The Hurricane Sandy Resilience Program

Strengthening Nature for People and Wildlife

Overview

Following the destruction caused by Hurricane Sandy in 2012, the Department of the Interior (DOI) invested $787 million in recovery of natural areas and communities along the Atlantic Coast. More than $300 million of this money was dedicated specifically for resilience projects that strengthen nature so people, habitats and wildlife can better withstand and recover from the effects of a changing climate — including inland and coastal flooding, shoreline erosion and water pollution as a result of rising seas, stronger storms and higher precipitation.

The resilience program funded 160 projects primarily through the U.S. Fish and Wildlife Service (USFWS) and competitive grants administered by the National Fish and Wildlife Foundation (NFWF). Projects focused on:
- habitat restoration (rivers, marshes, beaches and dunes);
- green infrastructure (living shorelines, water control structures);
- new science and tools (data collection, modeling, mapping);
- community resilience planning.

Measuring success

The projects were designed to directly improve resilience, increase knowledge about how to manage for resilience, and collect data for assessing current status and trends in coastal processes. Funding was dispersed in 2013, and projects were executed quickly with approximately 80% completed within 3 years. While many projects showed immediate benefits, most will take time to reach full potential. Ecological and socioeconomic benefits will be monitored on dozens of projects through 2023.

Accomplishments

The program made significant achievements in all focus areas, including:
- 373 miles of river habitat restored;
- 190,000 acres of marsh habitat restored;
- 80 acres of beach and dune habitat along 11 miles of shoreline restored;
- 10 miles of living shoreline, mostly oyster reefs, installed at 29 sites;
- 160 rain structures — such as gardens, basins and permeable paving — installed;
- More than 500 science tools developed — e.g., models of storm impacts, tools to identify vulnerable areas, analyses of storm surge dynamics, maps of elevation changes;
- 289 resilience plans, assessments, tools or engineering designs provided to communities;
- Projects implemented in 12 states and collectively benefitted residents in more than 220 communities.

Benefits for communities, wildlife and practitioners

Since 2012, there have been many weather events — from heavy rain to Nor'easters — that have tested the storm protection benefits of these projects. In nearly every case, resilience projects have performed well and provided expected benefits. Restored marshes, beaches and dunes have created a protective barrier between the ocean and coastal communities, while reconnected streams and rivers are reducing coastal and inland flood risk during high rainfall events. Living shorelines are stabilizing coastlines, reducing wave energy and shoreline erosion.

Beyond storm protection, resilience projects provide numerous benefits to people and wildlife:

Communities: Restored marshes, wetlands, rivers and beaches provide cleaner water and better outdoor recreation opportunities, improving health and generating tourism income. New resilience planning tools are helping communities better prepare for the conditions of a changing climate. Hundreds of jobs were created through these projects.

Wildlife: With dams removed and streams flowing free, migratory fish such as river herring and American shad are returning in record numbers to their historical spawning grounds. Migratory birds rely on healthy beach and marsh habitat as stopover sites during their long migrations. Marshes serve as nurseries for fish and other marine species. Living shorelines create new habitat for oysters, crabs and more.
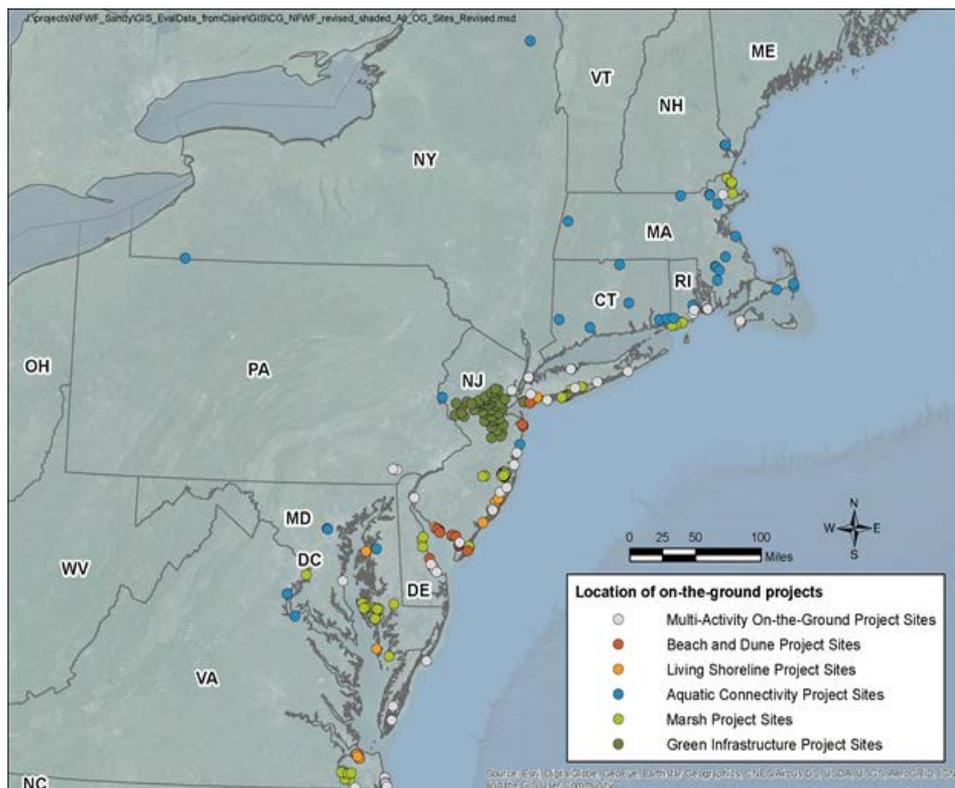

