SAN FRANCISCO
BAYKEEPER

October 7, 2010

Joe LaClair
San Francisco Bay Conservation and Development Commission
50 California Street, Ste 2600
San Francisco, CA 94111

Via electronic mail to joel@bcdc.ca.gov

Re: Proposed San Francisco Bay Plan Amendment No. 1-08 Concerning Amendment of Various Sections of the Bay Plan to Address Climate Change and to Add A New Climate Change Section with New Findings and Policies

Dear Mr. LaClair:

Thank you for the opportunity to submit these comments on behalf of San Francisco Baykeeper (Baykeeper) and our 1,500 members. We are writing to strongly support the efforts of San Francisco Bay Conservation and Development Commission (BCDC) to adopt San Francisco Bay Plan Amendment No. 1-08 regarding Climate Change (Amendment). In the public interest, BCDC must insist on developing policies based on best available science as well as existing guidance and policies contained in the Governor's California Climate Adaptation Strategy (CAS), Federal Coastal Zone Management Act (CZMA), California Environmental Quality Act (CEQA) Guidelines, as well as existing policies of the San Francisco Bay Plan (Bay Plan). Inclusion of this Amendment serves to improve the Bay Area's resiliency to climate change and storm surges, while achieving conservation and economic development goals consistent with the BCDC mandate. To omit or delay inclusion of this Amendment poses a threat to on-going conservation efforts, imposes future liabilities to citizens of the State, and would likely exacerbate flood risk throughout the region.

Baykeeper agrees with comments and suggestions made by California Coastkeeper Alliance (CCKA) on this matter and we incorporate by reference their comment letter dated October 6, 2010. We hope BCDC takes into consideration CCKA's suggested language and removes identified text from the Amendment perceived to be introduced as a means of weakening previous iterations. Comments located herein serve to support the finding that introduction of this Amendment is well within BCDC's legal mandate and provides recommended revisions intended to increase consistency and transparency in the project approval process.

I. INCLUSION OF AMENDMENT 1-08 IS A NECESSARY FIRST STEP FOR A REGIONALLY-COORDINATED APPROACH TO CLIMATE CHANGE ADAPTATION.

As BCDC is aware, anticipated rates of sea-level rise in coming decades will likely result in a number of adverse impacts to San Francisco Bay and surrounding environs. Some findings regarding the consequences of a rising sea under conservative forecasts of sea level rise include:

- Inherent shoreline inundation from a rising Bay and flooding from heightened storm surges, resulting in loss of tidal marsh areas, inundation of critical infrastructure and widespread property loss;
- Impediments to drainage and reduced sediment flux from low-gradient streams and rivers;[1,2]
- Modeling results suggest an 11.8-inch increase in sea level rise would shift the 100-year storm surge-induced flood event to once every 10 years;[3]
- Altered species composition due to inland migration of the tidal inundation zone;[4,5] and
- Alterations to the balance between sediment accretion and erosion, thereby affecting the success of tens of thousands of acres of tidal marsh restoration currently underway throughout the region.[6,7]

Legislative efforts such as AB 32 have demonstrated California's commitment to slowing the release of greenhouse gas emissions and mitigating the effects of climate change. However, at the state and

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[1] Phillips, J.D. and M.C. Slattery. 2006. *Sediment storage, sea level, and sediment delivery to the ocean by coastal plain rivers*. Progress in Physical Geography 30, 4. pp. 513–530

[2] Duncan M. FitzGerald, D.M., M.S. Fenster, B.A. Argow and I.V. Buynevich. 2008. *Coastal Impacts Due to Sea-Level Rise*. Annual Review of Earth and Planetary Sciences. v. 36, pp. 601-647

[3] California Climate Change Center. 2006. *Projecting Future Sea Level*. publication #CEC-500-2005-202-SF. Available at www.energy.ca.gov

[4] Galbraith, H., R. Jones, R. Park, J. Clough, S. Herrod-Julius, B. Harrington, and G. Page. 2002. *Global Climate Change and Sea Level Rise: Potential Losses of Intertidal Habitat for Shorelibirds*. Waterbirds. 25(2):173-183.

[5] Stralberg, D., V. Toniolo, G.W. Page, and L.E. Stenzel. 2004. *Potential Impacts of Non-Native Spartina Spread on Shoreland Populations in South San Francisco Bay*. PRBO Report to California Coastal Conservancy (contract #02-212). PRBO Conservation Science, Stinson Beach, CA.

[6] Orr, M., S. Crooks, and P.B. Williams. 2003. *Will Restored Tidal Marshes be Sustainable?.* San Francisco Estuary and Watershed Science 1(1):Article 5.

[7] Although some very high accretion rates occur in the San Francisco Bay region the average rate is approximately 1-2 mm per year. This rate has kept pace with recent sea level rise, but will likely fall short of the projected future sea-level rise of 2-3 mm (or more) per year. The high degree of development and infrastructure placed in near-shore areas restricts the inland migration of wetlands in many locations, thus more coastal wetlands are likely to be lost.

regional level, policy makers have been reluctant to provide municipalities with clear adaptation guidelines to address inevitable rates of sea-level rise. During the 2006 Climate Protection Summit, hosted by the Bay Area Air Quality Management District, local jurisdictions identified the need for a regionally coordinated effort and clear guidance. As a result, BCDC stated that "Developing strategies to adapt to the [e]ffects of climate change, especially the impacts of sea level rise, is where BCDC has the authority and responsibility to act."[8] This Amendment is the first necessary step in providing municipalities with appropriate guidance and grants BCDC the ability to direct inappropriate development away from vulnerable shorelines.

