

Save The Bay Position Paper
February 2023

San Francisco Bay Sea Level Rise & Flood Strategy

Flooding: A Looming Disaster We Can No Longer Ignore

As evidenced by recent atmospheric rivers and projections of accelerating sea level rise (SLR), rising tides and extreme storms will increasingly threaten hundreds of thousands of Bay Area residents, billions of dollars of economic activity, and large amounts of public infrastructure with flooding. In the face of this growing risk, many shoreline communities lack adequate flood protection from current high tides, with heightened risk in lower income and disadvantaged communities. Inland communities are also vulnerable to flooding during heavy rain events caused by a changing climate, and these risks will increase with sea level rise and more extreme storms. Added to this is groundwater intrusion that will threaten areas near the Bay and farther from the shoreline with additional flood risk and the threat of pollution releases around contaminated sites. These risks have long been evident but policymakers have not placed the necessary emphasis on addressing flood resilience at the state and local level.



Regional flooding from winter storms as a result of atmospheric rivers

In 2009, California's first Climate Adaptation Strategy called upon the state's coastal and ocean agencies to "Identify areas where their jurisdiction and authority should be clarified or extended to ensure effective management and regulation of resources and infrastructure subject to potential sea-level rise."

But neither BCDP, nor the State Lands Commission that regulates many shoreline Public Trust areas followed this recommendation, and Governors Brown and Newsom did not pursue changes in statutory authority for those agencies to advance sea level rise planning and implementation.

The 2009 Climate Adaptation Strategy also called for local governments to amend local coastal plans and general plans to address climate change adaptation. This recommendation has resulted in limited local plan updating over the last decade.

Later legislation (SB379 - 2015) requires cities to update their general plan safety element or local hazard mitigation plan to consider future risks from climate change, including sea level rise. While more cities have undertaken robust wildfire safety plans due to the devastating impact of fires on communities in recent years, few have planned for rising tides and increased precipitation-based flooding. Despite the requirements of SB 379, state agencies have not held cities accountable for failing to complete comprehensive risk assessments for the entirety of the climate risks they face, including flooding from sea level rise.

Some cities like Burlingame and Hayward have started to recognize these risks, and have taken meaningful steps to address them by incorporating future flood risk into local zoning ordinances and multi-jurisdictional shoreline management plans, but too often cities have not put in place sufficient plans and protections for their residents.

Regional agencies have also failed to meet the challenge and have advanced only minimal improvement of Bay Area resilience to the growing risks of flooding from climate change, increasing the likelihood that cities will be unprepared when disaster strikes. The Metropolitan Transportation Commission and Association of Bay Area Governments have adopted three updates of Plan Bay Area over the last two decades with only limited support for heightened flood risk avoidance and prevention into those blueprints for regional development. The San Francisco Bay Conservation and Development Commission in 2011 amended its Bay Plan with climate change policies calling for a regional sea level rise adaptation strategy. But a decade later, the Bay Area still lacks that regional strategy and regulatory mandates for flood risk avoidance, reduction, and mitigation in recognition of expected sea level rise and severe storm flooding.



*Present day San Francisco Bay compared to sea level rise projections for 2050**

In 2021, after 3 years of agency and stakeholder discussions, BCDC released the Bay Adapt Joint Platform of principles and goals for sea level rise adaptation. The Platform encourages voluntary action by local governments to plan for rising tides, but neither BCDC nor other government regulatory agencies have set timelines, accountability, incentives, or penalties to accelerate implementation of needed adaptation by Bay Area municipalities, individually or in combination. The Platform recognized that flood risk does not conform to city boundaries but did not recommend solutions to current governance hurdles and resource limitations that deter adaptation.

In August 2022, the state legislature passed SB 867, directing BCDC and the California Coastal Commission to mandate SLR resilience plans from local governments, but Governor Newsom subsequently vetoed the bill. Despite the Governor's veto, BCDC now proposes to develop guidelines for cities to complete shoreline resilience plans. What remains missing is a legislative mandate requiring cities to conform to this guidance and complete plans by a specific date.

