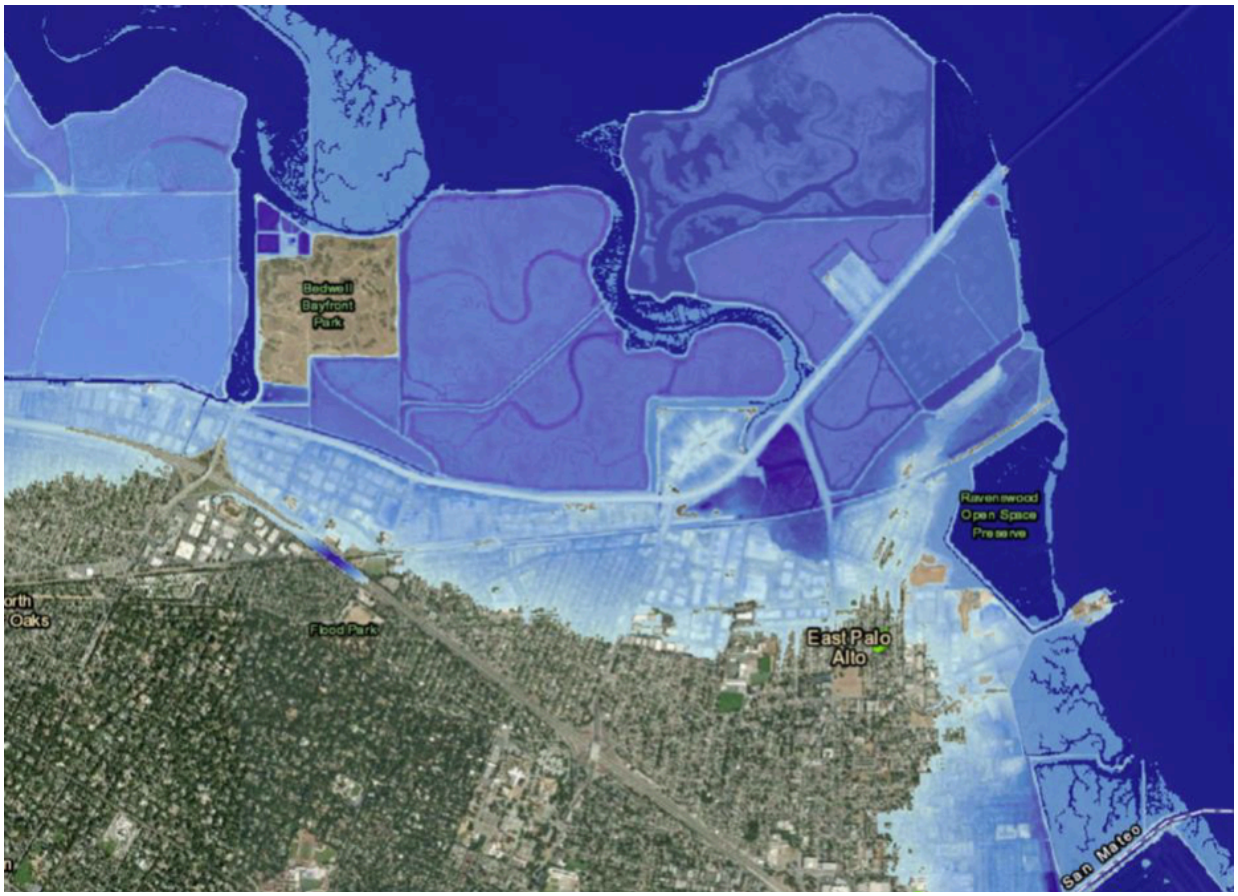
Strategies for Equitable Sea Level Rise Adaptation

Bringing residents and socioeconomic data into flood planning can help ensure sea level rise protections reach the communities most at risk



Projected sea level rise from NOAA viewer (Courtesy of Oneshoreline)

The Impact

Proactive cities and counties are engaged in planning, design, and construction efforts to adapt to rising sea level. Failure to mitigate the causes or adapt to the risk will result in increased flooding, erosion, infrastructure damage, economic losses and a growing risk of seawater intrusion. Adaptation strategies that incorporate local residents' engagement across income levels in a community-based, participatory design process have shown to be effective in promoting equitable climate resilience.

