

Save The Bay Position Paper April 2023

San Francisco Bay Sea Level Rise & Flood Strategy



Flooding: A Looming Disaster We Can No Longer Ignore

Rising tides and extreme storms threaten to flood hundreds of thousands of Bay Area residents, billions of dollars of economic activity, and large amounts of public infrastructure.¹ Recent atmospheric river storms and accelerating sea level rise (SLR) projections underscore that many shoreline areas lack adequate flood protection now, especially in lower income and disadvantaged communities. Inland communities are also vulnerable to storm flooding caused by a changing climate, and SLR will lead to groundwater intrusion near the Bay and farther from the shoreline. These factors threaten water quality and public health from contaminated flood runoff and the release of pollution from toxic sites.

For decades, Save The Bay has worked to protect and restore the San Francisco Bay with a particular focus on recreating thousands of acres of tidal marsh along the shoreline. To achieve this, we have led collaborative campaigns to create public funding for accelerated restoration, including the region-wide parcel tax, Measure AA. We have also worked to increase state and federal funding for greater coastal resilience in the Bay and beyond. These efforts have allowed us to partner with broad coalitions of environment, business, local government, and other interests to identify scientifically sound resilience approaches that prioritize functional natural systems that benefit both the Bay and our communities.

Restored marshes provide habitat for endangered species, improve water quality by filtering stormwater runoff, facilitate recreation and connections between residents and the Bay, and provide critical carbon sequestration to aid our fight against climate change. As sea levels rise and flooding increases in the coming decades, these shoreline areas are also under threat. Tidal marshes need room to migrate as seas rise, and new marsh restoration will become impractical if tides rise too quickly before construction is funded and completed. If we seize opportunities now, Bay restoration will help protect communities from flooding while also providing all the habitat, recreational, and water quality improvements that Save The Bay has long championed.



Regional flooding from winter storms as a result of atmospheric rivers

¹ http://www.bayareaeconomy.org/files/pdf/SurvivingTheStorm.pdf

Unfortunately, policymakers have not placed the necessary emphasis on addressing flood resilience at the state and local level despite having ample data justifying immediate action (see appendix for more information). 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. Although many local governments have delayed action on sea level rise, communities at risk and already experiencing flooding have begun to organize and advocate for their needs.

Save The Bay's vision for a flood resilient Bay Area emphasizes policies and projects crafted in collaboration with frontline communities and adopted at a regional scale. Elected leaders must commit resources to restoration and flood protection infrastructure and prioritize development away from areas that will flood. We will work with communities and their leaders to center their voices in decision making and advance solutions that protect people from increasing flood risks and improve the health and resilience of the Bay itself.



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

^{*} Map Credit: AECOM (2016). Adapting To Rising Tides Bay Area Sea Level Rise & Mapping Project: County/SF Bay. SF Bay Conservation and Development Commission. https://explorer.adaptingtorisingtides.org

Principles

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







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

- **1. Utilize nature wherever possible.** The Adaptation Atlas,² produced by the <u>San Francisco Estuary Institute</u>, identifies scientifically sound management approaches to improve climate resilience of the Bay. This blueprint shows how Bay Area subregions can 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 strategies can absorb tidal action and migrate upland with rising tides while supporting habitat and open space that reconnects people to the Bay. Studies³ also show how urban greening with natural stormwater infrastructure can reduce stormwater flooding in our cities and provide multiple climate adaptation benefits for public health and wildlife.
- **2. Center the voices of frontline communities.** Flooding and other climate impacts pose greater risks to lower income and disadvantaged communities that have suffered from disinvestment and may lack resources to plan for resilience. These communities must be centered in the process of creating truly equitable resilience. Improving flood protection should also minimize displacement of residents in these areas.⁴
- **3. Build for flood resilience.** Focus new development and redevelopment 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.

 $^{^{}a}\ https://www.sfei.org/sites/default/files/biblio_files/SFEI\%20SF\%20Bay\%20Shoreline\%20Adaptation\%20Atlas\%20April\%202019_highres.pdf$

³ https://www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions

⁴ https://greenlining.org/publications/making-equity-real-in-climate-adaptation-and-community-resilience-policies-and-programs-a-guidebook/

Priority Actions

Invest in Accelerated Shoreline Protections & Infrastructure Improvements

Many cities in the Bay Area at risk of flooding from sea level rise will benefit from new shoreline infrastructure that also promotes ecological restoration and habitat connectivity, and equitable access to recreation along the shoreline.