Municipalities and citizens have been waiting for BCDC to live up to its pledge to amend the Bay Plan, and the development community has been provided with adequate time to plan accordingly. Climate change adaptation policies have been successfully implemented elsewhere, demonstrating that guidance regarding appropriate development within areas subject to sea-level rise neither represents an all out ban on shoreline development, nor poses an impediment to economic activity. Instead of blocking this Amendment, the development community should view this as an opportunity for developing innovative design standards and creating a sustainable vision for the Bay Area. We look forward to working with BCDC, local authorities, and the private sector to make such a vision a reality.

II. BCDC'S AMENDMENT OF THE BAY PLAN TO ADDRESS SEA LEVEL RISE IS CONSISTENT WITH ITS MANDATE.

As described by CCKA in their comment letter (Attachment 1), BCDC holds a public trust and legal mandate to develop and enforce a sea-level rise adaptation policy for the San Francisco Bay Area. This arises from several laws, policies and guidance documents, as identified below:

A. California Climate Adaptation Strategy

BCDC's exercise of its mandate to address climate change follows state guidance on the matter. The California Climate Adaptation Strategy (CAS) specifically noted that BCDC, along with the State and Regional Water Quality Control Boards, California State Parks, and the State Lands Commission, should "continue to develop adaptation strategies that can be implemented through their existing planning and regulatory programs," by September 2010.[9] Although comments to the Amendment have suggested this guidance maintains no legal authority, this guidance document remains the most authoritative tool available to California agencies based on best available science and consideration of public trust.

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[8] San Francisco Bay Conservation and Development Commission. 2006. Staff Report on the Commission's Climate Change Planning Project and the November 10, 2006 Climate Protection Summit. Available at www.bcdc.ca.gov

[9] California Natural Resources Agency. 2009. *2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008*. p. 75. Available at www.energy.ca.gov

B. San Francisco Bay Plan:

Specific language regarding flood risk and climate change already exists within the Bay Plan, requiring BCDC to take sea-level rise into account. The following two policies explicitly require consideration of sea-level rise when determining flood risk and places limits on development within flood prone areas subject to future sea-level rise:[10]

Policy 4: To prevent damage from flooding, structures on fill or near the shoreline should have adequate flood protection including consideration of future relative sea level rise as determined by competent engineers.[11]

Policy 6: Local governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas.[12]

C. McAteer-Petris Act

BPA 1-08 constitutes an exercise of BCDC's public trust responsibilities, which are statutorily conferred under the McAteer-Petris Act. Under the Act, "in order to protect the present shoreline and body of the San Francisco Bay to the maximum extent possible, it is essential that the commission be empowered to issue or deny permits, after public hearings, for any proposed project that involves placing fill, extracting materials or making any substantial change in use of any water, land or structure within the area of the commission's jurisdiction."[13] The Bay Plan calls upon the Commission to ensure that trust uses "such as commerce, navigation, fisheries, wildlife habitat, recreation, and open space" are preserved.[14] In consideration of the imminent threat posed on these trusts as a result of sea-level rise, BCDC maintains a public trust responsibility to ensure development proceeds in a responsible manner.

D. California Environmental Quality Act

The proposed Amendment is consistent with CEQA Guidelines Section 15126.21, which states that: "Lead agencies should disclose any areas governed by the general plan that may be particularly affected

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[10] Sea Level Rise is also referenced in the SF Bay Plan in Finding k, p. 28; Policy 5, p. 29 in the Section Concerning Tidal Marshes and Tidal Flats Around the Bay and in Policy 4, p. 34 in the Section Concerning Subtidal Areas in the Bay.

[11] San Francisco Bay Conservation and Development Commission. *San Francisco Bay Plan*. 2008 Reprint., p. 33. Available at www.bcdc.ca.gov

[12] *ibid.*

[13] Cal. Gov. Code § 66604

[14] San Francisco Bay Conservation and Development Commission. *San Francisco Bay Plan*. 2008 Reprint., p. 79. Available at www.bcdc.ca.gov

by global warming, e.g.: coastal areas that may be subject to increased erosion, sea level rise, or flooding…"

E. Federal Coastal Zone Management Act

As the federally-designated state coastal management agency for the San Francisco Bay segment of the California coastal zone, BCDC must exercise its authority by the Federal CZMA to ensure that federal projects and activities are consistent with the CZMA, an Act which recognizes the imminent threats posed by sea-level rise. By reference, the CZMA mandates that BCDC must ensure that federal projects and activities are consistent with the policies of the Bay Plan and State law.

Under the Federal CZMA, as amended in 2005, Congress found that "because global warming may result in a substantial sea level rise with serious adverse effects in the coastal zone, coastal states must anticipate and plan for such an occurrence."[15] Accordingly, the CZMA proclaims that states should "…exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone." The CZMA goes on to state that "programs should at least provide for… the management of coastal development to minimize the loss of life and property caused by improper development in flood-prone, storm surge, geological hazard, and erosion-prone areas and in areas likely to be affected by or vulnerable to sea level rise, land subsidence, and saltwater intrusion."[16]

In addition, the Federal CZMA now defines the term "coastal zone" to expressly include coastal waters and the adjacent shorelands - classified as extending "inland from the shorelines only to the extent necessary to control shorelands… and to control those geographical areas which are likely to be affected by or vulnerable to sea level rise."[17] The CZMA contains no exceptions to this definition for San Francisco Bay or adjacent shorelands. It is recognized that the McAteer-Petris Act generally limits BCDC's jurisdiction to a 100-foot shoreline band. However, given BCDC's role to carry out the provisions of the CZMA in the San Francisco Bay region, the differing jurisdictional areas should be harmonized in favor of the more appropriate federal definition.

