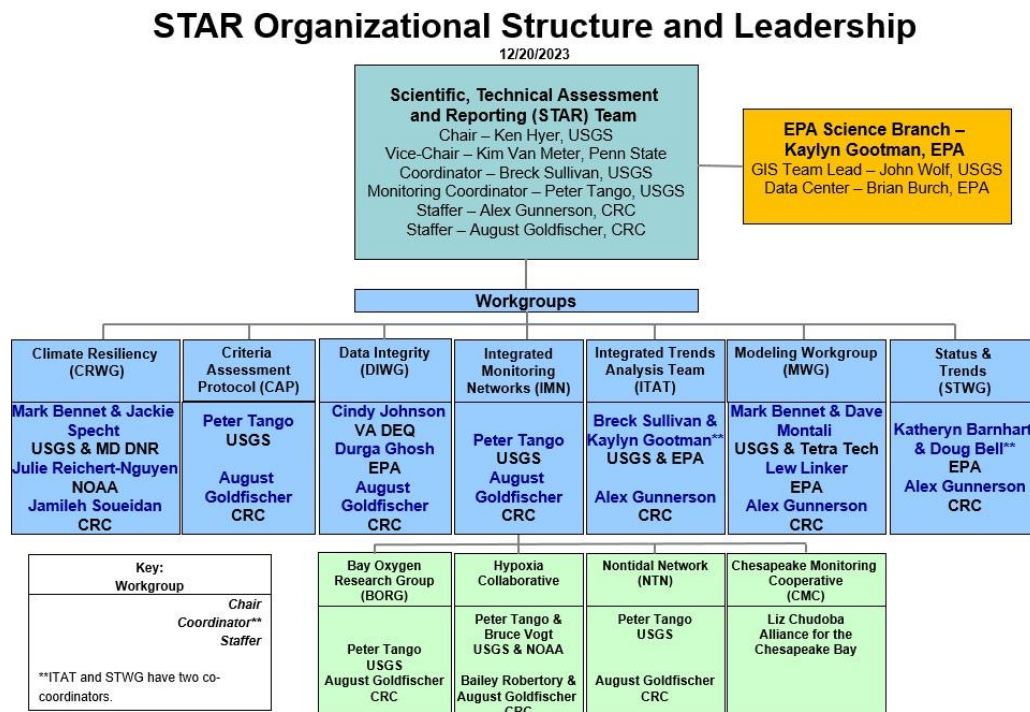# STAR Priorities

Scope and Purpose

Enhance Chesapeake Bay science and capacity by facilitating collaboration among science providers to provide monitoring, modeling, and analysis needed to update, explain, and communicate ecosystem condition and change to support the Chesapeake Bay Program (CBP) Goal Implementation Teams (GITs).

https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Final-STAR-Scope-and-Purpose-7.12.23.pdf

Science Needs

https://star.chesapeakebay.net/

GIT Funding has been critical to address the outcome's science needs. Approximately a quarter of the science needs have been or are currently being supported by a GIT Funding project. Outcome leads identify these science gaps they need to advance Chesapeake restoration and conservation efforts and decision making, but they lack the capacity, funding, and resources to fill the gap. GITs invested time into writing proposals and putting more detail into science needs for GIT Funding because their work was more likely to be funded, so a higher return in investment. GIT Funding has been a guaranteed opportunity to provide capacity and funding for science needs.

Since interacting with GITs to coordinate science partnerships and identify new opportunities to address science needs in Strategic Science and Research Framework (SSRF) and science capacity for Watershed

Agreement outcomes is a major function of STAR, a high priority is to increase interaction and cross-branch collaboration with both CBP branches:

- Increase interaction with CBP Science, Analysis, and Implementation Branch (SAIB). Share science needs from GITs to drive SAIB priorities and funding decisions. Collaborate with SAIB on opportunities to align modeling, monitoring, data management, and GIS needs with GIT science needs.
- Increase collaboration with CBP Partnership and Accountability Branch. Share science needs related to non-water quality related outcomes to increase staff capacity for establishing and maintaining indicators with available funding sources.

