Chesapeake Bay Program
Science. Restoration. Partnership.

Monitoring & Assessment, Adaptation Outcomes

Climate Resiliency Working Group
Mark Bennett, USGS
Co-Chair

Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*


Chesapeake Bay Program
Science. Restoration. Partnership.

Climate Resiliency Outcomes
Management Strategy
2015–2025, v.1

Photo Credit: Lee Goodwin

I. Introduction

All aspects of life in the Chesapeake Bay watershed—from living resources to public health, from habitat to infrastructure—are at risk from the effects of a changing climate. As one of the most vulnerable regions in the nation, the Chesapeake Bay is expected to experience major shifts in environmental conditions. Warming temperatures, rising sea levels and more extreme weather events have already been observed in the region, along with coastal flooding, eroding shorelines and changes in the abundance and migration patterns of wildlife. The stakeholders of the Chesapeake Bay watershed are large and diverse and are a critical component of any work to evaluate current and possible future conditions of the watershed. It is important that the work of the Climate Change Work Group embrace the diversity of these stakeholders, which includes decision makers, and utilizes the best available science while being responsive to their needs as they deliberate and make choices about implementation of the management strategy.

1

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.

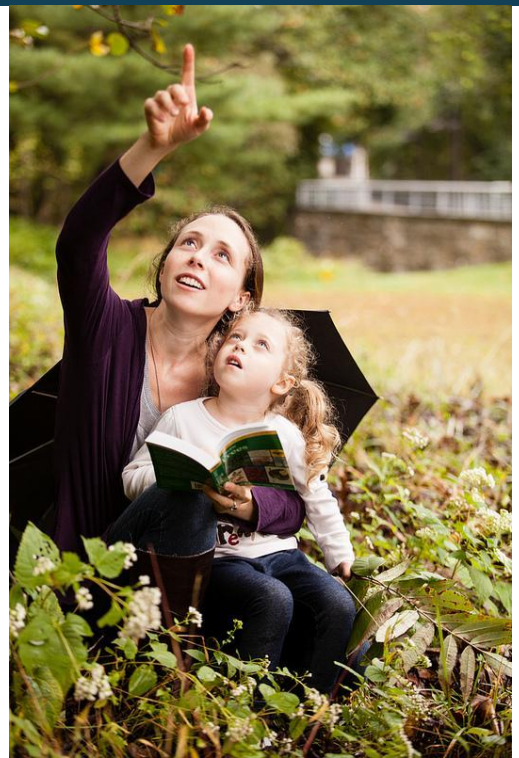
Monitoring & Assessment Outcome*:*

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.

What We Want



To have the Management Board support our efforts in:

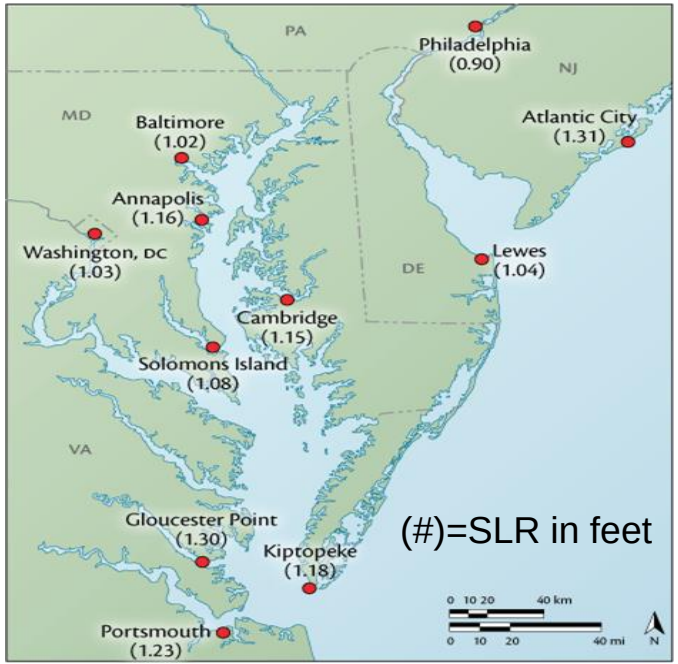
- Addressing recommendations for BMP Siting and Design data/research needs
- Developing a prioritized list of specific data needs for use by Citizen Science Programs
- Promoting utilization of the Chesapeake Bay Program Climate Smart Framework & Decision-Support Tool
- Incorporating climate change into the Phase III WIPs

1

Setting the Stage:

What are our assumptions?

