Work Plan for Cross Goal Team Project: Mapping Geographic Areas that Benefit Multiple CBP Outcomes

Updated August 19, 2016 (for discussion by Goal Team Chairs on August 30).

Need: The current CBP management strategies address individual outcomes of the Chesapeake Agreement. The program expects and intends collaboration between more than one Goal Implementation Team (GITs) to address outcomes. There are aspects of goals and outcomes that are inter-related (figure 1) and the GITs are starting to more effectively collaborate on inter-related outcomes. The guiding principles discussed by the GITs for addressing inter-related outcomes are:

- Providing maximum benefits for "living resources": fish, wildlife and people (**populations**)
- Through restoration or conservation of the habitats, water quality and lands they depend on (**conditions**)
- By focusing on inter-related outcomes and where practices in the CBP management strategies should be implemented (**interventions**) based on what the science tells us and;
- Considering future threats of population growth and climate change (**drivers of ecosystem change**).

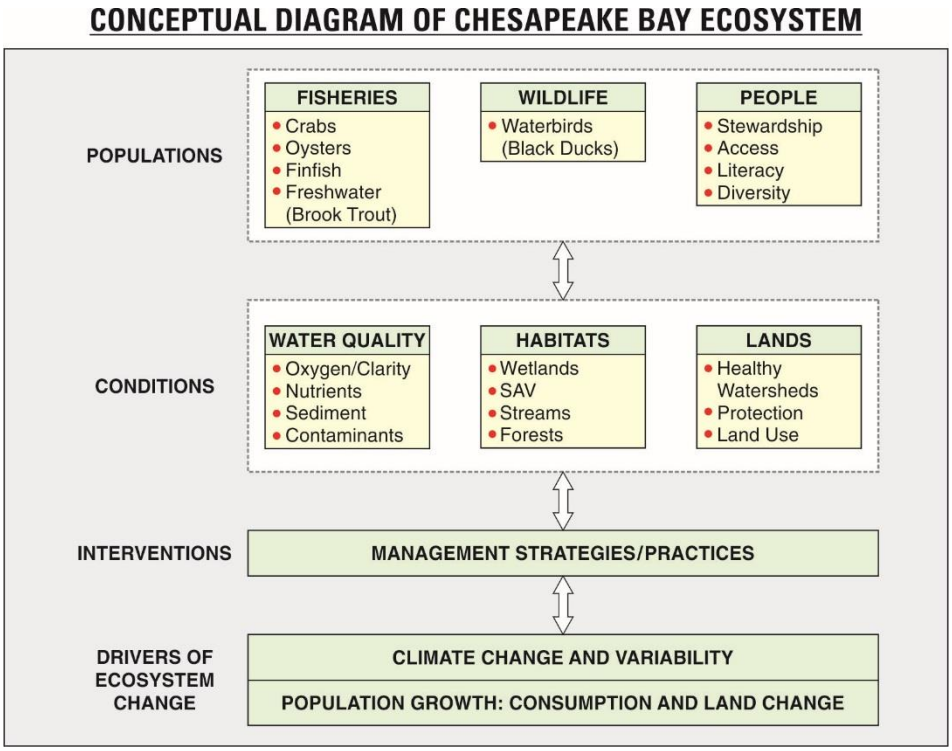

Figure 1 (from Phillips and Blomquist, 2015)

Resources to adequately achieve all 31 outcomes in the Watershed Agreement are limited. Therefore the GITs are working together with STAR to address multiple outcomes to more effectively share resources through these efforts:

- Identify inter-related actions between outcomes so they can be done more effectively,
- Map geographic areas where effort can be concentrated that benefit multiple outcomes,
- Summarize the factors that may affect achievement of multiple outcomes so they can better address these potential barriers, and
- Align partner efforts (federal, state and local jurisdictions, NGOs) to tackle multiple outcomes (both for 2016-17 work plans and planning for more opportunities in 2018-19).

The CBP is also beginning to design "Chesapeake Decisions", which will be a valuable tool to inform decision making for addressing CBP outcomes. However, this tool is in early stages of development so the GITs, working with STAR, are taking some initial steps to address multiple outcomes (see Appendix 1 for details). One effort is to have a project for mapping geographic areas where actions could benefit multiple outcomes, which is the purpose of this document.

