Enhancing Science Collaboration to Support the New Chesapeake Bay Watershed Agreement (*updated October23*)

Need: The new Chesapeake Bay Watershed Agreement will require additional monitoring, modeling, and analysis to help decision makers effectively achieve goals and associated outcomes. CBP science activities are coordinated through the **Scientific, Technical Assessment, and Reporting (STAR) team**. Over the past several years, STAR had a heavy emphasis on water-quality activities as the partners implemented the Bay TMDL. To address the needs of the new Bay Agreement, STAR is evolving to have more of an ecosystem-based science mission. STAR may evolve to be the Science Collaboration Team (SCT) to more accurately reflect its purpose and function.

Overview of Purpose and Functions

Purpose: Increase collaboration among science providers to provide monitoring, modeling, and analysis needed to update, explain, and communicate ecosystem condition and change to support the CBP Goal Teams.

The major functions of STAR (shown on figure 1) include:

- Manage CBP-funded monitoring networks and collaborate with monitoring organizations to utilize and enhance additional networks to address the outcomes in new Chesapeake Watershed Agreement.
- Ensure data comparability and integrity.
- Update, and deliver, the status and trends (indicators) of ecosystem conditions.
- Explain ecosystem condition and change.
- Expand modeling to better understand and predict ecosystem response.
- Coordinate climate change activities.
- Enhance information management, access, and GIS support.
- Synthesize and communicate results to support the CBP decision framework being used by the Goal Teams to develop and implement management strategies for the New Agreement.

Figure 1 shows the relationship to the Goals Teams, STAC and major functions of the STAR. Much of the technical expertise to address these functions already exists within the Goal Teams and with science providers (federal, state, and academic partners) involved in the CBP. The STAR will facilitate collaboration between science providers and Goal Teams to carry out these functions. The collaboration is critical to effectively provide the science needed to support the Goal Teams as they develop and implement management strategies, using the CBP decision framework, to achieve the goals and outcomes of the new Bay Agreement. The STAR can also advocate for the support of the CBP Office Science Cluster to provide data to address issues that benefit multiple Goal Teams. The products from many of these STAR efforts (such as explaining ecosystem change or synthesis products) would be "owned" by the science providers. STAR would help promote the products to decision makers. The STAR has a collaborative relationship with STAC; with STAC providing independent review and guidance to the

CBP and STAR working with Goal Teams to implement the science aspects of the recommendations. More information on STAC-STAR roles is provided in the next section.

