



Lessons Learned

from the **CLIMATE READY
ESTUARIES PROGRAM**

SOUTHEASTERN US CLIMATE READY ESTUARIES

Climate Ready Estuaries in the Southeastern U.S.

EPA's Climate Ready Estuaries works with the National Estuary Programs and the coastal management community to: (1) assess climate change vulnerabilities, (2) develop and implement adaptation strategies, and (3) engage and educate stakeholders. CRE shares NEP examples to help other coastal managers and provides technical guidance and assistance about climate change adaptation.

Since 2008, CRE has worked with the NEPs in the Southeast on a variety of local projects to better prepare them, and the communities in which they operate, for climate change. This document shares some of the lessons learned from these CRE climate projects. Additional information about the projects is available on CRE's website (www.epa.gov/cre).

Front cover photo courtesy of:
Mary Lundeberg

Photo at top of page 2 and 3 courtesy of:
Mary Margaret Bailey

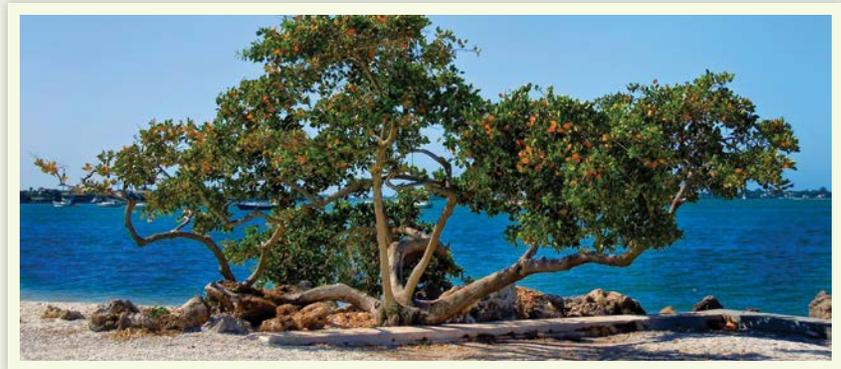
Photo at bottom of page 2 courtesy of:
Timothy Valentine

Back cover photo courtesy of:
Nancy Laurson

Get the public involved

Community members have a unique perspective on the place where they live. Helping them to understand how climate change may affect their varying interests and concerns will be important and can inform their input on adaptation strategies.

- The Tampa Bay Estuary Program uses king tides to communicate about sea level rise. King tides are the highest tides of the year in a coastal area and can cause tidal flooding. TBEP has been asking the public to take photos of king tides to document what sea level rise could be like in the future. In 2012, TBEP and the Sarasota Bay Estuary Program teamed up to hold a king tide photo contest. The winning photos were featured in a traveling exhibit.
- The Albemarle–Pamlico National Estuary Program reached out to increase public and local government awareness of climate change in five counties of the Albemarle-Pamlico region. Public opinion surveys and targeted interviews were used to design county-specific climate change communication strategies for meetings with community leaders. This led to constructive and practical discussion of climate change in the Albemarle-Pamlico region.
- Sarasota Bay Estuary Program in collaboration with Mote Marine Laboratory's Marine Policy Institute developed *Tips for Sea Level Rise Adaptation Planning*, a communication guide for local community leaders, planners, resource managers and concerned individuals that provides basic considerations and tools for climate-related planning of sea level rise. The focus is on adaptation for the impacts of sea level rise so that critical human systems (communities, economies, culture) and natural systems (wetlands, coastal ecosystems, fisheries) can continue to function effectively and become resilient in the face of climate change.



Geospatial tools and visualizations help to clarify problems

GIS, Lidar, digital elevation models and bathymetry can be integrated in creative ways to identify climate change risks and responses.

