

**BIENNIAL STRATEGY REVIEW SYSTEM**  
*Chesapeake Bay Program*



Logic and Action Plan: Post Quarterly Progress Meeting

**Climate Resiliency – 2018-2019**

[NOTE: make sure to edit **pre-** or **post-** in the text above, to tell the reader whether this logic and action plan is in preparation for your quarterly progress meeting or has been updated based on discussion at the quarterly progress meeting.]

**Long-term Target:** (the metric for success of Outcome)

**Two-year Target:** (increment of metric for success)

<b>Instructions:</b> Before your quarterly progress meeting, provide the status of individual actions in the table below using this color key.
Action has been completed or is moving forward as planned.
Action has encountered minor obstacles.
Action has not been taken or has encountered a serious barrier.

Additional instructions for completing or updating your logic and action plan can be found on [ChesapeakeDecisions](#).

Factor	Current Efforts	Gap	Actions	Metrics	Expected Response and Application	Learn/Adapt
<i>What is impacting our ability to achieve our outcome?</i>	<i>What current efforts are addressing this factor?</i>	<i>What further efforts or information are needed to fully address this factor?</i>	<i>What actions are essential (to help fill this gap) to achieve our outcome?</i>	<i>What will we measure or observe to determine progress in filling identified gap?</i>	<i>How and when do we expect these actions to address the identified gap? How might that affect our work going forward?</i>	<i>What did we learn from taking this action? How will this lesson impact our work?</i>
<b>Outcome: Monitoring and Assessment</b>						

<p><b>Monitoring &amp; Assessment: Scientific Capabilities.</b> The scientific capabilities to estimate, project, model and monitor ecosystem changes and impacts as a result of climate change are just emerging. Appropriate and accurate science and modeling are necessary for Chesapeake Bay Program partners to properly address climate impacts during policy planning and adaptation efforts.</p>	<p>STAC Chesapeake Bay Program Modeling 2.0 Workshop</p>	<p>Lack of scientific capability to monitor; lack of adequacy of downscaled climate data; continued efforts needed</p>	<p><b>2.1</b> <a href="#">Review recommendations of the 2018 STAC Climate Change Modeling 2.0 workshop and identify and implement follow-up actions in conjunction with the Water Quality GIT</a></p> <p><b>2.2</b> <a href="#">Review recommendations of the 2018 STAC Climate Change Modeling 2.0 workshop and identify and implement follow-up actions in conjunction with the Water Quality GIT</a></p>			
<p><b>Monitoring &amp; Assessment: Geographic extent/variability of the Watershed.</b> The impacts of climate change will be varied across the Watershed. It is important to not limit the focus of the management strategy to coastal issues alone but to recognize the wide range of monitoring,</p>	<p>Scientific data collection at DE, MD, VA NERRS sites to gain a better understanding of what is happening at the reserve level and how that can be applied to the Bay as a whole</p>	<p>Lack of data consistency and comparability among regions and sectors</p>	<p><b>2.3</b> <a href="#">Pursue research to support better understanding of precipitation changes with regards to intensity, annual amounts, seasonal impacts, storm events and storm water management</a></p>			

<p>assessment and adaptation needs throughout the region. However, the variability of the ecosystem within the Bay proper and the larger watershed presents challenges in data consistency and comparability among regions and sectors. The variability of ecosystems and ecosystem processes will also require different science and adaptation approaches.</p>			<p><a href="#">3.3 Maintain a database of climate change research efforts related to the 2014 Chesapeake Bay Agreement</a></p>			
<p><b>Monitoring &amp; Assessment: Complexity of the Monitoring Program.</b> Developing a monitoring program to detect ecosystem change and inform program and project response is a complex undertaking. Developing an acceptable monitoring approach for the watershed will be complex, and there are clear budgetary challenges associated with such long-term monitoring.</p>	<p>Data collected by NOAA Chesapeake Bay Sentinel Site Cooperative (CBSSC) and others that can assist with CBP monitoring efforts.</p>	<p>Institution capacity to develop and perform long-term monitoring to detect ecosystem change, and a steady funding source for such efforts.</p>	<p><a href="#">1.1 Design, implement and maintain annual monitoring and maintenance protocols to report on and review the existing suite of Chesapeake Bay Program (CBP) Climate Change Indicators and their corresponding data sets</a> <a href="#">3.5 Target engagement with educators, business leaders, state, municipalities, and local managers to enable incorporation of climate information/impacts into their decision-making</a></p>			