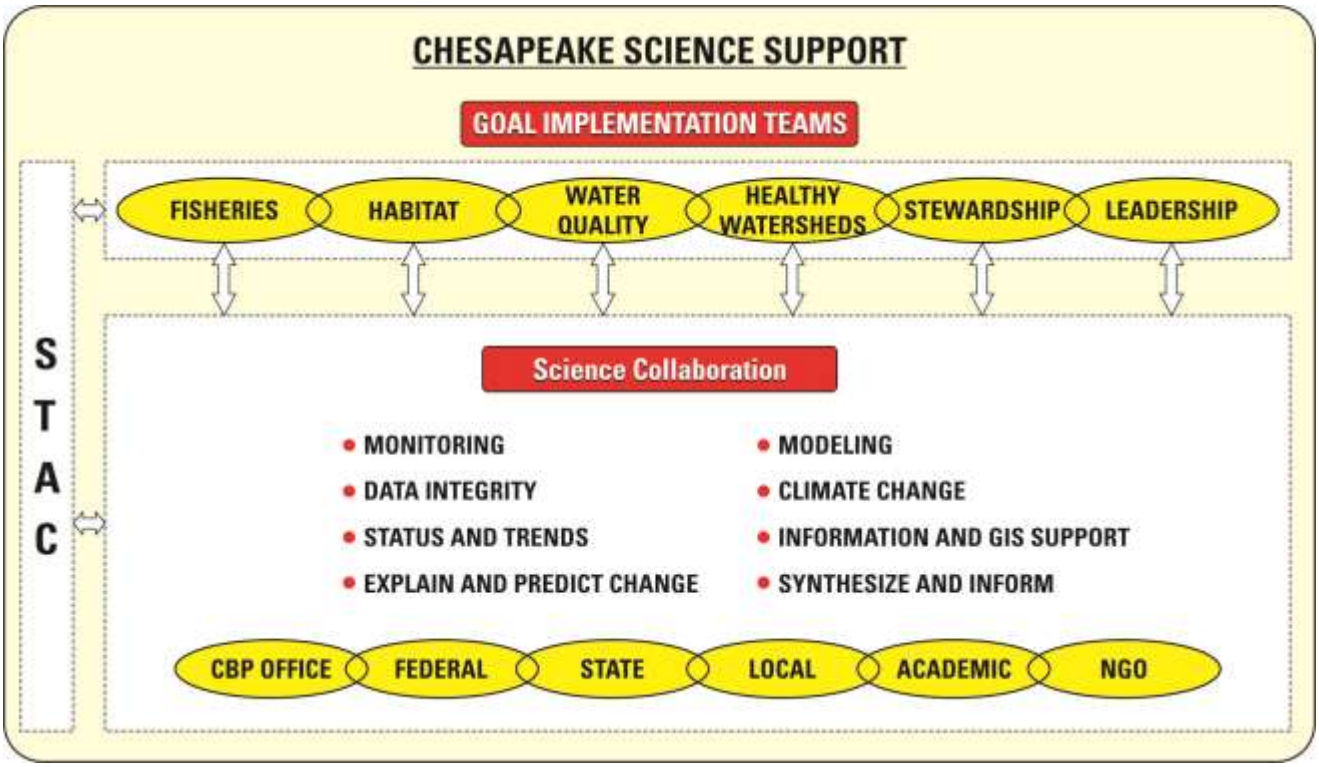

Figure 1: Major functions and science providers of the Science Coordination Team and relation to Goal Teams and STAC.

Relationship between STAR and STAC

STAR has a collaborative relationship with STAC and each has a distinct role:

- STAC provides independent review and recommendations to the CBP to enhance science (monitoring, modeling, and research) for decision making.
- STAR coordinates with science providers and Goal Teams to address the STAC recommendations.

Developing and implementing the management strategies for the new Bay Agreement is a new opportunity for STAC and STAR to support the Goal Teams and help them employ the CBP decision (adaptive management) framework (figure 2).

