



Building Coastal Resilience

for Disaster Risk Reduction and Climate Adaptation

The Nature Conservancy 
Protecting nature. Preserving life.

Healthy or restored natural systems can help reduce the human vulnerability and economic losses from current and growing natural hazards. Coastal storms, flooding and sea level rise will affect hundreds of millions of vulnerable people along with critical infrastructure, industry, tourism, and trade. The significant losses to local and national economies that we see today will continue to increase over the coming decades. Degradation of natural habitats raises the risk by further exposing people and property to the effects of erosion, flooding and inundation and by removing other benefits that healthy ecosystems can provide.

By increasing coastal resilience, The Nature Conservancy aims to reduce the current and growing risks to coastal communities from natural hazards and climate change through the use of natural solutions and smart development.

Impacts from natural hazards like storms and flooding are substantial and increasing significantly with climate change and poor coastal development decisions, putting ever more people and property at risk. In 2011, insured losses from natural disasters (especially coastal and riverine hazards) reached US\$105 billion, an all-time high.

Incorporating Nature into Disaster Risk Reduction, Development and Climate Adaptation Strategies

Coastal development and adaptation policies that consider social, economic and environmental risks simultaneously can reduce social and economic vulnerability and maximize the risk reduction benefits that natural habitats can provide.

The Nature Conservancy works to promote the role of natural ecosystems in reducing climate and disaster risks. We are working with partners at local and global levels to:

- Demonstrate where, when and how healthy or restored coastal ecosystems can contribute to cost-effective solutions that address current and growing risk from natural hazards and climate change;
- Provide communities, developers and government planners with the knowledge and tools to make decisions and take actions to reduce risks and enable climate-resilient development (see page 3);
- Develop the partnerships and political will needed to promote the use of effective natural solutions in adaptation and disaster risk reduction.

How Much Can Nature Protect? With lives and livelihoods at stake, The Nature Conservancy is working with partners to move beyond anecdotal information to answer the tough questions about the role nature can play in reducing risk. For each major coastal habitat—coral reefs, oyster reefs, mangrove forests and salt marshes—we are documenting and quantifying the risk reduction benefits that these habitats can provide. By developing the same information about habitats that engineers provide about sea walls and other built defense structures, we can analyze and identify when and where coastal ecosystems are effective for reducing the risks from natural hazards.

Healthy Coral Reef

A healthy reef crests near the surface and serves as a major natural break-water—reducing most wave energy and helping protect coastal communities. Healthy reefs have abundant living corals, and support fishing industries and diving.

In coastal areas where wave energy is lower, mangroves can grow and further stabilize shorelines, reduce erosion, and provide nursery habitat for fish, shrimp and crabs.

Degraded Coral Reef

When reefs are degraded, the living corals die and the reef is eroded to rubble. As a result, much more wave energy passes over the reef, which erodes shorelines, increases risks of damage to people and property, reduces fishing and diving, and may force coastal communities to retreat, or pay for expensive coastal defenses like seawalls.

Real Solutions for Reducing Social, Economic and Environmental Risks

We recognize the challenges and trade-offs that decision makers have to make every day, and the need to address the multiple management objectives of nature conservation, economic development and risk management. The Coastal Resilience approach helps decision-makers integrate social, ecological and economic considerations in coastal planning and engage stakeholders in finding suitable and effective solutions.

Using interactive decision support systems backed by the best available science, we enable planners, elected officials, managers and citizens to visually assess risk and identify a suite of solutions that best address their risk reduction needs without compromising the benefits that nature provides.

To assess risk, we examine hazard exposure, social susceptibility, economic costs, and ecological vulnerability under current and future conditions. We work to assess risk and solutions within communities; across states, regions and nations; and globally.

By making information widely, easily and freely accessible, the Coastal Resilience decision support tools can bring multiple disciplines, data and stakeholders together across different spatial and temporal scales to facilitate informed decisions and adaptive planning.



Artificial reef structures at oyster restoration site in Alabama, Gulf of Mexico. © Andrew Kornylak; Strong roots anchor mangroves in Bahamas, buffering the coast. © Mark Godfrey

Armed with new information, decision-makers can then evaluate various scenarios and cost implications given their specific context, and identify where natural solutions and smart development can be used as alternatives to more traditional options to risk reduction. These solutions can then be built into action plans and development programs that will be broadly supported and robust over the long-term.

