BIENNIAL STRATEGY REVIEW SYSTEM
Chesapeake Bay Program

Narrative Analysis

CLIMATE RESILIENCY OUTCOMES – NOVEMBER 14, 2020

THE NARRATIVE ANALYSIS SUMMARIZES THE FINDINGS OF THE LOGIC AND ACTION PLAN AND SERVES AS THE BRIDGE BETWEEN THE LOGIC AND ACTION PLAN AND THE QUARTERLY PROGRESS MEETING PRESENTATION. BASED ON WHAT YOU LEARNED OVER THE PAST TWO YEARS FROM YOUR SUCCESSES AND CHALLENGES, YOU WILL DESCRIBE WHETHER THE PARTNERSHIP SHOULD MAKE ADAPTATIONS OR CHANGE COURSE.

USE YOUR COMPLETED PRE-QUARTERLY LOGIC AND ACTION PLAN TO ANSWER THE QUESTIONS BELOW. AFTER THE QUARTERLY PROGRESS MEETING, YOUR RESPONSES TO THESE QUESTIONS WILL GUIDE YOUR UPDATES TO YOUR LOGIC AND ACTION PLAN. ADDITIONAL GUIDANCE CAN BE FOUND ON CHESAPEAKEDECISIONS.

1. EXAMINE YOUR RED/YELLOW/GREEN ANALYSIS OF YOUR MANAGEMENT ACTIONS. WHAT LESSONS HAVE YOU LEARNED OVER THE PAST TWO YEARS OF IMPLEMENTATION?

SUMMARIZE WHAT YOU HAVE LEARNED ABOUT WHAT WORKED AND WHAT DIDN'T. FOR EXAMPLE, HAVE YOU IDENTIFIED ADDITIONAL FACTORS TO CONSIDER OR FILLED AN INFORMATION GAP?

The Chesapeake Bay Program (CBP) Climate Resiliency Workgroup (CRWG) is responsible for both the **Monitoring and Assessment** and **Adaptation** outcomes under the climate resiliency goal in the Chesapeake Bay Watershed Agreement. Both outcomes have broad narrative objectives. The Monitoring and Assessment outcome involves tracking and assessing the trends and likely impacts of changing climate and sea level trends on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs and projects. The Adaptation outcome focuses on pursuing, designing, and constructing restoration and protection projects and emphasizes building resilience to impacts of coastal erosion, coastal flooding, and more frequent intense storms. Successes and challenges are presented below based on the following major themes related to meeting the climate resiliency outcomes: climate change indicators, TMDL climate model, best management practice (BMP) resilience, local engagement, and institutional capacity.

Climate Change Indicators

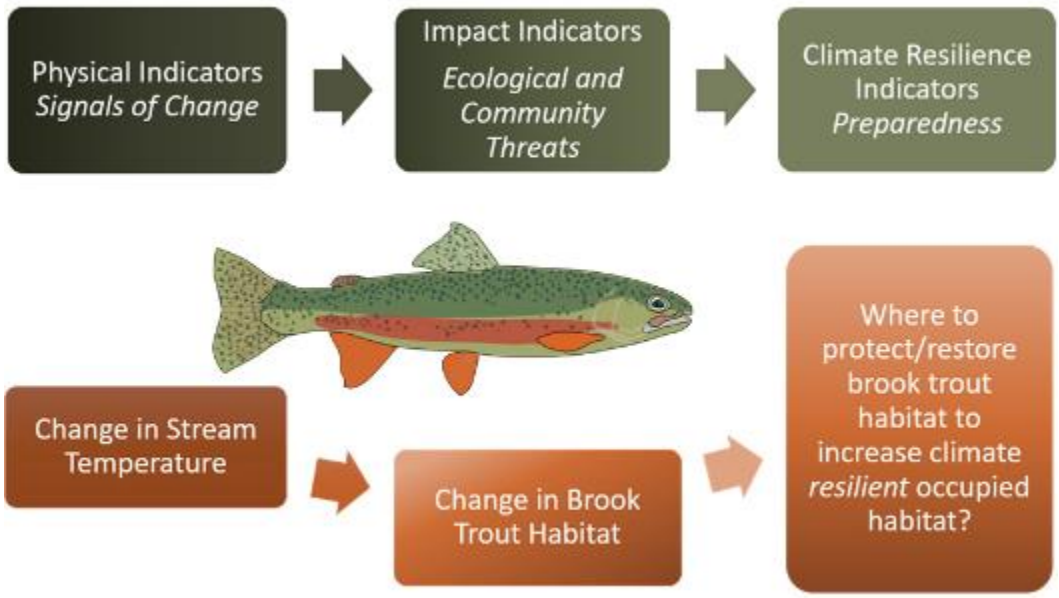
The CRWG has focused on building and maintaining efforts to assess past and future trends in sea level, precipitation patterns, temperatures and ecosystem responses to climate change. The workgroup, partnered with the U.S. EPA climate indicator team and successfully developed seven climate change indicators that are now on Chesapeake Progress. The development of these indicators followed recommendations from the GIT-funded project report, "Climate Change Indicators for the Chesapeake Bay Program: An Implementation Strategy." These indicators monitor changes in average air temperature, high temperature extremes, stream temperature, total annual precipitation, river flood frequency and magnitude, and relative sea level rise. They provide information on long-term trends

