rise will either enhance and protect critical coastal shoreline areas, beaches, and wetlands—or allow the irrevocable loss of these critical economic and environmental resources, along with the quality of life California now provides. We urge the OPC to ensure that this Resolution—California's first statewide policy dedicated to addressing sea level rise—will provide the clear guidance needed to ensure the effective management of California's shoreline and coast in the face of coming climate change impacts.

Sincerely,



Sara Aminzadeh
Programs Manager
California Coastkeeper Alliance

Jeff Russell
Oceans Program Attorney
Natural Resources Defense Council

Joe Geever
California Policy Coordinator
Surfrider Foundation

[51] California Climate Adaptation Strategy at 76.

Michael Endicott
Resource Sustainability
Advocate
Sierra Club California

Jen Kovecses
Staff Scientist
San Diego Coastkeeper

Brent Plater
Executive Director
Wild Equity Institute

Sarah Sikich
Coastal Resources Director
Heal the Bay

Nicole Capretz
Campaign Director
Environmental Health Coalition

Garry Brown
Executive Director
Orange County Coastkeeper
Inland Empire Waterkeeper

Sara Honadle
Programs Director
Coastal Environmental Rights
Foundation

Jason Weiner
Associate Director & Staff
Attorney
Ventura Coastkeeper

/s/
Don McEnhill
Executive Director
Russian Riverkeeper

Deb Self
Executive Director &
Baykeeper
San Francisco Baykeeper

ATTACHMENT 1

PROPOSED NGO CHANGES to the "Resolution of the California Ocean Protection Council on Sea-Level Rise" (DRAFT, November 9, 2010)

WHEREAS, numerous peer-reviewed scientific studies and exhaustive research has determined that climate induced sea-level rise ~~may~~ will have a dramatic ~~negative~~ impact on coastal planning and development; and

WHEREAS, research funded in part by the Ocean Protection Council (OPC) has shown that a 55-inch sea-level rise (SLR) with a 100-year storm event along the California coast may cause nearly $100 billion in property damages and put approximately 480,000 people at risk; and

WHEREAS, there has been an expressed need from state agencies for guidance on SLR to be used in the planning and development of current and future projects; and

WHEREAS, Governor's Executive Order S-13-08 directed state agencies to consider a range of SLR scenarios for the years 2050 and 2100 to assess project vulnerability, reduce expected risks, and increase resiliency to sea-level rise; and

WHEREAS, Governor's Executive Order S-13-08 called for the OPC to work with other state agencies to support an expert panel through the National Academy of Sciences (NAS) to develop recommendations for ranges of SLR to use for vulnerability assessments; and

WHEREAS, the NAS is conducting a comprehensive sea-level rise assessment and a final report is unlikely to be released before 2012 and sea-level rise guidance is necessary to inform state project decisions now; and

WHEREAS, coordination among state agencies on SLR improves efficiency and consistency of approaches for assessing vulnerability to SLR; and

WHEREAS, senior staff from fifteen state agencies collaborated through the Sea-Level Rise Task Force (SLR Task Force) of the Coastal and Ocean Working Group of the state's Climate Action Team (CO-CAT), and the OPC's Science Advisory Team and the California Ocean Science Trust provided science-based responses to questions posed by the Sea-Level Rise Task Force; and

WHEREAS, the fifteen state agencies within the SLR Task Force reached agreement on an Interim Sea-Level Rise Guidance Document, which presented policy recommendations informed by science; and

WHEREAS, there is less certainty about SLR projections for projects that have a time horizon that extends beyond 2050~~,~~ because of varying projected greenhouse gas emissions scenarios and the potential for catastrophic ice melting.~~there is less certainty about SLR projections and SLR projections vary based upon how quickly the international community reduces greenhouse gas emissions~~; and

~~WHEREAS, research shows that the timing for reduction of greenhouse gas emissions has a significant impact on the amount of SLR that will occur by the end of the century~~

Comment [SA1]: This phrase has been edited to reflect the certainty of dramatic impacts from sea level rise on coastal planning. The suggested deletion of "negative" (impact on coastal planning and development) leaves open the possibility that the immediate implementation of climate adaptation measures could have a positive impact on coastal developments, or at least prevent dramatic, negative impacts.