III. The Bay Plan Amendment Should Consider Minor Revisions For Ease of Implementation and Transparency.

Several findings and policies of the proposed Amendment address requirements for new and redevelopment projects as well as limitations on the type and location of projects suitable within vulnerable shorelands. Clear guidance regarding the appropriate type and location of developments to be considered along San Francisco Bay must be considered an essential element of this Amendment.

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[15] 16 U.S.C. § 1452

[16] ibid.

[17] 16 U.S.C. § 1453. Definitions (Section 304)

However, some statements are susceptible to varying degrees of interpretation and could benefit from further clarification.

I respectfully submit the following suggestions to several findings and policies meant to be constructive comments for the benefit of all. These are in part informed by my background as a flood risk hydrologist in England where I conducted many flood risk assessments for developments subject to sea-level rise adaptation strategies similar to the ones proposed in the Amendment.[18] Additions to Findings and Policies are highlighted in red while deletions are struck out.

Finding E (Climate Change) p.9:

> *Shoreline areas currently vulnerable to a 100-year flood event may be subjected to inundation by high tides at mid-century. Much of the developed shoreline may require new or upgraded shoreline protection to reduce damage from flooding. Shoreline areas that have subsided are especially vulnerable to sea level rise and may require more extensive shoreline protection. The Commission, along with other agencies, is responsible for protecting the public and the Bay ecosystem from flood hazards. This can be best achieved by using higher emissions scenarios, which correspond to higher rates of sea level rise. In planning and designing projects for the Bay shoreline, it is prudent to rely on the most current science-based and regionally specific projections of future sea level rise, develop strategies and policies that can accommodate sea level rise over a specific planning horizon (i.e., adaptive management strategies), and preclude developments requiring new shoreline structures for flood protection or developments that exacerbate existing flood risk through net loss of flood storage capacity ~~cannot be adapted to sea level rise~~.*

Policy 1 (Climate Change) p.15:[19]

> *For any project located within an area potentially subject to sea-level rise at the 2100 time horizon, a site-specific flood risk assessment must be prepared to identify all potential flood mechanisms, degrees of uncertainty, and consequences of defense failure. Site-specific risk assessments should demonstrate that the project shall maintain resiliency to gradual sea-level rise over the life of the development as well as during storm surges at varying return frequencies. In addition, risk*

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[18] Sea-level rise adaptation policies in the UK could provide useful templates for developing strategies in the Bay Area and beyond. For additional information refer to *Planning Policy Statement 25: Development and Flood Risk*, available at www.communities.gov.uk

[19] This Policy could benefit from consultation with Flood Control Districts, Army Corps of Engineers and/or the Federal Emergency Management Agency (FEMA) to develop an appropriate Policy regarding preparation of flood risk assessments for projects within areas subject to sea-level rise. For most sites in our region flood maps are out of date and do not consider sea-level rise. Also, analysis for a 1 in 100 year return frequency may in some cases not be strict enough and in others it may be too onerous, so an adaptive approach should be employed. A long term strategy should require the development of detailed hydro-dynamic models to provide clear guidance to developers, local authorities and agencies. In addition, BCDC should develop collaborations with Flood Control Districts, Army Corps of Engineers or seek outside consultants for review of site-specific flood risk assessments.

assessments should demonstrate that a project shall not exacerbate existing flood risk through net loss of flood storage capacity. Risk assessments should be accompanied and informed by the results of 2-D flood models specific to the proposed development. For complex sites or breach analysis studies, BCDC may request more advanced 3-D modeling pending input from qualified agencies or outside reviewers. Projects exempt from this requirement include habitat restoration and site remediation projects that will not alter the flood storage capacity of the site. ~~*When planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared, based on the estimated 100-year flood elevations that take future sea level rise into account. A range of sea level rise projections for mid-century and end of century, including at least one high estimate, that is based on the best science-based projections currently available, should be used in the risk assessment.*~~

Policy 6 (Climate Change) p.17-18:

Until a regional sea level rise adaptation strategy can be completed, when planning or regulating new development in areas vulnerable to future shoreline flooding, new projects located below the 100 year flood level plus 2100 sea-level rise should be limited to:

a) minor repairs of existing facilities or changes to land use designation ~~*small projects*~~ *that do not increase risks to public safety;*

~~*b) transportation facilities, public utilities or other critical infrastructure that is necessary for the continued viability of existing development;*~~

~~*c) infill development within existing urbanized areas that contain development and infrastructure of such high value that the areas will likely be protected whether or not the infill takes place;*~~

d) 'Less Vulnerable' and 'Water Compatible' developments, as defined below, and subject to appropriate pollution-prevention controls and adaptive management strategies.

