Resilience in the Face of Rising Seas

Regional Approaches to Sea Level Rise

ASP

American Security Project

Perspective

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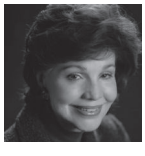

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Lieutenant General Norman R. Seip, USAF (Ret) served in the Air Force for 35 years. His last assignment was Commander of 12th Air Force.

In this Report:

Climate change-induced sea level rise has already begun to damage U.S. coasts and threaten the survival of communities situated in coastal areas. Predicting the severity of increasing sea levels is difficult, and thus creating adaptation plans to counter this threat is also challenging. In order to effectively combat sea level rise, regional adaptation methods must be established and more funding made available. This paper explains how different regional adaptation initiatives function and demonstrates how they can be improved by integrating alternative adaptation measures and collaborating with the federal government.

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IN BRIEF

- As the effects of climate change become more severe, sea level rise is projected to threaten between 4.2 and 13.1 million Americans by 2100.
- While there are effective federal programs and grants in place to address sea level rise, they are generally underfunded or focused on recovery rather than prevention.
- Federal programs such as The National Flood Insurance Plan (NFIP) have incentivized development in flood and disaster-prone areas in coastal regions, putting many at risk of sea level rise. Letting the NFIP program expire in 2017 would help create more resilient coastal areas by reducing the number of people living in the disaster-prone areas and freeing up funds that can be put towards other adaptation measures.
- Local governments in several at-risk urban regions have established successful regional sea level rise adaptation initiatives. These should be used as models for creating similar initiatives in more non-urban regions in the U.S. in order to improve overall resiliency.
- Regional adaptation initiatives should explore alternative methods such as nature-based approaches to counter sea level rise. Already at work in the Netherlands, New York, and Florida, these can be used to create more sustainable ways of protecting the coasts.

About the Author

Lieselotte Siegenthaler is an Adjunct Junior Fellow at American Security Project. She is pursuing an MA in Nonproliferation and Terrorism Studies at the Middlebury Institute of International Studies at Monterey (MIIS). She is currently working on her thesis, which explores whether or not climate change and its resulting extreme weather events impact the incidence of terrorist activity.

Introduction

Sea level rise is one of the greatest climate change-related threats to coastal areas within the United States. By partnering with the federal government, local and regional governments can create adaptation initiatives to ensure their infrastructure, land use practices and behavior are resilient to sea level rise. This will make the U.S. better prepared for a future of climate change.

Sea level rise is a result of the expansion in the volume of the global ocean, which is caused by "the warming of the oceans and the loss of land-based ice (such as glaciers) due to increased melting".[1] Projecting its rate is especially difficult because ice melts inconsistently, which impedes the ability to forecast when and where increasing sea levels will become a threat. This means that the danger of a rising sea level is that it occurs gradually enough to seem relatively inconsequential until a storm hits. The resulting surges then surpass existing storm barriers and infrastructure, endangering lives and causing significant physical and economic damage.

Our inability to predict the effects of sea level rise makes it challenging to properly prepare for it. With the projections that are available, sea level rise is predicted to threaten between 4.2 and 13.1 million Americans by 2100, depending on population growth and exact increase in sea level.[2] Non-urban areas are especially vulnerable to rising sea levels due to lack of finances and greater dependence on natural resources. Without investing in long-term sea level rise resilience strategies and infrastructure, these coastal areas will continue to require constant repair, preventing them from reaching full economic potential. While there are federal sea level rise adaptation programs and grants in place to strengthen infrastructure throughout the U.S., they alone cannot guarantee resilience. Collaboration between regional adaptation initiatives and compatible federal programs can ensure stronger coastal communities that can withstand rising seas.

Federal Sea Level Rise Adaptation Programs

Currently, there are two federal-level programs that contribute to adapting to rising sea levels. The first is the United States Army Corps of Engineers, which acts as "the nation's environmental engineer."[3] It broadly supports civilian and military efforts to maintain and restore land and natural resources, which increases resilience to sea level rise. To combat sea level rise directly, the Army Corps has programs focused on levee maintenance coastal ecosystem restoration, and flood risk management.[4] These broader themes are adapted into smaller projects in order to productively address issues at a local level.

Beach "renourishment" in Virginia Beach. U.S. Army Corps of Engineers.