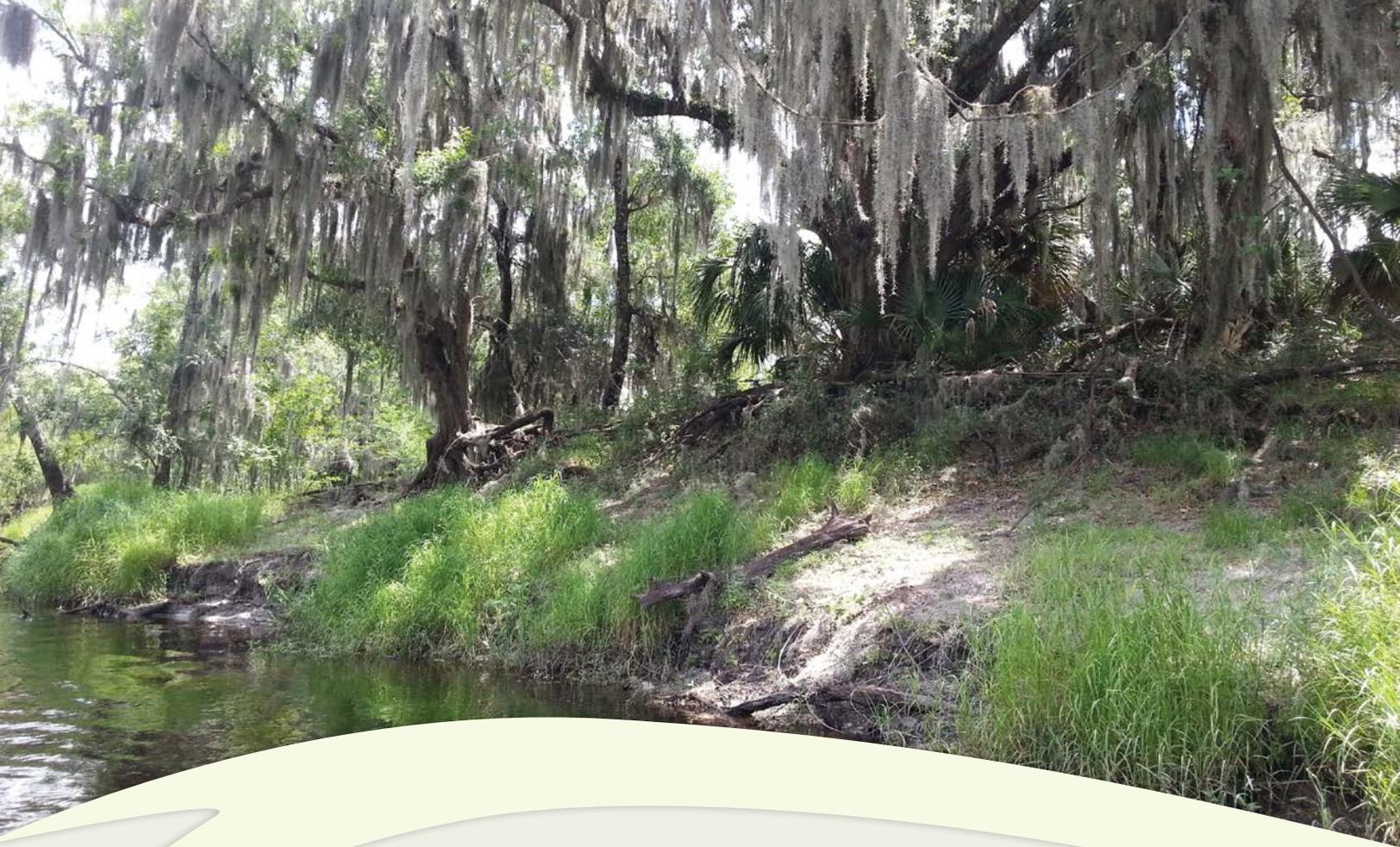
- Indian River Lagoon National Estuary Program used Lidar elevation data from Brevard County for a study of sea level rise impacts in Satellite Beach, Fla. The vulnerability of municipal infrastructure, residential housing and hurricane evacuation routes was shown when sea level rise scenarios were integrated with the elevation data.
- Sarasota Bay Estuary Program, in collaboration with Mote Marine Laboratory, created a Sea Level rise web map visualization tool that shows how different levels of water due to sea level rise and storm surge will impact areas in Sarasota and Manatee Counties. This tool (available at: <http://sarasotabay.org/slr-web-map/>) will support planning efforts in these coastal communities by showing which lands are vulnerable to sea-level rise.
- Restoration of the Indian River Lagoon depends on the continued existence of seagrass habitat. Sea level rise will affect seagrasses because they need to be in shallow water that sunlight can penetrate. The Indian River Lagoon National Estuary Program began a project using GIS data for a model to emulate sea level rise effects. The decision support results from this project will guide them to select the best strategies for improving water quality and help with the implementation of TMDLs in the future.



Partnerships magnify everyone's capabilities

Working with others who have similar goals or work in similar places produces better outcomes. Partners can extend program reach and help to get more done toward common goals.

- The Charlotte Harbor National Estuary Program and its host agency, the Southwest Florida Regional Planning Council, assisted the City of Punta Gorda to develop and approve the first small coastal city climate change adaptation plan in the country. Since its approval in late 2009, the City has implemented many of the adaptation priorities through its comprehensive plan update process, city ordinances and capital improvements. Lee County built on this work by developing a resiliency strategy, improving county governance and operations toward climate change resiliency.
- Mobile Bay National Estuary Program is working with the Mississippi–Alabama Sea Grant Consortium, the Town of Dauphin Island, the Dauphin Island Water and Sewer Authority, and the Dauphin Island Park and Beach Board to improve Dauphin Island's ability to adapt to climate change. The collaboration is helping to identify climate change impacts to the natural and built environments. They will complete a climate change risk assessment in order to provide recommendations for addressing the identified vulnerabilities.
- Mobile Bay National Estuary Program is working with low income and environmental justice communities in the lower Three Mile Creek watershed that are particularly vulnerable to increased stormwater runoff, nonpoint source pollution, and sea level rise. The project is working to foster more community engagement in watershed management and adaptation planning. They aim to increase the community's understanding of how climate change will impact the population, water quality and ecological integrity of the watershed.



Decision support tools lead to understanding and better solutions

Guidance and examples of how to take information and make good decisions go a long way. Conceptual models, expert systems and compilations of best practices are great resources that help focus thinking and improve outcomes.

- The Tampa Bay Estuary Program, in cooperation with Gulf of Mexico NEPs, National Estuarine Research Reserves, and other coastal restoration groups, developed a “Gulf Coast Community Handbook.” The guide demonstrates how to incorporate climate change resiliency into habitat restoration and protection plans. It has case studies in the Gulf of Mexico region which can help coastal managers as they seek to design and construct habitat restoration projects that are resilient to climate change.
- Charlotte Harbor National Estuary Program developed conceptual ecological models (CEMs) of its region to display the dynamics and interactions of climate change. CEMs illustrate the relationship of drivers, stressors and ecological effects. CEMs organize thought in a visual way, identify important linkages, provide a strategy for research and communicate complex ideas to citizens and decision-makers. Managers use CEMs to crystallize large amounts of science and place project decisions into context. Representative attributes of the ecological effects are then tied to specific measures. At the top of the hierarchy, climate change drivers included air temperature, rainfall, sea level rise, storm intensity and land use practice.
- The Albemarle–Pamlico National Estuary Program worked with the EPA Climate Ready Water Utilities program to use the Climate Resilience Evaluation & Awareness Tool. The CREAT software guides drinking water and wastewater utility owners and operators to understand their climate change risks and helps them to identify potential adaptation options for their situation.