Comment [s2]: This finding about the uncertainty of sea level rise is missing OPC guidance on how to proceed in light of uncertainty. Agencies need guidance about how to address uncertainty in climate adaptation planning and policymaking. Staff should consider deleting this provision in its entirety, or adding language that advises a precautionary approach.

~~and that emissions reductions early in this century will be much more effective in limiting sea-level rise than reductions later on; and~~

WHEREAS, adaptive capacity is the ability of a system to respond to climate change, to moderate potential damages, to take advantage of opportunities, and to cope with the consequences; and~~.~~

WHEREAS, development projects in areas vulnerable to future shoreline flooding endanger public safety, economic viability, and ecosystem services; and

WHEREAS, there is inadequate public funding available to protect all developed areas that are vulnerable to projected sea level rise and storm surges; and some developed areas may be suitable for ecosystem restoration if existing development is removed and the coast is allowed to migrate inland; and

WHEREAS, creating buffers of open space around beaches and wetland areas is a sea level rise adaptation strategy that both increases the amount and diversity of coastal and estuarine habitats, and enhances an ecosystem's natural adaptive capacity by allowing beaches and wetlands to migrate inland as the sea level rises; and

WHEREAS, enhancing the adaptive capacity of shoreline and estuarine ecosystems by restoring tidal wetlands, eelgrass beds, oyster beds, and other natural features creates aquatic habitats for threatened species, establishes a natural buffer against flooding and erosion, and ensures that ecosystems are more resilient to change; and

WHEREAS, other adaptive tools include the transfer of development rights, voluntary acquisition, rolling easements and temporary lease/occupancy agreements; and

WHEREAS, structural barriers, such as sea walls, frequently fail, require costly maintenance, erode adjacent beaches and coastal areas, prevent the natural migration of wetlands and reduce the amount of salt marsh and other habitats, and decrease the natural adaptive capacity of coastal ecosystems; and

WHEREAS, coastal resilience, the capacity of a system to absorb, utilize, or benefit from changes, is the underlying goal of sea level rise adaptation strategies; and

WHEREAS, waterfront parks, beaches, coastal trails, public access sites are particularly vulnerable to flooding from sea level rise and storm activity. Flooding of, or damage to these areas would adversely affect the region's quality of life if public spaces and recreational opportunities are lost;[1]

NOW, THEREFORE, the California Ocean Protection Council hereby

RESOLVES that state agencies are advised to consult and follow the recommendations contained in the SLR Task Force Interim Sea-Level Rise Guidance Document; and

[1] Adapted from San Francisco Bay and Conservation and Development Commission, San Francisco Bay Plan Amendment, BPA 1-08 Amendment at pp. 11-12.

Comment [SA3]: The inclusion of this statement, while true, implies that sea level rise may be avoided or limited under different greenhouse gas emissions scenarios. This implication is at odds with the overarching stated goal of the OPC resolution to guide planning for development in light of sea level rise.

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FURTHER RESOLVES to base SLR assessments on current scientific projections of SLR and to support regular updates to guidance on SLR for state agencies based upon the latest research; and

FURTHER RESOLVES that at this time, state agencies are advised to use the SLR values presented in the December 2009 *Proceedings of National Academies of Science* publication by Vermeer and Rahmstorf1as a starting place (see attached Table 1) and select SLR values based on agency and context-specific considerations of risk tolerance and adaptive capacity; and

~~FURTHER RESOLVES that the timeframe identified for a project is important for SLR assessments and will affect the approach for assessing impacts, and that risk tolerance and adaptive capacity should be considered when selecting estimates of SLR;~~ and

FURTHER RESOLVES that projects that are vulnerable to sea level rise pursuant to the SLR Task Force Interim Sea-Level Rise Guidance Document, or subsequent updated SLR values, ~~for projects that involve high consequences (high impacts and low adaptive capacity), it is advisable to avoid selecting SLR values that would result in high risk; for most situations this means it is advisable to avoid using low SLR values for high consequence projects~~should be restricted by state agencies; and