'Less Vulnerable' developments include:

- *Retail buildings;*
- *Non-residential offices;*
- *Restaurants;*
- *Storage and distribution facilities;*
- *Sand and gravel processing areas;*
- *Military installations;*
- *Assembly and leisure; and*
- *Land and buildings used for agriculture.*

'Water Compatible' developments include:

- *Roads and transportation facilities necessary for existing development;*
- *Electrical, water and sewage transmission infrastructure;*
- *Maintenance of flood control structures;*[20]
- *Docks, marinas and wharves;*
- *Navigation facilities;*
- *Ship building, repairing and dismantling, dockside fish processing and compatible activities requiring a waterside location;*
- *Water-based recreation;*
- *Public parks, habitat restoration projects, environmental remediation projects and essential infrastructure for these projects, such as restrooms and changing areas.*

e) redevelopment of 'More Vulnerable' developments, including residential units and health service facilities, that will remediate existing environmental degradation or contamination if the redevelopment ~~will~~ (1) ~~provide significant regional benefits and meet regional goals by concentrating employment or housing near adequate transit service sufficient to serve the project~~ provides wider sustainability benefits to the community that outweigh flood risk and potential costs associated with shoreline defense and (2) includes the following elements: (i) an adaptation strategy for dealing with rising sea level and shoreline flooding with definitive goals and an adaptive management plan for addressing key uncertainties for the life of the project; ~~(ii) measures that will achieve resilience and sustainability in all elements of the project;~~ (ii) a permanent financial strategy that will guarantee the general public will not be burdened with the cost of protecting the project from any sea level rise or storm damage in the future; (iii) evidence that project implementation shall not exacerbate flood risk through loss of flood storage capacity or;

e. projects or uses that are interim or temporary in nature where the use or structures: (1) can be easily removed or relocated to higher ground; (2) can be amortized within a period before removal or relocation of the proposed use is required; and (3) will not require shoreline protection during the life of the project.

[20] New flood control structures should be considered on a case by case basis. Where new structures are determined to provide sustainability benefits outweighing their impacts this would qualify under (e). However, hard structures (i.e. sea walls and revetments) should be considered only under worst-case scenarios and biological engineering (e.g. 'living walls', tidal marsh restoration, etc) approaches to flood protection should assume highest priority.

Finding F (Safety of Fills) p.19:[21]

Flood damage to fills and shoreline areas can result from a combination of sea level rise, storm surge, heavy rainfall, high tides, and winds blowing onshore. The most effective way to prevent such damage, is to locate projects outside areas at risk of sea-level rise and storm surges of an appropriate return frequency ~~and facilities on fill or near the shoreline above a 100-year flood level that takes future sea level rise into account, during the expected life of the project~~. Other approaches that can reduce flood damage include protecting structures or areas with biological engineering approaches (i.e. Living Walls), levees, seawalls, tidal marshes, or other protective measures, employing innovative design concepts, such as building structures that can be easily relocated, tolerate periodic flooding or are adaptively designed and managed to address sea level rise over time.

Policy 4 (Safety of Fills) p.20:[22]

Adequate measures should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project. The Commission may approve fill that is needed to provide flood protection for existing projects. New projects on fill or near the shoreline should either be set back from the edge of the shore so that the project will not be subject to dynamic wave energy; be built so the bottom floor level, including an appropriate freeboard, is placed at a height appropriate for the use and location of the site, as informed by a flood risk assessment in consultation with Flood Control Districts and/or the Army Corps of Engineers ~~of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project,~~; be specifically designed to tolerate periodic flooding~~,~~; or employ other effective means of addressing the impacts of future sea level rise and storm activity. Rights-of-way for levees or other structures protecting inland areas from tidal flooding should be sufficiently wide on the upland side to allow for future levee widening to support additional levee height so that no fill for levee widening is placed in the Bay.

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[21] This finding assumes the 100-year return frequency is always appropriate for all sites, which is usually not the case. For instance, residential sites may warrant more caution than warehouse facilities. In addition, this finding suggests that placing a project on fill outside the flood plain is a sustainable approach. In reality, raising a project of placing fill within the flood plain reduces flood storage capacity and exacerbates flood risk outside the project site. As part of the sea-level rise adaptation strategy BCDC should discourage fill within the floodplain and require all projects ensure no-net loss of flood storage capacity consistent with other sustainable flood management strategies.

[22] As above, flood mapping studies are required and a prescriptive flood frequency may not always be appropriate.

As one of California's first local planning strategies dedicated to addressing sea level rise, BCDC's development of a precautionary climate adaptation policy will not only facilitate the effective management of shoreline areas around the Bay, but will no doubt serve as a model for the implementation of local climate adaptation strategies throughout the state. As a leading advocate for San Francisco Bay and its communities, Baykeeper urges BCDC to implement its coastal management authority and public trust duties to the fullest extent possible through incorporation of this Amendment and taking the lead on development of a comprehensive sea-level rise adaptation strategy for the region.

Sincerely,

Ian Wren

Staff Scientist

San Francisco Baykeeper

Attachments:

Letter from Sara Aminzadeh (CCKA) to Joe LaClair (BCDC) regarding the Proposed San Francisco Bay Plan Amendment No. 1-08 Concerning Climate Change. October 6, 2010.

CALIFORNIA COASTKEEPER ALLIANCE

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Humboldt Baykeeper
Inland Empire Waterkeeper
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San Luis Obispo Coastkeeper
Santa Barbara Channelkeeper
Santa Monica Baykeeper
Ventura Coastkeeper

October 6, 2010

Mr. Joe LaClair
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50 California Street, Ste 2600
San Francisco, CA 94111
Submitted via email to joel@bcdc.ca.gov.