based on a 50 to 100-year period of record. Overall, these indicators of physical change provide general information whether the parameter is trending upwards or downwards.

The CRWG has encountered a couple of obstacles with the maintenance of the existing indicators on Chesapeake Progress. Both the CRWG and the Status and Trends Workgroup were without coordinators for ~ 6 months or longer. As a result, staff capacity has been limited delaying updates. Additionally, U.S. EPA is not receiving updated data for three of the seven indicators, specifically, stream temperature, river flood frequency, and river flood magnitude, because of USGS modifying their data management process. The CRWG is exploring additional partnerships to provide updated data for the stream water temperature change indicator (e.g., USGS Water Science Center stream temperature data compilation project). Overall, the maintenance of indicators is resource intensive.

To begin connecting indicators to management outcomes, the CRWG successfully hosted a cross-GIT/workgroup meeting resulting in a framework that connects physical climate indicators with associated impacts and climate resilience actions. The purpose of the framework is to align the climate indicators with assessing resilience by identifying vulnerable areas to implement resiliency projects and highlight existing resilient areas to assess how they are being successful, all of which will help inform management decisions and meet the Chesapeake Bay Watershed Agreement outcomes. An example of the draft framework is shown below for brook trout habitat.

Example of applying the climate change indicator framework with the Healthy Watersheds team



The top five new climate indicators that the workgroups indicated to focus efforts on included bay water temperature, wetland extent and physical buffering, shoreline condition, wetland migration, and coastal flooding. Results from the poll are shown below.

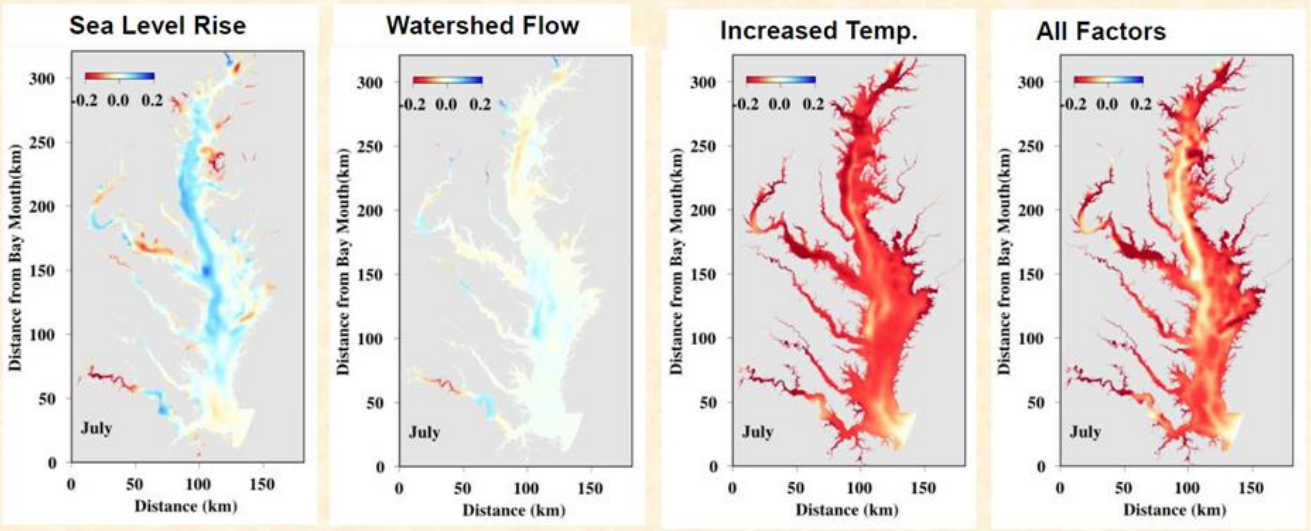
Overall, the cross-GIT/workgroup meeting produced an array of new climate indicators for potential development that would align with goals and outcomes related to living resources and habitat.

