

# BIENNIAL STRATEGY REVIEW SYSTEM

## Chesapeake Bay Program



### Logic and Action Plan: Post Quarterly Progress Meeting

#### 2025 WIP Outcome – 2018-2019 Logic and Action Work Plan

[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)

**Instructions:** 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
What is impacting our ability to achieve our outcome?	What current efforts are addressing this factor?	What further efforts or information are needed to fully address this factor?	What actions are essential (to help fill this gap) to achieve our outcome?	What will we measure or observe to determine progress in filling identified gap?	How and when do we expect these actions to address the identified gap? How might that affect our work going forward?	What did we learn from taking this action? How will this lesson impact our work?
Continuing to enhance and sustain the capacity of state and local governments and the private sector to implement practices	Continued funding and technical assistance support for BMP implementation, tracking,	Connecting water quality practices to other local priorities (co-benefits); continuous and stable	1.1 <a href="#">Support the development and implementation of Phase III WIPs.</a>	METRIC EXISTS: Consistent grant administration is one measure of progress:	State funding efforts for cover crops is one example: certification each year and expenditure figures attest to program implementation. See <a href="#">example</a> .	Successful and popular program, reinforces education; High level of buy in. Costly
			1.2 <a href="#">Support development and implementation of two-year milestones.</a>			

**Commented [PL1]:** PADEP Comment: The Management Strategy states “that these entities must continue to work towards strengthening and sustaining adequate capacity necessary to complete the efforts through the Phase III WIPs and future two-milestones” While we are collectively working toward that end goal, financial support for “boots on the ground” has not met the need. The challenges for technical assistance toward BMP verification and implementing new BMPs have been quantified in PA’s Phase 3 WIP.

I am unsure what the definition of “minor obstacles” are, but this should be in red, due to the enormous workload across all Bay jurisdictions.

Metric exists: Consistent grant administration is one measure of progress. The need is for increased funding for personnel, subawards for technical assistance, and education and outreach. Grant coordination across multiple federal and state sources must be considered.

Expected response and application: Not understanding the example provided under this category. This doesn’t address the factor.

Learn/adapt does not address the factor.

**Commented [PL2]:** Technical assistance gaps remain - particularly in the ag sector where higher levels of implementation are planned and expected - and states are experiencing resource and technical challenges with implementing BMP verification programs. However, work continues to move forward on better quantifying co-benefits. Increased funding toward Bay grant programs.

	verifying, and reporting through voluntary and regulatory (NPDES permits) measures	funding stream to support implementation efforts; strengthened coordination between federal, state and local levels to accelerate implementation (e.g., better coordination with LGAC).	<p><a href="#">5.5 Provide Support for continued BMP implementation, tracking and reporting on agricultural loads</a></p> <p><a href="#">5.6 Work with other federal agencies to build capacity that will support an efficient and robust trading market</a></p> <p><a href="#">5.7 Guide development of jurisdictions' trading and offset programs</a></p> <p><a href="#">6.1 Communication of funding needs to elected officials</a></p>	<p>Fed (examples):</p> <ul style="list-style-type: none"> <li>• CBRAP</li> <li>• CBIG</li> <li>• CREP</li> <li>• NFWF</li> <li>• SWG/INSR</li> </ul> <p>State (examples):</p> <ul style="list-style-type: none"> <li>• SRF</li> <li>• Trust Fund</li> <li>• Bay Restoration Fund (BRF)</li> <li>• Open Space</li> </ul> <p>Reports on dollars spent, results achieved in reductions (N,P,TSS)</p>		investment by the State.
<b>Delivering the necessary financial capacity to implement practices and programs</b>	Development of citizens monitoring programs; CBPO Grant Programs	Ensuring funding is targeted towards priority practices and	<a href="#">5.1 Evaluation of the Phase III WIPs and 2-year milestones</a>	CURRENT METRIC EXISTS BUT COULD BE REFINED. While funding	State funding efforts to distribute BRF and Trust Fund dollars currently use priority funding metrics to evaluate projects and implementation in MD. These metrics rank best	We have learned that targeted frameworks for spending millions of dollars are
	(CBIG, CBRAP); WIP Assistance Funding; state programs targeted towards delivering funding and technical assistance to local programs and initiatives;	watersheds; continued federal, state and local funding coupled with the identification and leveraging of other (e.g., private) funding sources	<p><a href="#">5.2 On-going sharing of lessons learned to help inform future 2-year milestones from WIP development and implementation</a></p> <p><a href="#">5.3 "Return on Investment" analysis of installed BMPs from data in grants (costs and pollution reductions) to better target BMPs and funding</a></p>	programs are in place, refinement of the assessment of need and best use can be improved. This is an ongoing factor which will be a focal point in the Phase III WIP, as modeling	performance on a pound of reduction per dollar spent. This example from MD could be shared with the other jurisdictions for potentially exploring or adopting for their own use. See, e.g., MDE Program <a href="#">webpage</a> : See also DNR Program <a href="#">webpage</a> : See also, <a href="#">areas designated by MDP</a> called PFA's which direct state dollars to targeted urban areas)	complex and important economic drivers. Ongoing evaluation of results and implementation success is always needed. New initiatives to incentivize private sector participants are

