Chesapeake Bay Program

410 Severn Avenue, Suite 112, Annapolis, Maryland 21403. 410-267-5700. FAX 410-267-5777. Toll free 800-968-7229

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Dr. Kirk Havens, STAC Chair
CBP Scientific and Technical Advisory Committee
645 Contees Wharf Road
Edgewater, Maryland 21037

Dear Dr. Havens:

Thank you for the opportunity to respond to the recommendations presented in the STAC workshop report entitled *Adapting to Climate Change in the Chesapeake Bay: A STAC workshop to monitor progress in addressing climate change across the Chesapeake Bay Watershed.* The Chesapeake Bay Program's (CBP) Management Board acknowledges that the climate is changing in the Chesapeake Bay watershed and that such change will have broad and far-reaching consequences. These include the extent to which current management practices will be effective in achieving water quality standards, impacts to living resources and their associated habitats, and wide-ranging effects on society, including changes to cultural and historical norms that have shaped societal values.

The Management Board appreciates STAC's broad and comprehensive interest in climate change and looks forward to a continued strong working relationship to ensure that these interests are reflected in CBP priorities. STAC's previous reports on climate change have highlighted 1) precipitation and sea level rise impacts, 2) changes in landscape ecology, 3) impacts on human health, 4) impacts on agriculture and food supply and 5) impacts on the Chesapeake ecosystem and the Chesapeake TMDL. The most recent STAC report, *Adapting to Climate Change in the Chesapeake Bay* follows STAC's comprehensive state of the science assessment on climate change, *Climate Change and the Chesapeake Bay State-of-the-Science Review and Recommendations (2008).* The scientific and technical information encompassed in these reports will provide a solid basis for designing and implementing an appropriate response to this issue going forward.

The CBP also appreciates that STAC has worked to make their recommendations consistent with recent CBP guidance on climate change, including EPA's *National Water Program Climate Change Strategy: Key Action Update (August 2010),* The White House Council on Environmental Quality's *Progress Report on the Interagency Climate Change Adaptation Task Force: Recommended Actions to Support a National Climate Change Adaptation Strategy (October 5, 2010)* and the *Executive Order on the Chesapeake Bay (May 12, 2009)* directive to assess the influence of climate change on the Chesapeake Bay TMDL by 2017.

Given the connections between the STAC recommendations and these high level policy drivers, we acknowledge the need to more fully address climate change as part of the CBP partnership's watershed restoration efforts.

Specific responses to the workshop recommendations follow.

Workshop Recommendation 1. Embed climate change in CBP decision-making

The Management Board agrees that climate change should be embedded in CBP decision-making. Examples of how this is being done include the requirements called for in the *President's Executive Order on Chesapeake Bay Protection and Restoration (May 12, 2009)* and the documentation of the Chesapeake Bay Total Maximum Daily Load (TMDL) issued in December 2010 to address the "…influence of climate change on the Chesapeake TMDL…" Under these directives the Management Board has agreed to examine the influence of climate change on the Chesapeake TMDL during the 2017 Midpoint Evaluation and make adjustments to the TMDL as needed. In addition, plans are underway for a CBP initiative across all its Goal Implementation Teams to infuse climate change considerations into all activities of the partnership. Also, due in part to STAC's focus on this issue, consideration of changing environmental conditions brought on by climate change are expected to be incorporated into Management Strategies being developed for each Outcome set forth under the new Chesapeake Bay Watershed Agreement. A separate Climate Resiliency Goal and associated Outcomes are also under consideration.

At the same time, the evolution of climate change strategies that are being developed in the Chesapeake watershed are less inclined toward a "singular lead or champion to support the consideration of climate change within Chesapeake decision making," as called for the STAC recommendations report, and more toward a cross-cutting process involving all levels of government and public policy. While this has not yet been worked out through the Partnership, STAC's recommendations/advice on the subject will be fully considered in decision-making on the final Agreement.

This perhaps reflects the perspective that climate change is a bigger job, and has a larger scope, than can be handled by a single position or entity and a response from the full range of governance, from municipalities, to States, to Federal agencies and departments is what is needed. It is less a matter of "climate change should be somebody's job" as called for in the STAC recommendations and more that climate change should be everybody's job, including all levels of government, research institutions, and regional programs like the CBP. Having said that, I do believe it is important to designate an individual to help coordinate a climate change effort across the full range of CBP activities. The Chesapeake Bay Program Office has directed funding support in the FY 2014 budget to secure a Climate Change Coordinator who will be responsible for cross-GIT and cross-agency coordination.

Examples of how agencies and local communities are adapting to climate change in their own unique place-based fashion includes the response of the naval base in Norfolk, which is developing new ways to raise piers by applying new two level pier designs to keep essential dock infrastructure out of rising waters. In addition, Norfolk is using social media to warn citizens of high tides requiring the movement of vehicles from frequently inundated streets. At the same time, broad strategic plans are being developed by Maryland and other Bay Program states. Many activities underway in the states (e.g., MD Climate Change Commission, MADE CLEAR, etc.) will be drawn

upon to articulate a clearer consensus of what types of actions might be included in management strategies to address climate related impacts.

These are just some of the local and state-led adaptations to climate change that are underway and are specifically adapted to individual community or regional needs.