TMDL Climate Model

The CRWG supported the STAC Climate Change Modeling 2.0 two-day workshop that brought together experts in climate change, estuarine and watershed sciences to undertake a focused examination of examination of the current results of the Chesapeake Bay Program's (CBP) Midpoint Assessment climate change modeling efforts, assess lessons-learned and recommend next steps. The motivation for the workshop stemmed from the Principals' Staff Committee decision to developed a framework for addressing climate change impacts in the Phase III Watershed Implementation Plans (WIPs), recognizing that further work is needed to have the CBP jurisdictions account for additional nutrient and sediment pollutant loads, due to 2025 climate change conditions, in their 2-year milestones beginning in 2022.

One of the outcomes of the workshop was the successful modification of bottom dissolved oxygen dynamics and how they are impacted by sea-level rise and temperature in the TMDL climate model scenarios. Modeling approaches from several other existing Chesapeake Bay estuarine models were compared order to assure that the methods being used to determine bottom dissolved oxygen concentrations under climate change scenarios in the TMDL model were consistent. We learned that, generally, sea level rise can result in increases in dissolved oxygen levels. However, increased water temperatures appear to be the dominant factor causing decreases in dissolved oxygen. **Overall, these discussions and analyses demonstrate the importance of evaluating multiple climate change factors that can influence water quality outcomes, which could lead to improved management decisions.**

Bottom Dissolved Oxygen Change (mg/L) (1995-2025)



Credit: Chesapeake Bay Program Office Modeling Team

In addition, the CRWG led discussions in coordination with the Modeling Workgroup on the projections being utilized in the TMDL climate model scenarios for sea-level rise, precipitation amount and intensity, and temperature. The approaches being used for precipitation amount and intensity and temperature projections were confirmed. The approach being used for sea-level rise projections was modified based on more current information from NOAA and the Virginia Institute of Marine Science.

BMP Resilience

The CRWG is supporting efforts to evaluate the design and function of BMPs under a new climate reality. There are several BMP climate resilience assessment efforts underway that the CRWG is assisting from a coordination/advisory capacity. These include the following:

- The Urban Stormwater Workgroup's GIT-funded project, "Piloting the development of probabilistic intensity duration frequency curves for the Chesapeake Bay Watershed."
- The Chesapeake Stormwater Network's vulnerability analysis of urban stormwater BMPs and restoration practices to changing climate conditions.
- The STAC-sponsored science synthesis project awarded to Virginia Tech to do a systematic review of Chesapeake Bay climate change impacts and uncertainty based on watershed processes, pollutant delivery, and BMP performance focused on agriculture and urban BMPs.
- The NOAA-CRC-sponsored project on the systematic review of habitat-related tidal water BMPs (e.g., tidal wetlands, living shorelines, oyster practices) to changing climate conditions through the NOAA-EPA Interagency Agreement.

These actions are in response to the PSC request to better understand how climate change will impact BMP responses that are included in the Phase III WIPs. A challenge arises though because there is not

recurring funding to fully answer the request from the PSC. Findings from these assessments could be used to inform a research agenda for a multiyear prototype science and technical program that was proposed in the issue paper, "Development and Implementation of Chesapeake BMPs, Stormwater Management, and Other Management Responses to Future Climate Risk." However, we learned that BMP climate change research can be costly, usually ranging from $150,000 to $300,000 per project.

A research program addressing BMP performance and climate resilience vulnerabilities would be extensive; such an undertaking would be infeasible for the CRWG to tackle alone and would require overarching CBP Partnership support and dedicated-funding.

Local Engagement

The CRWG core member's expertise is more associated with scientific and policy knowledge regarding climate change impacts and adaptation strategies and less so in local engagement. However, the CRWG has identified stakeholder engagement as an important component in moving forward with adaptation efforts since it is at the local level where resilience activities occur. The CRWG has worked with the Local Engagement Team to fill out the Local Engagement Needs and Resource Assessment to identify which efforts would help with engagement, but for most projects, the CRWG needs assistance for even the first stage of identifying local action, audience and trusted sources. The CRWG already relies on the CBP Communications Workgroup and the Local Leadership Workgroup to assist with social science research and developing the Climate Resiliency Newsletter. Successes include a FY19 GIT-funded project for social marketing research to improve understanding of the barriers as well as the benefits of implementing environmentally-sensitive shoreline management. Challenges have occurred with coordination of these efforts given staff turnover and availability within the different workgroups. Also, the newsletter, while it can be useful from a compilation standpoint, it is unclear of the value of the product in reaching the desired audience versus the time commitment.

