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## Helping Coastal Communities Adapt to Climate Change

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Coastal communities and decision makers urgently need to develop pragmatic, cost-effective strategies to protect both natural and human communities from the dramatic changes that are already underway due to climate change. Yet they lack both the information needed to plan and the enabling conditions needed to implement such strategies. This needs to change. If, in a rush to “defend the coast,” the potential value and role of coastal ecosystems—“nature’s green infrastructure”—are overlooked, we risk a future deprived of the ecosystem services that coastal ecosystems provide, including food, water, recreation, and shoreline protection.

Long Island’s coasts are at a critical juncture. Residential, industrial, and commercial development have cut off the public from the waterfront, and population growth, with its associated development pressures, threatens too many coastal natural areas. With climate change and predicted sea-level rise, the future health of Long Island’s coasts and estuaries depends on making adaptive land-use decisions today.

In their long-term planning, some of Long Island’s decision makers are evaluating ecosystem-based solutions, such as increasing the conservation of wetlands, alongside other options for adaptation. Ecosystem-based adaptation, or EBA, includes a range of actions for management, conservation, and restoration of ecosystems that help reduce coastal community vulnerability and increase resilience, and a growing body of evidence suggests that such adaptation can be cost-effective.<sup>1,2,3</sup> EBA has a simple premise: using nature to help people adapt to climate change provides multiple benefits, which include the following.

**Cost-effective shoreline protection.** Increasing evidence suggests that in many circumstances protecting or restoring coastal ecosystems is a better adaptation strategy than building sea walls, flood barriers, or other “hard” structures that interrupt natural processes and degrade natural habitats. “Soft” or “green” infrastructure can not only slow shoreline erosion and provide protection but also can provide open space, wildlife habitat, and better water quality while simultaneously being economically efficient.<sup>4</sup>

**Sustaining local livelihoods and contributing to local economies.** Ecosystem-based adaptation helps maintain ecosystem productivity and supports sustainable income-generating activities in the face of climate change. In resource-dependent communities, the habitat values of coastal ecosystems are essential for maintaining fisheries, tourism, and other important economic sectors.

**Carbon sequestration and reinforcement of mitigation efforts.** Coastal wetlands, including marshes, mangroves, and seagrass beds, sequester substantial amounts of carbon.<sup>5,6</sup> The majority of this captured carbon is likely to remain stable over millennial time scales, making these coastal ecosystems important carbon “sinks.”

On Long Island, land-use decision making is being informed by a decision-support tool known as Coastal Resilience ([www.coastalresilience.org](http://www.coastalresilience.org)). This tool uses local data and projections of sea-level rise and storm surges to illustrate the future condition of the shoreline, the risks posed to communities, and the role of natural resources in protecting the coast.<sup>7</sup> For example, in the town of Southold, decision makers are using Coastal Resilience to understand sea-level rise and coastal storms; to visualize the likely impacts and risks to social, economic, and natural resources; and to identify management options that diminish losses to natural and human coastal communities. People in Southold are keenly aware of the invaluable contribution the surrounding coastal and marine environments make to their town, providing them with resources that drive the economy and offer a high quality of life to residents and visitors. The town is developing a new comprehensive plan and—through a locally driven stakeholder process—is using Coastal Resilience to integrate EBA approaches. EBA should be a part of the solution for more coastal communities, and Southold’s comprehensive plan will be a valuable model.

With support from state and federal partners, as well as from NGOs and international aid agencies, The Nature Conservancy is rapidly expanding Coastal Resilience to places like the northeastern United States, the Gulf of Mexico, Puget Sound, the Caribbean, Papua New Guinea, and the Solomon Islands. The aim is to help communities in these places make decisions in the face of future climate change impacts. The hope is that, given time to plan, people will take steps to both preserve and restore the benefits that coastal ecosystems provide and will cost-effectively use those ecosystems to help them adapt.

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