

Recommended Approach Taking on Climate Change within the Chesapeake Bay Program Partnership

September 3, 2014 Briefing

Drivers and Motivators

2014 Chesapeake Bay Watershed Agreement

Goal: Increase the resiliency of the Chesapeake Bay watershed including its living resources, habitats, public infrastructure and human communities to withstand adverse impacts from changing environmental and climate conditions.

- **Monitoring and Assessment Outcome:** Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs and projects
- **Adaptation Outcome:** Continually pursue, design, and construct restoration and protection projects to enhance the resiliency of bay and aquatic ecosystems from the impacts of coastal erosion, coastal flooding, more intense and more frequent storms and sea level rise.

2011 Adapting to Climate Change in the Chesapeake Bay STAC workshop

Actionable actions identified by the workshop participants:

1. **Embed climate change in decision making.**
2. **Focus on solutions** to specific problems.
3. Identify and prioritize **vulnerabilities and adaptive opportunities.**
4. **Build capacity.**
5. Research priorities.

2010 Chesapeake Bay TMDL

“To carry out a more complete analysis of climate change effects, changes will be needed to the current suite of Bay models and tools including:

- **Applying the results from the next generation of global climate change models** to develop the best available estimates of the effects of climate change on the mid-Atlantic region
- Developing a better means for **down-scaling the results from the applicable global climate change models** to match the finer segmentation of the Phase 5.3 Chesapeake Bay Watershed Model

- Developing the means to better understand and fully simulate the **interactions between increased evapotranspiration and high intensity precipitation events** within the Chesapeake Bay Watershed Model
- Building the capacity to **simulate the effects of change in tidal water column temperatures** on all the existing temperature dependent rates and processes currently simulated with the hydrodynamic, estuarine water quality, sediment transport, living resources and filter feeder component models of the Chesapeake Bay Water Quality and Sediment Transport Model
- Reevaluate the **temperature dependent effects on key species and communities** (e.g., eelgrass) to ensure the latest scientific understanding has been factored into the suite of Bay models.”

“EPA and its partners are committed to conducting a more complete analysis of climate change effects on nitrogen, phosphorus, and sediment loads and allocations in time for the mid-course assessment of Chesapeake Bay TMDL progress in 2017 as called for in Section 203 of the Chesapeake Executive Order 13508 (May 12, 2009. *To do that will require building the capacity to quantify the impacts of climate change at the scale of the Bay TMDL—92 Bay segments and their surrounding watersheds at the scale of the Phase II Watershed Implementation Plans’ target loads—and incorporate that information into the full suite of Bay models and other decision support tools.*”

2009 Executive Order

Adapting to the impacts of climate change involves maintaining or enhancing the resiliency and reducing the vulnerability of the Chesapeake Bay and its watershed. The design and implementation of adaptation strategies includes careful analysis of existing decision-making processes. It is necessary to understand:

- **rates** at which conditions are changing and are projected to change in the future;
- how various **factors**, such as land-use changes, interact with climate change impacts;
- likely **consequences** for water quality, habitats, fish and wildlife and communities.

2008 STAC Climate Change Report

“The Bay Program and its partners can and should immediately require all major resource management decisions to include an assessment that (1) identifies climatic assumptions, (2) evaluates the potential for climatic change to undermine or alter these assumptions, and (3) explicitly considers alternative management options that are more resilient and adaptive.

The Bay Program and its partners should take the lead in establishing an organization that links climate science, policy, and management throughout the watershed as quickly as possible.

The Bay Program and its partners should take immediate action to promote and support the development of a Baywide Climate Change Action Plan.”

Scoping Out Climate Change Effects and Impacts

1) Focus on quantifying the individual and then the cumulative effects of the manifestations of climate change:

- Sea level rise and inundation of lowland coastal areas
- Higher sea levels at the Bay/ocean boundary
- Loss of tidal wetlands
- Changes in evapotranspiration
- Changes in precipitation levels and intensity
- Changes in humidity levels
- Changes in atmospheric carbon dioxide concentrations
- Increases in estuarine water column temperature
- Increases in salinity
- Changes in dissolved oxygen saturation levels
- Increased water column density
- Climate change effects on attainment of air quality standards

2) Quantify the direct and indirect impacts on the Chesapeake Bay ecosystem:

- Changes in storm intensity
- Changes in stream and river flows from the watershed
- Changes in nutrient and sediment pollutant loads from the watershed
- Changes in relative effectiveness of BMPs
- Changes in land use
- Changes in estuarine water column stratification
- Changes in atmospheric nitrogen deposition
- Level of effort required to achieve dissolved oxygen, water clarity, SAV, and chlorophyll *a* water quality standards
- Implications for eelgrass populations due to temperature sensitivity
- Estuarine water column temperature increases influence on biological rates and activities

3) Establish linkages with Bay and watershed restoration and protection actions and strategies:

- Wetlands and stream restoration
- Fisheries management
- Continue to flesh out this list....

