Expanding Coastal Climate Adaptation in California

Coastal climate adaptation that includes the protective value of natural habitats

To support decision-makers in their efforts to manage coastal resources in a changing world, the Natural Capital Project (NatCap) and the Center for Ocean Solutions (Ocean Solutions) are helping to shape climate adaptation planning throughout coastal California. We are building collaborations with regional planners and experts to provide science-based information on natural capital that coastal planners can use to make informed climate adaptation planning decisions. This information is critical for making long-term planning decisions on how to safely and affordably develop coastal communities in the face of rising sea levels.

Climate impacts are increasing along with the desire to protect natural systems and capitalize on their protective value and other co-benefits

Cities and counties in California are making significant investments in infrastructure development, such as water supply, transportation, waste management, shoreline protection, ports, and recreational areas. In light of future climate impacts, these planning decisions will have consequences for coastal ecosystems and the services they supply including protection from coastal erosion and flooding, provision of fisheries habitat, and recreation opportunities. California's legislation directs regional and state agencies to use the best available science to reduce vulnerability to climate impacts through planning and implementing adaptation strategies. With credible information about the role that natural systems can play in each of these investment choices, cities and counties can save money and conserve natural assets while achieving their development goals.

In collaboration with local planners and decision-makers, NatCap/Ocean Solutions aim to:

- **Expand** coastal climate adaptation action plans to include natural capital.
- **Evaluate** the effects of coastal adaptation strategies and climate scenarios on the ecosystem services provided by natural systems.
- **Provide** credible information that allows cities and counties in California to improve investment choices by conserving and restoring natural assets while achieving their development goals.
- **Inform** decision-making and enhance the capacity of local, regional, and state governments by tailoring reporting metrics to specific decision contexts.
- **Engage** decision-makers, planners and regional experts to build the evidence and guidance needed to include natural capital in climate adaptation decisions.

Preliminary Results

- **Collaborated with Integrated Regional Water Management planners** to develop vulnerability assessments to inform where conservation and restoration of habitats could reduce the vulnerability of coastal populations and water infrastructure.
- **Informed Climate Adaptation Strategies** in collaboration with regional experts and Integrated Water Management planners in the Monterey Bay region.
- **Incorporated Natural Capital into Climate Adaptation Plans**. We have incorporated InVEST coastal vulnerability analyses into climate adaptation planning decisions in coastal California Integrated Regional Water Management plans.
- **Engaged with California Coastal Commission** staff to address their needs to include the multiple benefits from natural systems in their climate adaptation decisions.
- **Fostered Community Consensus around the Value of Natural Capital** in climate adaptation decisions. We are working with regional experts to build the scientific evidence and guidance planners need to include natural capital in their decisions.

Coastal Climate Adaptation in California

Coastal Protection
Coastal habitats such as wetlands, dunes, and beaches create buffers against sea level rise, erosion, and storm surge. InVEST's coastal protection models map areas vulnerable to coastal hazards and quantify the protective role of natural habitats.

Fisheries
Wetlands and other coastal habitats provide important fish habitat for commercial and recreational fishing. These services could be impacted by rising sea levels and adaptation strategies. InVEST models can quantify the effects of climate change and adaptation strategies on fisheries provision.

Recreation and Tourism
Climate change and adaptation strategies could impact recreation and tourism activities. InVEST can quantify how climate scenarios and adaptation strategies impact visitation rates.

Carbon sequestration
Coastal wetlands and seagrass store carbon in their standing stocks and bury it in their sediments, creating long-term sequestered carbon. InVEST can quantify how changes in these habitats due to climate impacts or development can lead to changes in carbon sequestration.

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Conducting Vulnerability Assessments
We are mapping where coastal habitats provide protection for people, property, and water infrastructure from sea-level rise and storms using the InVEST coastal vulnerability model. We developed metrics with Integrated Regional Water Management (IRWM) planners in Santa Cruz and Monterey Counties to highlight where coastal habitats are providing important protective services and helped to target conservation and restoration activities. This information is being integrated into the IRWM plans for Santa Cruz and Greater Monterey County regions to inform sustainable water management development in the face of climate change.

Informing Coastal Planning for Sea-level Rise in California
California's Climate Adaptation Strategy identifies the need to support regional and local planning to address sea-level rise impacts and the importance of updating Local Coastal Programs (LCP) as a key adaptation approach. LCPs guide development in the coastal zone of California under the Coastal Act. These plans focus on conserving and protecting coastal ecosystems and the services that they provide such as recreation opportunities, fish nursery habitat, and coastal protection. We are working with local jurisdictions to support the development of their LCPs and helping with vulnerability assessments and evaluation of adaptation responses.

Engaging Decision-makers to Support Climate Adaptation Needs
To ensure the sustained delivery of benefits from marine and coastal systems, we are empowering decision-makers to implement climate adaptation actions that protect or restore the value of natural habitats by co-developing planning strategies and investment priorities and building community consensus around the value of ecosystem services in climate adaptation decisions. At the state and regional level, we are listening and engaging with Coastal Commission staff and regional jurisdictions to determine how we can address their needs to include the value of natural systems in protecting coastal communities from climate change impacts. We serve as a liaison between ecosystem services experts and coastal decision-makers to listen and translate the benefits of natural infrastructure in planning contexts.

Building Regional Ecosystem Services Science
We are building ecosystem services science and collaborations with local experts to produce the evidence and guidance coastal planners and decision-makers need in order to include natural capital in climate adaptation decisions.

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