**Commented [PL3]:** PADEP Comment: Recommend red. The evaluation of BMP implementation and maintenance costs have not been evaluated (CAST). How costs might be reduced by more cost-effectively reallocating nutrient and sediment reductions among source sectors also needs to be re-evaluated (CAST). This factor is called "delivering the necessary financial capacity to implement". This delivery has not occurred, nor does it seem to be on track.

Expected Response: does not make sense as related to the factor. Specific example provided by MD is unclear how it connects.

I'm not certain where the information using examples from Maryland relate to the "Expected Response" and "Learn/Adapt"?

**Commented [PL4]:** Funding gaps vary amongst state and local jurisdictions, but more financial resources are needed in some areas to meet implementation goals by 2025. Work and support continues to target funding towards priority watersheds and practices. Discussions are underway to leverage other sources of (federal) funding (e.g., NRCS). Conowingo WIP financing strategy may serve as a model for private sector investments in water quality improvements.

	Farm Bill/NRCS funding; exploration of private investment options		<p><b>5.4</b> <a href="#">Evaluation of BMP implementation and maintenance costs and actual nutrient and sediment reductions</a></p> <p><b>6.1</b> <a href="#">Communication of funding needs to elected officials</a></p>	results are finalized and finer grained goals are developed.		being pursued in MD. Would be good to see if similar examples exist in the other jurisdictions.
<b>Improving the identification of sources and their contributions to nitrogen, phosphorus and sediment pollutant loads</b>	<p>Explaining trends project provided initial findings on relation between nutrient sources and</p> <p>trends in the watershed. Developing methods to measure and report on incremental progress towards attaining Water Quality Standards. Information shared with WQ GIT reps, and the findings being used to inform WIP development; High resolution land cover and</p>	<p>Continuation of current efforts and future data collection efforts to coincide with two-year milestones and annual progress runs. Better translate the scientific findings into management implications and work with State and local governments to apply findings toward implementing water-quality practices (improved targeting). This information</p>	<p><b>1.3</b> <a href="#">Continue to incorporate additional/more recent local land use data.</a></p> <p><b>4.1</b> <a href="#">Refine information on the factors affecting the changes in sources and loads through the Bay watershed, and their delivery and impacts on the estuary. Better understand response times to management of nitrogen, phosphorus, and sediment.</a></p> <p><b>4.2</b> <a href="#">Better predict future impacts of population growth and climate change in the Bay watershed and impacts on water quality.</a></p> <p><b>4.11</b> <a href="#">Provide enhanced focus how population changes and economic influences may affect nutrient and sediment loads, and estuary changes.</a></p>	<p>METRIC EXISTS. The Mid Point Assessment is complete. New modeling tools were finalized in 2017 and Phase III WIPs are to be completed in 2019</p>	<p>More refined local goals; more study and remedies in response to new sources with implementation planning improvements. See e.g., the MDE <a href="#">webpage</a> related to Water Quality Certification of the Conowingo Dam and solutions to sediment infill.</p>	<p>This is an ongoing effort.</p> <p>Use of USGS's new modeling approach to identifying sediment source to aid in targeting sediment sources and management actions</p>