The CRWG is more directly involved in two local engagement efforts that incorporate the need for climate change science expertise. The CRWG successfully achieved funding for the FY19 GIT-funded project, "Building a Bay-Wide Scorecard to Track Climate Resilience for Watershed Communities," awarded to the RAND Corporation and the Virginia Institute of Marine Science (subcontractor). This project focuses on developing a scorecard that will help watershed communities (inland and coastal) to track progress toward implementing climate adaptation efforts, the success of those efforts, as well as bring awareness of management actions to implement in the future. Representatives from the CBP Local Engagement Team, Local Government Advisory Committee (LGAC), Scientific, Technical Assessment and Reporting Team (STAR), and the Diversity Team are participating on the advisory team to assist the CRWG to connect the project outcomes to local and DEIJ issues and CBP decision-making. The CRWG is looking at this effort as a conversation-starter with localities to identify climate resilience metrics of community importance connected to the outcomes of the Chesapeake Bay Watershed Agreement's water quality, fisheries, and habitat goals. Ultimately, the CRWG would like the scorecard to help inform future adaptation engagement efforts.

The CRWG also partnered with LGAC and co-hosted the, "Building Local Community Resilience Against Climate-Related Flooding," forum. This was a successful virtual one-day forum that brought climate experts and local government decision makers together to discuss and draft recommendations on strategies around community capacity building, regional collaboration, financing, local ordinances, climate environmental justice, and innovative approaches to harness additional support and resources necessary to effectively prepare for and manage local flooding impacts. A report is currently being drafted and will be shared with the CBP.

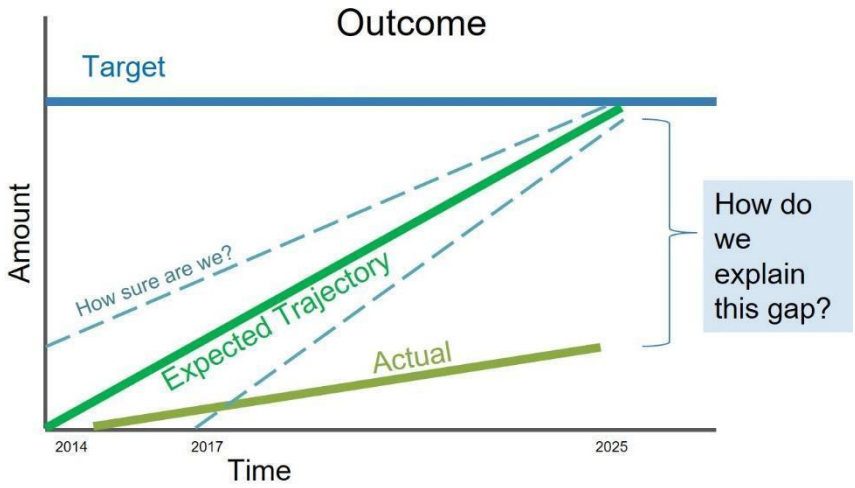
Institutional Capacity

The CRWG re-energized workgroup meetings by focusing on specific themes that directly relate to the work plan and climate science needs. The workgroup meetings accomplished bringing together CRWG and other CBP workgroup members and researchers within the Partnership and outside to prioritize new climate indicator development in connection with habitats and fisheries, identify available water temperature data sources for the tidal bay and streams to track change, share information on marsh migration and saltwater inundation research efforts, generate GIT-funded ideas to address climate science needs around wetlands and seagrasses, coordinate land use and climate change TMDL modeling efforts, and explore finance and investment strategies to support wetland and other green infrastructure projects that promote climate resilience.

For the past two years, the CRWG has and is going through leadership (co-chair) and staff changes, which creates a continuity challenge in completing workgroup objectives. Additionally, staffers that support CRWG also support STAR and several other workgroups. While the CRWG is under STAR, the goals and outcome of this workgroup are cross-GIT and impact the work of other groups in the CBP requiring our staff to tackle projects in other workgroups and **limiting the workgroup's ability to achieve some of our own work plan actions.** For instance, while there is interest in having overarching databases of adaptation research and efforts, staff time is already stretched thin to update and maintain such databases.