The region must accelerate planned and current marsh restoration projects, like those in the South Bay Salt Ponds and Sonoma Baylands, as well as acquire additional restorable parcels and upland marsh migration zones to allow for marsh adaptation as sea levels rise in the Bay. These shoreline restoration efforts should be paired with resilient infrastructure improvements (such as a levee upgrades) in vulnerable areas that incorporate future sea level rise, groundwater intrusion, and upland flooding.

The benefits of large-scale restoration projects include strengthened protections against flooding, restored habitat for threatened and endangered species, and improved access to outdoor recreation. Once in place and certified, new shoreline infrastructure can also reduce the cost of flood insurance 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 areas more vulnerable to current and future flood risks.

Additionally, transportation and infrastructure planners should also design projects that incorporate nature-based flood protection into roads, utilities, and other projects in public areas. These projects should be designed to work with nature and utilize natural processes to promote flood protection.

Funding from Measure AA, along with state and federal government grants can support these types of projects, but significant additional funding and accelerated planning is essential to provide more protection before tidal flooding increases damage in the coming years.

- Policymakers must increase funding for relevant state (State Coastal Conservancy) and federal (EPA) agencies to invest in shoreline and urban flood resilience projects.
- 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.
- California Highway 37 redesign is a signature flood resilience opportunity for the Bay Area. Accelerating the environmentally preferred "causeway" alternative will allow for large-scale marsh restoration, natural flood resilience, and habitat restoration through transportation improvements.

Develop Strong, Enforceable Standards for Sea Level Rise Planning at BCDC

The Bay Conservation and Development Commission (BCDC) recently began a program to establish SLR resilience guidelines for Bay Area municipalities. This effort remains voluntary and will not address the full challenge of consistent sea level rise preparation until state law mandates planning and implementation. BCDC's guidelines should show municipalities how to incorporate sea level rise and flood resilience into their planning documents for better regional adaptation 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 conduct an open and inclusive public process that centers the priorities and voices of vulnerable, frontline communities in the guidance, development, and plan requirements.
- In coordination with the Ocean Protection Council and the California Sea Level Rise State and Regional Support Collaborative, BCDC should incorporate and advance the best available science-based projections for sea level rise and flood risk, and adaptation.
- BCDC guidance should prioritize scientifically sound nature-based adaptation strategies such as those identified in the <u>Adaptation Atlas</u> wherever possible, including preservation of upland areas suitable for marsh migration.
- Municipal 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.
- Local plans should focus new development away from areas vulnerable to sea level rise and flooding from extreme storm events. <u>SPUR</u>, a regional planning organization, has already identified areas at heightened risk for these hazards as well as wildfire risk.⁵
- Plans should encourage cross-jurisdictional collaboration to ensure that resilience does not end at city boundaries. This should include the use of climate resilience districts as authorized by state law (Senate Bill 852 in 2022).

⁵ https://www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions

To address the gap between guidance and implementation, we will press the state to take steps to incentivize and require the completion of these plans.

- The Governor and state legislature should provide funds to assist Bay Area municipalities in preparing resiliency plans that meet BCDC's guidelines, especially in under-resourced cities without planning capacity.
- Previously appropriated and future state resilience funding should be prioritized for cities with a resilience plan that conforms to BCDC guidance.
- The Governor and state legislature should empower BCDC to mandate the completion of shoreline resilience plans.
- The Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) should connect these implemented shoreline resilience plans with regional development strategies such as Plan Bay Area, and target infrastructure funding to projects that support the implementation of the regional shoreline resilience plans.



^{*} Map Credit: See Which Bay Area Locations Are at Risk From Rising Seas, KQED, https://www.kqed.org/science/1973624/maps-see-which-bayarea-locations-are-at-risk-from-rising-seas

Update Statewide Building Codes to Account for 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. A study⁶ 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 wildfire 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, such as New York and South Florida, have already taken steps to strengthen building codes to make communities more resilient to climate change-related flood risk.