Depending upon the local context, natural solutions or actions may include protecting or restoring natural ecosystems that provide risk reduction services; linking natural infrastructure to hard engineering options in hybrid engineering; or developing regulations to avoid development in high-risk areas, among others.

coastalresilience.org With the Coastal Resilience online mapping tool, communities can visualize risk to important infrastructure from sea level rise and storm surge, and identify how wetlands, reefs and other natural buffers can fit into shoreline defenses.

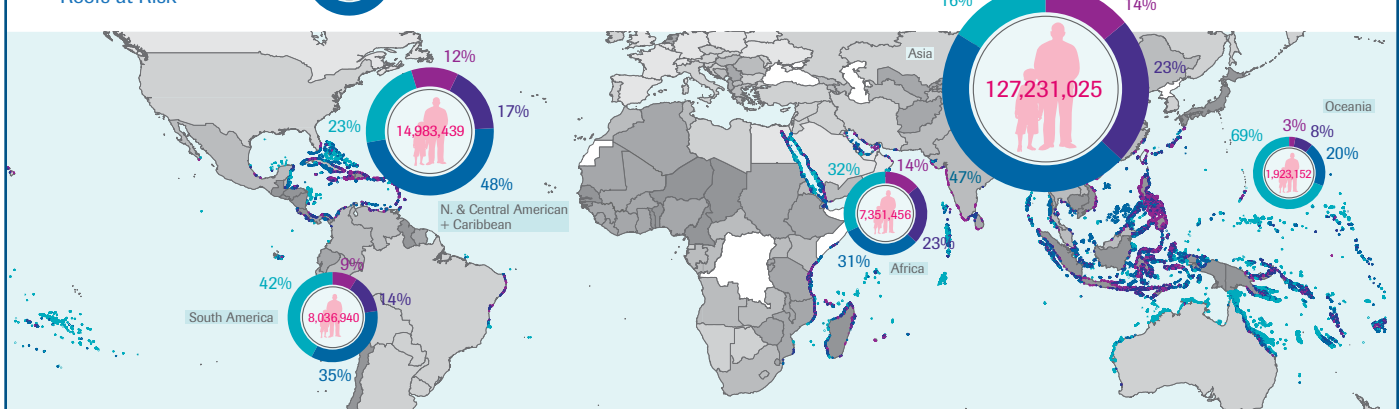


The Nature Conservancy is working with partners and planners to incorporate social, economic and environmental risk into coastal development policies and decisions.

People at Risk, Reefs at Risk

INSIDE CIRCLE:
Number of at Risk People (<10m elevation)
near reefs (within 50km)

OUTSIDE CIRCLE:
Reefs at Risk



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Building Coastal Resilience Locally and Globally

Building on 60 years of addressing local problems with tangible solutions, The Nature Conservancy is demonstrating how nature can be incorporated into coastal development, adaptation and disaster planning in the most vulnerable coastal environments.

We are facilitating the synthesis and exchange of the latest science and knowledge on coastal habitats. We are working with local partners and governments to test, innovate and build coastal resilience around the globe. We are establishing a community of managers and planners who are grappling with these issues to exchange expertise and lessons learned in using natural solutions and smart development to reduce risk to coastal communities.

At the local, national and global levels, we promote the development of partnerships, political support, policies and funding that encourage the use of natural solutions in climate, development and disaster risk planning.

The Conservancy is a member of the Partnership for Environment and Disaster Risk Reduction (PEDRR) which includes UN agencies, environmental and development organizations, and academic institutions. We collaborated with

the Alliance for Development Works and the United Nations University on the World Risk Report 2012 to highlight the role coastal ecosystems play in reducing risk.

Through these efforts, we aim to reduce the cost of risk by incorporating the science and economics of natural coastal protection into relevant policy, risk models and financial incentives and flows.

The Nature Conservancy: Bridging Science, Policy and Practice for Tangible Results

The Nature Conservancy has been developing approaches for coastal hazard mitigation and risk reduction since 2005 and is a leader in advancing the science, developing innovative tools and demonstrating real-world examples to inform important critical decisions in policy, planning and practice. Our combination of science, technology, collaboration and on-the-ground experience leads to pragmatic solutions and lasting results.



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