Climate Resiliency Workgroup STAR Update

MARK BENNETT, U.S. GEOLOGICAL SURVEY
CO-CHAIR, STAR CLIMATE RESILIENCY WORKGROUP

ZOË JOHNSON, NOAA CHESAPEAKE BAY OFFICE
CBP CLIMATE CHANGE COORDINATOR

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Chesapeake Bay Program
Science. Restoration. Partnership.

2014 Chesapeake Bay Agreement

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CLIMATE RESILIENCY

GOAL: Increase the resiliency of the Chesapeake Bay watershed, including its living resources, habitats, public infrastructure and 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.

Key Actions – Recent Efforts

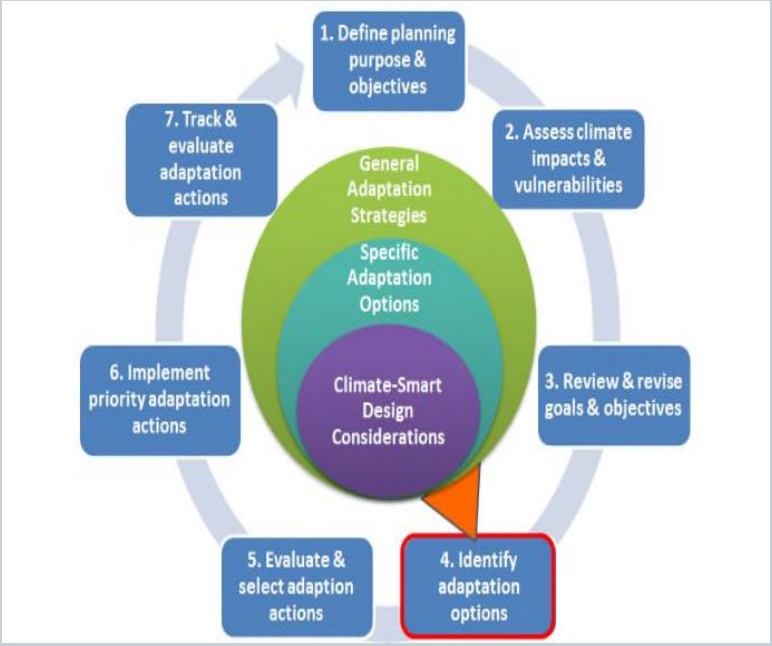
- Compendium of Climate Research and Adaptation Efforts
- Chesapeake Resiliency Newsletter
- FY16 GIT Funding Proposal – Development of Climate Change Indicators and Metrics for the CBP
- Climate Resiliency Analysis Matrix Project (FY15 GIT Funding)
- 2017 Mid-Point Assessment – Workgroup Guidance on Climate Change Data and Information

Climate Resiliency Analysis Matrix
Project Goals

- Develop a structured, science-based framework through which the principles of climate-smart adaptation planning can be effectively applied to the existing 29 management strategies in the Watershed Agreement
- Engage one-on-one with GITs to identify, assess, evaluate and revise climate-related elements of individual management strategies

CCAP Design Tool

- Developed to apply Climate Smart principles to coral reef adaptation plans, but highly applicable for incorporating climate change vulnerability considerations into Chesapeake Bay management strategies
- A structured approach, using a series of three related matrices that guide managers/ stakeholders through the process
- Focuses on developing "climate-smart design considerations," two categories of questions related to how climate change is likely to:
  - impact both the stressors being managed by an action; and
  - the effectiveness of the action itself