**Commented [PL5]:** The work on explaining trends and the updates to the high-resolution land cover data continues. Working to incorporate more monitoring and trends data into assessments of progress.

	land use data produced and used to improve Phase 6 model inputs; Phase 6 model calibration; Maintained monitoring networks and provided trend updates.	will provide additional lines of evidence to measure progress, including changes in aquatic conditions.	<a href="#">4.14 Updating the high-resolution land cover and land use datasets to remap the Chesapeake Bay Watershed.</a>			
<b>Quantifying the reductions from pollution control practices and verifying their continued performance</b>	BMP expert panels and implementation of BMP verification programs	Streamlining and simplification of the requirements for BMP verification as described in the 2014 BMP Framework to recognize resource limitations; implementation of BMP verification programs; continued crediting of new, innovative practices.	<a href="#">4.3 Quantifying the effect of variations in watershed properties (such as soils, geology) on nutrient and sediment reduction practices</a>	METRIC EXISTS. Current annual progress is one method to assess implementation relative to achievement of the 2025 goals.	This is an ongoing effort. There will be further review of methods to quantify reduction scenarios as needed local goals are developed.	This is an ongoing effort. One lesson has become evident: BMP verification must be robust and applicable across sectors.
	Updating the Manure Treatment Technology Expert Panel Report with specific calculation methodology that provides more advanced considerations in the calculation of credits.		<a href="#">2.2 Quantifying changes in Best Management Practices (BMP) performance over time through verification</a>			
		Routine review of BMP expert panels to ensure accurate reduction quantifications, especially for innovative practices (e.g., use of data	<a href="#">4.4 Evaluating the potential future impacts of climate change on BMP performance</a>			
			<a href="#">7.6 Review and refine stream restoration technical protocols in order to preserve and enhance ecological function in stream restoration, floodplain connection, and urban stream practices.</a>			

**Commented [PL6]:** BMP panels underway or completed. Ad-hoc action team recently established to address verification issues and concerns. Work continues under the USWG on stream restoration protocols.

**Commented [PL7]:** PADEP Comment: Recommend yellow. BMP Ad-hoc Action team has met once. Since January, it took six months to pull together an action team.

Streamlining and simplification of the requirements for BMP verification has not yet occurred. BMP verification and dealing with credit durations has been an ongoing issue that has, at the very least, hit minor hurdles.

		from INSR grants).				
<b>Enhancing the existing decision support tools (Phase 6) and accelerate the time to fully utilize a new BMP in the model (e.g. time from completion of BMP expert panel report to crediting in model).</b>	Completed - Phase 6 model development occurred over past 5 years, approval by PSC for management application	Continue to build in optimization system to address costs and effectiveness. Explore approaches to build in co-benefits of water quality practices with other CBP outcomes into decision support tools. Refine Phase 6 Model as agreed to address simulation of phosphorus in soil.  Updating modeling tools may not be consistent with the PSC decision on the stopping rule and freezing planning targets through 2025. Modeling workgroup and WQGIT will	<b>1.4</b> <a href="#">Modeling tools will be updated with new information every two years, to coincide with two-year milestone development. These updates will be consistent with the decisions approved by the PSC in July 2018. Phase 6 suite of modeling tools released and approved by the CBP partnership for management application in the Phase III WIPs and two-year milestones.</a> <b>7.2</b> <a href="#">Develop approaches to better quantify co-benefits with other outcomes into decision-support tools</a> <b>1.7</b> <a href="#">Improve the quality and representation of soil P input data in the Phase 6 watershed model to improve development of Phase III WIPs.</a>	METRIC EXISTS. The Mid Point Assessment is complete. New modeling tools were finalized in 2017 and Phase III WIPs are to be completed in 2019	Better understanding and application of modeling framework has become possible. The models represent better and more land use categories, take advantage of refined land use capture methods and incorporate local data in some jurisdictions, all of which improves the accuracy and resolution of the products which in turn helps to better guide Chesapeake Bay restoration decisions.	State agencies, NGOs and local government and citizen advisory committees will continue to participate in Chesapeake Bay Partnership meetings, decisions and to contribute to the assessment of progress toward 2025.

