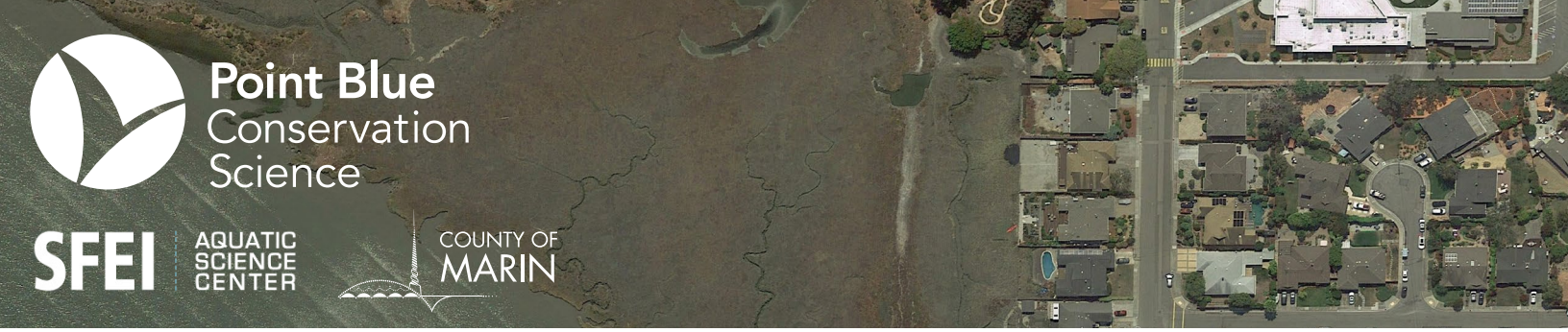
Point Blue Conservation Science

SFEI AQUATIC SCIENCE CENTER

COUNTY OF MARIN



Paradise Drive along Corte Madera's shoreline. Photo courtesy of Google Earth

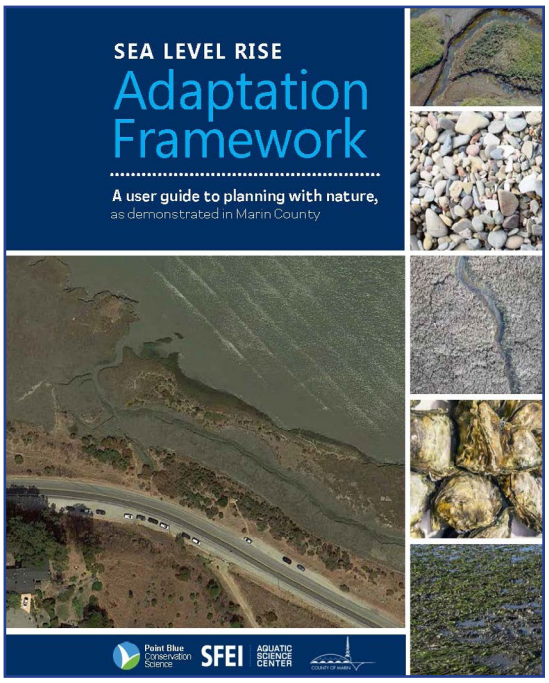
Sea Level Rise Adaptation Framework

Planning with Nature

Point Blue Conservation Science and the San Francisco Estuary Institute, in partnership with the County of Marin, developed a framework and resources to enable planners and other coastal decision makers to identify, evaluate, and prioritize adaptation strategies to manage risk in a way that transparently considers multiple benefits.

The resources in the user guide are intended to help coastal decision-makers (1) efficiently identify a range of natural and nature-based, landscape-scale adaptation strategies that can address coastal climate change vulnerabilities, and (2) evaluate how well these adaptation strategies achieve coastal community and stakeholder objectives, and prioritize their implementation. We demonstrate the application of the framework by illustrating the decision-making process with examples from two regions of the Marin County shoreline.

The framework, case studies, and resources presented in our user guide are a step toward addressing the challenges in transitioning from community vulnerability assessment to action. The adaptation phase of Marin County's Bay Waterfront Adaptation and Vulnerability Evaluation (BayWAVE) project was used as a test case with the intent that the framework developed be applicable around the entire San Francisco Estuary and beyond.



