



# Climate Resiliency Workgroup Projects and Collaboration Opportunities

Agriculture Workgroup Meeting  
July 16, 2020

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# Chesapeake Bay Watershed Agreement

## II. Goal, Outcomes and Baseline

This management strategy identifies approaches for achieving the following goal and outcomes:



### ***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.

# Relevant Climate Resiliency Work Plan Actions

Action #	Description	Performance Target
<b>Monitoring and Assessment – Assess past and future trends</b>		
1.1	Design, implement, and maintain existing climate indicators and datasets	Continue to evaluate data to develop future climate change indicators including, but not limited to, fish population distribution, bay water temperature, tree canopy
<b>Adaptation – Address the design and function of BMPs under a new climate reality</b>		
1.1	Pursue priority recommendations from STAC workshop on BMP siting and design (2017)	Review and compile general guidance for BMP siting and design under future climate change
1.2		<b>Develop long term plans to address the broader, fundamental science needs of climate impacts on BMPs</b>

Workshop Report: **Monitoring and Assessing Impacts of Changes in Weather Patterns and Extreme Events on BMP Siting and Design**, [https://cfpub.epa.gov/si/si\\_public\\_record\\_report.cfm?Lab=NRMRL&dirEntryId=341421](https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=341421)

# Monitoring and Assessment: Climate Resiliency Workgroup (CRWG) Projects

- **Climate Indicator Development (~ Oct 2020 – Dec 2022)**
  - Develop 2-3 new climate indicators that have cross-workgroup use related to water quality, habitat, living resources, and/or communities
- **GIT-Funded Bay-Wide Climate Resilience Scorecard (~ May 2020 – Sep 2021)**
  - Contract awarded to RAND Corporation (Point of Contact: Krista Romita Grocholski)
  - Develop method to track climate resilience progress by inland and coastal communities in the Chesapeake Bay Watershed

**Point of Contact: Julie Reichert-Nguyen, CRWG Coordinator (NOAA)**

# Adaptation Projects: BMP Climate Resilience Assessment Efforts

- **STAC-Funded Climate Change Science Synthesis (~ Jan 2020 – Jan 20201)**
  - **Point of Contacts: Kurt Stephenson and Zach Easton**
  - Awarded to Virginia Tech: Assessing questions related BMP performance (nutrient/sediment cycling) to climate change impacts (e.g., warming, precipitation changes, extreme weather events, changes to growing season)
  - Includes focus on priority ag BMPs in Phase III WIPs
    - E.g., cover crops, animal waste management systems, grass and forest buffers, conservation plans, conservation tillage, nutrient management, pasture fencing, phytase feed additives, precision grazing, non-urban stream restoration
- **NOAA-EPA Interagency Agreement BMP Climate Funds (FY21)**
  - **Point of Contact: Julie Reichert-Nguyen**
  - Additional funds to support the assessment of BMP performance under changing climate conditions
    - Includes focus on tidal BMPs with co-benefits related to habitat and living resources (e.g., living shorelines, oyster practices)