**Commented [PL8]:** Partially completed. Phase 6 was used to set the Phase III WIP planning targets, supported Phase III WIP development and implementation, and will support future milestone development and implementation. Updates to the Phase 6 model (e.g., CAST) continues to occur on a 2-year cycle. This includes the incorporation of updated land use data, BMPs, and other data sources (e.g., 2017 Ag Census).

**Commented [PL9]:** PADEP Comment: Recommend Yellow. "Accelerate the time to fully utilize a new BMP in the model..." what does this mean? Acceleration is relative. To my knowledge, the only BMP in the model that has been accelerated has been the urban stream restoration due to the creative approach of using protocols.

Better understanding and application of modeling framework – we need to ensure that the communication and outreach tools are developed and utilized by all in the watershed for a better understanding.

		consider options in April and May 2019.				
<b>Ongoing review and update historical implementation data that has been submitted by the jurisdictions to the CBP partnership, confirming that</b>	Completed – jurisdictions have spent the last couple years updating their BMP historical data, as well as developing	The Basin-wide BMP Verification Framework needs to be streamlined and simplified to allow for realistic	<a href="#">2.1 Annual implementation progress reporting for inclusion in modeling tools and annual reporting on progress on programmatic milestones.</a>	METRIC EXISTS.  Annual progress reviews will continue.	Verification protocols were developed. See response to # 4 above	This is an ongoing effort.

**Commented [PL10]:** PADEP comment: Recommend Yellow. It relates back to the issues with BMP verification framework and credit durations. “...ensuring that accurate information is included in the modeling tools” is why I would downgrade to yellow.

The BMP Verification framework has not been streamlined or simplified.

BMPs are still in place and ensuring that accurate information is included in the modeling tools	their BMP verification programs	verification programs based on available resources. BMP	<a href="#">2.2 Quantifying changes in Best Management Practices (BMP) performance over time through verification</a>			
		verification program implementation and annual progress submissions				
The Management Board directed the WQGIT to consider co-benefits for a selected set of CBP outcomes: <b>Improving</b>	The EPA expectations document for the Phase III WIP development process	Need for technical understanding from monitoring and modeling science to	<a href="#">7.1 Optimization tools for co-benefits will be explored. An optimization framework with respect to cost and water quality in CAST is under development, and</a>			

**Commented [PL11]:** Partially completed. Jurisdictions have the opportunity to update their historical record every year to coincide with the annual progress and verification submissions.

**Commented [PL12]:** Co-benefit fact sheets have been completed. Projects underway to better understand and quantify ecosystem services. Optimization framework and tool still under development.