Preparation remains voluntary and inconsistent as risks grow every year.

Actions to Advance Bay Area Flood Resilience

For decades Save The Bay has led our region to protect the Bay from fill and shoreline development. Save The Bay has led campaigns to restore the Bay's tidal marshes both to improve the health of the Bay and to provide for buffers between cities and rising tides. We have led the Bay Area to create public funding to accelerate that work through Measure AA, secured increased state funding to leverage that funding for greater coastal resilience in the Bay and beyond, and advocated for similar federal investment. We have partnered with broad coalitions of environment, business, local government, and other interests to achieve that progress on the shoreline. Now development near the shoreline and in our cities is increasingly vulnerable to flooding, and communities need protection from a rising Bay and extreme storms.

Recognizing that while local governments have delayed action on sea level rise, communities at risk and already experiencing flooding have continued to organize and advocate for their needs. Bay Area climate change solutions require collaborative approaches to address the full range of risk – including looking inland and upstream to increase resilience and sustainability. We will work with community leaders to center their voices in decision making and work to advance solutions that protect people from the increasing flood risks climate change is bringing and improve the health and resilience of the Bay itself.

Principles

Protecting vulnerable areas from increasing flood risk should advance these principles:



1. Utilize nature wherever possible. The Adaptation Atlas¹ already provides a blueprint for Bay Area subregions to maximize the use of restored tidal marshes, horizontal levees, and other nature-based infrastructure to buffer developed areas from the Bay's rising tides. These are superior to sea walls because they absorb tidal action and can migrate upland with rising tides while supporting habitat and open space that reconnects people to the Bay. Environmental and Energy Study Institute Fact Sheet | Nature as Resilient Infrastructure—Overview of Nature-Based Solutions (Luedke, 2019) and other studies show how urban greening with natural infrastructure can reduce stormwater flooding in our cities and provide multiple climate adaptation benefits for public health and wildlife.



2. Prioritize Equity in Resilience. Flooding and other climate impacts pose greater risks to lower income and disadvantaged communities that have suffered from disinvestment and may lack resources to boost their resilience. These communities must be centered in the process of planning for resilience. Improving flood protection should also minimize displacement of residents in these areas.



3. Address Near Term Risk While Planning for the Future. Focus new development and re-development in less vulnerable areas near transit and jobs to increase climate resilience and reduce climate emissions. In developed areas where sea level rise and extreme storms will bring intermittent flooding, apply resilient building standards consistently to minimize social and economic disruption from flooding.

Healthy wetlands and horizontal levees offer nature-based buffers to flooding and rising seas

¹https://www.sfei.org/sites/default/files/biblio_files/SFEI%20SF%20Bay%20Shoreline%20Adaptation%20Atlas%20April%202019_highres.pdf 4

Priority Actions

Sea level rise planning at BCDC

The Bay Conservation and Development Commission (BCDC) recently approved a program to establish guidelines for Bay Area municipalities to complete subregional San Francisco Bay shoreline resiliency plans. While this effort remains voluntary and will not address the full challenge of consistent sea level rise preparation until such plans are mandated by state law (as SB867 would have done), this effort will provide municipalities more direction on how to incorporate sea level rise resilience into planning documents. As such, it remains the best opportunity to affect regional adaptation planning in the near term. We plan to engage with local community partners to ensure that BCDC incorporates the strongest guidance possible to achieve equitable, nature-based shoreline resilience.

- BCDC should develop an open and inclusive public process that centers the priorities and voices of vulnerable, front-line communities.
- In coordination with the Ocean Protection Council and the California Sea Level Rise State and Regional Support Collaborative, these plans should incorporate and advance the best available science-based projections for sea level rise and flood risk, and adaptation.
- BCDC guidance should make nature-based adaptation strategies (such as those identified in the Adaptation Atlas) the priority wherever possible.
- These plans should include vulnerability assessments and mitigation strategies for risks associated with sea level rise and climate change that occur away from the shoreline, including groundwater rise, the risk of toxic pollution migration, and upstream flooding associated with storm impacts.
- Plans should encourage cross-jurisdictional collaboration to ensure that resilience doesn't end at city boundaries. This should include the use of climate resilience districts as authorized by SB 852 (2022).