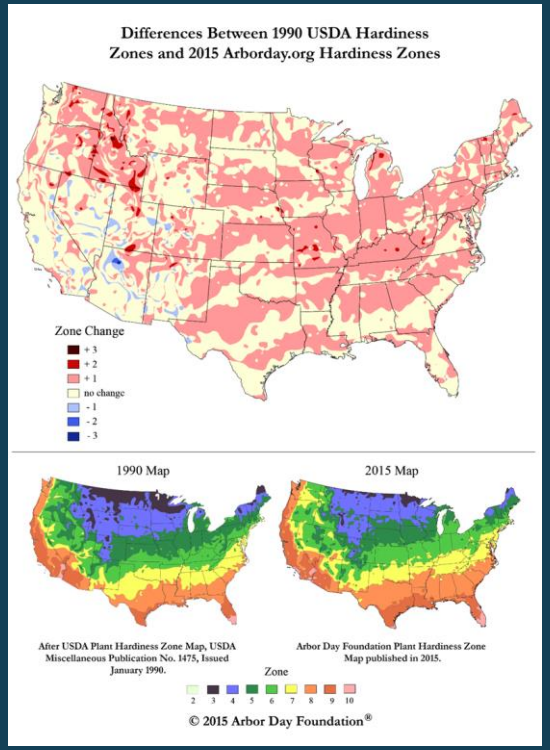
Climate Change: *Real Consequences*



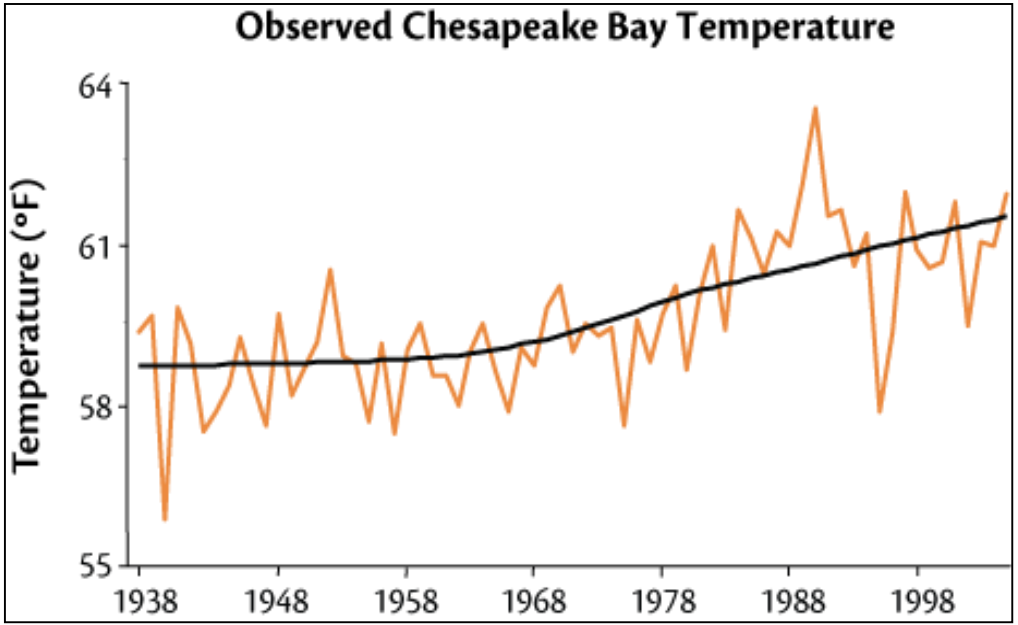
Sea level has risen approximately one-foot in the last century