RE: Proposed San Francisco Bay Plan Amendment No. 1-08 Concerning Climate Change

Dear Mr. LaClair,

Thank you for the opportunity to submit these comments on behalf of California Coastkeeper Alliance. California Coastkeeper Alliance (Alliance) represents 12 Waterkeeper groups spanning the California coast from the Oregon border to San Diego. The Alliance and its member Waterkeepers work daily to protect and maintain healthy coastal and estuarine habitats throughout the state. On behalf of the Alliance, I strongly support San Francisco Bay Conservation and Development Commission's (BCDC) work to issue clear guidance on how to manage sea level rise in the San Francisco Bay Area.

Sea level has risen eight inches since 1900 and is projected to rise more than an additional foot by 2050, and nearly five feet by 2100. Much of the Bay Area's critical infrastructure lies close to the shoreline, at or near sea level: two international airports, multiple emergency and health care facilities, myriad industrial facilities, and 21 wastewater treatment plants. The inundation of any of one of these sites could disrupt the delivery of critical public services to large numbers of Bay Area residents and release unknown amounts of pollutants into the environment. As sea water creeps inland, salt water will intrude into the Bay Delta Estuary and groundwater basins, impacting ecosystem health and fresh-water supplies. Additionally, many of the Bay's low-lying wetland areas are at risk of inundation, which could undermine Bay Area communities' substantial investments in restoring wetlands and tidal marshes.[1]

We now know that projected sea level rise, combined with high tides and storm surges, will put Bay Area infrastructure and ecosystems at risk much sooner than 2050. BCDC's adoption of a strong Bay Plan Amendment Concerning Climate Change (BPA 1-08) can protect the critical wetlands and shoreline areas that sustain a high quality of life for Bay Area residents. Alternatively, a weak or delayed policy will put public safety and the local economy and environment in jeopardy. I therefore urge BCDC to adopt a strong Bay Plan Amendment Concerning Climate Change that will protect vulnerable Bay Area communities and ecosystems from sea level rise.

[1] *See* Matthew Heberger, 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 ("Pacific Institute SLR Report"), p. 29 (citing Hutzel 2008) ("Numerous wetland restoration projects have been initiated in the San Francisco Bay, with the cost of restoring these tidal marshes ranging from $5,000 to $200,000 per acre.").

I. BCDC'S AMENDMENT OF THE BAY PLAN TO ADDRESS SEA LEVEL RISE IS A REASONABLE EXERCISE OF ITS LEGAL DUTIES AND RESPONSIBILITIES.

BCDC's adoption of climate change amendments to the Bay Plan is not only a *permissible* exercise of its authority, it is *necessary* to BCDC's fulfillment of its two primary mandated responsibilities. BCDC's mission is twofold: protect and enhance the San Francisco Bay and encourage its responsible use.[2] With an estimated $62 billion worth of property[3] and hundreds of acres of wetlands at risk of inundation or flooding from sea level rise,[4] BCDC cannot fulfill its mission without issuing clear guidance on how to address sea level rise. The planning and regulatory activities squarely within BCDC's jurisdiction are already understood to encompass the management of sea level rise impacts. BCDC's Climate Change Amendments merely provide additional clarification and guidance on existing policies in the San Francisco Bay Plan, which date back to July 2001:[5]

> Policy 4: "To prevent damage from flooding, structures on fill or near the shoreline should have adequate flood protection including consideration of future relative sea level rise as determined by competent engineers."[6]
>
> Policy 6: "Local governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas."[7]

In addition to permitting authority strictly conferred to BCDC by state legislation, BCDC has additional powers and duties which must be considered in interpreting BCDC's role in regulating shoreline areas impacted by sea level rise. BCDC has public trust responsibilities, which are statutorily conferred under the McAteer-Petris Act.[8] The Bay Plan calls upon the Commission to ensure that trust uses "such as commerce, navigation, fisheries, wildlife habitat, recreation, and open space" are preserved. BCDC also has management authority as the federally-designated state coastal management agency for the San Francisco Bay segment of the California coastal zone. This means that, like the California Coastal Commission, BCDC can use the authority of the federal Coastal Zone Management Act to ensure that federal projects and activities are conducted consistent with state law and, in this case, the policies of the Bay Plan.

BCDC's development and implementation of BPA 1-08 is supported by state guidance on climate change. The Governor's California Climate Adaptation Strategy specifically noted that the San Francisco Bay Conservation and Development Commission, along with the State and Regional Water Quality Control Boards, California State Parks, and the State Lands Commission should "continue to develop

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[2] "[BCDC] is dedicated to the protection and enhancement of San Francisco Bay and to the encouragement of the Bay's responsible use." *See* BCDC's Mission Statement at http://www.bcdc.ca.gov/mission.shtml.

[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" (CA Climate Adaptation Strategy), p. 68 ("The initial estimates of development in San Francisco Bay in 2100 indicate that over $62 billion worth of building and contents could be at risk."), available at www.climatechange.ca.gov/adaptation.

[4] Two thirds of the nearly $100 billion worth of property that is at risk of flooding from projected sea level rise are concentrated on the San Francisco Bay. *See* Pacific Institute Report on Sea Level Rise, p. 3.

[5] Sea Level Rise is also referenced in the San Francisco Bay Plan in Finding k, p. 28; Policy 5, p. 29, in the Section Concerning Tidal Marshes and Tidal Flats Around the Bay; and Policy 4, p. 34, in the Section Concerning Subtidal Areas in the Bay.

[6] San Francisco Bay Plan, p. 39.