			<p><a href="#"><u>3.6 Target engagement with educators, business leaders, state, municipalities, and local managers to enable incorporation of climate information/impacts into their decision-making</u></a></p>			
<p><b>Monitoring &amp; Assessment: Non-Climate-Related and Multiple Stressors.</b> Overall, climate change impacts are particularly difficult to monitor and assess because they can be exacerbated by existing non-climate or human-induced stressors such as regional or localized land-subsidence, land use change, growth and development. It is often difficult to differentiate climate impacts from the impacts of other</p>	<p>MDE Water and Science Administration efforts to estimate the effects of imperviousness and lack of riparian shading on stream temperature, Fish Habitat Assessment being conduct by Fish Habitat Action Team, contractor will be hired to sit at COL with GIT funding.</p>	<p>Lack of understanding of the impact of non-climate related stressors on ecological restoration efforts</p>	<p><a href="#"><u>3.1 Promote the availability and accessibility of climate and other related science data and information</u></a></p>			
			<p><a href="#"><u>3.2 Promote the availability and accessibility of climate and other related science data and information</u></a></p>			

<p>stressors. An increased understanding of these interactions is necessary to successfully assess climate impacts, and the effectiveness of restoration and protection policies, programs and projects.</p>			<p><b>3.4</b> <u>Target engagement with educators, business leaders, state, municipalities, and local managers to enable incorporation of climate information/impacts into their decision-making</u></p>			
<b>Outcome: Adaptation</b>						
<p><b>Outcome Adaptation: Stakeholder engagement.</b> Although there is acknowledgement that climate change and adaptation need to be addressed, there is a lack of understanding or agreement from stakeholders on what it means to be resilient or what constitutes resiliency, including what kind of actions support an adaptive management approach. Lack of appropriate stakeholder engagement jeopardizes acceptance of choices made about action plans and implementation strategies, introducing</p>	<p>Facilitated online climate academy using Chesapeake Exploration (Bart Merrick); Virginia Resiliency Workshop in coordination with education community (Bart Merrick); BWET Grant with TNC focusing on resiliency and stakeholder engagement.</p>	<p>Lack of collective agreement; lack of coordination among stakeholders; lack of collaboration; hesitance to discuss managed retreat as an option.</p>	<p><b>4.3</b> <u>Convene a subset of Climate Resiliency Workgroup meetings as topic specific / "themed" meetings to allow for information sharing with groups doing similar work and improve cross goal coordination</u></p>			

<p>additional levels of social discord in an already complex environmental-economic-social landscape. If social stability is reduced, then policy effectiveness would likely be reduced.</p>						
<p><b>Outcome Adaptation: Lack of capacity.</b> Institutions and the private sector have a general lack of capacity to understand the science and incorporate meaningful change into plans, programs, processes or projects. Although building that capacity is paramount, it can be time consuming and costly, considering the resource constraints faced by governments and organizations.</p>	<p>Ongoing Maryland Climate Change Academy and related trainings to build institutional knowledge with infrastructure executives, business leaders, municipalities and state/local decision-makers; local city, state and university Sustainability Coordinators.</p>	<p>Lack of time and resources committed to building capacity to understand the science.</p>	<p><a href="#">1.3 Pursue priority recommendations from STAC workshop on BMP siting and design (2017)</a></p> <p><a href="#">2.2 Maintain listing or database of climate change adaptation efforts related to the 2014 Chesapeake Bay Agreement</a></p> <p><a href="#">3.3 Promote and support social marketing assessment to understand barriers to implementing living shorelines in MD, DE, and VA (GIT funding)</a></p>			
<p><b>Outcome Adaptation: Authority</b> Governments' and institutions' ability to respond to climate change is also limited by legislative, policy, regulatory and other authorities.</p>	<p>Individual jurisdictional incorporation of climate narrative (or voluntary numerical target) into WIPs III.</p>	<p>Lack of knowledge of institutional/regulatory barriers; Lack of incorporation of climate change across programs.</p>	<p><a href="#">4.4 Provide technical assistance to jurisdictions and DoD on incorporating climate change (via climate change narrative or additional measures) into Phase 3 WIPs in</a></p>			