Audiences and Benefits of the Mapping Project

The initial audience for the project is the GITs since they (1) are focused on implementing activities to achieve outcomes, and (2) have representation of federal, jurisdictional, and NGO partners. Additional audiences include:

- The Management Board, which includes the GITs Charis and CBP signatories, can help direct resources to areas identified important for both restoration and conservation.
- Principal Staff Committee, who can consider policy implications to better achieve inter-related outcomes.

The mapping project will allow the GITs to better identify "regional" locations to better coordinate and focus resources that will benefit multiple, inter-related outcomes. The result will be better integration of efforts between multiple partners to make progress toward multiple outcomes. The project will also provide an improved understanding of focusing in key geographic locations to achieve maximum benefits for restoration and conservation activities.

Considerations to identify geographic areas

There are several approaches or considerations for mapping geographic areas:

- Focus on places most important for living resources (fish, wildlife, and people)
- Identify areas to focus restoration and conservation activities
- Consider threats from land and climate change
- Identify areas where multiple partners are already working or consider priorities.

Mapping considerations for each of the items are discussed below.

1. Focus on places more important for living resources.

The initial focus is on living resources that are specified in the Bay Agreement:

- Fish: crabs, oysters, forage fish, and brook trout (as an indicator for freshwater species),
- Wildlife: black ducks (as an indicator for other waterfowl)
- People: outcomes related to stewardship, public access, literacy, and diversity.

The geographic extent for different species varies across the watershed. For example, the tidal waters contain a unique set of shell and finfish species compared to remainder of the watershed. Wildlife has similar distinctions in the range they occur in the watershed. Initially, the project team and GITs considered dividing the watershed into different provinces (Highlands, Piedmont, and Coastal Plain) given the different occupancy ranges of living resources. However, the initial mapping will just consider the entire watershed and make some distinctions for fishery habitat in tidal areas.

Each GIT identified a list of initial outcomes they would like to have mapped (see table xxx) considering the needs for fish, wildlife, and people. Almost every outcome has areas we want to 1. Protect because they are already providing a function to benefit an outcome, or 2. Restore, where they function needs improved to help achieve an outcome (next item has more details)

2. Identify areas for conservation and restoration activities that benefit multiple outcomes

Where habitats and lands need to be protected or restored for fish, wildlife, and people. These are usually different and distinct areas. Two examples include the map on the left showing areas important to protect based on ecological integrity and water quality (figure 2) and map on the right (figure 3) showing areas important to restore based on nitrogen loads to local waters.

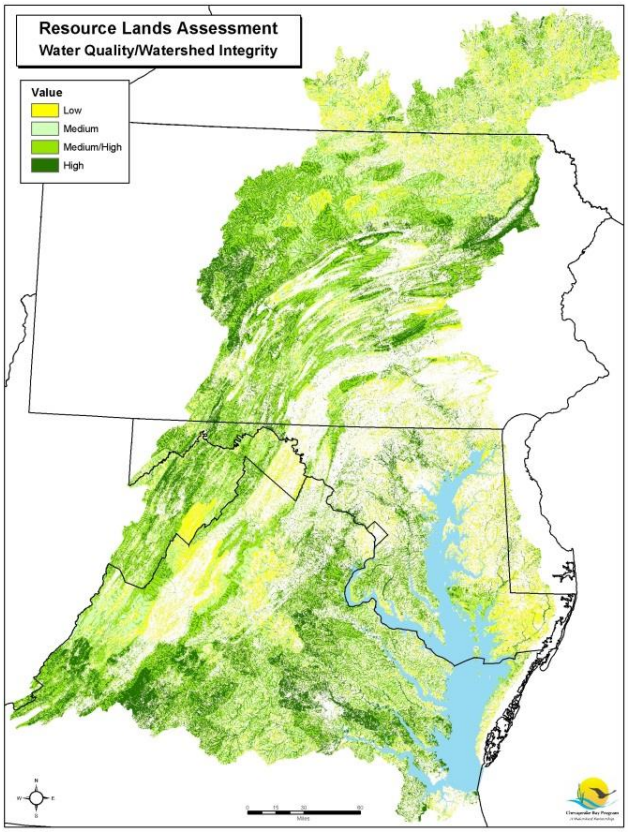

Figure 2: Map of areas of ecological integraty and important water quality protection (from CBP Resource Lands Assessment).