The CRWG has made incremental progress in working with the other CBP workgroups to build in climate resilience considerations into their work plan actions. **We have found that one-on-one discussions with the leadership of the workgroup have led to further conversations within their workgroup. This has aided in the incorporation of climate resilience considerations in GIT-funding project ideas.** These conversations have also resulted in exploratory analyses by that workgroup that could lead to more climate change-specific action items in future work plans. Initially, the CRWG explored the use of the Climate Smart Framework and Decisions Support Tool that was developed through a GIT-funded project for workgroups to use. This tool provided a structured framework and process to integrate climate change considerations into the CBP management strategies and actions. This tool was piloted with the Habitat GIT and the Toxic Contaminants workgroup during two separate workshops. The CRWG held a feedback meeting with the workgroups and learned that, while they appreciated the structured format to facilitate climate discussions, they found it difficult to translate the results into something that would be actionable. We learned that implementing the tool requires a lot of staff time and resources and hasn't quite produced the desired result of workgroups taking the lead on climate change initiatives affecting their outcomes. **It appeared that there was an underlying expectation that the CRWG will lead all climate change-related efforts for the CBP Partnership. However, given the current workgroup resources, this is not feasible.**

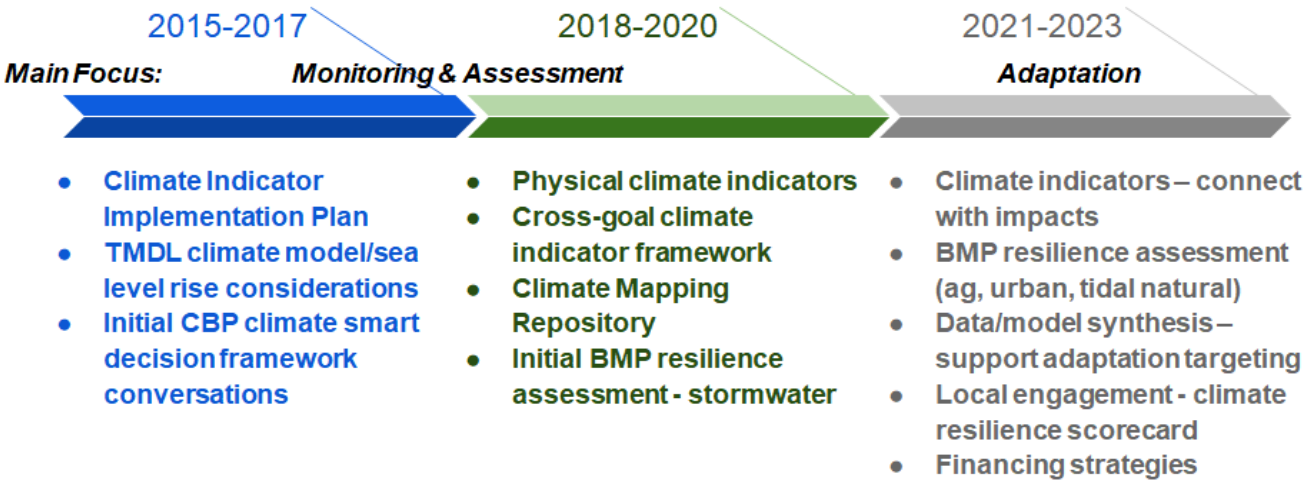
2. REGARDLESS OF HOW SUCCESSFUL YOUR SHORT-TERM PROGRESS HAS BEEN OVER THE PAST TWO YEARS, INDICATE WHETHER WE ARE MAKING PROGRESS AT A RATE THAT IS NECESSARY TO ACHIEVE THE OUTCOME YOU ARE WORKING TOWARD. THE EXAMPLE GRAPH BELOW ILLUSTRATES THIS CONCEPT.



*USE THE **EDITABLE** GRAPH BELOW (OR YOUR OWN CHART) TO ILLUSTRATE YOUR PROGRESS. EXPLAIN ANY GAP(S) BETWEEN OUR ACTUAL PROGRESS AND OUR ANTICIPATED TRAJECTORY.*

The Climate Resiliency outcomes do not have quantifiable metrics, making it difficult to evaluate whether we are making progress at the desired rate. With climate change, there will always be the challenge of keeping up pace since we will never be truly done with our outcomes. We are continually trying to improve and implement strategies to build resilience to climate change impacts to the Chesapeake Bay restoration efforts.