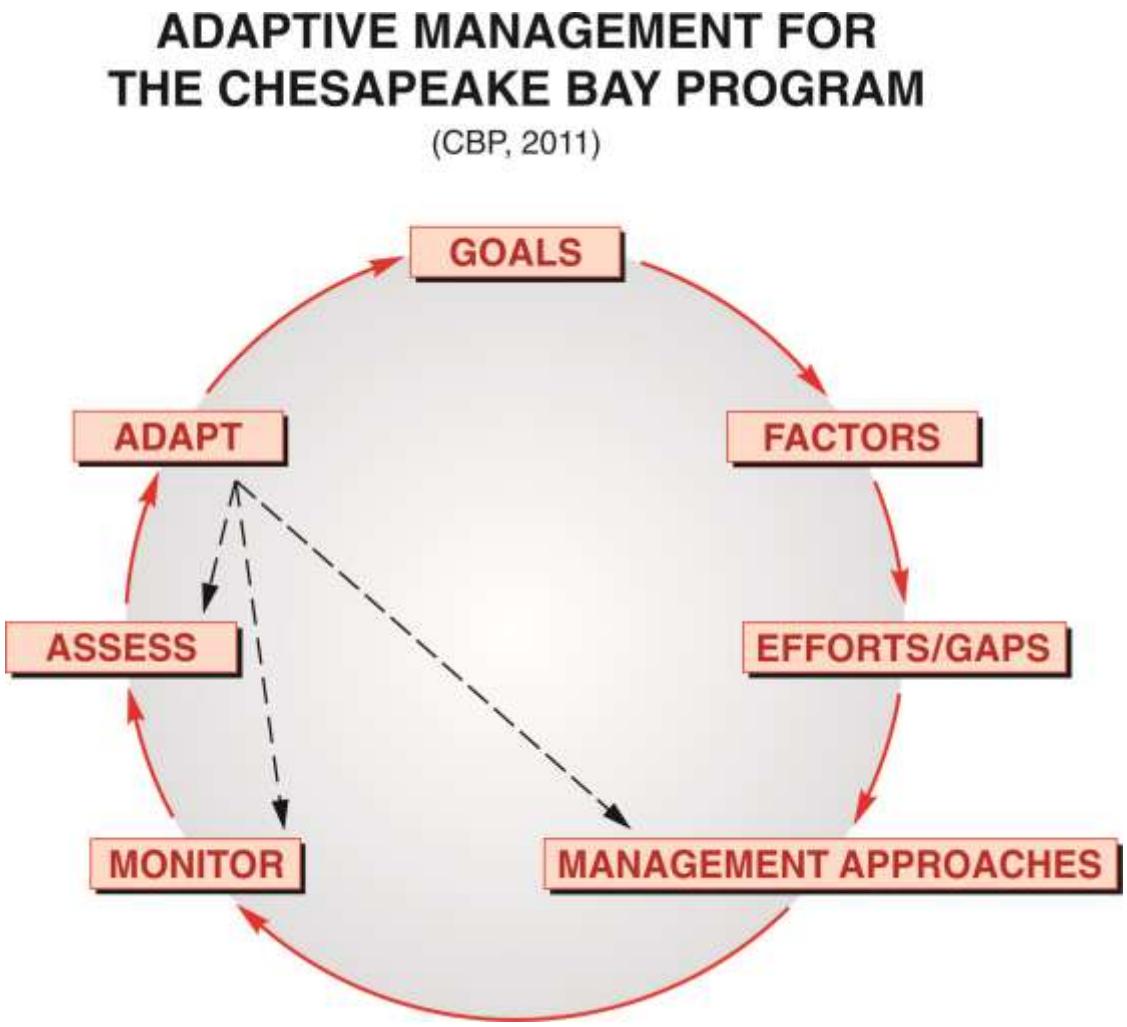

Figure 2: CBP decision framework that will be used to develop and implement management strategies

To be most effective, it is important for the GITs to understand how STAC and STAR plan to advise them during the development of their management strategies. Through collaboration, STAC and STAR will work together to assist each GIT during this process. Below is how each group plans to advise the GITs.

Management Strategies

STAC:

- Advisors of the adaptive management process
- Link to the scientific community
- Provide guidance during the development of factors influencing and management approaches with STAR and GITs

STAR:

- Collaborate with GITs to identify factors influencing agreement outcomes
- Assist GITs in development of management approaches using STAC guidance

- Work with GITs to identify additional science providers that can help inform management strategies and prioritize science activities that can benefit multiple management strategies

Monitoring

STAC:

- Advisors of the adaptive management process
- Link to the scientific community
- Provide guidance during the development of the monitoring needs of the Chesapeake Bay Agreement (which are based on outcomes in the new Agreement).

STAR:

- Coordinate monitoring effort of implementing the Bay Agreement
- Determine feasibility of STAC recommended monitoring needs
- Based on STAC recommendations, work with the GITs to identify the current capacity of the monitoring programs and gaps in monitoring. Work with GITs on opportunities for implementing additional monitoring through partnerships with more science providers.

Assessment (Indicators and assess performance)

STAC:

- Advisors of the adaptive management process
- Link to the scientific community
- Provide guidance during the development of the thresholds and indicator needs of the Chesapeake Bay Agreement with STAR and GITs
- Communicate thresholds and indicators to the Management Board
- Review and advise the GITs during the 2 year evaluations

STAR

- Based on STAC recommendations, work with the GITs to implement the new indicator framework and communications products.
- Work with GITs to assess and explain change in response to management practices and policies.
- Assess if actions are achieving performance thresholds and work with GITs and STAC to revise strategies when necessary.

Description of STAR Functions, Workgroups, and Potential Staffing

The following is a description of the major functions of STAR and anticipated support needs.

Manage CBP monitoring networks and expand efforts to address the outcomes in new Chesapeake Watershed Agreement.

The CBP currently manages several water-quality monitoring networks including a watershed network and several estuary networks (water quality and SAV). The networks are complex with multiple partners collecting data. There is additional monitoring that needs to be conducted to address the outcomes of the new Bay Agreement. The STAR will work with the CBP Goal Teams to assess existing that can be utilized to assess the new outcomes networks (or identify gaps). The use of Citizen monitoring will be examined to help meet the expanded monitoring needs and applied as appropriate. STAR has begun the

process to assess monitoring designs and coordination through the **B**uilding **A**nd **S**ustaining **I**ntegrated **N**etworks (BASIN) process. The initial work is too evaluate the water-quality networks, followed by assessing options to address monitoring needed for outcomes in the new Bay Agreement.