Taking on Climate Change within the Partnership

Bring on Board the Partnership's Climate Change Coordinator

1. Incorporate Climate Change Considerations into the Partnership Shared Decision Making.
 - Lead and coordinate efforts to develop both policy and programmatic mechanisms necessary for proactively building consideration of climate change into the Chesapeake Bay Program partnership's collaborative decision making processes.

- Lead planning efforts to assess vulnerability and to identify and prioritize adaptation response strategies.
 - Identify and pursue opportunities that ensure that the Partnership's Management Strategies include evaluation changing conditions on both the cost and efficacy of the restoration and protection actions and explicitly target the implementation of management options that increase resilience or facilitate adaptation to changing conditions.
2. Build and Enhance the Institutional Capacity to Prepare for and Respond to Climate Change.
- Build the capacity among Chesapeake Bay Program partnership professional staff and researchers to understand and address the consequences of changing climatic conditions.
 - Building capacity for informal collaboration across organizational, jurisdictional and disciplinary boundaries.
 - Coordinate the collection of data and the development of tools and communication and decision-support products to increase knowledge and capacity to plan for and implement restoration and protection efforts that build community and ecosystem resilience.
3. Establish Mechanisms for the Prioritization of Evaluation of Impacts from and Adaptation to Climate Change.
- Work to maximize the effectiveness of existing management practices by securing Partnership adoption of a decision framework to identify climate change impacts and their effects on the performance of specific management practices, restoration actions, and protection measures.
 - Provide the Partnership with the ability to systematically prioritize impacts based on criteria such as risk, vulnerability, and opportunity.
 - Work to inform the Partnership's decision makers with the data, tools, resources, and support to assess climate vulnerability and establish and set priorities for increasing the ecosystem resiliency.
 - Ensure the Partnership's decision makers understand the consequences of their decisions in light of widely available information about the plausible range of future conditions.
4. Facilitate Information Exchange Between Researchers and Decision-Makers.
- Build and direct an integrated, interdisciplinary team of climate change professionals focused on climate change research, coordination, and information sharing.
 - Work through the team to develop collective research agenda, as well as an information portal as the means to share and funnel data, information, tools and decision-making products into the Partnership's shared decision processes to support adaptive management planning for protection and restoration activities.
 - Identify and pursue opportunities, including the pursuit of external funding, to develop and advance collective research priorities directed toward reducing

key uncertainties, improving and integrating monitoring networks and modeling systems, and expanding relevant dimensions of social science and communications research.

5. Serve as the Chesapeake Bay Program Partnership Climate Change Liaison.
 - Develop and foster a strong working relationship with researchers, policy makers, resource managers, academia and officials of other federal, state, regional and local agencies.
 - Represent the Partnership on various task forces, panels, committees (e.g., Chesapeake Bay Sentinel Site Cooperative), and initiatives (e.g., Climate Change Communications Consortium) related to climate change.
 - Represent the Partnership's position and/or explain policies and programs to public interest groups.
 - Pursue, foster and engage in collaborative partnerships with managers and officials of other federal, state, regional and local agencies to advance and promote the Partnerships' climate change resiliency objectives.

Establish An Interagency Climate Change Workgroup Under STAR

- Develop the workgroup charge
- Secure strong leadership from the Partnership in the form of a chair and vice chair

Carry Out this Work in a Sequenced Manner Over Time

2014 – Getting Organized

- Hiring the Partnership's Climate Change coordinator
- Establishing the Climate Change Workgroup under STAR

2015 – Getting the Partnership Bought into How We Plan to Embed Climate Change in Partnership Decision-making

- Reach consensus on how to address climate change with the 2017 Bay TMDL midpoint assessment and within each of the forthcoming Management Strategies
- Building the tools and assessment capacity
- Refining the Partnership's suite of environmental models
- Collaborating with numerous researchers to factor in their data, research findings, insights

2016 – Conducting Assessments of Effect, Impacts, Vulnerabilities and Adaptation Opportunities

2017 – Making Partnership Decisions on the Long Term Path Forward

2018 – Factoring in Decisions into the Phase III WIPs and the Management Strategies