The second is the National Flood Insurance Program, which operates under the Federal Emergency Management Agency (FEMA) and:

> "Aims to reduce the impact of flooding on private and public structures. It does so by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations."[5]

The true impact of the National Flood Insurance Program has been widely contested, despite its apparently good intentions. The program has been criticized because it "relies on outdated flood maps and creates huge financial risk for the federal government by helping people live in areas where flooding is likely."[6] The program has incentivized people to build in high-risk areas, leading to unnecessary damage and expenditures by the government and the residents. As a result, it pays out on the claims, faster than it can bring in premiums, resulting in a $23 billion debt.[7]

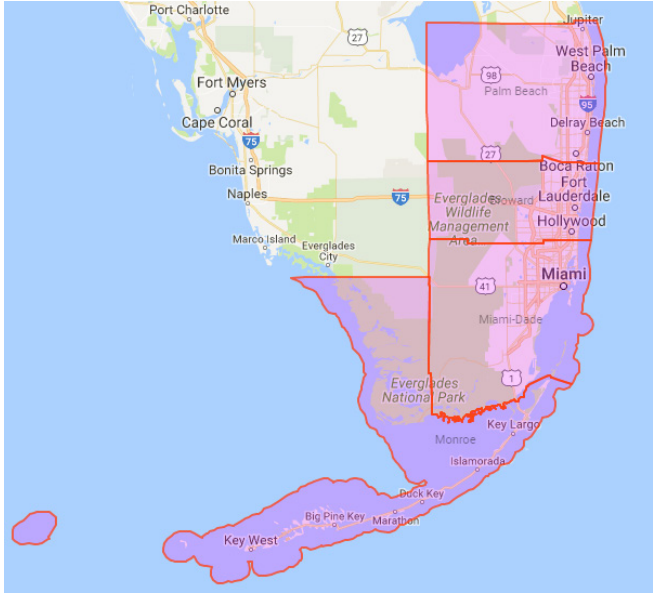
Issues with the National Flood Insurance Program extend outside of the program itself. An analysis carried out by the U.S. Government Accountability Office (GAO) states that "weaknesses in National Flood Insurance Program management and operations, including weaknesses in contractor oversight and an outdated policy and claims management system, have also placed the program at risk."[8] As the effects of climate change become more pronounced and flooding becomes stronger and more frequent, it will continue to strain the agency.

The National Flood Insurance Program is due to expire in 2017. If Congress allows it to do so, people and companies will be discouraged from developing flood and disaster-prone areas. The agency could then support the less prosperous communities that the National Flood Insurance Program assisted by putting the funding previously allocated to the program towards enhancing sea level rise resiliency and adaptation in more sustainable capacities.

Regional Sea Level Rise Adaptation Initiatives

In addition to the federal projects, local government initiatives to counter increasing sea levels and climate change effects have emerged in particularly vulnerable areas of the U.S. These can be used as models for regions in need of viable adaptation methods, as they are especially effective because they can be tailored to the vastly different landscapes and geological makeups by the local agencies and experts that are familiar to the areas and their needs.

The most prominent of these initiatives is the Southeast Florida Regional Climate Change Compact, made up of representatives from Broward, Miami-Dade, Monroe and Palm Beach counties in South Florida who work to "coordinate mitigation and adaptation activities across county lines."[9] In addition to enabling local governments to create relevant adaptation methods, the Compact is designed to cooperate with state and federal agencies for support and technical assistance. To counter increased sea levels, the Compact created working groups related to sea level rise mitigation such as the Florida Reef Resilience Program, the Sea Level Rise Work Group and the Shoreline Resilience Working Group, which partners with the Nature Conservancy to report on nature-based solutions to sea level rise threats.[10]



A second regional climate change adaptation initiative is the San Francisco Bay Area Clean Water, Pollution Prevention and Habitat Restoration Measure, known as Measure 22. Passed in June of 2016, it brings together nine Bay Area counties to focus on habitat and marshland restoration, which can act as a natural adaptation to and protect against increased sea level. The measure will be funded by an annual tax of $12 per property parcel within all of the counties over 20 years. Half of these funds will be distributed among the counties on the basis of population and the other half will be given in the form of individual grants. [11]

Finally, cities, educational institutions, and nature conservancy organizations within the San Diego region have formed the Climate Collaborative, which has an overarching goal of preparing for climate change impacts and reducing greenhouse gas emissions. The Collaborative emphasizes the need to cooperate between local and federal government agencies, academics and communities in order to create the most resilient model possible.[12] It includes a specialized project called the Resilient Coastlines Project of Greater San Diego. In contrast to the SFRCC and Measure 22, the project is funded by the National Oceanic and Atmospheric Administration's Regional Coastal Resilience Grant Program.[13]

San Diego has the advantage of housing such institutions as Marine Corps Base Camp Pendleton, the Marine Corps Recruitment Depot, Naval Base San Diego and Naval Base Coronado, which gives the federal government a greater stake in maintaining the area. However, the City of Coronado is not part of the Climate Collaborative has not yet initiated any plans to address the looming sea level rise. Its neighboring cities have begun to plan for rising sea levels, but when Coronado is affected in the future, these other, better-prepared cities will invariably be forced to address its effects in the form of financial or disaster management aid. This demonstrates the importance of including all of the various cities and counties planning for increased sea level adaptation strategies.