Priorities

CBP Data Center

- ChesapeakeData Launch

GIS Team

- Chesapeake Data Launch. Chesapeake Data will be the Chesapeake Bay Program's authoritative access point to decision support and data products. It is scheduled to launch in late Spring 2024.
- Continued support for the robust use and development of targeting products, including building out content for the Chesapeake Bay Targeting Tools Portal, including case studies, tutorials, and access to additional authoritative content relevant to conservation and restoration decisions at multiple spatial scales.
- Maintain key data driven decision support tools, including the updated Watershed Data Dashboard, the Environmental Justice and Equity Dashboard, the Watershed Resources Registry, and other GIT-specific tools.
- Complete an updated GIS Team Geospatial Strategy that identifies programmatic, data development, and system architectural priorities for the next five years.
- Release of updated high-resolution land use (including 2021) and hyper-resolution hydrography data to the public.
- Provide GIS and mapping support for Chesapeake Bay watershed ecosystem services quantification and mapping efforts. One of the recommendations of the STAC Ecosystem Services Workshop Report included the following Recommendation #1: Develop a tool that quantifies ecosystem services currently being provided across the Chesapeake Bay Watershed. CBPO should adopt an accounting framework and develop an associated platform that quantifies a set of priority ecosystem services at appropriate spatial scales (e.g., parcel-scale, land-river segment, project-scale) across the Chesapeake Bay watershed, using science-based, standardized methods.
    - A related idea proposed for additional GIT funding is to operationalize the use of ecosystem services at multiple spatial scales. Should this be pursued, a contractor would be needed to guide the process. However, the potential for cross-program applicability of ecosystem services will also require a concerted data development and management effort. GIS Team support is estimated at 0.5 FTE to fully implement and maintain an ecosystem services assessment and tracking system.

Climate Resiliency Workgroup

- Climate Adaptation
  - Better understanding of the resilience effectiveness of natural infrastructure (e.g., living shorelines, marshes, forest buffers, oyster reefs) strategies to maintain/enhance ecosystem services to climate change impacts. Need better determination and quantification of associated benefits (e.g., habitat quality, shoreline protection) and potential unintended consequences to other restoration metrics (e.g, sediment dynamics), research on improving siting and design of natural infrastructure projects to maximize benefits, and cost-effectiveness analyses of these strategies under changing climate conditions.
    - The Climate Resiliency Workgroup has been exploring other resources to fund this effort through the NOAA Effects of Sea Level Rise (ESLR) funding. The proposal we are putting forward with partners for the FY24 funding is for 1.6 million over the course of 4 years that includes monitoring, modeling, remote sensing/AI analyses, and socioeconomic analyses in quantifying the performance of oysters as natural breakwater systems in protecting marshes and enhancing coastal resilience under changing climate conditions. The NOAA funding is not guaranteed, so they would still like to be considered for this EPA pool of funding. If EPA moves forward with it, and if NOAA also awards the proposal, the team will want to make sure there is a collaborative effort among both parties, so efforts are not duplicative.
    - Cost Estimate: In its entirety is a multi-million dollar effort. However, aspects of it can be funded at smaller amounts. The cost depends on how many different types of natural infrastructure strategies you are evaluating. To give you an idea of how much it costs, for our (ESLR) proposal that is examining oyster structures, reefs, and marshes, NOAA set aside $600,000 to monitor around 6 sites to verify and determine coastal resilience performance metrics with storm surge and sea level rise modeling. They also allocated $600,000 for remote sensing/AI analyses, development of a data library, and coordination of a Management Transition Advisory Group. NOAA is also adding social and economic valuation at $320,000.
  - Sea-level rise and tidal wetland impact indicator
    - Working with LUWG and WWG on developing it
  - GIT Funded Marsh Adaptation Project
    - Host workshop to identify collaborative large-scale marsh adaptation projects within focus areas
- Climate Monitoring and Assessment
  - Research on climate change impacts, including sea level rise, storm surge, increased temperatures, extreme precipitation events and saltwater inundation, on the siting, design, and performance of BMPs to reduce nitrogen, phosphorus, and suspended sediment and enhance benefits to habitats and living resources.
  - Research on the selection, placement, and tradeoffs of implementing current water quality best management practices (BMPs) in relation to minimizing the impacts of rising water temperatures to streams and nearshore tidal waters while maximizing the needed nutrient and suspended sediment load reductions to improve dissolved oxygen conditions, habitat for aquatic resources, and clean water for communities.

- We have been engaging other funding mechanisms through NOAA and EPA to support these needs where funding amounts are from $500,000 to $1.6 million.

Criteria Assessment Protocol

- Understand the impacts of climate change on criteria assessment
- Develop, establish, adapt protocols for criteria assessment for short duration DO criteria *(CAP/Hypoxia/BORG joint goal)*
- Support development of Segment specific monitoring design strategy supporting assessment of all D.O. criteria for 92 bay segments (see Hypoxia Collaborative for cross WG application)
- Develop use cases for Community Science derived data for CBP monitoring and assessment needs (e.g., SAV Watchers for ground truthing SAV satellite, benthic monitoring, salt tracking, bacteria pollution)
- Develop, establish, adopt quantitative translation of the narrative Bay criteria for Chlorophyll a
- Develop, establish, adopt protocol for satellite-based SAV monitoring and assessment in Chesapeake Bay