California should encourage focused development away from flood hazard areas and prioritize conservation of undeveloped parcels along the shoreline. The state can also improve flood resilience building standards for redevelopment in already-built areas at risk from sea level rise, groundwater intrusion, and increased storm flooding.

- In developed areas where current shoreline protections do not meet future flood risk projections, state building codes should require a minimum of 4 feet of freeboard above the current Base Flood Elevation, to align with state guidance that recommends planning for 3.5 ft of SLR by 2050.⁷
- Identify and require appropriate setbacks from creeks and shoreline areas to allow for intermittent flood surges and incorporate those into resilience plans. This will also allow for additional restoration opportunities and enhance habitat and recreational access.
- Identify and adopt new standards to mitigate the risk of building damage due to increased liquefaction risk in areas susceptible to groundwater intrusion.
- Require the use of flood resistant materials and building practices for new construction in areas of shoreline and inland flood risk from projected sea level rise and increased storm intensity.

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

⁶ https://www.nber.org/digest/202203/effects-mandatory-investment-wildfire-resilience

⁷ https://www.opc.ca.gov/webmaster/_media_library/2022/08/SLR-Action-Plan-2022-508.pdf

Strengthen Enforcement and Oversight of SB 379 Plan Requirements

SB 379 (2015) requires cities to conduct a climate change vulnerability assessment as part of their 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 being 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.

- 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 be required to engage vulnerable and historically underinvested communities to crosscheck assessment data with the lived experience of community members, and ensure climate resilience policies and investments are made equitably.
- Safety elements should incorporate completed local sea level rise plans for which BCDC is developing guidance. Policies and zoning ordinances should be updated to reflect these plans.

Incorporate Groundwater Rise Projections into Flood Resilience Planning

Rising sea levels also increase flood risk in low lying areas away from the Bay shoreline by raising groundwater tables that can cause flooding of nearshore and inland areas.⁸ Groundwater rise threatens to inundate the storm drain system,⁹ increase the risk of liquefaction during an earthquake event,¹⁰ and displace toxic contamination that has been capped in place, or where cleanup and removal has not taken place.

- State sea level rise mapping and flood resilience planning should include and consider groundwater rise projections.
- Identify and adopt new building standards to mitigate the risk of building damage due to increased liquefaction risk in areas susceptible to groundwater intrusion.
- Invest in resilient stormwater infrastructure (see below).



Green stormwater infrastructure in Oakland and San Francisco

⁸ https://www.sfei.org/sites/default/files/biblio_files/Shallow%20Groundwater_Sea%20Level%20Rise_Pathways_SFEI_2022_v2_2.pdf

⁹ https://www.nature.com/articles/s41558-020-0874-1

¹⁰ https://storymaps.arcgis.com/stories/b5f973b6e4da45258c0b5a5368ca26f7

Identify and Address Toxic Pollution Risks from Flooding

Rising sea levels and groundwater intrusion threaten to release toxins from hazardous sites (such as power plants, sewage treatment plants, and refineries) which will impair water quality in the Bay and compromise public health. Many toxic sites where cleanup actions resulted in capping contamination in place may also see groundwater interaction allow for toxins to migrate from under the caps, bringing additional risk to surrounding communities.

More than 400 toxic sites around the Bay Area have already been identified as at risk of flooding due to sea level and groundwater rise by 2100.¹¹ Much of this legacy toxic contamination disproportionately threatens lower income and disadvantaged communities.

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. Protecting these threatened communities and the environment against additional toxic contamination from rising groundwater should be a priority for responsible government agencies and local municipalities.

- The state should conduct detailed vulnerability evaluations of the impacts of flooding on toxic site pollution risks.
- Toxic materials removed as part of cleanup efforts should be disposed of in the least harmful manner so that the impact is not shifted from one vulnerable community to another.
- The state Department of Toxic Substances Control (DTSC) and the State and Regional Water Boards should strengthen 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 that incorporates the concerns and input of the local communities, protects public health, and provides transparency in the process of remediating toxic sites.
- New housing should not be built on or near hazardous sites in flood-prone areas before cleanup has been completed.