Additionally, to address the gap between guidance and implementation, we will work to ensure that the state takes steps to incentivize and require the completion of these plans.

- The Governor and state legislature should support acceleration of this process by providing funds to assist Bay Area municipalities in preparing resiliency plans that meet BCDC's guidelines with an emphasis on under-resourced cities to build capacity.
- Previously appropriated and future state resilience funding should be prioritized for cities with a resilience plan that conforms to BCDC guidance.
- Future legislation should empower BCDC to mandate the completion of shoreline resilience plans.

Update statewide building codes to account for SLR and projected storm flood risk

Building codes in California have been standardized to reduce risk to life and property from earthquakes, wildfire and other natural hazards, and revised to reflect updated knowledge and conditions.

After the 1991 Oakland Hills fire, California revised statewide building codes to require more stringent fire-resistant construction standards, especially for homes built within local or state fire hazard severity zones or the wildland urban interface after 2008. ²A study analyzing the effects of mandatory investment in wildfire resilience found that homes built after 2008 and subject to statewide wildfire building codes were 40 percent less likely to be destroyed by a wildfire than homes built in 1990, demonstrating that updating mandatory building codes can significantly enhance structural resilience. In 2021 AB9 expanded the requirements for construction and maintenance of properties within these higher fire risk areas, in response to the tragic increase in fire danger throughout the state.

Similarly, the state has taken steps to reduce earthquake vulnerability even when doing so limits local land use planning authority of cities and counties. Under the Alquist-Priolo Earthquake Fault Zoning Act, structures for human occupancy are not allowed to be sited within an active fault zone mapped by the Department of Conservation, and state building codes have been updated regularly to reduce the risk of structural failure in earthquakes. Other areas of the country at risk of flooding from sea level rise have already taken steps to strengthen building codes to make communities more resilient. California should proactively increase flood resilience standards and enhance restrictions on development in flood zones for new development and redevelopment. These zones should include areas at risk from sea level rise, groundwater intrusion, and increased storm flooding.

- In areas where current shoreline protections do not meet future flood risk projections, state building codes should require a minimum of 4 ft of **freeboard** above the current Base Flood Elevation.
- Identify appropriate setbacks from creeks and shoreline areas to allow for intermittent flood surges.
- State building codes should also ensure that construction in these areas of higher flood risk (both shoreline and upstream) under the state's sea level rise projections incorporate flood resistant materials and building practices.

Freeboard: An additional amount of height above the Base Flood Elevation used as a factor of safety (e.g., 2 feet above the Base Flood) in determining the level at which a structure's lowest floor must be elevated or floodproofed to be in accordance with state or community floodplain management regulations. <https://www.fema.gov/about/glossary>

Strengthen enforcement and oversight of SB 379 plan requirements

SB 379 (2015) requires cities to conduct a climate change vulnerability assessment as part of the Local Hazard Mitigation Plan or General Plan Safety Element update and include a set of policy strategies to mitigate risk to the community. While the Governor's Office of Planning and Research has guidance for how to satisfy that requirement, actual compliance is left to the cities themselves. Many cities in the Bay Area have not completed SB 379 required updates, and regularly amend general plans to accommodate new developments that are at odds with their Local Hazard Mitigation Plans or General Plan Safety Elements.

²<https://www.nber.org/digest/202203/effects-mandatory-investment-wildfire-resilience>

- The Governor and legislature should strengthen SB 379 to require real and consistent compliance with state climate risk reduction guidance. The Governor's Office of Emergency Services (CalOES) should certify consistency of plans.
- Plans should prioritize vulnerable and disadvantaged communities to prevent displacement and ensure climate resilience policies and investments are made equitably.
- Safety elements should incorporate the completed BCDC shoreline plans previously mentioned. Policies and zoning ordinances should be updated to reflect these plans.