Data Integrity Workgroup

- Development of a crosswalk for current analytes reported to the CBP and laboratory specific methods and instruments used for analyses.
  - This is expected to assist recruitment of additional labs and providing them information necessary to evaluate their capability to conform to defined project goals.
  - Quality Assurance tests are Coordinated Split Sample Program, Blind Audits, and USGS standard reference sample project. The original plan had been to get all participating labs to run all three tests. However, given the cost of the programs as well the changing landscape of participatory labs, it was decided to have labs run at least two of the tests. Traditional labs such as CBL, DCLS, ODU, MDH etc. continue to participate in all three. The number of split sample analysis has also been adjusted to twice per year for any given lab to accommodate these factors. The rising costs associated with these tests though may result in the workgroup rethinking the requirements.
- Integration of new methods with defined quality objectives for use by non-traditional partners given the nature and resources at disposal for volunteer groups.
- In addition to the primary focus on external performance assessments, DI workgroup reviews will include field and laboratory precision and accuracy indicators.
- Field Audits
  - Within region nontidal audits. If we consider the internal portion alone (green), there is a total of eight audits.

  - At one day per audit that would be eight hours of time for at least four individuals. We are then looking at 32 hours total to be repeated at the very least every three years. In terms of a dollar amount this would be about $8-10K every three years.

Bay Oxygen Research Group
- Working with Elgin Perry and Tetra tech to develop 2024 tasks and funding – additional funding from the already $60K dedicated from infrastructure funding will be needed
- Continuing engagement with partners to sustain and enhance monitoring.
- Testing methods for the 4D interpolator and development.
- Document development of the 4D interpolator; publish documentation as a new Technical Document supporting Chesapeake Bay water quality criteria attainment assessments

Hypoxia Collaborative
- Optimization analysis of high frequency sensor sampling design (offshore and nearshore monitoring resources) to support bay habitat assessment
  - Development of an optimal long-term sampling design plan supporting application of new sensor investments and existing resources fostering efficient, effective, robust data applications and strategic investments in habitat monitoring to support assessment of DO watery quality attainment.
  - The design plan can be used by the CBP as an investment guide and long-term implementation approach necessary for high temporal density habitat assessment and baywide assessment of water quality criteria previously unavailable to our community.
- Deploy 3-4 new continuous real time (10 min data frequency) hypoxia monitoring stations (there are 3 existing stations) in 2024, maintaining 6-7 total stations. The target is to achieve 10 total stations in 2025.
- Engaging with partners to gauge interest in investing in and expanding the hypoxia monitoring network

Nontidal Network Workgroup (NTN)
- Improve historical water quality monitoring data through reconstructing historical datasets for all nontidal stations – expected completion in Spring 2024
- Continue engagement with partners to sustain and enhance monitoring, especially searching for sustainable funding for the [monitoring enhancements funded through infrastructure funding](#) identified in the PSC Monitoring Report.
- NTN historical data completion – (in question – SRBC may have older, historical data in Excel spreadsheets). The development of the foundational NTN database requires the data to be accessible to computer program scripts calling for data from Water Quality Portal data sources. March 2024 NTN meeting will evaluate final pieces of missing historical data to identify capacity needs for finalizing availability and accessibility of data that exists but not in an accessible form and location.

Chesapeake Monitoring Cooperative (CMC)
- Identify key barriers to entry for underrepresented communities and start to develop tools to overcome those barriers.
- Provide continued support of community based monitoring groups across the watershed and highlight local data uses.
- Develop a prioritization report that catalogues current data uses across jurisdictions and prioritizes future monitoring needs.
- Increase utilization of data points in the CMC Data Explorer to better inform decision-support needs, especially for tier 1 and 2 data.

Integrated Trends Analysis Team
- Conduct annual analysis of water quality trends at long-term monitoring stations throughout the Bay and tidal tributary waters
- Make additional updates to baytrends and baytrendsmap to reflect user feedback, routine software update needs, and overall tool accessibility.
  - Additional funding for a contractor to build functionality of creating baytrendsmap "simple" GAM graphs into baytrends R package for state deliverables
  - Additional funding for a contract to analyze difference between using water year versus calendar year in trend results and potentially build in functionality of option to do water year.

- Preparation of tributary summaries and story maps.
  - Need to increase capacity to complete 12 tributary summaries and 12 storymaps in a year with new monitoring data. This includes new sections like one on climate change.
- Share and communicate findings from tributary summaries and story maps with stakeholders who can utilize this information for advocacy, research, and management.
- There is work Tetra Tech is doing for ITAT on cluster analysis of our tidal trends, but we need more funding and another contractor because their schedules are booked with 4D work. ITAT was considering using GIT Funding to fund Tetra Tech to continue the work. The tidal trends can reveal how meteorology, BMP implementation, and other forcing functions impacts the trends, but our methods for those trends can't discern which stations are exhibiting similar trends. Therefore, we use cluster analysis to group stations with similar trends. This can help us assess whether BMPs are influential over broad geographical areas. It is also important for differentiating regions where progress is satisfactory from regions where more attention to reverse degrading trends is needed. The greatest need for more funding is that the current person that knows how to use this method is retiring in a few years. We need them to finish the coding so that someone like Breck, Kaylyn, or Rebecca Murphy can produce the results for communicating water quality trends and produce the maps in our Tributary Summaries.