¹¹ KQED "Bay Area Hazardous Sites and 2100 Sea Level Rise". https://www.kqed.org/science/1979645/see-a-map-of-hazardous-sites-at-riskfrom-rising-seas

Invest in Resilient Municipal Stormwater Infrastructure

Precipitation-caused flooding in California is expected to increase in coming years. New studies¹² point to the increasing likelihood that an atmospheric river superstorm will cause widespread, devastating flooding in coming decades, while sea level rise and groundwater intrusion will reduce the effectiveness of the Bay Area's existing stormwater infrastructure.¹³ Even outside of a megastorm, communities are already experiencing flooding that keeps kids from going to school, damages homes and businesses, and even leads to death. 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 to absorb stormwater, but can also filter pollution from stormwater, reduce the urban heat island effect, 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 and account for groundwater intrusion. 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.

- Cities and counties should integrate stormwater management both grey and green – with transportation, public works, and recreation projects, prioritizing vulnerable communities at highest risk of flooding.
- Municipalities and public agencies should prioritize integrated infrastructure planning, such as incorporating stormwater infrastructure into urban canopy, complete streets, and "vision zero"¹⁴ plans.
- Capital improvement plans should prioritize projects that address flood risk caused by more intense storms, including by increasing the standard flow rates for which storm drain systems are designed to accommodate.
- 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 taxes and existing and emerging state and federal funding sources.
- State agencies should modify transportation funding programs to incentivize the inclusion of GSI in transportation projects and avoid more costly retrofits.

¹² https://pubmed.ncbi.nlm.nih.gov/35960799/

¹³ https://www.nature.com/articles/s41558-020-0874-1

¹⁴ https://visionzeronetwork.org/about/what-is-vision-zero/

Reform the National Flood Insurance Program

Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) requires resilient building standards in areas at risk of flooding from extreme storm precipitation and current sea levels, influencing the location, design, and construction of homes nation-wide. However, these standards and any required disclosures of the flood risk at a home for sale are often based on old maps that identify **Base Flood Elevation** using outdated flood risk data. Municipalities largely use the same outdated maps to determine permitted land uses and zoning within their General Plans.

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.

- FEMA's current update to the National Flood Insurance Program's Floodplain Management Standards should require additional first floor elevation standards to account for future conditions, including further increased standards for critical infrastructure like hospitals and schools.
- FEMA flood maps should be updated and incorporate future flood protections, accounting for impacts from sea level rise, increased precipitation events, and groundwater intrusion.
- FEMA should require future flood risk disclosures to home buyers and renters consistent with those updated maps.
- Congress should establish a means-tested assistance program to help low- and moderate-income policy holders afford the cost of participation in the NFIP, while still providing full awareness of the true flood risk to their property.

Conclusions

The impacts of climate change are not just a future concern but a clear and present danger 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. Smart, coordinated planning now can accelerate investment and implementation of projects that reduce risks to people and wildlife, building a more resilient Bay Area.

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. And while resilience projects have a cost, being unprepared when disaster strikes is far more expensive, with FEMA projecting that hazard mitigation saves \$6 on average for every \$1 spent.¹⁵

The strategies outlined here present a path forward that will better protect our communities from rising tides and more intense, climate-driven storm systems while continuing to support a healthier, more resilient San Francisco Bay. They require new ways of thinking about how and where to build, how to listen to impacted community voices in resilience planning, and how to overcome bureaucratic obstacles and meet the challenges of a changing climate. By embracing these new approaches we can build a resilient, sustainable, and equitable Bay Area.

¹⁵ https://www.fema.gov/sites/default/files/2020-07/fema_mitsaves-factsheet_2018.pdf

Appendix A History of Missed Opportunities

- 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 the Bay Conservation and Development Commission (BCDC), 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 because there is currently no requirement that they do so.
- 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. BCDC amended its Bay Plan in 2011 with climate change policies calling for a regional sea level rise adaptation strategy. But a decade later, the Bay Area still lacks a regional strategy and regulatory mandates for flood risk avoidance, reduction, and mitigation in recognition of expected sea level rise and severe storm flooding.
- 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 vetoed the bill. Despite the Governor's veto, BCDC now proposes to develop guidelines for cities to complete more detailed vulnerability analyses and shoreline resilience plans to further advance the goals of the Bay Adapt program. What remains missing is a legislative mandate requiring cities to conform to this guidance and complete plans by a specific date.
- At present, flood and sea level rise preparations remain voluntary, inconsistent, and hampered by insufficient, outdated information and funding, as risks continue to grow.