# Adaptation Projects: BMP Climate Resiliency Assessment Efforts

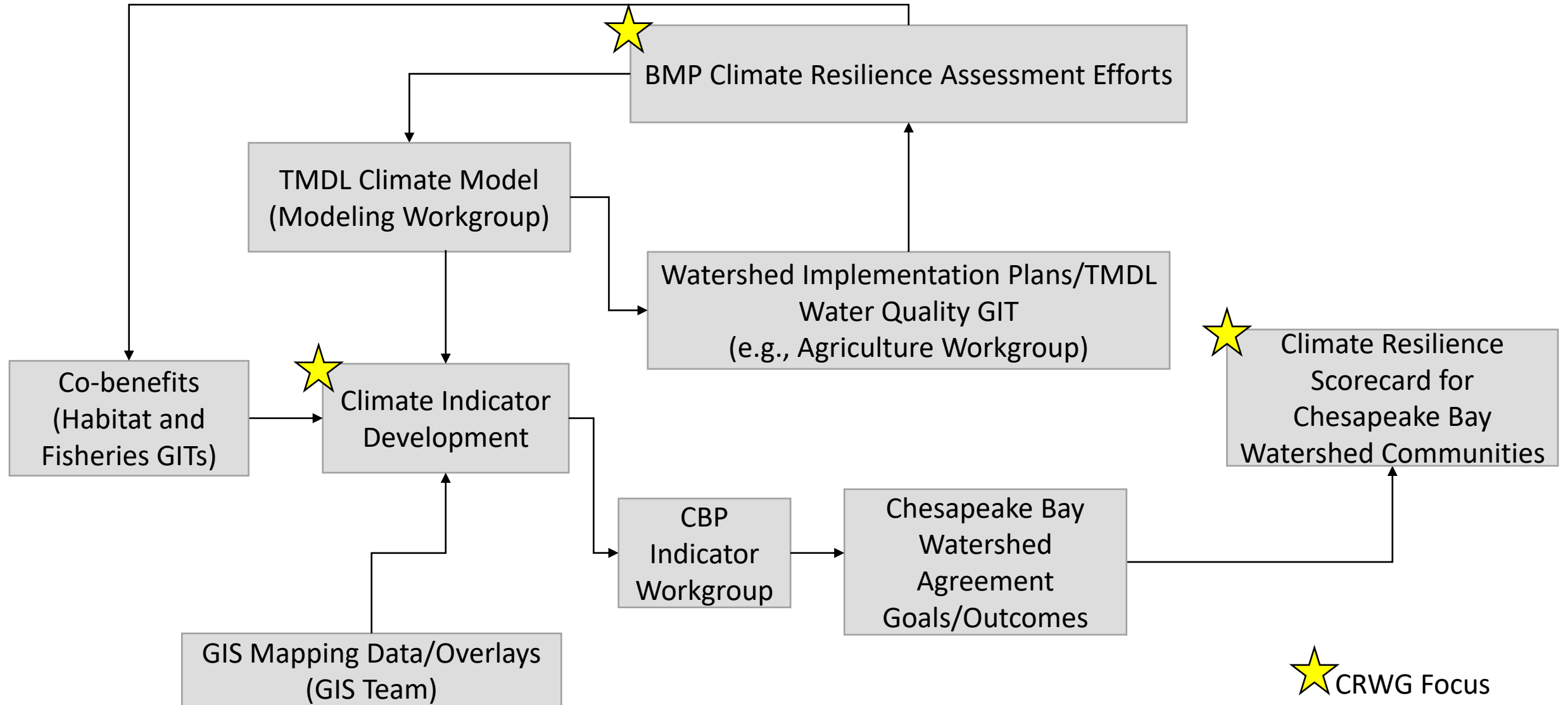
- **Urban Stormwater Workgroup (Point of Contact: David Wood, Chesapeake Stormwater Network)**
  - GIT-Funded – Piloting the Development of Probabilistic Intensity Duration Frequency (IDF) Curves for Chesapeake Bay Watershed (~ March 2020 – March 2021)
    - Evaluation of climate downscaling methods/calibration with historical precipitation extremes; quantification of climate model uncertainties for projected precipitation extremes
    - Urban stormwater BMP climate vulnerability assessment (~ Jan 2020 – October 2020)

## Virtual Flood Summit (September 24, 2020)

***Problem Statement:*** *As more and more communities face the increasing challenge of climate-related disasters involving inland and coastal flooding from extreme weather events, high tides, and sea level rise, there is a growing need for local decision makers to combine efforts across localities to harness support at a regional level to make the case to state and federal partners for funding actions to improve resiliency. Framing the issue, and making it one of hazard mitigation, national security, public safety, and economic vitality is critical to quantify the cost of doing nothing compared to securing resources to prepare for and better respond to flooding impacts.*

**Point of Contacts:** Jennifer Starr, LGAC Coordinator (Alliance for the Chesapeake Bay) and Julie Reichert-Nguyen, CRWG Coordinator (NOAA)

# Climate Resiliency Cross-Workgroup Collaboration





# CRWG Climate Indicators Project

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- GIT Funded Project:
  - 2017 - 2018
  - Eastern Research Group, Inc. (ERG)
- Goal: Conceptualize, select, and partially develop a suite of indicators that can be used to track progress toward the Climate Resiliency goal and outcomes in the 2014 Watershed Agreement