Description

Sea Level Rise (SLR) is the change in sea level height due to increased ocean volume caused by melting of glaciers and ice sheets, warmer conditions, and other factors. The state of California advises its population to prepare for 1 to 6.6 feet of SLR by 2100 if current levels of greenhouse gas

emissions continue. The scientific literature confirms that SLR interacts with local demographic, economic, and institutional disparities, disproportionately exposing lower-income communities to severe losses. By evaluating physical exposure together with demographic and financial indicators, planners can detect hidden vulnerabilities, allocate emergency resources equitably and tailor mitigation policies to the specific local context. Equitable coastal adaptation combines participatory planning, nature-based infrastructure, and proactive retreat frameworks.

Strategies for addressing sea level rise fall into three main categories: protection, accommodation, and retreat. Protection seeks to avoid the hazard, accommodation allows people and the hazard to exist in the same place safely, and retreat means moving people away from the area where the hazard occurs.The accommodation strategies include elevating structures, performing retrofits and using materials to increase the strength of a development. Such strategies can help as a short-term solution, buying time for low-income residents without the immediate need for displacement.

The retreat approach relocates or removes existing development from hazardous areas and prevents construction of new developments in vulnerable areas. Examples include voluntary buyouts, rent-back programs and ecological buffers. This approach can be a strategic way of relocating the most vulnerable developments away from danger while preserving coastal resources and access for future generations.

Where It's Been Implemented

San Mateo County, which has the most shoreline of any California county, began countywide sea level rise planning in 2015 through Sea Change SMC led by the county's Office of Sustainability. Following state legislation AB 825, the county established the San Mateo County Flood and Sea Level Rise Resiliency District, also known as OneShoreline, in January 2020 to address sea level rise, flooding, coastal erosion, and stormwater needs across jurisdictions.

A 2021 Stanford University study found that close to half of the households in East Palo Alto were at risk of financial instability because of existing social factors or flooding expected through 2060. When the San Francisquito Creek Joint Powers Authority (SFCJPA) had developed plans to redesign a bridge, East Palo Alto officials worried the change could raise flood risk downstream. Researchers from Stanford and the University of Florida tested the plan with a model that combined future flood scenarios with income and social vulnerability data. They found that the redesign would handle a flood the size of 1998's, yet would leave hundreds of lower-income East Palo Alto households more exposed to increased flood risk. Following several years of conversations between the researchers and the city, the SFCJPA, and community partners, the agency revised its plans to include a permanent floodwall along the creek and a higher bank at one particularly low point.

Led by the SFCJPA, the SAFER Bay project covers about seven miles of shoreline and includes equity priority communities. The SFCJPA brought in two local community-based organizations to lead outreach, and the project has a Community Advisory Committee. In May 2026, the SFCJPA board certified the project's final environmental impact report and approved the project, allowing both cities to move toward permitting, final design, and construction. Menlo Park notes that once the project is complete, a large share of the Belle Haven and Bayfront neighborhoods could be eligible for removal from FEMA's 100-year coastal flood maps.

OneShoreline is planning a project to address chronic flooding in San Bruno's Belle Air neighborhood by upgrading aging infrastructure, restoring habitat, improving water quality and access to open space. Starting in January 2024, OneShoreline worked with the community groups Rise South City and Climate Resilient Communities to hold listening sessions in English and Spanish, go door to door with storm-safety information, recruit community leads to record residents' flooding experiences,

and host two workshops at Belle Air Elementary School to share findings and gather further input. A $900,000 FEMA grant awarded in August 2024 is funding data collection, public engagement, design alternatives, and environmental review, and staff have recommended bringing a long-term resilience plan to the OneShoreline board by summer 2027.