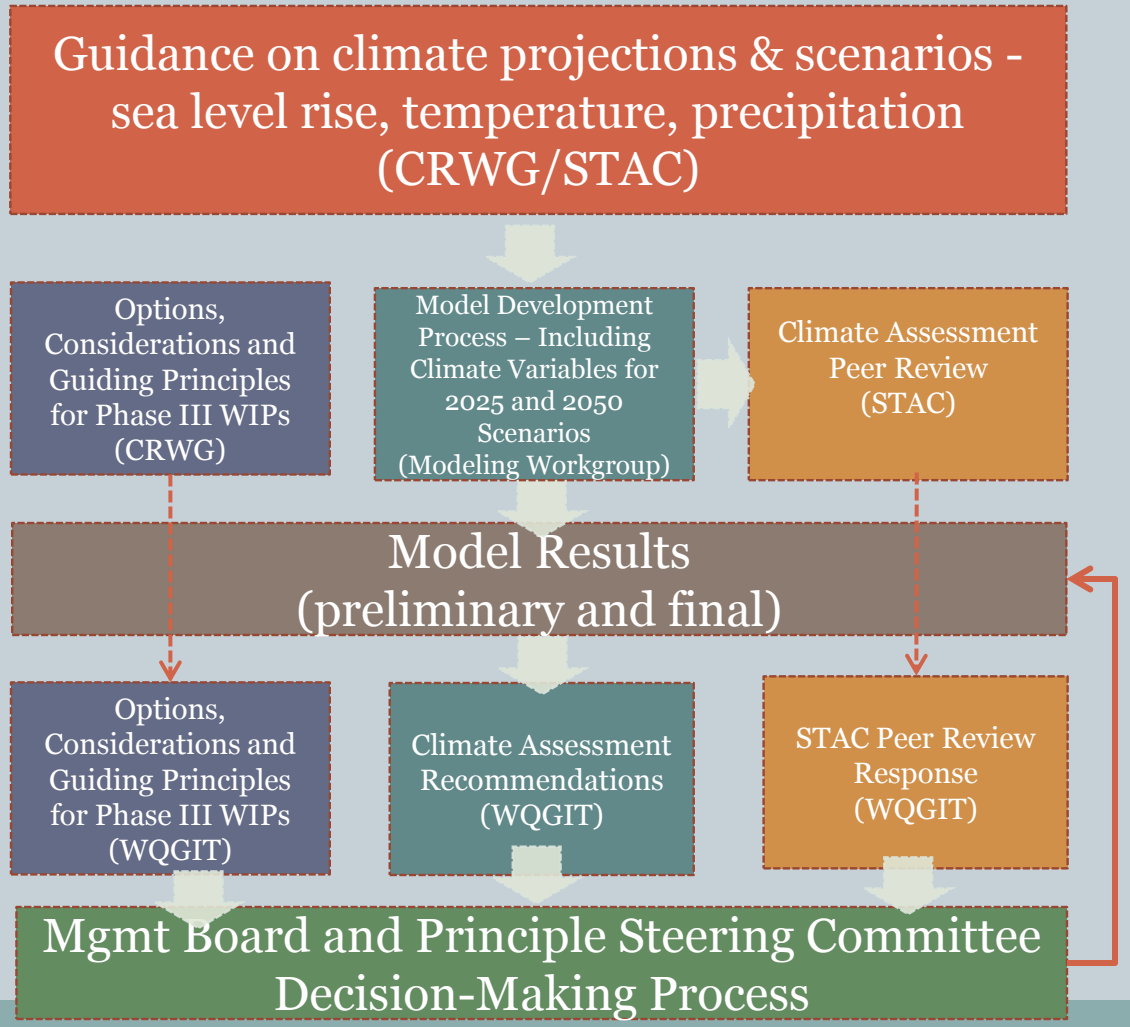
General Approach

- Tailor the concepts of Climate Smart Conservation Framework to incorporate consideration of climate change vulnerabilities into planned Chesapeake Bay management strategies and restoration actions
  - Utilize CCAP Adaptation Design Tool and framework as a starting point
- Use 2 workgroups as pilots to develop the approach:
  - Wetlands – Black Duck
  - Submerged Aquatic Vegetation
- Facilitate a structured approach (e.g., modified SDM) in a set of workshops to work through the process with each pilot workgroup
  - Workshops: Nov. 15-16, 2016, Shepardstown, WV.

Climate Change & the TMDL Mid-Point Assessment Considerations

- Assess how climate change may affect current water quality standards (i.e., nutrient and sediment source loads over time)
  - Precipitation change (increased volume and intensity)
  - Temperature increase (air and water)
  - Sea level rise (hydrodynamics and impacts to beneficial resources (i.e., wetlands)
- Evaluate climate impacts on the effectiveness of existing water quality BMPs over time
  - BMP water quality efficiencies
  - "Climate-smart " siting and design guidance for BMP implementation
- Explore options for if, how and when to address projected climate-related changes in water quality standards
  - Incorporate changes into Phase III WIPS
  - Add an explicit Margin of Safety (MOS)
  - Strategically incorporate into select BMP practices (e.g., wetland restoration, storm water)
  - Seek opportunities to prioritize BMP's with ancillary "climate resilience" benefits (storm surge and flood attenuation, shore protection)
  - Defer integration but continue to monitor, assess and adaptively manage

Climate Change Decision-Making Process



Chesapeake Bay TMDL 2017 Mid-Point Assessment

Recommendations on Incorporating Climate-Related Data Inputs and Assessments: Selection of Sea Level Rise Scenarios and Tidal Marsh Change Models

Climate Resiliency Workgroup

August 5, 2016

Climate Resiliency Workgroup Recommendations - SLR

- The CRWG recommends that the CBP leadership consider the application of the plausible range of sea level rise projections for CBWQSTM modeling efforts, with upper and lower limits, for the years 2025 and 2050.

- In selecting the range of scenarios, the upper bound should be consistent with a higher emissions scenario (but not the extreme upper scenario). This would result in the upper bound corresponding with the 99.5% probability, plus 0.1m to account for interannual variability.