<p><b>Habitats; Reducing Toxic Contaminants; Conserving Lands; Addressing Climate Resiliency; Public Access.</b> There was a stakeholder survey done by LGAC (Local Government Advisory Committee) to identify outcomes most of interest to local governments. Of those, this selection is MB's best judgement as most closely related to the water quality outcomes. The selected outcomes have had co-benefits identified with them, according to the "Estimation of BMP Impact on Chesapeake Bay Program Management Strategies" (<a href="#">Tetra Tech 2017 report</a>).</p>	<p>included encouragement for the jurisdictions to consider multiple benefits of watershed management practices and policy. The Climate Resiliency Workgroup, with WQGIT support, has been charged with developing and communicating understanding of climate-resilient BMP siting and design. The Urban Stormwater Workgroup and the Stream Health Workgroup have submitted a proposed GIT project to explore opportunities for enhanced ecological uplift in stream restoration practices for nutrient and sediment reductions, which did not receive</p>	<p>support inclusion of selected co-benefits</p>	<p><a href="#">this framework is being built to be flexible enough that we can incorporate co-benefits, as optimization goals or constraints, once we have quantitative information regarding the ecosystem services. So, incorporating co-benefits in an optimization procedure will be possible once the co-benefits are quantified</a></p> <p><a href="#">7.3 Develop improved understanding of the potential benefits, and risks, of selected practices and policies to provide benefits to multiple outcomes.</a></p> <p><a href="#">8.3 Existing technical tools will be expanded, and new tools may be developed, to provide the information for decision makers to consider practices that provide benefits for multiple outcomes. Tools include Watershed Data Dashboard currently developing planning, tracking and reporting tools in coordination with PA. These tools will be developed in coordination with WQGIT, EPA and jurisdictions. Currently working to build on the Cross GIT mapping effort, and are preparing to coordinate with all GITs in this effort. Current story maps (Conservation and</a></p>			
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	funding; however ad-hoc stream committees are ongoing anyways in the Urban Stormwater Workgroup (USWG).		<a href="#">Restoration</a> ) are available online, and report on these mapping efforts is being developed.			
			<p><a href="#">4.9 Build capacity for analysis and communication of linkage between watershed changes and estuary response</a></p> <p><a href="#">7.4 Collaborate with source-sector workgroups to identify projects of mutual interest that support collective reductions of toxic contaminants, nutrients and sediments. Explore and develop approaches for estimating BMP removal effectiveness for PCBs and other selected toxic contaminants. Collaborate on reductions from stream restoration practices (with Stream Health Workgroup and USWG). Explore approaches to integrate Phase III WIP development for stormwater practices with stormwater reductions (e.g. MS4) under local toxic contaminants TMDLs.</a></p> <p><a href="#">7.5 Cross—outcome consideration of applications, management practice implications, and next steps from report on PCB</a></p>			

			<a href="#">removal and WWTP ENR upgrades</a>			
			<a href="#">7.6 Review and refine stream restoration technical protocols in order to preserve and enhance ecological function in stream restoration, floodplain connection, and urban stream practices.</a>			
			<a href="#">7.7 Ecosystem Services Valuation Project</a>			
<b>Understanding the factors affecting the ecosystem response to pollutant load reductions to focus management efforts and strategies</b>	<p>Better understanding of “lag times”, which has been built into the Phase 6 suite of modeling tools for planning purposes.</p>	<p>The relationships between water quality improvements and the recovery of habitat conditions for</p>	<p><a href="#">4.10 The WQGIT will collaborate with the Climate Resiliency Workgroup to pursue research, policies and practices to address climate impacts in the Watershed with regards to water quality management practices.</a></p>	<p>SEVERAL METRICS WILL BE NEEDED HERE.</p> <p>This is an ongoing effort.</p>	<p>Many options are available and could include:</p> <ul style="list-style-type: none"> <li>• Technical, scientific studies of the uncertainties, such as time lag in restoration or targeting more effective practices and implementation locations</li> <li>• Financial studies and gap analyses to determine innovative funding initiatives and needs</li> <li>• Population projections and trends coupled with economic estimates related to restoration and growth capacity analysis</li> </ul> <p>Development of co-benefits analysis and promotion of multi-faceted interventions that produce economic activity in addition to resulting in higher eco system service benefits</p>	<p>This is an ongoing effort. Jurisdictions engage with Chesapeake Bay partners that range from NGOs to academic institutions to develop economic solutions that improve environmental outcomes.</p>
	<p>Explaining trends project (through STAR) provided initial findings for both the watershed and estuary. Held a STAC workshop, with WQ GIT reps, on ways to integrate the findings and inform WIP</p>	<p>fish and shellfish populations and how increases in plant and animal biomass in response to improved water quality improves the assimilative capacity of the system for nutrients and</p>	<p><a href="#">4.11 Provide enhanced focus how population changes and economic influences may affect nutrient and sediment loads, and estuary changes.</a></p> <p><a href="#">4.12 Improved understanding of uncertainty associated with model projections. The partnership needs to have a better understanding of uncertainty</a></p>			