Key Drivers

State legislation has pushed local planning forward. Following AB 825, OneShoreline was established; SB 272, signed in 2023, requires local governments along the California coast and San Francisco Bay to develop sea level rise plans by 2034, either through a local coastal program. Each plan's vulnerability assessment must describe "efforts to ensure equity for at-risk communities," and local governments with approved plans should receive priority for implementation funding, subject to state appropriations.

Grants and private partners have made individual projects possible. For SAFER Bay, about $6 million in grants from the California Department of Water Resources and the San Francisco Bay Restoration Authority supported environmental review. Menlo Park was awarded a $50 million FEMA grant in 2023, with local matching funds of $10 million from PG&E and $7 million from Meta, although most of that grant was later rescinded (see Key Obstacles). East Palo Alto has a phased $17.5 million hazard mitigation grant through the California Governor's Office of Emergency Services, matched by $5 million in city funds. In San Bruno, a $900,000 FEMA grant is paying for early planning and design.

Local concerns also shaped priorities. East Palo Alto officials questioned whether an upstream creek redesign would push flood risk toward their city, and Ruben Abrica, the city's elected representative on the SFCJPA board, was quoted in a 2024 Stanford Report article as saying that researchers, planners, city staff, and policymakers share responsibility for not putting some people at greater risk than others. In San Bruno, the work targets long-standing flooding in the Belle Air neighborhood that is getting worse.

Key Factors for Success

A successful adaptation strategy requires a community-based design process. This process can be simplified into six steps as outlined in the University of Melbourne's Values Approach for Adaptation Planning in the "Guide for Government": (1) gathering information on climate scenarios and vulnerability, (2) scoping potential values at risk, (3) confirming actual values at risk, (4) developing a profile of residents and their values, (5) identifying scenarios to guide adaptation planning, and (6) encouraging community participation in development of adaptation strategies. These steps were developed and tested in five communities.

Several of these steps can be seen in local projects. Researchers from Stanford and the University of Florida combined future flood scenarios with income, demographic, and social vulnerability data (step 1) and used the results to test a planned bridge redesign on San Francisquito Creek (step 5). In San Bruno, OneShoreline and its partners Rise South City and Climate Resilient Communities held bilingual listening sessions and door-to-door conversations, then returned to residents at workshops to share what they had heard and gather further input (steps 2–3), and published a summary of what residents reported (step 4). For SAFER Bay, two local community-based organizations led outreach, and the project has a Community Advisory Committee (step 6).

Planning for future rather than past conditions also helps. OneShoreline's Planning Policy Guidance, adopted by its board in June 2023, offers cities sample policy wording for general plans and zoning codes, plus advice on reviewing projects and negotiating development agreements. The goal is for new public and private assets to last their intended lifespan and support community resilience without

expensive upgrades later. The agency is developing similar guidance for public assets such as stormwater and wastewater systems, roads, parks, marinas, and utilities.

Key Obstacles

Large shoreline projects can be especially complex. SAFER Bay involves equity priority communities, major infrastructure, habitat for endangered species, and historical and sacred lands, and requires coordination among many federal, state, and local agencies. Timelines can be long: Menlo Park first applied for federal funding in December 2020, the project's final environmental impact report was certified in May 2026, and the city expects construction to follow only once full funding is in place.

Federal funding has also become less predictable.Menlo Park's $50 million SAFER Bay grant came from FEMA's Building Resilient Infrastructure and Communities (BRIC) program, which FEMA announced it would end in April 2025. According to the SFCJPA, Menlo Park received first-phase funding for further design, but most of the grant has been rescinded; that money had been expected to cover much of the city's construction costs. A federal court ruled the BRIC termination unlawful in December 2025, and in March 2026 ordered FEMA to report on the status of awarded projects.

Menlo Park was awarded a $50 million FEMA grant for its part of SAFER Bay. Most of it was rescinded when FEMA moved to end the program in 2025, although a federal court order restarted the program. The city says construction will begin once full funding is secured.

Finally, standard analysis can overlook inequities. Conventional flood models are typically based on a single past flood; the Stanford researchers noted that such models were not wrong but were not designed to answer questions about equity.

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