## Climate Change Indicators for the Chesapeake Bay Program: An Implementation Strategy

**Submitted to:**

Chesapeake Bay Program  
410 Severn Avenue, Suite 109  
Annapolis, MD 21403

**Submitted by:**

Eastern Research Group, Inc.  
2300 Wilson Blvd, Suite 350  
Arlington, VA 22201

**Revised Edition**  
**July 13, 2018**

# Indicator development process

**210 topics**

- ERG developed a master list of potential topics

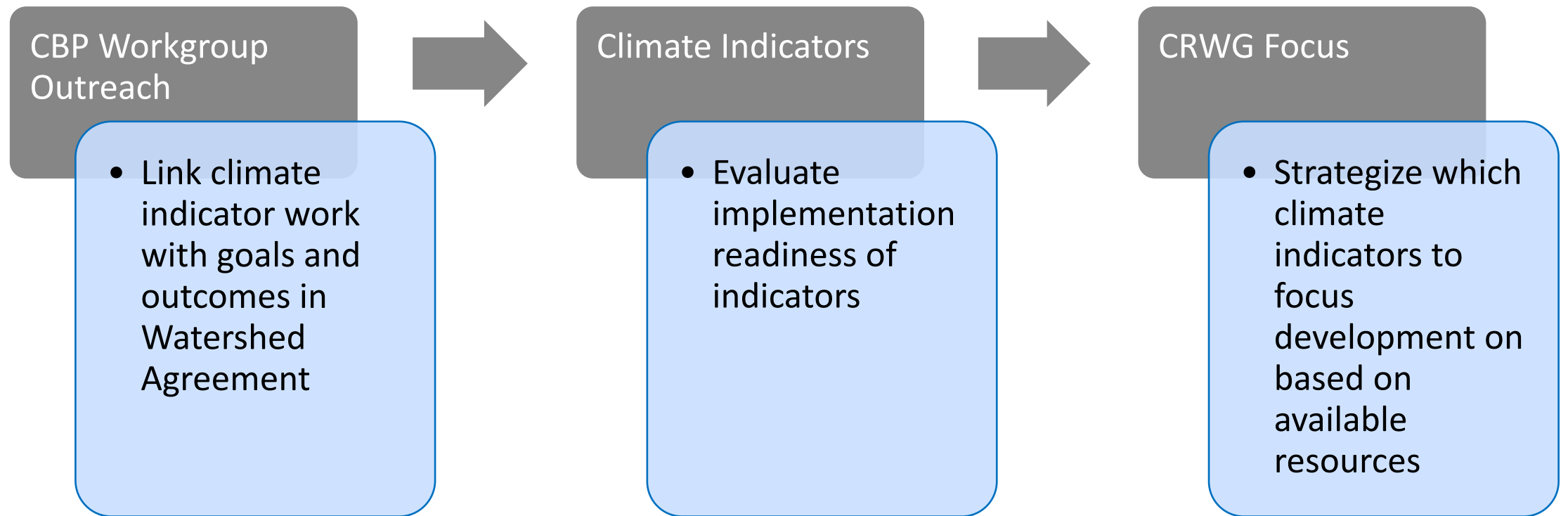
**21 indicators**

- Criteria was created for choosing indicators for development
- ERG proposed a suite of 21 indicators for possible development
  - Indicator Implementation Plan

**10 CBP indicators**

- Data and metrics for 9 indicators were available immediately
- Three were existing indicators with other workgroups: Protected Lands and Restored Oyster and Ag Wetland Habitat
- Seven were new climate indicators posted to Chesapeake Progress
  - <https://www.chesapeakeprogress.com/climate-change/climate-monitoring-and-assessment>

# Climate Indicator Development



# Climate Indicator Framework



Topic (green = indicator available)	Anticipated cost	Anticipated timeframe
<b>Group A: Indicators for Physical Stressors</b>		
Air Temperature	Low	Short-term
Precipitation	Low	Short-term
Sea Level Change	Low	Short-term
Stream Water Temperature	Low	Short-term
Acidification (low pH; low carbonate availability)	Low	Short-term
Bay Water Temperature	Moderate	Short-term
<b>Group B: Indicators for Climate Related Impacts</b>		
Upstream Flooding (River Flood Frequency & Magnitude)	Low	Short-term
Coastal Flooding	Low	Short-term
Submerged Aquatic Vegetation Composition	Medium	Medium-term
Wetland Extent and Physical Buffering Capacity	Medium	Short-term
Bird Species Ranges	Medium	Medium-term
Property at Risk or Damaged	High	Long-term
Fish Population Distribution	High	Long-term
Harmful Algal Blooms	TBD	Short-term
<b>Group C: Indicators to Measure Climate Resilience</b>		
Protected Lands	None	Short-term
Restored Habitat (Oyster and Ag wetlands)	None	Short-term
Land Use/Land Cover	Medium	Short-term
BMPs and Green Infrastructure	High	Medium-term
Shoreline Condition	High	Medium-term
Wetland Migration Corridors	High	Medium-term
Urban Tree Canopy	TBD	Short-term

**GREEN** = Indicator of some sort available on Chesapeake Progress

CBP Workgroup Interests  
(Habitat and Living Resources)

Wetlands  
Workgroup

SAV  
Workgroup

Forestry  
Workgroup

Fish Habitat  
Team

Fish Forage  
Team

Healthy  
Watersheds

Preliminary  
Evaluation:  
Selected by 4 or  
more workgroup  
leads



# Example from Workgroup Input

Physical Indicators  
(Signals of Change)



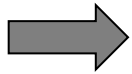
Impact Indicators  
(Ecological and Community Threats)



Climate Resilience  
Indicators  
(Preparedness)

Example:

Change in  
**Water  
Temperature**



## Habitat quality

- **Suitability** for key fish (brook trout, striped bass, forage fish) and SAV species
- Fish, SAV, tree species abundance and **distribution**



## BMP Implementation

- Temperature lowering BMPs (e.g., forest buffers) in high priority aquatic habitat areas

# Next Steps

- **Identify specific resilience indicators of interest with individual workgroups**
  - As BMP and modeling efforts progress, coordinate with Agriculture Workgroup to determine if there are agriculture-related climate resilience indicators that can be pursued
  - Are there any existing metrics/indicators that could be incorporated in the Climate Resilience Scorecard?
- **Expand BMP climate assessment efforts to include sea level rise**
  - Interest has been expressed to include evaluation of flooding and saltwater inundation impacts for relevant BMPs (could be relevant to some agriculture BMPs for coastal farms)

## QUESTIONS