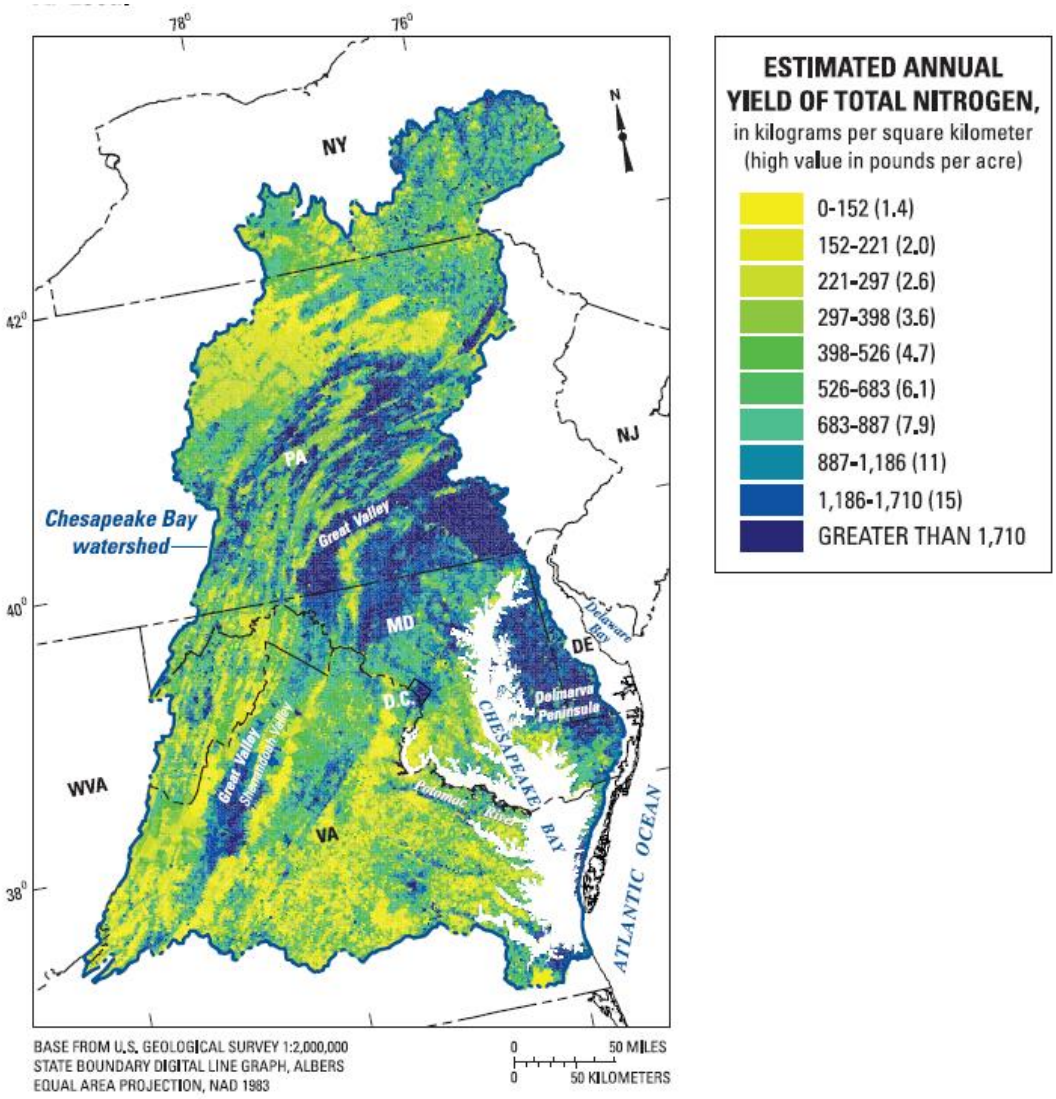

Figure 3: Map of nitorgen loads to local streams in the Chesapeake Bay Watershed (from Ator and other, 2011)

3. Consider threats from land and climate change

Understanding the threats to restoration and conservation areas would be based the two primary stressors to the Bay ecosystem (fig 1):

- Population growth and associated land-use change
- Climate change and variability.