With that said, the CRWG has made significant gains from 2015-2020 in building partnerships, developing climate change indicators, and incorporating climate change impacts and sea level rise considerations in the TMDL climate model to advance our monitoring and assessment capabilities. In regards to the adaptation outcome, the CRWG has made less progress in pursuing, designing and implementing adaptation projects. This is in part because of the need for progress in monitoring and assessment to help inform which adaptation actions to take and where. Even so, incremental progress has been made for the adaptation outcome. For instance, the CRWG supported a STAC workshop on BMP siting and design in 2017 and a cross-GIT/workgroup meeting in 2020 to formulate a framework to connect climate change indicators to climate resilience actions related to living resource and habitat impacts. Looking forward (2021-2023), the CRWG is planning to mainly focus on increasing adaptation efforts, described further below in questions 3 and 4.



3. WHAT SCIENTIFIC, FISCAL AND POLICY-RELATED DEVELOPMENTS WILL INFLUENCE YOUR WORK OVER THE NEXT TWO YEARS?

THIS MAY INCLUDE INFORMATION LEARNED AT THE PREVIOUS BIENNIAL SRS MEETING OR MORE SPECIFIC INFORMATION ABOUT YOUR OUTCOME SUCH AS AN INCREASE OR DECREASE IN FUNDING, NEW PROGRAMS THAT ADDRESS GAPS, AND NEW SCIENTIFIC DATA OR RESEARCH. DESCRIBE HOW THESE DEVELOPMENTS ARE LIKELY TO IMPACT YOUR RECOMMENDED MEASURE(S) OF PROGRESS, THE FACTORS YOU BELIEVE IMPACT YOUR ABILITY TO SUCCEED, AND NEWLY CREATED OR FILLED GAPS. THESE CHANGES SHOULD BE REFLECTED IN THE FIRST THREE COLUMNS OF YOUR REVISED LOGIC AND ACTION PLAN AFTER YOUR QUARTERLY PROGRESS MEETING.

Several scientific and policy developments will likely play a significant role in the CRWG's efforts over the next two years. As mentioned above, the CRWG has made progress in establishing partnerships and collaborative efforts to build capacity to monitor and assess physical climate change trends, but **more progress is needed to connect these efforts with impacts on natural resources and communities to support robust resilience/adaptation strategies.** We have learned that it will be important to work with the corresponding GITs/workgroups to connect the climate indicators with associated impacts that will affect the achievement of their outcomes and to identify resilience actions to track meaningful progress.

The CRWG hosted an all-day meeting with the jurisdiction's climate action plan leads during October 2019. We learned that the states are focused more on mitigation efforts and less so on adaptation. However, more states are beginning to think about adaptation plans, presenting an opportunity for the CRWG to provide guidance and offer technical expertise in this area. Synthesizing and utilizing existing datasets with climate change projections can help fill knowledge gaps in targeting restoration efforts to build resilience. Additionally, research on identifying and determining thresholds in which habitats and living resources can withstand climate change impacts will better inform climate smart design plans for restoration and conservation. **However, lack of funding among Bay program partners for climate adaptation projects is a barrier in building resilience. More resources will be needed across the Chesapeake Bay Program Partnership to help states shift priorities to adaptation.**

The following three recently funded projects will help advance our understanding of where to target resilience adaptation projects, evaluate design considerations, and better understand thresholds to enhance resiliency of the Bay and aquatic ecosystems:

- FY20 GIT-Funded project, "Synthesis of Shoreline, Sea Level Rise, and Marsh Migration Data for Wetland Restoration Targeting:" This project will synthesize information about sea level rise, topography, shoreline condition, wetland area and migration corridors from VIMS, USGS and other CBP partners to compile a full list of available data sources in the tidal regions of the Chesapeake Bay. This project will build upon this existing data and expand it to include a climate resilience and marsh migration analysis under different sea level rise scenarios in a specified geographic location, to serve as a pilot for applying this synthesized information to local decision-making. If available, demographic, socio-economic, and land use data for this region will also be included in the analysis to better understand the community and social dynamics that may affect the areas where marsh could migrate, or land could be restored or conserved.
- FY20 GIT-Funded project, "Modeling climate impacts on submerged aquatic grasses (SAV) in Chesapeake Bay:" The objective of this project will be to model interactions between nutrient loading and emerging climate stressors, including warming temperatures, oxygen minimum zones, sea-level rise, greater precipitation, and reduced water clarity in determining future SAV

abundance and recovery potential, and to determine species and community-level tipping points.
- NOAA Ocean Acidification Program project, "Vulnerability of oyster aquaculture and restoration to ocean acidification and other co-stressors in the Chesapeake Bay" (VIMS).