The regions that have been able to develop their own sea level rise resilience measures have had the advantage of being relatively prosperous, urbanized areas, or, as in the case of San Diego, the area houses significant Department of Defense infrastructure. As evidenced by San Francisco Bay's Measure 22, these urban centers have higher populations from which to draw more resources and create a greater motivation to implement sea level rise adaptation plans. In contrast, non-urban communities tend to have fewer resources, less economic diversity, fewer inhabitants and are more dependent on the natural resources that are affected by increased sea levels.[14] Building sea level rise-resilient infrastructure requires significant funding and impetus, and so the non-urban areas are either unable or unwilling to allocate funding to ready themselves for the coming climate change effects. This puts the entire region at risk, because as the current infrastructure degrades, fewer people can be supported, the local economy suffers and the population is forced to leave.

Alternative Options for Sea Level Rise Adaptation Funding

There are two leading options for smaller regions to acquire federal climate change adaptation funding for their own projects. NOAA provides Regional Coastal Resilience Grants, which fund San Diego's Climate Collaborative. In total, these grants offer $100,000 to $2 million to local and state governments as well as private companies and institutions of higher education. However, in 2016, the agency had $9 million to allocate to only the 12 projects that were selected.[15] Although the grants are awarded to regional projects that will affect diverse groups of people, this is not enough funding to address all of the areas that need it.

Nevertheless, awarding this grant to non-urban regional consortia could be viewed as a first step, as simply applying for the grant requires that the residents and local representatives meet and discuss the issue.

The second, larger federal initiative to fund resiliency and adaptation is the Department of Housing and Urban Development's (HUD) National Disaster Resilience Competition. It has allocated between $15 million and $176 million to thirteen states, counties and cities that were "impacted by major disasters between 2011 and 2013."[16] The nature of the disasters varies depending on the location, but many of the projects that the National Disaster Resilience Competition funds affect regions' ability to weather rising sea levels, such as: protecting coastal wetlands in Louisiana, preserving "economically-isolated coastal neighborhoods" in Connecticut through the state's proposed Coastal Resilience Plan, or incorporating rising sea level into the State of New York's Hazard Mitigation Plan.[17] [18]

The National Disaster Resilience Competition will undoubtedly aid parts of the U.S. in adapting to sea level rise. Unfortunately, it is a one-time opportunity to finance such projects, as the funding was allocated by the Disaster Relief Appropriations Act, "which made emergency funds available for Hurricane Sandy and other Presidentially declared major disasters occurring in 2011-2013." It funds adaptation plans in places that have already been impacted rather than the locations that are projected to be impacted in the future.[19] This is a reactive rather than proactive action. In order to create truly resilient systems, more funding can be made available to these areas that are slated to be more strongly affected in the future. To ensure that communities are able to adapt properly to climate change effects such as sea level rise, resiliency measures must be sustainably funded for long periods of time. After the measures have been put in place, they must be maintained and strengthened as climate change effects become more severe with time.

Alternative Adaptation Methods

In addition to expanding these federal level sea level rise adaptation funding opportunities, sea level rise-susceptible regions would also benefit from exploring adaptation methods used in similar environments. The Netherlands is an example of a country that has been managing water to adapt to increased sea level order to survive. The Dutch Ministry of Infrastructure and Environment makes use of extensive man-made infrastructure such as dykes and storm surge barriers.[20] Similar to the Southeast Florida Regional Climate Change Compact, the Netherlands' sea level rise adaptation strategy includes nature-based adaptation methods like underwater sand replenishment, and barrier islands and wetlands maintenance.[21] The Ministry of Infrastructure and Environment's work is supplemented by private urban design and landscape architecture firms, whose projects include strengthening the resiliency of coastal infrastructure and landscapes as well as ecological restoration.

Dune reinforcement in the Netherlands. Credit: Johan Wieland/Flickr

Although the Netherlands is demographically and geologically different than many parts of the U.S., replicating or using its adaptation strategies as inspiration can help certain American communities. Private Dutch firms have already begun to work on resiliency issues in the U.S., the most prominent example of which West 8's adaption of New York's Governor's Island. To protect against projected rising sea levels and increasingly forceful storms, the firm raised the elevation of much of the island, incorporated high walls that will protect the island during flooding events and replaced the old sea wall with more resilient material.[22] [23]

Conclusion

As the effects of climate change become more severe, sea level rise will continue to threaten the existence of American coastal communities, causing billions of dollars of economic loss along the way. Non-urban communities are especially exposed to this threat, and regional adaption projects must be implemented in these areas in order to prevent them from being destroyed by rising sea levels.

To offset the financial hardship of developing these projects and improving infrastructure, the regional governments should partner more closely with the federal government. The U.S. Army Corps of Engineers has been making a concerted effort to engage the public, providing an opportunity for them to collaborate on more sea level rise adaptation projects. [24] Regional initiatives can also apply for larger federal grants, provided that they continue to be funded. To create the most robust and effective sea level rise adaptation projects possible, the non-urban communities can model them on domestic and international sea level rise adaptation initiatives, and consult with landscape architecture firms. This increased communication between the private sector and different levels of the public sector can lead to a greater adaptation abilities that can then be expanded to other communities. Preparing for the effects of sea level rise can improve the U.S.' overall resilience and can ensure the security of the nation as a whole.

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