The CBP has a Land-Change Model (Claggett, USGS) that can be used to show likely areas of land-use change. The CBP has multiple assessments of climate change being conducted through the Climate Change Workgroup. Selected results of these assessments, such as extent of projected sea-level rise, will be used to display potential geographic areas.

4. Identify areas where multiple partners are already working or consider priorities

Many groups have already identified areas where they are focusing efforts that can be used for the mapping project. Some examples include Harris Creek Oyster restoration effort, Delmarva RCPP wetlands restoration, and federal partner focus areas. These areas will be gathered for the mapping project so areas of benefits (maps produced in items 1 and 2) can be compared with current areas where partners are focused. This will help partners decide if the location of current efforts should be modified.

5. Conduct joint planning with multiple partners to enhance efforts in selected geographic areas

The areas identified from steps 1-3 will provide the most "strategic geographic areas" for protection and restoration efforts for multiple outcomes. The next step is compare these areas with those in step 4 where partners are already focusing efforts or consider a priority. Where both ideas line up, it provides an opportunity to enhance activities. Other areas identified in steps 1-3 may not have much current effort, so areas could be considered for future CBP activities.

Proposed Approach and Next Steps (Status updated as of Aug 19).

Create base maps for Chesapeake Bay watershed and selected tidal reaches

Who: CBP GIS team (J. Wolf and C. Wright).

Status: Initially, the project team and GITs considered dividing the watershed into different provinces (Highlands, Piedmont, and Coastal Plain) given the different occupancy ranges of living resources. However, the initial mapping will just consider the entire watershed and make some distinctions for fishery habitat in tidal areas. Will need to consider how to subdivide tidal waters into major salinity regions given their influence on fisheries.

Compile list of GIS layers that will be helpful to identify geographic areas

Who: GIT staffers with Lindsey Gordon as lead.

Status: Team identified over 100 layers to be considered and where gathered from:

- Fish habitat mapping, particularly for forage, migration and spawning location priorities (GITs 1 and 2)
- North Atlantic Landscape Conservation Cooperative (NALCC) and Appalachian LCC to bring in layers that depict index of ecological integrity and the synthesis mapping of the State Wildlife Action Plans. They will have mapped Regional Conservation Opportunity Areas (RCOA) in July 2016 – which will show state priorities within a regional context and the layers are supposed to be compatible with our system. (GITs 1 and 2)
- Water quality maps of high loading areas to local streams and the Bay (GIT3)
- Landscope Chesapeake priority conservation lands, public access points and healthy watersheds mapping (GITs 4 and 5)

Begin to analyze information to identify geographic areas.

Who: GIT staffers and coordinators working with CBP GIS team and STAR. Analysis would include:

- Identify areas of intersection where multiple priorities coalesce based on the science

- Then begin to bring in other layers (actions in the work plans or outcomes not yet mapped) and discuss opportunities to add other disciplines to these geographic areas where work is either already happening or could happen in the context of restoration and protection
- Categorize map layers in terms of positive or negative factors (vulnerabilities, threats, opportunities)
- Conduct structured decision making (SDM) to decide on the target focus areas with an eye toward geographic distribution, input from partners and signatories.
- Environmental justice screen to see what gaps or opportunities surface
- Identify the emerging stories, sound bites, story maps to communicate the work

Status: During July STAR meeting, the GITs identified initial priorities (table 1). The Goal Team chairs are meeting on August 30 to discuss the selections.

Gather information on existing partner efforts and priorities

Who: Kristin Saunders and Greg Barranco working with GITs, other partners, and MB

- Coordinate efforts with Army Corps of Engineers to see how this work might inform or glean information from the Chesapeake Bay Comprehensive Water Resource and Restoration Plan watershed assessment.
- Discuss with NFWF their ideas for selecting priority areas.
- Engage MB and PSC (so integrates with signatories at "levels" above staff on the GITs
- Major opportunity is to have habitat restoration and other disciplines' benefits reflected in the Phase 3 WIPs for each state.