			<a href="#">conjunction with the Water Quality GIT</a>			
			<a href="#">4.1 Utilize the Chesapeake Bay Program's SRS process to conduct a biennial review of the Climate Resiliency Workgroup and assess priorities</a>			
			<a href="#">4.2 Utilize the Chesapeake Bay Program's SRS process to conduct a biennial review of the Climate Resiliency Workgroup and assess priorities</a>			
<p><b>Outcome Adaptation: Adapting to Change and Lack of Guidance.</b> There is currently a lack of clear science (models, tools and metrics) and guidance for the Chesapeake Bay Program, as well as stakeholders, to use to develop plans or to measure efficacy of response. The nature of on-the-ground implementation often requires certainties (e.g., hydrology, water quality, temperature,</p>	<p>Ongoing research and models, tools and metric development by CBP partners</p>	<p>Development of clear science, tools and guidance to develop plans and efficacy of response; lack of extensive information (or information dissemination) on the costs of climate change impacts in specific areas, or the cost savings and ecosystem benefits represented by specific mitigation or adaptation measures.</p>	<p><a href="#">2.1 Consider lessons learned from the implementation of state and local-level adaptation planning efforts</a></p>			

precipitation, sea level rise, coastal erosion rates) that are not yet available for a changing climate.						
<b>Outcome Adaptation: Lack of Collaboration.</b> . The many and diverse stakeholders and organizations that make up the Bay Program are a strength, but it also causes collaboration challenges that must be addressed in order to leverage resources and provide consistent approaches across the watershed.	The Climate Resiliency Workgroup meets monthly to discuss a variety of climate topics; NOAA CBO engagement in the development of the NE Regional Action Plan; NOAA CBO engagement with regional partners on outcomes of Choptank Habitat Focus area vulnerability assessment.	Inability to achieve consensus and provide consistent approaches.	<a href="#">3.1 Promote utilization of “climate-smart” decision making tools and products</a>			
			<a href="#">3.2 Promote utilization of “climate-smart” decision making tools and products</a>			
<b>Outcome Adaptation: Variable adaptation approaches.</b> There is variability in institutional responses and the capacity to respond.	Climate Resiliency workgroup development of 7 unique climate resiliency indicators.	Lack of capacity to monitor long term the success of climate resiliency indicators	<a href="#">1.1 Pursue priority recommendations from STAC workshop on BMP siting and design (2017)</a>			
			<a href="#">1.2 Pursue priority recommendations from STAC workshop on BMP siting and design (2017)</a>			