As mentioned above, there are also several efforts underway to assess how approved BMPs for the Chesapeake Bay TMDL will perform under changing climate conditions. These assessments will help inform a research agenda by identifying gaps in knowledge. Understanding BMP performance is critical in building climate resilience considerations in the TMDL to ensure that we meet water quality goals under future changing climate conditions. The Modeling Workgroup has developed the climate TMDL model that incorporates projections of changing temperatures, precipitation, and sea level rise on nitrogen, phosphorus, and sediment loadings. Currently, policy decisions are being made on when and how to implement these climate change considerations in the WIPs. The direction of these decisions will influence additional targets that will need to be met to meet water quality standards. This emphasizes the need to improve our knowledge of BMP performance to build resilience in achieving targeted loads. **However, the implications of not having dedicated funding to develop a research agenda around BMP performance related to changing climate conditions will impact our ability to succeed in having climate change ready WIPs. This would likely result in the inability to achieve water quality standards, and subsequently, the habitat and living resource goals in the Chesapeake Bay Watershed Agreement.**

To potentially support adaptation projects, the CRWG has been exploring finance and investment options (e.g., blue carbon) using the finance coaching hours that became available from an FY19 GIT-funding project. Advancements in generating carbon credits from blue carbon-related restoration efforts (e.g., wetlands/marshes, living shorelines/SAV) could open new doors for funding climate resilience projects, especially if bundled with nutrient reduction.

The current pandemic causes challenges in improving local engagement efforts. Before the pandemic, localities were already stretched thin in being able to address climate change impacts, but now localities are even more resource-stressed. This has caused challenges in local engagement efforts in building the Bay-wide Climate Resilience Scorecard resulting in project delays. **It will be important to explore creative engagement options and differentiate our effort from others in connecting CBP program needs related to climate resilience with local priorities.** Additionally, bringing together various stakeholders in a workshop setting, regardless if the workshop is virtual or in person, and following up on recommendations is resource intensive.

One of the biggest challenges impacting progress is that the CRWG itself faces a capacity issue. Climate change impacts affect multiple outcomes in the Chesapeake Bay Watershed Agreement. **The CRWG does not have the staff or resources to lead all climate-related efforts in the Partnership.** We have also found we don't have the capacity to run workshops for the Climate Smart Tool. **It will be important to continue exploring strategies to have workgroups effectively build in climate resilience considerations in their work plan actions that don't heavily rely on the CRWG for implementation.**

4. BASED ON YOUR RESPONSE TO THE QUESTIONS ABOVE, HOW WILL YOUR WORK CHANGE OVER THE NEXT TWO YEARS?

DESCRIBE THE ADAPTATIONS THAT WILL BE NECESSARY TO MORE EFFICIENTLY ACHIEVE YOUR OUTCOME AND EXPLAIN HOW THESE CHANGES WILL LEAD YOU TO ADJUST YOUR MANAGEMENT STRATEGY OR THE ACTIONS DESCRIBED IN COLUMN FOUR OF YOUR LOGIC AND ACTION PLAN. CHANGES THAT THE

WORKGROUP, GIT OR MANAGEMENT BOARD CONSIDER SIGNIFICANT SHOULD BE REFLECTED IN YOUR MANAGEMENT STRATEGY.

To further progress on the Adaptation outcome, we are planning to focus efforts in 2021-2023 on supporting BMP climate resilience assessments as described above, data/model synthesis projects to inform adaptation targeting related to water quality, wetlands, and SAV, local engagement through the climate resilience scorecard, and continued exploration of alternative financing strategies (e.g., blue carbon markets) for climate resilience-building restoration and protection efforts (e.g., living shorelines, wetlands, SAV). We anticipate working within our workgroup expertise to consult on 1-2 proposals that support the implementation of climate adaptation projects from other funding sources (i.e. NFWF). These proposals could involve working towards regional climate adaptation design plans that strategically connect various restoration efforts to address climate impacts in that area. Proposals could also involve BMP performance research to fill gaps identified by the BMP climate resilience assessments.

The CRWG has also been interested in a local engagement workshop specific to adaptation training in the Chesapeake Bay. **Given the level of effort for these types of workshops, it will be important to identify clear objectives, search out partners, and find funding to support planning and follow-up actions.** The success of the LGAC/CRWG flood forum was driven by partnering across workgroups, hiring a facilitator/expert to run the meeting and take the lead in drafting the report, and staff time in organizing the breakout sessions and recruiting experts and presenters to participate.