[7] *Id.*

[8] CAL GOV'T Code § 66604 (Westlaw 2010).

adaptation strategies that can be implemented through their existing planning and regulatory programs" before November 2010.[9] Additionally, CEQA Guidelines Section 15126.21 states that "[l]ead agencies should disclose any areas governed by the general plan that may be particularly affected by global warming, e.g.: coastal areas that may be subject to increased erosion, sea level rise, or flooding . . . ."

BCDC's Bay Plan Amendment 1-08 fills a badly needed void in the San Francisco Bay Area's preparation for sea level rise providing technical assistance and crafting a set of best practices for local governments and communities as they face sea level rise.

II. BPA 1-08 SHOULD REFLECT KEY COASTAL PLANNING PRINCIPLES, INCLUDING GUIDANCE IN THE CALIFORNIA CLIMATE ADAPTATION STRATEGY.

To date, the California Climate Adaptation Strategy (CAS) provides the best guidance on crafting regional and local adaptation strategies to address sea level rise. BCDC, along with the Ocean Protection Council, California Coastal Conservancy, California Coastal Commission, State Lands Commission, Department of Fish and Game, and State Parks contributed to the development of strategies in CAS to manage ocean and coastal resources under threat from climate change.[10] The California Attorney General's Office also refers communities undertaking local planning processes to use the California Climate Adaptation Strategy as guidance to "assess climate change impacts, identify areas most vulnerable to these impacts, and to develop reasonable and rational risk reduction strategies."[11]

The CAS articulates foundational principles and strategies to guide state and local agencies in crafting sea level rise adaptation policies. Many of the strategies are best practices of coastal planning that have become necessary in light of projected sea level rise. The BPA Amendment 1-08 findings and policies should reflect the following five key principles and directly reference the CAS language, as appropriate:

1. Restrict development in hazard zones.
2. Prioritize adaptation strategies that enhance an ecosystem's natural adaptive capacity.
3. Discourage the use of structural protective barriers such as sea walls**.**
4. Critical habitats must be protected and "buffered."
5. Coastal resilience is the overriding goal of adaptation strategies (instead of aiming only to reduce vulnerability).

A. Preserve Key Provisions of BPA 1-08.

There are several existing provisions in BPA Amendment 1-08 that reference adaptation strategies that utilize natural ecosystem processes and make shoreline areas more resilient to sea level rise, as well as the other above-referenced key principles. I strongly support the amendments listed below that reflect these key principles, and I urge BCDC to preserve the existing language in these amendments, or, at the very least, the meaning conveyed in the existing language, in its final draft. (Please note that if a finding or policy is not listed below, it does not necessarily reflect a lack of support for those provisions.)

[9] CA Climate Adaptation Strategy, p. 158.
[10] CA Climate Adaptation Strategy, p. 72.
[11] Recommendation 9 states that "[c]ommunities 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." http://ag.ca.gov/globalwarming/ceqa/generalplans.php.

- Findings "k" and "l" Tidal Marshes and Tidal Flats Section (pp. 4-5). I support these findings, which recognize the necessity of sediment transport to aid landward marsh migration. An adequate supply of sediment is particularly crucial to aid the inland migration of wetlands because the "high degree of development and infrastructure placed in near-shore areas restricts the inland migration of wetlands"[12] in many areas around the San Francisco Bay.

- Finding "n" Tidal Marshes and Tidal Flats Section (p. 5). I strongly support the addition of this new finding to define buffer areas and highlight their ability to mitigate rising sea levels. Protecting critical habitat is identified as a key "near-term" action in the CAS in order to protect coastal resources from sea level rise.[13] The creation of buffers of open space around beaches and wetland areas is a dual-purpose sea level rise adaptation strategy that both increases the amount and diversity of estuarine habitats and enhances an ecosystem's natural adaptive capacity by allowing beaches and wetlands to migrate inland as the sea level rises.

- Finding "e" Climate Change Section (p. 9). I strongly support the addition of this new finding, which recommends using the most current projections of future sea level rise through an adaptive management approach. Previous drafts of this provision have used different approaches ranging from a "precautionary approach" to a "risk-averse approach." While employing a precautionary approach might best protect public health and safety, I believe an adaptive management approach is an adequate compromise.

  In particular, I support the inclusion of the last phrase in Finding e: ". . . and preclude development that cannot be adapted to sea level rise." The top priority strategy identified in the California Climate Adaptation Strategy to protect coastal and ocean resources is **"to avoid establishing or permitting new development inside future hazard zones in most cases if new protective structures would be necessary."**[14] Just as the provisions in BPA Amendment 1-08 reflect BCDC's recognition that some development in the 100 year floodplain may be permissible or necessary, it is critical that BPA 1-08 recognizes instances where development must be precluded.

- Finding "f" Climate Change Section (p. 10). I strongly support new finding "f," which defines two important concepts in climate adaptation planning: shoreline resilience and adaptive capacity.

  I submit for BCDC's consideration, additional definitions of resilience that could be integrated into findings and policies throughout BPA 1-08 to further highlight the importance of this concept. 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."[15] Additionally, a community's resilience is "a measure of how well people and societies can adapt to a changed reality and capitalize on the new possibilities offered."[16] In resilient coastal regions, flexibility, adaptability, and durability are prominent themes in planning and management.[17]

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[12] CA Climate Adaptation Strategy at p. 69.
[13] CA Climate Adaptation Strategy at p. 74.
[14] CA Climate Adaptation Strategy at p. 72 (emphasis added).
[15] Holling, Crawford Stanley, "Resilience and Stability of Ecological Systems," *Annual Review of Ecology and Systematics* 4:1-23 (1973).
[16] Douglas Paton, Gail Kelly, and Michael Doherty, "Exploring the Complexity of Social and Ecological Resilience to Hazards" (2006).
[17] *See generally* Beatley, Timothy, *Planning for Coastal Resilience: Best Practices for Calamitous Times.* Washington DC: Island Press ("Planning for Coastal Resilience") (2009).