**MONITORING & ASSESSMENT ACTIONS – 2018-2019**

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
<b>Monitoring &amp; Assessment - Management Approach 1: Assess past and future trends in sea level, precipitation patterns, temperature and ecosystem response to climate change</b>					
1.1	Design, implement and maintain annual monitoring and maintenance protocols to report on and review the existing suite of Chesapeake Bay Program (CBP) Climate Change Indicators and their corresponding data sets	Based on the climate change indicator criteria, continue to evaluate if additional data is available to develop future Climate Change indicators including but not limited to a Fish Population distribution Indicator and Bay Water Temperature Indicator as well as explore opportunities for tracking and reporting of relevant climate data for existing Tree Canopy Indicator	CRWG coordinator (NOAA), EPA Indicator Coordinator, CRWG, relevant workgroups		
<b>Monitoring &amp; Assessment - Management Approach 2: Develop a research agenda to improve understanding of climate impacts and fill critical data and research gaps</b>					
2.1	Review recommendations of the 2018 STAC Climate Change Modeling 2.0 workshop and identify and implement follow-up actions in conjunction with the Water Quality GIT	Inform climate projections and scenarios for input into future Chesapeake Bay watershed and estuarine modeling processes	CRWG, Modeling Workgroup, Water Quality GIT		
2.2	Review recommendations of the 2018 STAC Climate Change Modeling 2.0 workshop and identify and implement follow-up actions in conjunction with the Water Quality GIT	Brief the Climate Resiliency Workgroup on the completed Climate Change Modeling 2.0 Workshop report, relevant findings and identify next steps	CRWG, Modeling Workgroup, Water Quality GIT		
2.3	Pursue research to support better understanding of precipitation changes with regards to intensity, annual amounts, seasonal impacts, storm events and storm water management	Pursue research opportunities to address climate impacts due to precipitation changes to inform the TMDL	CRWG, Modeling Workgroup, Water Quality GIT		
<b>Monitoring &amp; Assessment - Management Approach 3: Undertake public, stakeholder and local engagement to increase understanding of climate change impacts</b>					
3.1	Promote the availability and accessibility of climate and other related science data and information	Develop a Chesapeake Bay Data and Mapping Portal of existing climate data and mapping in support of Chesapeake Bay Program needs	CBP GIS Team (USGS), CRWG		

**Commented [B51]:** Yellow: Progress has been made by partnering with US EPA's indicator team to feature Chesapeake Bay watershed climate indicators for average air temperature increases, changes in high temperature extremes, stream temperature change, change in total annual precipitation, river flood frequency and magnitude, and sea level rise.

Encountered some obstacles with maintenance of existing indicators – delay in updating current indicators on Chesapeake Progress (both CRWG and Status and Trends were without coordinators for some time; both groups now have coordinators). For the stream temperature indicator, US EPA's source for data updates the project funding ended – CRWG exploring new collaboration with USGS PA Water Science Center to connect their stream temperature compilation project with updating the stream temperature indicator. CRWG also looking to connect this indicator with impacts to habitats (e.g., brook trout habitat in healthy watersheds).

**Commented [B52]:** Green: Covered by IDF curves, and looked at other drivers for modeling effort

**Commented [J3R2]:** The IDF curve work is being spearheaded by the Urban Stormwater Workgroup – given CRWG limited capacity, we may want to consider rephrasing this to “provide support where needed from an advisory capacity” – Discuss with the Urban Stormwater Workgroup to continue to take the lead on this item.

**Commented [J4]:** Recommendation: We should re- envision this approach to connect with CRWG main priorities – climate indicators, BMP resilience, targeting adaptation strategies – use the climate resilience scorecard effort to tie in local leadership with our priorities as an end user.

**Commented [J5]:** The climate mapping open data portal was completed and available at <https://data-chesbay.opendata.arcgis.com/search?tags=Climate%20Resiliency>

However, it is unclear whether or how this information is being used for decision-making by stakeholders – recommend that the next work plan evaluate how this is being used.

**MONITORING & ASSESSMENT ACTIONS – 2018-2019**

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
3.2	Promote the availability and accessibility of climate and other related science data and information	Explore opportunities to provide NMFS regional downscaled climate model data to Chesapeake Bay Program Partners	NOAA, Fish GIT, CRWG, Water Quality GIT, Habitat GIT		
3.3	Maintain a database of climate change research efforts related to the 2014 Chesapeake Bay Agreement	Update 2016 Compendium of Chesapeake Bay Climate Change Research Efforts	CRC Staffers; NOAA; CRWG		
3.4	Target engagement with educators, business leaders, state, municipalities, and local managers to enable incorporation of climate information/impacts into their decision-making	Work with existing Chesapeake Bay educational network to provide data, information, and topical experts in support of targeted engagement related to climate change impacts	NOAA, CBNERRS, CRWG, Local Leadership workgroup		
3.5	Target engagement with educators, business leaders, state, municipalities, and local managers to enable incorporation of climate information/impacts into their decision-making	Develop partnerships to investigate opportunities for a "Chesapeake Bay Climate Adaptation Workshop"	CRWG		
3.6	Target engagement with educators, business leaders, state, municipalities, and local managers to enable incorporation of climate information/impacts into their decision-making	Identify existing regional conferences, forums and workshops that could support a "Chesapeake Bay Climate Adaptation Workshop" or adaptation related training	CRWG		

**Commented [BS6]:** Was supposed to be worked on this summer but was interrupted due to COVID.

Mark noted this is an action the partners are doing so maybe we should remove it from the next work plan

**Commented [BS7]:** List of research that we know has been conducted. Obstacle: Limited staff time to work on this action when more time needs to be dedicated to the technical actions and workgroup meetings. Need input from the workgroup on how useful this resource is.