**Commented [PL13]:** PADEP comment: Who should be understanding the factors? The CBP Partnership, or our stakeholders? If stakeholders, this should be yellow. Stakeholders still do not understand the lag time and ecosystem response (link between modeling and monitoring).

**Commented [PL14]:** Work is ongoing to understand climate resilient BMPs (e.g., NOAA project). Further research and funding could be directed towards this effort to support jurisdictions’ two-year milestones (climate change loads to be addressed starting with the 2022-2023 milestones). Need update from Modeling Team on addressing uncertainty and timing for achieving water quality standards. Lag times have been built into the Phase 6 Watershed Model.

	development. Explaining trends project also providing a better understanding of other factors in addition to nitrogen, phosphorus and sediment pollutant load reduction that affect response of DO, clarity, SAV and chlorophyll; the effects of climate change due to increased temperatures and sea level rise in the estuary	sediment. Assess the time it will take for different tidal segments to achieve water-quality standards to better understand responses restoration efforts	<a href="#">quantification. Performance targets will be developed in future time periods, as the partnership develops additional data/information on uncertainty associated with model projections. The partnership will decide what to do with uncertainty quantification in future time periods.</a> <a href="#">4.14 Updating the high-resolution land cover and land use datasets to remap the Chesapeake Bay Watershed.</a>  <a href="#">8.4 Establish stronger use of results to inform implementation of WIPs and 2-year milestones through 2025.</a>			
<b>Factoring in effects from continued climate change</b>	CBP partnership developed the tools to quantify the effects of changes in watershed flows, storm intensity and changes in hypoxia due to increased temperatures and sea level rise in the estuary. Current efforts	Better understanding of climate resilient BMPs and the quantification of climate change impacts on hypoxia in 2025 and beyond. The partnership will be looking at projected climate change effects expected by	<a href="#">1.5 Document current state and local programs, policies, and strategies to address climate change</a>  <a href="#">4.4 Evaluating the potential future impacts of climate change on BMP performance</a>  <a href="#">4.13 Continue to refine the estimate of pollutant load changes due to 2025 conditions so that jurisdictions will be able to meet the expectation</a>			

**Commented [PL15]:** PADEP Comment: Climate allocations have not yet been recommended by the WQGIT.

What should go in the blank boxes?

**Commented [PL16]:** Modeling team has completed the updated climate change assessment and now working with the partnership on understanding results and achieving consensus decisions on how to incorporate climate impacts into planning and implementation efforts.