- The lower range value should be within the “likely” range, as presented by Dr. Kopp, consistent with a lower emission scenario (RCP 2.6), but not be the extreme lower scenario which depicts historical tide gauge trend.

- Based on the considerations above, the CRWG recommends that the following range of sea level rise projections for 2025 (.2 - .4 m) and 2050 (.3-.8 m) be applied in the CBWQSTM.

Climate Resiliency Workgroup Recommendations - Wetlands

- Use a multi-model approach, tied to the CRWG's recommended range of sea level rise projections for 2025 and 2050, to gain estimates of current wetland area and projected wetland loss/gain. Use these estimates to inform watershed loads in the CBWQSTM modeling effort.

- To estimate project wetland gain/loss, analyze data results available through the National Wildlife Foundation, Sea Level Affecting Marsh Model v.5 of the Chesapeake Bay (2008) and data available through NOAA's Office for Coastal Management Sea Level Rise Marsh Impacts and Migration Tool.

- In interpreting the data available through these two products, assess whether the sea level rise projections used for the studies were consistent with the 2025 and 2050 SLR projections (as recommended by the CRWG); or, in the case of the NOAA Marsh Tool, whether data runs could be acquired for a different SLR scenario.

- The USGS/CBP GIS Team, which is working to compile the land use/land cover data set for the Midpoint Assessment, should work with the EPA/CBP Modeling Team to ensure there is consistency among the wetland classifications included in the marsh loss modeling outputs (NWF SLAMM (2008) and the NOAA Marsh Tool) to allow for side by side comparison of results.

Status – Modeling Workgroup

- The work is coming together including guidance provided by the Climate Change Workgroup and March 2016 STAC Workshop.
- The aim is to have all elements of estimated watershed loads, temperature increases, sea level rise, and tidal marsh loss fully integrated and operational for a 2025 and 2050 assessment by the October 4-5 Modeling Quarterly Review.
- The analysis will be presented at the October 24-25 WQGIT and discussions aimed at deciding if, when, and how to incorporate climate change considerations into the Phase III WIPs will begin.

2017 Mid Point Assessment
Climate Integration Timeline

Action	Partnership Group	Date
WEBINAR by the STAR Team's Modeling Workgroup and Climate Resiliency Workgroup Co-Chairs and Coordinators on recent climate change analyses for sea level rise projections, projected changes in water column temperatures, estimates for tidal wetland inundation, and the changes in the climatology and hydrology in the watershed..	All Partnership Groups	October 18, 2016 1:00 – 3:00 PM
DECISION to present the proposed climate change assessment procedures, including whether to use a 2025 or 2050 climate change projection to guide the future work of the Climate Resiliency Workgroup, as the WQGIT's recommendations to the Management Board.	WQGIT	October 24-25, 2016
DECISION on the ranges of options for if, when and how to factor climate change considerations into the Phase III WIPs with decisions in spring 2017 informed by the outcomes of the proposed climate change assessment procedures.	WQGIT	October 24-25, 2016
DECISION on the next steps, timeline and upcoming climate change related Partnership decisions.	WQGIT	October 24-25, 2016
DECISION on presenting the WQGIT's proposed climate change assessment procedures to the Principals' Staff Committee at their December 2016 meeting for a final decision.	Mgmt. Board	November 17, 2016
DECISION on presenting the WQGIT's proposed ranges of options for if, when and how to factor climate change considerations into the jurisdictions' Phase III WIPs with final Partnership decisions in spring 2017 informed by the outcomes of the proposed climate change assessment procedures to the Principals' Staff Committee at their December 2016 meeting for a final decision.	Mgmt. Board	November 17, 2016
DECISION on the proposed climate change assessment procedures.	PSC	December TBD 2016
DECISION on the proposed ranges of options for if, when and how to factor climate change considerations into the jurisdictions Phase III WIPs with decisions in spring 2017 informed by the outcomes of the proposed climate change assessment procedures.	PSC	December TBD 2016

Climate & the Mid-Point Assessment– Next Steps

- Continue to review and advise on the climate assessment methodology, including key data inputs.
  - October 18, 2016 Webinar to present most recent analysis and assessment process.

- Develop a list of options for incorporating climate considerations in Phase III Watershed Implementation Plans.
  - Formation of a small working group to assist with the exploring the list of options and developing guiding principals Phase III WIPs.
  - Please contact me (zoe.johnson@noaa.gov) if you are interested in serving on this small group.
  - September 19, 2016 CRWG In-Person Meeting to focus on this topic.

Questions

Mark Bennett
Director, USGS West Virginia and Virginia Water Science Center
(804) 261- 2643
mrbennet@usgs.gov

Zoë Johnson
Climate Change Coordinator
Chesapeake Bay Program
NOAA Chesapeake Bay Office
(410) 267-5656
zoe.johnson@noaa.gov