Source: www.umces.edu/climateimpacts/

Climate Change: *Real Consequences*



Red areas have warmed since 1990 producing in a northward shift of zones

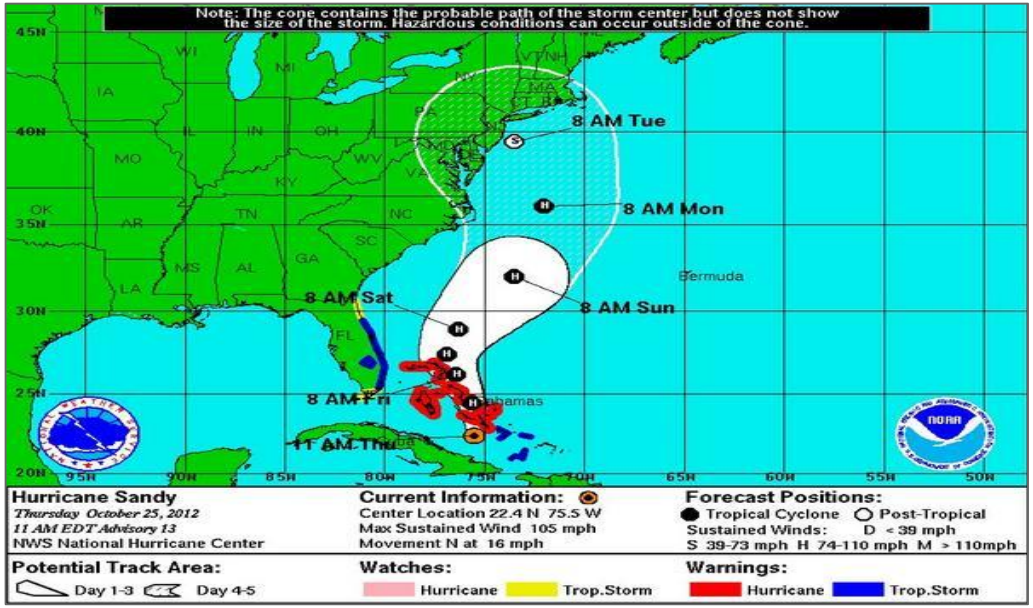


Chesapeake Bay has warmed by more than 2°F.

Climate Change: *Real Consequences*

Annapolis 2003 Balt Sun

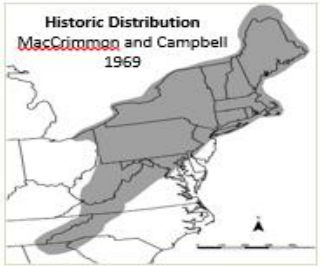
Ellicott City 2018 NY Times

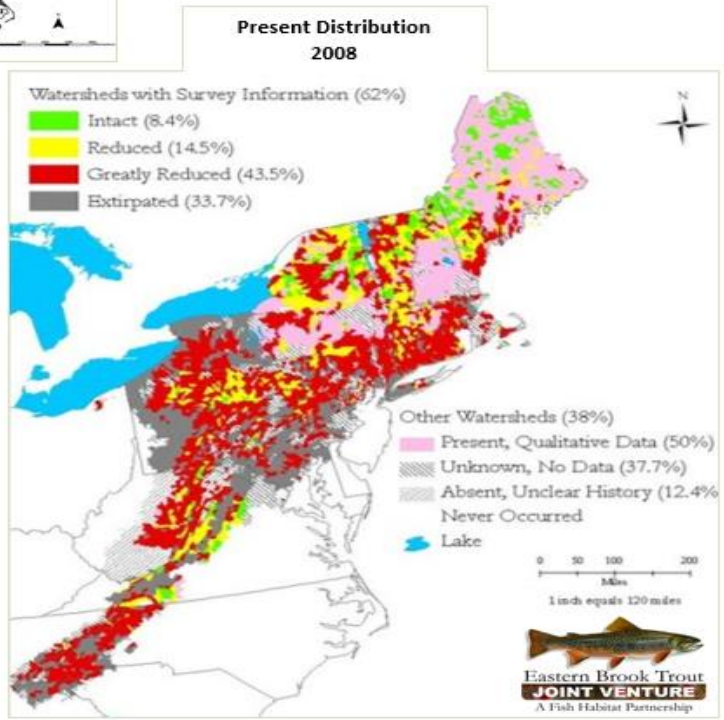


Extreme Events, such as Hurricane Isabel 2003, or higher intensity storm events (Ellicott City 2018) foreshadow the Watersheds vulnerability to climate change