Workshop Recommendation 2. Focus on solutions to specific problems

The Management Board concurs with this recommendation. The CBP will be assessing the influence of climate change on the Chesapeake Bay TMDL, which is planned as part of the 2017 Midpoint Assessment. This will be a broad ranging assessment that will include future estimated flows, nutrient loads, temperatures, land use, sea level rise, wetland loss due to inundation, and the sensitivity of key living resources such as eelgrass (*Zostera*). Using the 2017 Midpoint Assessment does not preclude us from starting immediately to identify potential climate change impacts and evaluating how they might be addressed. Activities also are underway by federal, state, local governments and NGOs to consider the impacts of climate change on wetland restoration (evaluating ample shoreward space for migration), changes in pH (acidification), etc.

Workshop Recommendation 3. Identify and prioritize vulnerabilities and opportunities for adaption

The Management Board concurs that climate change is a pervasive driver of Chesapeake Bay processes and has far-reaching consequences. As STAC has suggested, the CBP is actively examining key vulnerabilities and adaptive opportunities, which include the examination of opportunities to incorporate climate change into planned revisions to the TMDL and the Watershed Implementation Plans (WIPs). The Chesapeake water quality standards are the specific imperative because the living resource based standards must be met and maintained despite the influences of climate change. The assessment of the Phase 3 WIPs for the final BMPs and management actions between 2017 and 2025 provides an opportunity to consider management actions needed to address impacts and implications of climate change on the Chesapeake TMDL.

Workshop Recommendation 4. Build capacity

The Management Board concurs that CBP institutions can work to build capacity among professional staff to understand and address the consequences of changing climatic conditions. The CBP structure provides a unique opportunity to build the capacity for informal collaboration across organizational and disciplinary boundaries. The CBP capacity building efforts will ultimately result in management actions that respond to climate change in the WIPS. It is equally important that climate change impacts and adaptation opportunities also be considered across all other goal implementation activities.

Current assessments of climate change in the Chesapeake are underway and include active CBP collaboration with researchers from 1) EPA's Global Change Research Program 2) Penn State 3) University of Maryland, 4) USGS, and providing the CBP with additional high quality climate change analysis and other collaborative assessments of climate change with principal investigators from Johns Hopkins and the University of Virginia. Most jurisdictions within the watershed have initiated or completed climate change assessments and adaptation plans. Many local governments, especially in coastal areas, have begun to recognize the importance and urgency of responding to climate change impacts which are already occurring. The advocacy and conservation communities

also recognize the need to assess and respond to changing environmental conditions in the watershed.

Workshop Recommendation 5. Research priorities

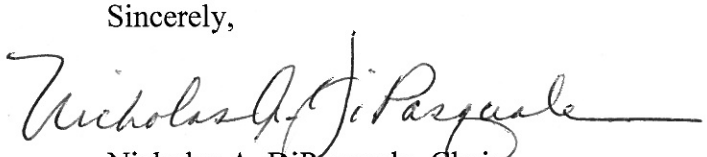
The Management Board agrees that the uncertainties associated with climate change need to be addressed. The various climate change uncertainties were comprehensively addressed by previous STAC reports on climate change (Pyke et al. 2008; Najjar et al. 2010). Examples of the CBP addressing the uncertainties include improved projections of precipitation and streamflow in the Chesapeake watershed undertaken with assistance and collaboration from researchers from Penn State and EPA. To address the interaction of land use changes and climate change, an estimate of Chesapeake watershed land use in every decade between the current period and 2100 is under way and key aspects of this work will be incorporated into the analysis associated with the 2017 Midpoint Assessment. In addition, the direct impacts of warming on Bay biogeochemistry and living resources will be included with the CBP models with the application of temperature corrected reaction rates as well as the refinement of temperature sensitivities of key living resources. Ongoing efforts also are underway looking at the past record of climate change in the Chesapeake watershed with monitoring observations.

The current generation of linked CBP models of the watershed, air-shed and estuary are being refined to include the changes in land use, stream flow, sea level rise, temperature and ocean boundary conditions brought about by climate change which would influence key metrics, such as deep water hypoxia. As recommended in the STAC report, strategic investments in the next generation of modeling tools are underway in order to understand the implications of changing conditions for management targets, particularly for the 2017 Midpoint Assessment.

The climate change recommendations of STAC are important to the CBP, and are also important as a record of recommendations for policy and research for coastal watersheds everywhere. In that light, STAC's recommendation of "case study research on policy dynamics across organizational, jurisdictional, sectoral, and disciplinary boundaries" in other coastal watershed regions is most welcome. This approach, as STAC has suggested, would support wide reaching advances in the consideration of novel institutional options, and on coordinating climate change adaptation actions across diverse stakeholder networks. The CBP encourages STAC to continue this work.

In closing, on behalf of the Management Board, please extend my thanks to the workshop steering committee and participants for their time and effort in the workshop as well as STAC members generally for their attention to climate change with both climate change workshops and a major climate change report over the last few years. We remain, as always, appreciative of STAC's role in providing independent insight and guidance in management of the Chesapeake Bay restoration effort.

Sincerely,



Nicholas A. DiPasquale, Chair
Management Board

ec: Management Board Members
Goal Implementation Team Chairs