Status: discussion held with USCOE and NFWF, who will share their ideas and consider information gathered from mapping project

Coordinate project efforts and interaction with CBP entities

Who: Kristin Saunders and Greg Barranco coordinate efforts between GITs and interacting with CBP partners and entities (such as MB). Scott Phillips provided collaboration with STAR.
Status: we are doing our best.

Table 1: Initial layers to consider for restoration and conservation

	Data Layer	Topics
GIT 1	Priority Living Resources Areas (surrogate for Fish Habitat)	Conservation
	Oyster Restoration Areas	Restoration
	National Fish Habitat Action Plan (risk of current habitat degradation)	
GIT 2	Regional Conservation Opportunity Areas	Conservation
	Index of Ecological Integrity (NALCC)	Conservation or Restoration
	Brook Trout	Conservation
	Black Duck Energetics Model	Conservation?
GIT 3	SPARROW Nutrient Loads	Restoration
	Waters Impaired for PCBs	Restoration
	Long Term WQ Monitoring Trends	Restoration
	Water Quality Standards Attainment	Restoration
GIT 4	Healthy Watersheds	Conservation
	Protected Lands	Protection Overlay
GIT 5	Public Access	Conservation
	Land Protection Priorities (via Chesapeake Conservation Partnership)	Conservation
Climate	Sea Level Rise/Inundation	Threat
	Flood Hazard Risk (riverine)	Threat
	Wetland Adaptation Areas	Threat/ Conservation
Diversity	High Poverty	
	Ethnic Minority	
	Public Health Indicator ((e.g. cancer rates, asthma, birth defects))	
Land Change	CB Land Change Model	Threat

Appendix 1: Objectives of Cross Goal Team Collaboration

The goal is to more effectively coordinate actions and resources to achieve inter-related outcomes. The ideas around this project were discussed by the GIT chairs in the fall of 2015 and have evolved since that time. The CBP Scientific, Technical Assessment and Reporting (STAR) and other partners have offered to apply their capabilities to help carry out the approach working closely with the GIT teams. The project has these primary phases:

- **Phase 1: Identify inter-relation between outcomes**. Common actions that are needed to address 2 or more inter-related outcomes would be gathered from the Management Strategies and 2016-17 associated work plans.
- **Phase 2: Mapping: Identify geographic areas important for inter-related outcomes.** Conduct geospatial analysis to determine where the geographic areas overlap for inter-related outcomes. These geographic results can be used to:
    - (1) Identify areas where addressing multiple outcomes should be considered. This would include unique areas where restoration and/or protection need to be emphasized.
    - (2) Choose a subset of locations where multiple partners want to focus efforts.
- **Phase 3: Summarize the factors that affect achievement of 2 or more inter-related outcomes.** Use the information in the management strategies to summarize the most common factors that affect achieving outcomes. Also identify regions where the drivers of ecosystem change (population growth and climate change) will most likely affect achieving outcomes.
- **Phase 4: Identify the interrelated outcomes and factors most important to achieve the goals of Chesapeake Agreement.** This phase will help identify those outcomes and factors which are "keys" (the most inter-relation) to making progress on multiple outcomes in the agreement. Results of this analysis would most likely be used in the next phase of the work plans (2018-19) but some initial findings could help implement the current work plans.

Phase 1 would be carried out by the Coordinators/Staffers based on reviewing all the management strategies and draft work plans and their knowledge of the outcomes. Phase 2 would be done with support from the STAR and the CBP GIS team. Phase 3 would be carried out by the Staffers/Coordinators. Phase 4 would utilize structured-decision making (SDM), which is an approach to help groups discuss and prioritize options to solve an issue. USGS and FWS have staff experienced in SDM. If staffers/coordinators find it useful toward accomplishing the above task, a more comprehensive approach could also be considered with information from all management strategies /work plans put into a data base for a more detailed assessment of each tier. The results from the project can be used through the CBP decision framework to consider refinements to work plans in 2018-19 and ultimately adaptively manage implementation.