Mary Conti/TNC

Using oyster castles to build a living shoreline at Gandy's Beach in New Jersey.

Practitioners: Dozens of best-practices for promoting project success were identified — including effective partnerships, planning, budgeting and permitting expertise. These lessons-learned, along with new knowledge and tools, are helping communities better undertake resilience projects.

Looking ahead

As climate conditions continue to change and the risk of natural hazards rises, there will be an increase in spending for recovery and mitigation efforts. Recent studies suggest that investing in resilience efforts makes good economic sense. One study showed that wetlands saved $625 million in flood damage during Hurricane Sandy, while an analysis of the Gulf Coast found that green infrastructure could save $57.4 billion of a projected $134 billion in damages over 20 years. Green infrastructure also has the added benefit of improving over time, whereas grey infrastructure deteriorates over time. Sandy caused $70 billion in damage and killed 48 people — investments in resilience now could help prevent similar large-scale costs in the future.

The Hurricane Sandy Resilience Program worked quickly over a large area, evaluating lessons-learned along the way to share with other resilience efforts nationally and globally. One of

Location of on-the-ground projects
○ Multi-Activity On-the-Ground Project Sites
● Beach and Dune Project Sites
● Living Shoreline Project Sites
● Aquatic Connectivity Project Sites
● Marsh Project Sites
● Green Infrastructure Project Sites

the most valuable results of this work is the gathering of new science and the testing of new methods that are rapidly improving our understanding of resilience. The Hurricane Sandy Resilience Program adds to a growing body of work about resilience as a natural solution that benefits people and nature.

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Results

River restoration. 373 miles of river habitat restored, including the removal of 23 dams, 10 culverts and 1 low-head bridge. Both wildlife and people are benefitting — species such as river herring and American shad are returning to habitat that had long been blocked, and communities enjoy increased recreation opportunities, cleaner water and improved flood resilience from the reduced risk of dam failures. Almost half of the removed dams were ranked high risk, presenting significant hazard.

Marsh restoration. 190,000 acres of marsh habitat (equivalent to 300 square miles) restored, creating a protective buffer between the ocean and coastal communities. Marshes soak up water like a sponge, protecting homes, roads and businesses from coastal flooding. Marshes also provide vital services by filtering pollutants, making the water cleaner for people and wildlife, and supplying nursery habitat for fish and other marine species.

Beach and dune restoration. More than 10 projects restored 80 acres of beach and dune habitat along 11 miles of shoreline. Beaches and dunes are the first line of defense against coastal storms, and they provide important habitat for migratory shorebirds traveling long distances between wintering and breeding grounds. They are also a main driver of tourism dollars in many coastal communities along the Atlantic.

Green infrastructure. More than 10 miles of living shoreline, primarily oyster reefs, were installed at 29 sites to reduce shoreline erosion and protect coastlines from storm surge. And 160 rain structures — such as gardens, basins and permeable paving — were installed to filter stormwater, reducing risks of flooding and water pollution. Green infrastructure incorporates nature to reduce storm impacts, unlike grey infrastructure which uses concrete and other hard surfaces.

Science. A total of 87 projects were undertaken and completed to improve scientific knowledge and understanding of coastal resilience. These projects produced more than 500 products — including models of storm impacts, tools to identify vulnerable areas, analyses of storm surge dynamics, data collection of coastal elevation changes, and maps of natural resources and their ability to provide storm protection.

Community resilience planning. Projects provided 289 plans, assessments, tools or engineering designs to communities to improve decision-making related to resilience. The work includes development of local and regional resilience plans, trainings and outreach, and site-specific natural infrastructure designs to improve resilience.