To further our Monitoring and Assessment outcome, we will focus on the development of climate indicators involving water temperature. However, given the level of effort to maintain indicators, **it will be important for the management decisions that the climate indicators are meant to inform are thoroughly mapped out to ensure they have an end user purpose.** We plan to continue working with the other workgroups and partners to identify end uses for the indicators during development to ensure that the climate indicators meet their intended purpose. It will also be important for the other workgroups to assist with the maintenance of climate indicators related to their goals and outcomes.

We are also planning to streamline our work plan and clearly identify projects where we are taking the lead - e.g., develop Bay-wide climate resilience scorecard, coordinate BMP climate resilience reviews, develop Bay water temperature indicator. We are also looking into a potential STAC workshop to continue the blue carbon conversation to identify science/information gaps that would affect the Chesapeake Bay region to participate in crediting programs. It will be important to assess the value of products to end users for projects the CRWG takes on themselves or joins in with other GITs compared to the time commitment of completion and upkeep.

The CRWG also needs to reassess how we are going to interact with the other GITs to incorporate climate change considerations in their work. Given our current resources, **the CRWG can assist from an advisory capacity**, but would rely on workgroups to be the lead on their climate-related efforts. We do not have the capacity to work on everything climate-related in the CBP, but we can take ownership of certain projects that align most with our specific Monitoring and Assessment and Adaptation outcomes.

5. WHAT, IF ANY, ACTIONS CAN THE MANAGEMENT BOARD TAKE TO HELP ENSURE SUCCESS IN ACHIEVING YOUR OUTCOME?

PLEASE BE AS SPECIFIC AS POSSIBLE. DO YOU NEED DIRECT ACTION BY THE MANAGEMENT BOARD? OR CAN THE MANAGEMENT BOARD DIRECT OR FACILITATE ACTION THROUGH OTHER GROUPS? CAN YOU DESCRIBE EFFORTS THE WORKGROUP HAS ALREADY TAKEN TO ADDRESS THIS ISSUE? IF THIS NEED IS NOT MET, HOW WILL PROGRESS TOWARD YOUR OUTCOME BE AFFECTED? THIS ASSISTANCE MAY INCLUDE SUPPORT FROM WITHIN A MANAGEMENT BOARD MEMBER'S JURISDICTION OR AGENCY.

The CRWG has made substantial progress in identifying climate change indicators and building a framework to connect with the overall Chesapeake Bay Watershed Agreement outcomes. However, given that the majority of the Chesapeake Bay Watershed Agreement outcomes are impacted by climate change and there is limited staff capacity to develop and maintain indicators, the CRWG requests that the Management Board provide guidance on which climate indicators they feel offer the most utility for CBP management decisions. The CRWG can do a follow-up presentation for the Management Board on the available climate change indicators and the proposed climate indicator framework for feedback.

Various climate resilience reviews are currently underway for urban, agriculture, and natural tidal water BMPs related climate change impacts, such as increases in temperatures and precipitation and sea level rise among others, to identify vulnerabilities and BMP performance research needs. In order to make progress in how we use BMPs under future climate conditions to meet the Chesapeake Bay Watershed Agreement goals, long-term CBP Partnership program support and dedicated funding for a research agenda will be needed. The CRWG requests that the Management Board assist in identifying Partnership-wide strategies to meet this need as the CRWG does not have the resource capacity to tackle this important task on its own.

As mentioned above, the CRWG is working with the RAND Corp. to develop a Bay-wide Climate Resilience Scorecard to work with localities to identify progress towards implementing resilience actions to withstand or adapt to climate change impacts based on metrics of community importance that also relate to meeting the Chesapeake Bay Watershed Agreement outcomes. The project is in its beginning stages and stakeholder involvement is critical to its success. The CRWG asks for the Management Board's assistance by providing a list of potential stakeholders that we can invite to the virtual engagement meetings to solicit feedback on metrics of community importance with connections to water quality, habitat, and living resource goals.

The CRWG has two wide-ranging outcomes it is responsible for that also affects the majority of the other outcomes in the Chesapeake Bay Watershed Agreement. The CRWG currently does not have adequate staff resources to support all the management approaches and initiatives identified in their management plan. The CRWG requests that the Management Board support additional staff resources (e.g., dedicated staffer instead of sharing with STAR, technical analyst, etc.) for the CRWG. Without additional support, the CRWG will have to narrow their work plan further. If this is the case, then the CRWG asks that the Management Board's help in identifying two key priorities under each outcome they suggest the CRWG focuses on in the next work plan.