



# Lessons Learned

*from the* CLIMATE READY  
ESTUARIES PROGRAM



**EPA's Climate Ready Estuaries (CRE) provides targeted assistance to National Estuary Programs (NEPs) to plan for climate change. In its first years, CRE partners have successfully completed vulnerability assessments, engaged stakeholders, identified climate change indicators, and initiated adaptation planning efforts.**

**The NEPs have a wealth of knowledge about stakeholder engagement, environmental planning, and coastal management. As they have grappled with the challenges that climate change will pose in their watersheds, the NEPs have drawn on their experience and have identified successful strategies and common challenges.**

**This compilation presents best practices and lessons learned that are taken from the CRE annual progress report for 2010. The varied experiences of CRE partners around the country can guide other communities or organizations that are planning responses for climate change impacts.**

## Vulnerability Assessment Efforts

**Vulnerability assessments can help to identify key concerns for an estuary and may also assist in identifying information needs. General lessons learned for these efforts include:**

- Recognize that non-climate drivers, such as development, pollution, and population growth, often exacerbate climate change vulnerabilities.
- When working with limited data, use readily available scientific best professional judgment to help support decision making. Surveying both local and regional experts and stakeholders can assist in building knowledge, as they have access to some of the most up-to-date information and research.
- Focus on emergency and disaster management, which is one area where NEPs can work with local and state governments to incorporate climate change issues. Vulnerability and risk assessment can help identify areas that need targeted adaptation that also supports and uses emergency planning experts and resources.
- Collaborate with and use local partners, such as universities, non-profits, Sea Grants, and National Estuarine Research Reserves to fill information gaps.
- Determine scope – vulnerability assessments do not necessarily have to be broad in scope. Focusing on the vulnerability of a specific resource, such as horseshoe crabs in the Delaware Estuary or culverts in the Oyster River Watershed, may generate momentum for adaptation.



## Stakeholder Engagement Efforts

Each CRE partner that has undertaken stakeholder engagement activities has developed its own lessons learned on locally specific issues and key audiences. General lessons learned for these efforts include:

- Leverage existing efforts. Some regions have many different organizations already working on climate change and adaptation, including work on acquiring data/information, stakeholder engagement, and education/outreach. Several NEPs have learned the value in leveraging these existing activities and organizations through partnerships and division of labor on different efforts.
- Focus on local issues. It can be more effective to communicate about local impacts to communities (e.g., flooding, drought) rather than tackling the broader issue of climate change. Presenting local evidence of climate

change (e.g., changes in seasonal events or animal behavior, local projections of wetland loss) to local officials and the general public is often a useful approach to build support for adaptation.

- Link climate change adaptation messages to clean water supply and stormwater drainage. This can be an effective way to engage local decision makers, as constituents are increasingly concerned about these issues.
- Target entities most responsible for construction and maintenance of public infrastructure (e.g., municipalities,

counties or regional authorities) first to encourage greater willingness to engage on the impacts of sea level rise due to the significant fiscal implication of infrastructure loss or damage.

- Conduct meetings or phone calls with key stakeholders to help identify what stakeholders are already working on and their key needs for undertaking climate change adaptation. For some NEPs, these meetings revealed that stakeholders need specific targeted technical assistance on adaptation techniques rather than data or information on impacts.

## Climate Change Indicators and Monitoring Efforts

The development of climate change indicators for estuaries is still an evolving field, but there have already been a number of lessons learned from the CRE partners:

- Identify desired climate change information outputs prior to the beginning of the indicator selection process. For example, determine whether any outreach materials will be needed to communicate information on indicators, or how indicators will need to be incorporated into different types of management documents.
- Consider conducting a climate change vulnerability assessment prior to developing climate change indicators. A vulnerability assessment may be useful in order to ensure that the candidate list of indicators is comprehensive and to identify variables that are indicative of consequences rather than drivers.
- Explore the development of conceptual ecological models (CEMs) of climate change prior to developing indicators. CEMs are an excellent way to organize thoughts and visually portray complex relationships. CEMs are organized in a hierarchical way among drivers, stressors, ecological effects, key attributes, and measures. The measures point the way to key indicators of climate change.
- Draw up a universe of candidate indicators from which to consider. Identify any factors that are uncertain (such as the direct tie to climate change or available monitoring), as these factors will be important to consider later. Additional candidates can be added to the list as the process evolves.
- Obtain as much public and scientific input as possible on selecting a subset of indicators for more intense review. Citizens will help to keep the list relevant to public interests. A survey sent to all known stakeholders, posted on the website and listed in newsletters, is an excellent way to obtain many completed surveys.
- Recognize that regional efforts that cross state lines often require additional involvement from government agencies and other key stakeholders. The involvement of key local, state, and regional organizations will be important to discuss during the initial stages of any indicator development process.



## Adaptation Planning Efforts

Adaptation plans may contain a wide range of adaptation actions that are designed to reduce impacts or exploit beneficial opportunities resulting from climate change. Adaptation planning efforts require coordination and collaboration at many levels.

Lessons learned from the CRE partners include:

- Start small. Demonstrating assessment and planning in one innovative community can generate interest to replicate and build on the effort for a much larger region.
- Build adaptation planning into other local, state, and/or federal planning efforts, in order to:
  - Ensure that climate change planning becomes a part of routine activities that public officials and citizens already support.
  - Bring more resources to bear and more easily achieve consensus.
- Incorporate adaptation into restoration efforts already underway. This may be a key management option for reducing vulnerability to future climate change impacts.
- Recognize that small steps do lead to future progress. Initiation of a climate adaptation process in one place will tend to generate interest and other financial and technical support, often from unlikely sources.
- Practice adaptive management. As new partners join and support fledgling adaptation efforts, process managers may have to adapt the initial scope and content of their work; often expanding and refocusing the overall effort to incorporate the interests of these new partners and to ensure their support for adaptation.



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