- Findings "l," "m," and "n" Climate Change Section (p. 12). I strongly support findings l, m, and n, which collectively describe the importance of the San Francisco Bay shoreline and ecosystem, and recognize some of the ways in which human communities could be impacted if sea level rise adaptation measures are not undertaken.

- Finding "s" Climate Change Section (p. 14). I strongly support this recognition that some undeveloped areas contain critical habitat or may be converted into such habitat, and some developed areas may be ideal for bay migration and habitat enhancement as sea level rises. This finding recognizes the importance of "ecological variability" (i.e. allowing ecosystems to adapt by changing and moving), which coastal planning experts identify as a fundamental component of resilience.[18]

- Policy 5, Climate Change Section (p. 16). I strongly support this guidance on developing and updating a regional strategy to adapt to Bay-related impacts of climate change. In particular, I support the language, "resilient Bay and shoreline systems and increasing their adaptive capacity." Restoring tidal wetlands, eelgrass beds, oyster beds, and other natural coastal ecosystems creates aquatic habitats for threatened species and also establishes a natural buffer against extreme weather.

  This policy reflects a forward-thinking framework that will enable local governments and communities to make decisions on a regional scale regarding "areas that should include identification of those areas where development should be protected, those areas where development should eventually be removed and those areas where the Bay should be allowed to migrate inland."

B. Revise or Delete Language to Strengthen BPA 1-08.

A review of earlier drafts of the Bay Plan Amendment Concerning Climate Change reveals that revisions and changes made since the initiation of the stakeholder process have substantially weakened BPA Amendment 1-08, as reflected by the language of the September 3, 2010 Draft of BPA Amendment 1-08. The below proposed changes to BPA 1-08 the findings and policies are aimed at restoring key coastal planning principles so that the Policy truly protects public health and safety and the San Francisco Bay ecosystem. I respectfully submit the following suggestions for revisions:

- Finding "m" Tidal Marshes and Tidal Flats (p. 5). As described above, I support BCDC's recognition in findings "k" and "l" of how sediment transport impacts the natural adaptive capacity of wetland and marsh areas. However, I believe that finding "m," which describes information that is needed to understand sediment transport and volumes in the Bay, should include language about the impacts that barriers, such as dams, culverts and levees, have on sediment transport.

  Suggested Revision: "Human actions, such as dredging, disposal, ecosystem restoration, and watershed management, can affect the distribution and amount of sediment available to sustain and restore wetlands. Dams, culverts, levees and other barriers that inhibit the natural flow of sediments also affect the delivery of sediment to tidal wetlands. Research on these and other impacts to Bay sediment transport processes is needed . . ."

- Finding "k" Climate Change Section (p. 11). This finding has been revised so significantly from earlier drafts that its original meaning has been lost completely. Language in the October 2009

[18] Planning for Coastal Resilience, pp. 8-9.

draft identified the challenge of protecting all developed areas and introduced a potential solution: to remove development. That proposal has been replaced with the statement that "[a] lack of funding to address projected impacts from sea level rise will limit the Bay Area's ability to meet environmental, public health, equity and economic goals." This statement does not constitute a useful finding that can guide local action to address sea level rise in any way whatsoever.

Suggested Revision:
Delete this phrase: "~~A lack of funding to address projected impacts from sea level rise will limit the Bay Area's ability to meet environmental, public health, equity and economic goals.~~"
Replace it with: "There may be inadequate public funding available to protect all developed areas that are vulnerable to sea level rise and storm surge, and some developed areas may be suitable for ecosystem restoration if existing development is removed and the Bay is allowed to migrate inland."

- Policy 2, Climate Change Section (p. 14). This policy has been weakened considerably from previous drafts by the deletion of the phrase "projects should be discouraged." It is critically important that the Policies in the Climate Change Section, in addition to the Findings, provide clear guidance on this central point of discouraging projects that are at risk from inundation due to sea level rise.

  Suggested Revision: "To protect public safety and ecosystem services, projects should be discouraged within areas vulnerable to future shoreline flooding . . . ."

- Policy 5a and 5c, Climate Change Section (p. 17-18). The phrase "shoreline environment" has been replaced with the phrase "shoreline development" in several provisions of BPA 1-08, including Policies 5a and 5c. This new phrase suggests a narrowed focus on the developed environment, which is less preferable than a phrase that encompasses both the natural and developed environment. I therefore encourage BCDC to return to the language of previous drafts and use the phrase "shoreline environment" rather than "shoreline development."

  Suggested Revisions:
  "a. advance regional public safety and prosperity by protecting most existing ~~shoreline development~~ shoreline environment, especially development that provides regionally significant benefits . . . ."
  "c. integrate the protection of existing and future ~~shoreline development~~ shoreline environment with the enhancement of the Bay ecosystem, such as by using feasible shoreline protection measures that incorporate natural Bay habitat for flood control and erosion prevention . . . ."

C. Add Key Language to Strengthen BPA 1-08.

I believe there are two important points that are not reflected in the September draft of the BPA 1-08, or are not adequately highlighted.