More Information

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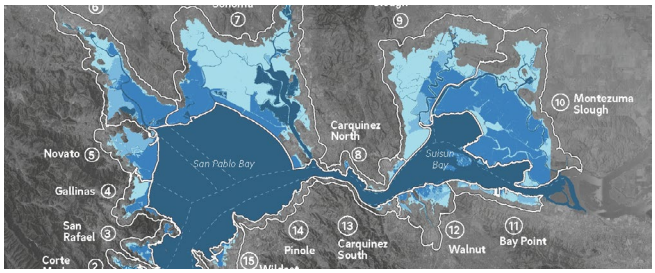
Benefits of Natural Solutions

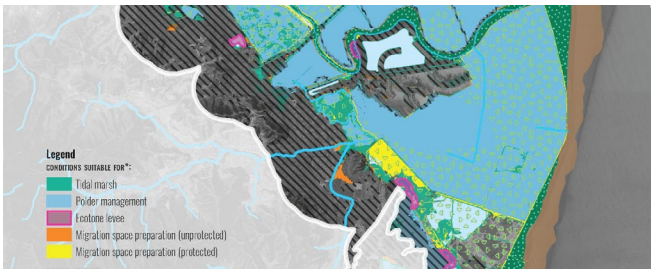
Natural and nature-based adaptation measures, like restored marshes and ecotone levees, reduce the vulnerability of communities to hazards related to climate change. They also provide a wide array of additional benefits that most traditional hard armoring solutions lack (e.g., fish and wildlife habitat, recreational opportunities, carbon sequestration). In addition, because natural and nature-based measures work with rather than against coastal processes of sediment and water movement, they tend to enhance adjacent coastal ecosystems and can change and adapt as seas rise.

Challenges

Despite the advantages, natural and nature-based measures have primarily been implemented only at the pilot or demonstration scale in California and face several challenges before they can become mainstream and widespread. Some of these challenges include (1) a lack of familiarity with the options and their efficacy, (2) a lack of technical guidance to understand where and under what conditions different options may be suitable or appropriate. The framework, case studies, and resources presented in our user guide are intended as one step toward addressing these challenges.



San Francisco Bay Operational Landscape Units. CoSMos 2.0; Barnard et al. 2014.



Example of an opportunity map resource created from the SF Bay Shoreline Adaptation Atlas.

Operational Landscape Units

The scale at which we plan for sea level rise should be reflective of the scale at which natural processes, such as tides, waves, and sediment movement, affect shorelines. Operational Landscape Units (OLUs) are geographic areas that share certain physical characteristics that control the production and flow of coastal ecosystem functions and services. Defining and mapping shoreline typologies such as OLUs provides communities with a way to develop coherent, geographically-appropriate adaptation strategies.

Suitability of Measures

Tidal marshes manage risk on the shoreline by buffering waves and protecting the built environment, while providing many other co-benefits, but they are only sustainable in areas with the right elevations, wave environments, and sufficient sediment supply. We provide resources from work by SFEI and SPUR to map suitability of a range of natural and nature-based measures in the San Francisco Bay and examples of combining measures into broader strategies to achieve a desired future outcome.

Bothin Marsh. Photo by Marin CDA staff

Marsh at high tide on marin County shoreline. Photo by Light Hawk Baykeeper

Understanding Trade-Offs

The framework provides resources and case studies to guide the user in accounting for multiple benefits and ecosystem services, and evaluating among strategies. Understanding the broader suite of benefits and assessing trade-offs that go beyond the cost of construction is a critical need in transitioning from vulnerability assessment to action.

Adaptable Framework

Although the resources and case studies in this user guide focus on the San Francisco Bay Area and Marin in particular, the basic approach can be modified and applied to develop similar resources for any coastal area. Users can also develop strategies that mix grey and nature-based measures to better reflect the values and priorities of the community.

Overview of the Adaptation Framework

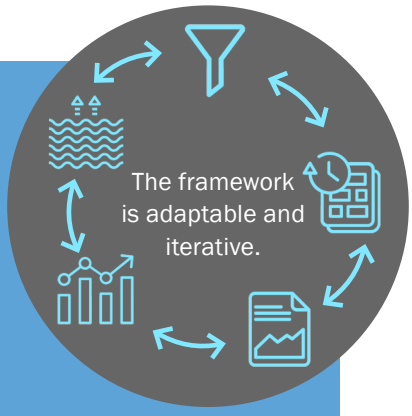
STEP 1
Assess vulnerability to sea level rise

STEP 2
Identify adaptation approaches

STEP 3
Envision desired futures

STEP 4
Develop adaptation strategies

STEP 5
Evaluate trade-offs and prioritize strategies



The Adaptation Framework is a five step process intended as a decision support framework to enable planners and other coastal decision makers to identify, evaluate, and prioritize adaptation strategies in a way that transparently considers multiple benefits.

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Point Blue Conservation Science is a 501(c)(3) not-for-profit organization.
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