Nicole Carlozo: Holding 10 minutes during each meeting to share research efforts – this may be more ...

**Commented [J8R7]:** To make this more manageable we could focus compiling what is shared during CRWG meetings.

**Commented [BS9]:** Julie served as a technical expert and presenter for NOAA educational events. ...

**Commented [BS10]:** Fostered a partnership with LGAC. LGAC and CRWG hosting a forum to discuss strategies to address/adapt to flooding from changing climate conditions – Julie and Cuiyin are on the ...

**Commented [JS11R10]:** Working with Local Government Advisory Committee on forum focused on developing recommendations to address flooding issues from changing climate conditions.

**Commented [J12R10]:** It would seem like this item should fall under the adaptation outcome. For next workplan we could look into incorporating the climate indicators and Bay-wide climate resilience scorecard ...

**Commented [BS13]:** Julie and Mark are on the planning committee for the Chesapeake Watershed Forum where the theme is, "Climate Resiliency in a Changing Chesapeake Watershed." Julie is facilitating ...

**Commented [BS14R13]:** Nicole Carlozo: Did we actually develop a comprehensive list of existing workshops where we could add on a half day event? Might want to revisit this to be broader than ...

**Commented [J15R13]:** I don't believe there was a comprehensive list and instead we took advantage of existing opportunities that presented themselves (LGAC climate flood forum, Chesapeake Watershed ...

## ADAPTATION ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
<b>Adaptation - Management Approach 1: Address the design and function of Best Management Practices (BMPs) under a new climate reality</b>					
1.1		Review and compile general guidance for BMP siting and design under future climate change	CRWG, WQGIT, NOAA, CRC Staff		
1.2	Pursue priority recommendations from STAC workshop on BMP siting and design (2017)	Develop long term plans to address the broader, fundamental science needs of climate impacts on BMPs	CRWG, WQGIT, NOAA, CRC Staff		
1.3		Pursue social marketing research related to improving understanding of the barriers to, as well as the benefits of, implementation of environmentally-sensitive shoreline management* (GIT funding)	Communications Workgroup, CRWG, MDE		
<b>Adaptation - Management Approach 2: Implement and track priority adaptation actions, their effectiveness and ecological response and lessons learned</b>					
2.1	Consider lessons learned from the implementation of state and local-level adaptation planning efforts	Review and discuss state level adaptation plans at future CRWG meetings to determine commonalities, gaps, data needs and lessons learned to inform future actions of the workgroup	CRWG, Modeling Workgroup, UMCES, VIMS, DCNR		
2.2	Maintain listing or database of climate change adaptation efforts related to the 2014 Chesapeake Bay Agreement	Review usage patterns of Climate Resiliency Workgroup newsletters and if warranted, update and promote the 2016 Compendium of Chesapeake Bay Climate Change Adaptation Efforts	CRC Staffers; NOAA; CRWG		
<b>Adaptation - Management Approach 3: Continually increase knowledge about the resiliency of the Chesapeake Bay watershed from the impacts of coastal erosion, inland and urban flooding, more intense and frequent storms and sea level rise</b>					
3.1	Promote utilization of “climate-smart” decision making tools and products	Train Chesapeake Bay Program Staff and CRWG members on Chesapeake Bay Program Climate Smart Framework & Decision support tool and US Global Change Research Program’s Climate Resilience Toolkit 5 step planning process, case studies and tools for utilization in their work and for incorporation with their stakeholders	NOAA in conjunction with other GITs and workgroups		

**Commented [BS16]:** IDF curves, still need to do work on this action item - ongoing

**Commented [J17R16]:** How is this different from the STAC report that compiled guidance on BMP siting and design? For next work plan, we should rephrase this to be specific on what recommendations we are pursuing and how.