Identify flood and pollution risks from groundwater rise

Rising sea levels also increase flood risk in low lying areas away from the Bay shoreline by raising groundwater tables and increasing groundwater inundation of nearshore and inland areas. Groundwater rise threatens to displace toxic contamination that has been capped in place, or where cleanup and removal has not taken place. The Toxic Tides project at UC Berkeley identified nearly 200 toxic sites at risk of flooding from groundwater rise, and much of this legacy toxic contamination disproportionately threatens lower income and disadvantaged communities that should receive priority protection from this pollution.

Community-based organizations from many of these impacted areas have been raising concerns about toxic site cleanup for years and have done significant work to highlight this issue prior to the growing awareness of groundwater and other sea level rise risks to these toxic areas. Save The Bay align our efforts with policy proposals that are informed by that work, and we seek to support the community voices who have long called for attention to these significant community health risks.

- State sea level rise mapping and risk assessments must include detailed vulnerability evaluations of toxic site pollution and the impacts of both shoreline and groundwater rise.
- The state Department of Toxic Substances Control (DTSC) and the State and Regional Water Boards should update cleanup guidelines for polluted properties to account for groundwater and sea level rise risk and prioritize cleanup of sites that are the most vulnerable to these risks. These guidelines should be informed by a cooperative approach to incorporating the concerns and input of the local communities at risk of this toxic contamination.
- Community health must be protected during the cleanup process and done in close coordination with frontline communities.
- Toxic materials removed must be disposed of in the least harmful manner so that the impact is not simply shifted from one vulnerable community to another.
- New housing should not be built on or near hazardous sites in flood-prone areas before cleanup has been completed.

Invest in municipal stormwater infrastructure to protect people and development

Precipitation-based flooding in California is expected to increase in the near future. New studies³ point to the increasing likelihood in our lifetimes that an atmospheric river superstorm will release an average of 16 inches of rain across the state in a single month. In many places, the combined forces of sea level rise and extreme storms will have potentially catastrophic impacts. We must invest now in strategies to protect people and the built environment inland and upland from the Bay shoreline, starting with the most physically and financially vulnerable communities.

Green stormwater infrastructure (GSI) such as green streets, stormwater tree wells, rain gardens, and vegetated swales not only increase permeable area for absorbing stormwater, but can also filter pollution from stormwater, reduce urban heat island, and provide green space to support public health and active transportation. Alongside GSI, major investments are necessary to retrofit our traditional stormwater conveyance infrastructure – drains, pipes, channels, and retention basins – to handle orders of magnitude increases in precipitation. This “grey” stormwater infrastructure has been largely ignored for decades and is poorly understood even within municipal bureaucracies. Unfortunately, planning and funding for both green and grey stormwater infrastructure is very siloed, leading to more costly projects and numerous missed opportunities to integrate stormwater with other public infrastructure projects, such as road improvements. Local government must embrace stormwater and flood management as a cross-departmental priority and plan accordingly.



Green stormwater infrastructure in Oakland and San Francisco

- Cities need to integrate stormwater management – both grey and green – with transportation, public works, and recreation projects, prioritizing vulnerable communities at highest risk of flooding.
- Cities should prioritize integrated infrastructure planning, such as incorporating stormwater infrastructure into urban canopy, complete streets, and vision zero plans.
- Capital improvement plans must prioritize projects that address flood risk caused by intensifying storms.
- Funding at all levels should be prioritized for projects in under-invested communities first and focused on approaches that provide multiple benefits beyond flood control, including reducing ambient temperatures during heat events and managing urban pollution.
- Municipalities and local agencies must pursue new funding sources for grey and green stormwater infrastructure, including local stormwater fees and existing and emerging state and federal funding pots.
- State agencies should modify transportation funding programs to incentivize the inclusion of GSI in transportation projects and avoid more costly retrofits.

³<https://pubmed.ncbi.nlm.nih.gov/35960799/>

Reform the National Flood Insurance Program to Account for Flood Risk with Projected Precipitation and Sea Level Rise, based on Updated FEMA maps incorporating those projections.

Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) requires resilient building standards in areas at risk of flooding from historical extreme storm precipitation and current sea levels, influencing the design and construction of homes nation-wide. However, required disclosures of the flood risk at a home for sale are likely based on old maps using outdated flood risk data, as are municipalities' permitted land uses and zoning within their General Plans. Builders of properties within flood zones are required to incorporate standards to elevate the lowest floor of a residence to be above the **Base Flood Elevation**, which in most areas is also based on outdated maps and data. To ensure new and existing homes and infrastructure are resilient to future flood risk, NFIP must provide communities and homeowners with accurate assessments that incorporate projected precipitation and tides resulting from climate change and require that new development be resilient to projected flooding in those conditions.

Base Flood Elevation: *The elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year. <https://www.fema.gov/node/404233#:~:text=The%20elevation%20of%20surface%20water,%2C%20V1%E2%80%93V30%20and%20VE>*

- FEMA's current update to the National Flood Insurance Program's Floodplain Management Standards should require additional first floor elevation standards of 4 feet of freeboard for new construction within the 100-year flood zone.
- FEMA should incorporate future flood protections as an advisory layer on all FEMA flood maps and require future flood risk disclosures to home buyers consistent with those updated maps.

Invest In Accelerated Shoreline Protections

Many cities at risk of flooding from climate change and sea level rise will benefit from new shoreline infrastructure that also promote ecological restoration and equitable access to recreation along the shoreline.

Projects such as the South Bay Shoreline Project include critical improvements to levees along with large scale tidal marsh and shoreline restoration. The benefits of these projects include strengthened protections against flooding, restored habitat for threatened and endangered species, and improved access to outdoor recreation. Once certified, these projects can also alleviate the cost burden of paying for flood insurance as required by the National Flood Insurance Program. Many communities face inequitable flood insurance costs due to a history of exclusionary zoning policies that only permitted them to exist in more vulnerable areas.

Transportation and infrastructure planners should also design projects that incorporate nature-based flood protection alongside traffic management. These projects should be designed to work with nature and enable natural processes to promote flood protection.

Measure AA funding, along with increased shoreline resilience funding from the state and federal governments are supporting these types of projects, but progress needs to be accelerated to ensure protections are put in place prior to flood impacts occurring in the coming years.

- Relevant state and federal agencies need to increase investment in shoreline protections that are already planned, including the South Bay Shoreline Phases 2 and 3.
- The Army Corps of Engineers should prioritize the beneficial reuse of dredge material to support shoreline restoration projects.
- Shoreline protections should prioritize nature-based design elements wherever possible to promote the multiple benefits of flood protection, habitat restoration, and equitable recreational access.
- The Highway 37 redesign should focus on accelerating the environmentally preferred “causeway” alternative that will allow for large-scale marsh restoration, natural flood resilience, and habitat restoration alongside traffic improvements.

Conclusion

The impacts of climate change are not a future consideration but a fact that already threatens our communities with substantial risks from wildfire, extreme heat, drought, and flooding. As sea levels rise, flood risks will increase in coming decades even if we do all we can to reduce greenhouse gas emissions and reform our economy to support more sustainable approaches. We can't assume that these impacts can be avoided, and so smart, coordinated planning now is key to building a resilient Bay Area that is ready to meet the threats of today and the future.

Communities are already suffering due to overwhelmed and under-engineered stormwater and flood infrastructure. In many parts of the Bay Area, long-neglected neighborhoods have been demanding attention to these problems for years and only now are leaders starting to heed that call. But progress remains too slow, and inconsistent.

The strategies outlined here present a path forward that will better protect our communities from rising tides and more intense, climate-driven storm systems. But they require new ways of thinking about how we build, how we listen to impacted community voices, and how we overcome bureaucratic obstacles to meet the challenges of a changing climate. Its only by embracing new approaches that we will be able to truly build a resilient, sustainable, and equitable Bay Area.