- Anticipated Support Needed: (1) Monitoring design and analyses needs for water-quality networks of BASIN. Coordinate with multiple Goal Teams and Agencies/partners to address monitoring needs for new Agreement (next phase of BASIN). (2) Evaluate and coordinate use of citizen science to as part of BASIN process.
- Proposed Workgroup: Integrated Monitoring Networks WG (Merged aspects of the previous Tidal and Nontidal workgroups).

Ensure information comparability and integrity. The STAR will lead coordination of CBP partners to ensure the comparability and integrity data collected from monitoring networks. An ongoing function is to ensure the quality of data generated from the CBP water-quality networks. An increasing future need will develop approaches to assess and improve comparability of information from additional networks that will be used to support outcomes of the Bay Agreement. Evaluating the use of citizen-based data will be an important task.

- Anticipated Support Needed: Extra help with data management needed for expanding monitoring networks and data to produce CBP indicators.
- Proposed WG: Data Integrity WG (was AMQWG)

Update status and trends (indicators) of ecosystem conditions. Many of the Goal Team and associated WGs have the lead responsibility to update CBP indicators. The STAR will collaborate with the Goal Teams and science providers to update indicators, or plan for additional indicators that are needed for the new Bay Agreement. The CBP GIS group would oversee compilation and support of spatial data related to the indicators. The STAR will work with the CBP communications team to have the results reported on the CBP WWW site, in ChesapeakeStat, and the annual Bay Barometer.

- Anticipated Support Needed: (1) analysis of water-quality data to update progress toward meeting WQ standards attainment, (2) develop and maintain new indicators needed for the outcomes in the Chesapeake Bay agreement. Will require analysis and "coordination" skills to interact with GITs and data providers.
- Proposed leadership: Status and Trends team, which would include Indicator Coordinator working with Goal Team coordinators, GIS team, and WWW team.

Explain ecosystem condition and change. Explaining ecosystem condition and change is needed for by all the Goal Teams to help assess understand progress (or lack of) toward the outcomes in the new Agreement. The Goal Teams have work groups addressing specific outcomes. The unique role of the STAR is bringing together groups to better understand key ecosystem linkages between outcomes. To explain ecosystem condition and change, several activities needed to be coordinated including modeling, monitoring, and analysis. Given the large scope of the effort, the STAR will work with Goal Teams and science providers to carry out these primary activities:

- *Work with the GITs to enhance technical expertise to address the outcomes of the new agreement.* Technical workgroups already exist within the GITs. STAR would work with them and STAC to attract additional science providers. The STAR has also established liaisons (as has STAC) to enhance interaction with the Goal Teams. In some cases STAR may establish a workgroup or team to address a technical need to the GITs. An example is STAR having a climate change workgroup since it is a cross cutting need for the GITs.
- *Work with GITs and STAC to identify cross-cutting technical topics.* STAR will work with the Goal Teams to identify cross-cutting topics or factors that affect achieving multiple outcomes. The STAR, STAC, and Goal Teams will organize technical exchanges (or propose STAC workshops) to discuss ways to address cross-cutting issues. Some of the initial cross cutting issues suggested by the goal teams include: (1) Estuary fisheries (shellfish and finfish) changes in response to land change and management policies, (2) Enhancement and restoration of wetlands to support black ducks, waterfowl, and water quality, (3) Ecosystem (WQ standards attainment) response to management practices to reduce nutrients and sediment, (4) Stream conditions and other factors affecting the recovery and protection of brook trout populations and freshwater fisheries, (5) Effects of toxic contaminants on fisheries and wildlife, (6) Conserving lands and healthy watershed in the face of a growing population. All of the above should include potential effects of climate change and population growth.
- *Work with GITs to summarize information and produce synthesis products* (see later item)

Proposed leadership: Have self-directed, topical teams.

Enhance modeling to better understand and predict ecosystem response.