**Commented [BS18]:** NOAA-EPA Inter-agency agreement CRC funds to VA Tech to build on BMP synthesis project. Yellow because this is not a long term plan, but will identify where we need research. The Inter-agency agreement was only ~ \$73,000 which is not enough for research. For this to be successful there needs to be a commitment of long-term funding.

**Commented [J19]:** I believe this effort is being spearheaded by the communications team.

We should consider revising this for the next workplan to state that we will help consult on and review communication research related to climate. We need to determine which actions makes sense for CRWG to be the lead on given the expertise of the workgroup and which actions other workgroups should lead and we support from an advisory capacity.

**Commented [BS20]:** We have not had time to review usage patterns of the newsletter. Someone outside the workgroup maintains the newsletter.

**Commented [J21R20]:** Obstacle: CRWG staff resources are limited and needed to support CRWG meetings and technical guidance on projects. While CRWG can provide resources we do not have the capacity to be the lead on all climate-related items. We should look into whether this action could be built into the communication workgroup’s workplan.

If we commit to maintaining a list of adaptation efforts then I recommend we focus on efforts directly related to CRWG priority areas.

**Commented [BS22]:** Did not train staff, but held meeting to understand lessons learned and challenges from the GITs that tested the Climate Smart Framework & Decision Tool. Didn’t work with the US Global Change Research Program’s Climate Resilience Toolkit 5. Training and holding workshops for this takes a lot of time and staff assistance, and CRWG leaders have ...

## ADAPTATION ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
3.2		Apply Chesapeake Bay Climate-Smart framework in coordination with two new/additional Chesapeake Bay Program workgroups or GITs	NOAA, CRWG, other GITs and workgroups		
3.3	Promote and support social marketing assessment to understand barriers to implementing living shorelines in MD, DE, and VA (GIT funding)	Convene subset of Chesapeake Bay Program staff and partners to conduct review of existing Chesapeake Bay Program social marketing research, strategies and relevant work	Communications Workgroup, MDE, CRWG, Citizen Stewardship workgroup, Wetlands workgroup		
<b>Adaptation - Management Approach 4: Address the institutional capacity of the Chesapeake Bay Program to prepare for and respond to climate change</b>					
4.1	Utilize the Chesapeake Bay Program's SRS process to conduct a biennial review of the Climate Resiliency Workgroup and assess priorities	Develop Climate Resiliency Workgroup work plan, logic table and update management strategies to determine the workgroup approach and actions for the next two years	CRWG		
4.2		Prepare Climate Resiliency Workgroup for the next round of SRS reviews by the Chesapeake Bay Program's Management Board	CRWG		
4.3	Convene a subset of Climate Resiliency Workgroup meetings as topic specific / "themed" meetings to allow for information sharing with groups doing similar work and improve cross goal coordination	Themes may include convening meeting of practitioners to share examples of climate adaptation measures of storm water BMPs; addressing sea level rise impacts; resiliency, shoreline condition and response; inland and urban flooding; as well as stream health and condition	CRWG; topical experts		
4.4	Provide technical assistance to jurisdictions and DoD on incorporating climate change (via climate change narrative or additional measures) into Phase 3 WIPs in conjunction with the Water Quality GIT	Analyze, synthesize and provide a synopsis of lessons learned, approaches, etc. across the climate change sections of jurisdictions Phase III WIPs (2019/2020) and provide recommendations	CRWG, WQGT, MDE		

**Commented [J23]:** Based on workgroup feedback, this climate smart framework needs some refinement to connect better with their work plan actions. We have been working with GITs/workgroups in other ways to incorporate climate considerations (see comment above for 3.1.

Obstacle: Resources to update framework and decision tool.

**Commented [J25R24]:** I recommend we streamline the next work plan and remove any duplicative actions. Also it would benefit us to identify CRWG key priorities that we will take the lead on versus items that we can support from an advisory capacity.

**Commented [BS24]:** Referring to GIT Funding project – same as above