Stream Temperature Change – Habitat Change Influences Living Resources (Geographic) Distributions in the Chesapeake Bay Region

Cross-Outcome Considerations





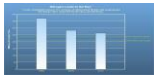
Agreement Goals and Outcomes

Sustainable Fisheries

- Blue Crab Abundance
- Blue Crab Management
- Oyster
- Forage Fish
- Fish Habitat

Vital Habitats Goal

- Wetlands
- Black Duck
- Stream Health
- Brook Trout
- Fish Passage
- Submerged Aquatic Vegetation (SAV)
- Forest Buffer
- Tree Canopy



Water Quality Goal

- 2017 Watershed Implementation Plans (WIP)
- 2025 WIP
- Water Quality Standards Attainment and Monitoring

Toxic Contaminants Goal

- Toxic Contaminants Research
  Toxic Contaminants Policy and Prevention

Healthy Watersheds Goal

- Healthy Waters

Stewardship Goal

- Citizen Stewardship
- Local Leadership
- Diversity

Land Conservation Goal

- Protected Lands
- Land Use Methods and Metrics Development
  Land Use Options Evaluation

Public Access Goal

- Public Access Site Development

Environmental Literacy Goal

- Student
- Sustainable Schools
- Environmental Literacy Planning

Climate Resiliency Goal

- Monitoring and Assessment
- Adaptation Outcome

Green = Climate Change links

Logic Behind Our Outcome

Factors Influencing Success

Current Efforts and Gaps

Management Approaches

Logic Behind Our Outcome

Following the Decision Framework:

Factors Influencing Success:

- Scientific Capabilities: data availability and accessibility
- Variability across the watershed
- Collaboration among Goal Implementation Teams

Gaps:

- Consistent incorporation of climate into jurisdiction efforts
- Indicators to inform decision making
- Impact of climate on BMPs

Management Approaches:

1. Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem
2. 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 frequent storms and sea level rise

2

Progress:

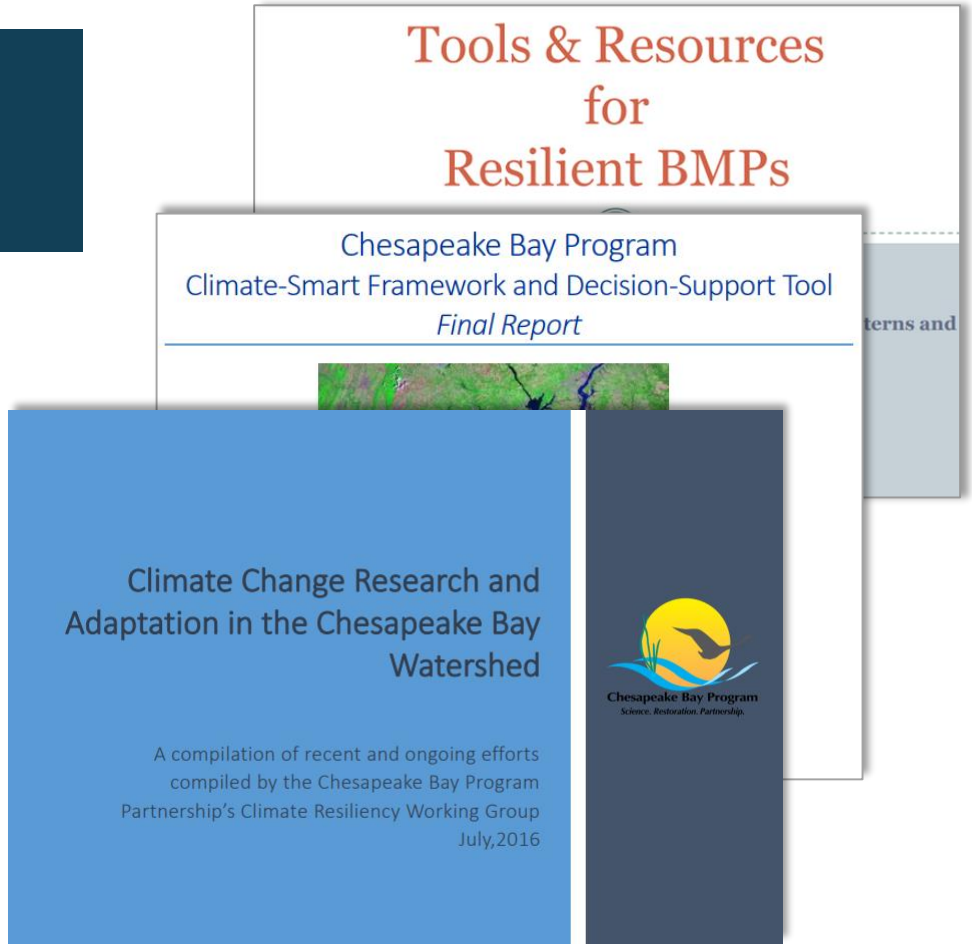
Are we doing what we said we would do?