Modeling to understand the impacts of a changing ecosystem, such as the infilling our major reservoirs and the impacts of climate change on ecosystem response. In addition modeling needs to support the evaluation of management decisions to achieve outcomes in the new Bay Agreement. Modeling is an integrating tool and the concept of multiple models will be used to create a collaborative environment for integrating disparate scientific studies. The modeling would need to expand out from water quality and address/coordinate with ecosystem modeling efforts supporting other goal and outcomes. Opportunities to better collaborate with Chesapeake Community Modeling Partnership will be explored to help expand monitoring capacity.

- Proposed WG: Modeling workgroup will initially support water-quality needs but needs to evolve to address expanded needs of new Agreement

Coordinate Climate Change Activities

STAR will coordinate efforts to address climate effects for the CBP since it is a cross-cutting topic for the CBP. The WG will address the two outcomes on Climate Resiliency in the new Agreement.

- Monitoring and Assessment Outcome to "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"

- Adaptation Outcome: Continuously pursue, design and construct restoration and protection projects to enhance the resiliency of Bay and aquatic ecosystems from impacts of coastal erosion, coastal flooding, more intense storms and more frequent storms and sea-level rise.

The work group will interact with the Goal Team to assess their priorities for assessments and needs for adaptation that should be in the initial management strategies.

- Anticipated Support Needed: work group leadership and membership needs to be established. Fulltime coordinator will be required.
- Proposed WG: Climate-change workgroup

Enhance information management, access, and GIS support

The CBP data center, a part of CBPO Science Cluster, will continue efforts for enhance data systems to more effectively manage, share and access data. The Data Center will continue its core function to manage information to support the water-quality needs of the CBP agreement. The data center will have to expand partnerships with other providers to effectively manage and share information needed by the CBP to address the other outcomes in the New Agreement. The CBP GIS group would oversee compilation and support of spatial data needed by the Goal Teams to carry out the new agreement. All of these activities would be coordinated through STAR.

- Anticipated Support Needed: Extra help with data management needed for expanding monitoring networks and data to produce CBP indicators.
- Proposed Leadership: CBP Data Center and GIS team

Synthesize and communicate results to improve decision making. STAR will work with Goal Team to identify technical topics where a synthesis product would help communicate results to decision makers. STAR would work with science providers and CBP communications office to summarize technical results of above efforts and communication findings and management implications to a wider range of audiences. Prepare communication products that are tailored to specific audiences and ensure the science is correctly portrayed.

- Anticipated staffing support: Help communicate results of STAR efforts to a wider range of audiences
- Proposed leadership: Specific topics will be selected by science providers and Goal Teams. UMCES IAN and CBP Communications Office will lead and support efforts.

Next steps to implement new STAR purpose and functions

1. Revise STAR WGs to carry out new functions.
2. Enhance collaboration with each GIT. STAR will increase collaboration with each Goal Team by (1) having a STAR liaison to each Goal Team, and (2) working more closely with Goal Team coordinators and CRC staffers to meet their science needs and help prioritize unmet GIT science needs. The GIT-STAR liaisons are essential to facilitating this interaction and tracking activities in this regard.

3. Increase interaction with STAC. The STAR will work closely with STAC to identify additional science provides to assist GITs. We will also work with STAC and GITs to identify cross-cutting topics and organize technical exchanges or propose workshops to address the topics.
4. Enhance science coordination. Based on the recommendations of STAC workshops, STAR will help identify science providers to work with GITs to address and implement STAC recommendations.
5. Expand membership. STAR will expand its membership to include science providers to be on its workgroups to carry out each of its major functions. STAR will also work with the Goal Teams to have chairs of their technical workgroups interact with STAR so they can enhance collaboration monitor, assess, and explain ecosystem change. The STAR leadership will expand to include all STAR workgroup chairs and CBP Goal Team Coordinators.
6. Refine Meetings. STAR will have two types of meetings: (1) full membership meetings (every other month or once a quarter) and (2) leadership meetings (months between full STAR meetings). The full membership meetings will focus on supporting and coordinating science needs of the GITs. They would have key presentations of findings and coordination opportunities that should be of interest to multiple GITs. The leadership meetings would focus on reviewing progress of STAR workgroups to provide the science requested by the GITs. Seminars, hosted by UMCES, could also be part of either the full STAR or leadership meetings.