Modeling Workgroup

- Complete building of watershed model structure and continue to improve the Dynamic Watershed Model and create CalCAST to help with evaluating model uncertainty.
- Continue the interim development phase of the Main Bay Model and Multiple Tributary Models to create finer spatial resolution estuarine models.
- Complete the water quality data portal standardization project to provide clear guidance on which types of data can be accepted into the model and share with program partners.
- Continue writing documentation as models are developed to ensure clear records of methods and data inputs.
- Continue collaboration with partners on the airshed model and land use change model to improve the inputs to the watershed model.
- Roll out the series of public webinars on the optimization tool to solicit partner feedback and begin educating partners on utilization.
- Work with RAND on the recently awarded stormwater RFA to determine relative change in pollutant removal efficiency in existing CBP-approved stormwater management BMPs under future increased volumes and intensities of precipitation in the Chesapeake watershed.
- Collaborate with partners to support co-benefit modeling projects, like striped bass, SAV, human health (vibrio vulnificus) and others.

Status and Trends Workgroup

- Support the development of relevant performance, output, and influencing factor indicators for outcomes currently without metrics on ChesapeakeProgress.
- Facilitate cross-outcome learning on how to re-envision Beyond 2025 outcomes with measurability and assessment in mind.
- Provide a forum for science communication best management practices so indicators effectively convey an accurate portrait of the data progress towards achieving the outcome.

GIT Funding Ideas
Priorities listed above that need funding resources.

Hypoxia Collaborative

- Model-assisted optimization analysis for a high frequency sensor water quality sampling design strategy to support bay habitat and criteria assessment at the segment scale
  - Development of a nearterm strategy for deploying the initial 10 arrays for supporting habitat assessment.
  - Development of an optimal long-term sampling design plan supporting application of new sensor investments and existing resources fostering efficient, effective, robust data applications and strategic investments in habitat monitoring to support assessment of DO watery quality attainment.
    - The design plan can be used by the CBP as an investment guide and long-term implementation approach necessary for high temporal density habitat assessment and baywide assessment of water quality criteria previously unavailable to our community.

Climate Resiliency Workgroup

Of the CRWG-identified climate science needs, they selected the following as our priority for GIT-funding given the typical funding amount ($65,000-$80,000):

- Research on 1) the impacts of climate change (including flooding, sea level rise, extreme weather, heat, etc.) on Chesapeake Bay communities, including an analysis of which communities are most vulnerable to climate change impacts and how climate change is impacting marginalized communities in the region, 2) effective adaptation and resilience strategies for Chesapeake Bay communities impacted by climate change, including how to minimize unintended consequences (e.g., green gentrification), and 3) peoples' perception of climate change and implementing resilience strategies.

Integrated Trends Analysis Team

- There is work Tetra Tech is doing for ITAT on cluster analysis of our tidal trends, but we need more funding and another contractor because their schedules are booked with 4D work. ITAT was considering using GIT Funding to fund Tetra Tech to continue the work. The tidal trends can reveal how meteorology, BMP implementation, and other forcing functions impacts the trends, but our methods for those trends can't discern which stations are exhibiting similar trends. Therefore, we use cluster analysis to group stations with similar trends. This can help us assess whether BMPs are influential over broad geographical areas. It is also important for differentiating regions where progress is satisfactory from regions where more attention to reverse degrading trends is needed. The greatest need for more funding is that the current person that knows how to use this method is retiring in a few years. We need them to finish the coding so that someone like Breck, Kaylyn, or Rebecca Murphy can produce the results for communicating water quality trends and produce the maps in our Tributary Summaries.
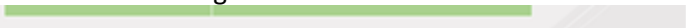
Non-tidal Network Workgroup

- Sustainable funding for the [monitoring enhancements funded through infrastructure funding](#) identified in the PSC Monitoring Report.
- NTN historical data completion – (in question – SRBC may have older, historical data in Excel spreadsheets). The development of the foundational NTN database requires the data to be accessible to computer program scripts calling for data from Water Quality Portal data sources. March 2024 NTN meeting will evaluate final pieces of missing historical data to identify capacity needs for finalizing availability and accessibility of data that exists but not in an accessible form and location.

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