What is our progress?

- Compendium of Climate Change Research and Adaptation Efforts (2016)
- Technical Recommendations to Modeling Workgroup: Guidance on climate projections & scenarios - sea level rise, temperature, precipitation "Recommendations on Incorporating Climate-Related Data Inputs and Assessments: Selection of Sea Level Rise Scenarios and Tidal Marsh Change Models"
- STAC Workshops: BMP and The Development of Climate Projections for Use in the Chesapeake Bay Program Assessments
- Development of Climate Change Indicators and Progress Measures for the Chesapeake Bay Program
- Three, One-Day Workshops for SAV, Blue Crabs, and Oysters: "An Analytical Framework for Aligning Chesapeake Bay Program Monitoring Efforts to Support Climate Change Impact and Trend Analyses and Adaptive Management"

What is our progress?

- Implementation of STAC Workshop "Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design"(September 2017)
- Climate Smart Framework & Decision-Support Tool Workshops with Toxic Contaminant, SAV, Tidal Wetlands workgroups
- Inform policy implementation of the Phase III Watershed Implementation Plans (WIPs) – 2017 mid-point assessment



Analysis

Which management actions will be the most critical to your progress in the future?

- STAC Workshop in September 2018: Chesapeake Bay Program Climate Change Modeling 2.0: Developing recommendations for new/refined methods for modeling techniques to assess future impacts of projected climate change on watershed loads and estuarine processes

- Research related to the impact of climate change on BMPs – "Starting with the 2022-2023 milestones, determine how climate change will impact the BMPs included in the WIPs and address these vulnerabilities in the two-year milestones"

3

Challenges:

Are our actions having the expected effect?

Challenges

What scientific, fiscal or policy-related developments or lessons learned (if any) have changed your logic or assumptions about your Outcome?

- Fiscal challenges associated with monitoring recommendations
- Uncertainty of climate science
- Lack of quantitative endpoints

4

Adaptations:

How should we adapt?

Based on what we've learned, we plan to…

What (if anything) would you recommend changing about your management approach at this time? Will these changes lead you to add, edit or remove content in your work plan?

- **Modify work plan format and narrow the work plan focus into four main areas:**
  - Shoreline condition and response;
  - Climate change on BMPs;
  - Inland and urban flooding;
  - Stream health condition

- **Potentially narrow the focus of the work plan to report on those activities that the Climate Resiliency Working Group directly impact**

Cross-Outcome Considerations

Continue to focus on climate change impacts to:

- Black Duck
- Wetlands
- SAV
- Brook Trout
- Water Quality
- Fish Habitat
- Forest Buffer
- Healthy Watersheds
- Stream Health
- Diversity

What We Want

To have the Management Board support our efforts in:

- Addressing recommendations for BMP Siting and Design data/research needs
- Developing a prioritized list of specific data needs for use by Citizen Science Programs
- Promoting utilization of the Chesapeake Bay Program Climate Smart Framework & Decision-Support Tool
- Incorporating climate change into the Phase III WIPs

Discussion