FURTHER RESOLVES that all~~for~~ projects ~~that have a lifespan that extends beyond 2050, it is especially important to consider risk tolerance and adaptive capacity to guide decisions of whether to use low, medium, or~~ should apply high SLR projections with an added safety factor to reflect elevated water levels from storms, high tides, and extreme weather events, and

FURTHER RESOLVES that it is important for state agencies to coordinate with each other when selecting values of SLR and~~, where appropriate and feasible,~~ use ~~the same~~ a uniform baseline projection~~s~~ of SLR, with agency discretion to use higher projections and apply a safety factor as necessary; and

FURTHER RESOLVES that for SLR estimates beyond two decades, linear extrapolation of SLR based on historic observations is inadequate and would likely underestimate SLR; and

FURTHER RESOLVES that prediction of future sea levels at a specific location will be improved if local and regional trends in sea level and land elevation are factored into the analysis; and

FURTHER RESOLVES that consideration should be given to the highest water levels projected within the lifespan of a project in order to assess impacts from extreme events such as those caused by storms during El Niño-Southern Oscillation events; and

FURTHER RESOLVES that California's very dynamic coast will respond to rising sea level differently depending upon local geomorphology, and assessments of impacts from SLR on shoreline projects should address local shoreline changes; and

Comment [s4]: The timeframe identified for a project should not be overemphasized in an analysis of its vulnerability to SLR. Once a development is created, it is likely to be re-developed, maintained, or expanded once its initial projected lifespan is complete.

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Comment [SA5]: This statement should be strengthened since parties are extremely unlikely to concede that their projects have high impacts and low adaptive capacity. Arguably, in light of projected sea level rise, any development in the coastal floodplain is a development that should be considered "high impact" and "low development"

Comment [SA6]: All projects should utilize high SLR estimates in order to best protect public health and safety, and to guide economically viable developments.

Comment [SA7]: We strongly support this statement

FURTHER RESOLVES that it is important to reduce greenhouse gas emissions early in this century in order to limit the amount of damages from SLR that will occur as a result of rising temperatures; and

FURTHER RESOLVES that the OPC will continue to support climate change research and monitoring and support the development of common modeling assumptions so that planning actions in different agencies are based on shared information and current scientific understanding to the greatest extent possible.

FURTHER RESOLVES that state agencies with shoreline management authority should evaluate existing vulnerable developments for adaptation actions, prioritizing for protection those developments that provide critical public safety and public service functions; and

FURTHER RESOLVES that the California Coastal Commission, San Francisco Bay Area Conservation and Development Commission, and other agencies with shoreline management authority should conduct sea-level rise impact analyses for any new development proposed in areas that are vulnerable to sea level rise including the consideration of land-use regulation, zoning, open-space conservation, land trusts, easements or other land-use measures, and to use extreme caution when considering permitting in these areas;[2] and

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FURTHER RESOLVES that the California Coastal Commission, San Francisco Bay Area and Development Commission and other permitting state agencies should limit the approval of sea walls, levees, barriers, and other coastal armoring structures to cases where no non-structural protection measure or less environmentally damaging alternative can be feasibly applied; and

FURTHER RESOLVES that for armoring structures deemed absolutely necessary, the California Coastal Commission and other permitting agencies must require that structures do not eliminate or impede the public's access along the shore; and

FURTHER RESOLVES that state and local agencies should endeavor to fund and facilitate adaptation strategies that facilitate coastal resilience and enhance the natural adaptive capacity of coastal and estuarine ecosystems; and

FURTHER RESOLVES that state and local adaptation measures should include actions to preserve public access to the California coast; and

FURTHER RESOLVES that where armoring structures are strictly necessary, the California Coastal Commission should ensure that structures do not impede the public's access along the shore and are designed to allow ecosystem continuity between the ocean and the shore.[3]

[2] Suggested edit adapted from the New York SLR Task Force Report at 16.
[3] Adapted from M. Caldwell; SYMPOSIUM: LITIGATING TAKINGS: ARTICLE: No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access Along the California Coast. *34 Ecology L.Q. 533, 534* (2007)