One important omission from the BPA Amendment 1-08 is language that discourages the use of sea walls and other structures. Structural protection measures have high economic and environmental costs. Sea-walls frequently fail, require costly maintenance, erode adjacent beaches and coastal areas, and decrease the natural adaptive capacity of coastal ecosystems. Sea-walls, like parking-lots, roads, and rails, also prevent the natural migration of wetlands and reduce the amount of salt marsh, and other habitats. Ten percent of California's coast has already been armored, or "hardened," including more than a third of coastal areas in the four southernmost counties. The pressure on agencies with coastal management authority to approve permits for sea-walls and levees will increase exponentially as sea-

levels rise and extreme weather and coastal erosion accelerate over the next 50 years. Thus, I request that BCDC incorporate at least one finding and one policy that explain the environmental harms posed by sea walls and other protective structures, and discourage their use.

The second omission was reflected in the October 2009 draft of BPA Amendment 1-08, but has since been removed. The language, "the most risk-averse approach for minimizing the effects of sea level rise and storms is to discourage new development and remove existing development within areas vulnerable to inundation," is a quintessential finding of the Climate Adaptation Strategy. This point is central in meeting the goals of BCDC's Climate Change Program. Thus, I request that it be put back into the Policy Section of the BPA Amendment.

- Requested Addition as a Policy in the Climate Change Section: "The most risk-averse approach for minimizing the effects of sea level rise and storms is to discourage new development and remove existing development within areas vulnerable to inundation."

III. THE BAY PLAN AMENDMENT SHOULD BE REVISED SO THAT PROVISIONS REGARDING INFILL DEVELOPMENT DO NOT LIMIT BCDC'S DISCRETIONARY AUTHORITY.

The integration of mitigation and adaptation strategies is an important goal of BCDC's Bay Plan Amendment to address climate change.[19] Indeed, a climate adaptation strategy that also reduces greenhouse gas emissions is clearly preferable from an economic and environmental standpoint. There are numerous types of such dual purpose, "no-regrets" strategies. One simple example is the preservation of wetlands, which buffer sea level rise and storm surges and can also be used for carbon sequestration. Additionally, low-impact development techniques such as rain gardens and cisterns, which mitigate flooding from storm-surges and rises in sea-level, can also reduce California's substantial energy budget dedicated to moving water (20%) by creating local, sustainable supplies.

Over the course of revisions to the Bay Plan Amendment, the larger policy goal of prioritizing adaptation strategies that reduce our regional carbon footprint seem to have been replaced by a narrower preference for infill development. Infill development, defined in the latest BPA Amendments as "the economic use of underutilized or vacant land, or the rehabilitation of existing structures or infrastructure located in an area where supporting infrastructure is in place and that is surrounded by existing development that either is or will be served by transit," is certainly a key component of meeting our state and regional greenhouse gas emissions goals. However, infill development scenarios should not be interwoven throughout BPA 1-08 to the extent that it undermines the primary aim of climate change amendments to protect the public's safety and Bay ecosystems within BCDC's jurisdiction, particularly because infill development in areas that are vulnerable to sea level rise is directly at odds with state guidance in the CAS, which states:

> All levels of government are encouraged to consider:
> - Incentive programs to encourage property owners in high-risk areas to relocate or limit future development.
> - Clustering new development in areas considered to have a low vulnerability to sea-level rise.
> - Creating additional buffers and setbacks for new construction to minimize risks to people and property and to protect coastal resources such as natural habitat and recreational areas.[20]

[19] Staff's preliminary recommendations highlight working with the Joint Policy Committee and other agencies to "integrate regionally mitigation and adaptation strategies" as a primary goal.
[20] CA Climate Adaptation Strategy, p. 73

Infill development is referenced thirty-one times in the September 3, 2010 draft of BPA Amendment 1-08. This disproportionate focus on infill development appears to supersede other principles and guidance reflected in the Bay Plan and is extremely problematic. Additionally, provisions that reflect a different standard of review for infill development could arguably applied to nearly all developments in a heavily built-out area like the San Francisco Bay Area, and may ultimately undermine BCDC's discretionary authority to evaluate projects. Accordingly, I respectfully request that BCDC revisit and reevaluate all references in BPA Amendment 1-08 to infill development to determine whether they are necessary to meet the overarching climate adaptation goals of the amendments. I also request that BCDC consider deleting the below provisions referencing infill development, which I believe are particularly problematic:

- Findings "p" and "r" Climate Change Section (p. 13)
- Finding "2" Climate Change Section (p. 13)
- Policy 2, Climate Change Section (p. 15)
- Policy 5(g) Climate Change Section (p. 17)
- Policy 6(c) Climate Change (p. 18): ~~infill development within existing urbanized areas that contain development and infrastructure of such high value that the areas will likely be protected whether or not the infill takes place.~~

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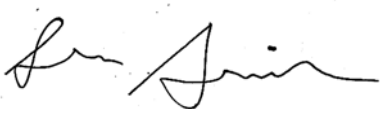
As one of California's first local planning strategies dedicated to addressing sea level rise, BCDC's development of a climate adaptation policy has the potential to not only facilitate the effective management of shoreline areas around the San Francisco Bay, but to serve as a model for the implementation of local climate adaptation strategies throughout the state. I urge BCDC to adopt a strong Bay Plan Amendment Concerning Climate Change and look forward to continuing to work with BCDC staff to achieve this goal.

Sincerely,



Sara Aminzadeh, Programs Manager