



Chesapeake Bay Program
SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE

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STAC Report to the Chesapeake Bay Executive Council
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Adaptive management of the Chesapeake Bay Watershed or any ecosystem requires a careful understanding of the uncertainties related to the ecosystem, the development of policy, the effectiveness of specific management actions and policies, the accuracy and appropriateness of measures used to evaluate those actions and policies, and the interim analysis of the success of any action or policy. The Chesapeake Bay Program's (CBP) Scientific and Technical Advisory Committee (STAC) acts as an independent advisor to the CBP Partnership, investigating the uncertainties associated with all portions of the adaptive management enterprise as described above, and works closely with the CBP to ensure the effective implementation of an adaptive management ecosystem-based approach throughout the Chesapeake Bay Watershed.

Moreover, STAC's unique membership expertise, and its ability to access additional global scientific expertise, allows the Committee to serve as an independent entity with a wide external source of scientific and technical advice for all members of the CBP Partnership community, from federal agencies to state agencies and local stakeholders. In an effort to provide innovative solutions and suggest science-informed adaptation of existing programs, policies, and institutions to this array of stakeholders, STAC has devoted its time and efforts on the following priority activities in recent months:

- Assessed a suite of emerging hydrodynamic models for future CBP modeling efforts
- Investigated how to incorporate social science research within CBP decision-making
- Discussed how the CBP might institutionalize climate change science

The Future of Chesapeake Bay Program Modeling

Over the past decade, STAC has been closely involved in reviewing components of the suite of CBP models recently used to develop the Chesapeake Bay-Wide Total Maximum Daily Load (TMDL) allocations. Major components investigated in these reviews included: land use data and methodologies; water clarity and submerged aquatic vegetation components of the estuarine model; and water quality assessment methods. Following each review, the CBP made improvements to its suite of models based partly upon the recommendations forwarded by STAC. This review process has considerably improved the CBP's modeling capabilities. However, based upon concerns of some modeling experts and emergence of newer models, the CBP's current model suite is not likely to be used to determine allocations for the 2017 Phase III Watershed Implementation Plans (WIPs). Instead, the CBP is investigating alternative

hydrodynamic models that may better explain water quality parameters within the Chesapeake Bay. This presents an important opportunity for STAC and the scientific community to inform the future of Chesapeake Bay modeling.

STAC continues to stress the need for a new, innovative approach to modeling hydrodynamics within the Chesapeake Bay using multiple models. Similar to the National Hurricane Center's use of multiple hurricane forecast models to predict a more accurate storm path, the CBP could utilize multiple hydrodynamic models to provide alternative estimates of water quality parameters in the Chesapeake Bay. Moreover, this innovative approach will allow managers to view a range of possible water quality parameter estimates similar to the range of landfall predictions provided by multiple hurricane forecast models. On June 9-10, 2011, STAC convened a regional group of modeling experts to discuss the future of hydrodynamic models within the CBP, and this group will publish a report within the next few months describing their findings. STAC looks forward to continuing this work with the CBP, and with external modeling experts in the coming year.

Incorporating the Social Sciences

Decision-makers are increasingly aware that human behavior is a key determinant affecting efforts to protect and restore the Chesapeake Bay Watershed. As the population within the Watershed continues to increase, it is more important than ever that the CBP understand human behavior and incorporate this knowledge into program and policy initiatives. Integrating social science research from fields such as anthropology, sociology, psychology, economics, and human geography into CBP decisions will lead to better programs and policies and a more engaged citizenry.

In March, 2011, STAC took what it considered the first step in establishing an innovative role for the social sciences within the CBP. The Committee convened a workshop of representatives from governmental and nongovernmental agencies to showcase specific examples of how social science research can be utilized to design and manage programs seeking to affect human behavior and the environment. Discussions following these presentations showed that managers across the watershed are receptive to using social science research in Chesapeake Bay restoration programs, but are unsure how to utilize social science research implications in the same manner that they have adopted ecological science lessons.

Now that managers have been introduced to some social science capabilities, STAC will work with the CBP over the coming year to locate and prioritize specific opportunities for utilizing social science expertise. Additionally, STAC will continue to recommend that only a truly integrated social and natural sciences approach will lead to the successful restoration and sustainable maintenance of the Chesapeake Bay Watershed.

Institutionalizing Climate and Vulnerability Sciences

It is clear that climate is a pervasive driver of Chesapeake Bay ecological processes. It is even more apparent that a changing climate threatens to undermine restoration efforts carried out over the past two decades. Since 2008, STAC has stressed the importance of considering potential

climate changes in all CBP policies and programs. STAC has consistently recommended that CBP leaders hire a qualified leader to oversee climate change research and the incorporation of climate change research into policies and programs, consider climate change in all policy decisions and provide direct and indirect support for targeted climate change research and development. It is the opinion of STAC that the CBP still fails to account for the likely effects of climate change in many of its protection and restoration efforts. In March, 2011, STAC held a workshop to discuss how the CBP as an institution might incorporate climate change effects into its decision-making processes. The following are major suggested strategies by the participants at the workshop, including federal, state, local government managers, scientists, and CBP partners:

- 1) Embed climate science into all research conducted and decisions made within the institution
- 2) Focus on solutions to specific problems already caused by the changing climate
- 3) Identify and prioritize vulnerabilities and opportunities for adaptation
- 4) Build institutional knowledge and capacity amongst professional staff
- 5) Identify specific research priorities

STAC will release a report with regards to these findings in the coming weeks, and looks forward to continued collaboration on this topic with the CBP. We contend that the time has come for a paradigm shift in CBP's approach to restoration programs. Historic average measurements of ecological processes provide managers with a perspective of how to restore the Chesapeake Bay for the past century. It is time that the CBP begins planning for the current century and beyond. Over the longer term, considering climate change in all restoration efforts will be essential to successfully restore the Chesapeake Bay and maintain it in a restored state.