	are to frame an initial future climate change scenario based on estimated 2025 conditions	2025, 2035, 2045, and 2050 from the baseline of 1995.	<a href="#">to account for these additional nutrient and sediment pollutant loads beginning in 2022.</a>			
<b>Assessing the implementation potential of filter feeders for nutrient and sediment reductions</b>	The oyster model has been revised as necessary to incorporate aquaculture operations and additional oyster biomass brought about by restoration activities including sanctuaries. First part of oyster BMP panel completed and approved by the CBP partnership.	Complete second part of oyster BMP panel in the 2018 timeframe and update modeling tools as a result of this information. Updating modeling tools may not be consistent with the PSC decision on the stopping rule and freezing planning targets through 2025. Modeling workgroup and WQGIT will consider options in April and May 2019		METRIC EXISTS. The Oyster Recovery Partnership's 2017 presentation on metrics and ways to measure progress of oysters as a BMP can be found <a href="#">here</a>	Oyster Recovery Partnership Further information is posted on ORP's website: <a href="https://oysterrecovery.org/water-quality-improvement/">https://oysterrecovery.org/water-quality-improvement/</a>	The ORP'S Oyster Recovery Partnership 2016 – 2021 Strategic Plan is available <a href="#">here</a> .  The phase 2 report to be completed in Summer of 2019. A public webinar on the work of the panel will be held in May 2019.
<b>Addressing the impact the lower Susquehanna dams have on the pollutant loads to the Bay, including changes over time</b>	Numerous studies have been completed to understand the trapping capacity behind dams, especially the Conowingo, as well as greater	Development of a Conowingo WIP and Planning Targets, as well as a financing strategy to fund implementation	<b>1.6</b> <a href="#">Development and implementation of a Conowingo WIP, two-year milestones, and financing strategy to achieve the nutrient and sediment load reduction targets because of Conowingo dam reaching its trapping capacity.</a>	Phase 6.0 Modeling and planning metrics are being developed and will be elaborated upon through	This effort is ongoing by state and federal agencies in cooperation with several private and NGO partners. Partners have developed a draft Framework for the Conowingo Watershed Implementation Plan.	

**Commented [PL17]:** Although delayed, the second oyster BMP panel should be available for partnership review and comment in the summer 2020 timeframe.

**Commented [PL18]:** PADEP comment: What about incorporation of freshwater mussels?

**Commented [PL19]:** The modeling assessment on quantifying the additional nutrient and sediment loads due to Conowingo infill has been completed. The Conowingo WIP Steering Committee and three grantee organizations have been working on developing the Conowingo WIP (both numeric and programmatic analyses). However, CWIP has been delayed due to consideration of multiple considerations of the CWIP and difficulty achieving consensus decisions on numeric and programmatic commitments.

	representation of local impoundments and reservoirs throughout the Phase 6 Watershed Model.	n of the Conowingo WIP and its associated two-year milestones over time. Also, development of a timeline for implementing the Conowingo WIP and achieving the Conowingo Planning Targets.	<a href="#">4.15 Provide analyses of Conowingo and estuarine monitoring through 2018 high flows to support Conowingo WIP development</a>	the Conowingo WIP		
<b>Addressing chlorophyll in the tidal James River</b>	CBP partnership is working closely with the principal investigators of the James River chlorophyll-a criteria assessment to determine the criteria necessary to meet water quality standards in the James River.	Modeling and criteria and assessment alternatives analysis have delayed final rule making that will establish new Chlorophyll-a criteria for the James until summer 2019.	<a href="#">2.3 Planning targets developed for the James River for dissolved oxygen only. Any additional actions needed to meet new chlorophyll-criteria will be developed separate from the Phase 3 WIP planning process.</a>			

**Commented [PL20]:** This action is partially complete.

**Commented [MD21R20]:** I'm not sure if this work is entirely complete. New criteria were developed but I understand that modeling work is on-going to determine if existing DO planning targets/WIP will meet the chlorophyll a criteria. I guess it depends on how we are defining "addressing" here but if I look at the Conowingo item above, it seems that while the modeling work was done there, we are saying it is "yellow" because the WIP isn't finalized. Perhaps VA can provide insight.

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
<b>Management Approach 1: : WIPs, and Two-Year Milestones to reach attainment of target loads to reduce N, P, and sediment provided in the Chesapeake Bay TMDL.</b>					
1.1	Support the development and implementation of Phase III WIPs.	Draft and final Phase III WIPs	Jurisdictions, WQGIT and source sector workgroups, EPA, CBPO, STAR, Habitat GIT, co-benefit GITs	Chesapeake Bay Watershed and jurisdictions	Draft Phase III WIPs due April 12, 2019 and final Phase III WIPs due August 9, 2019
1.2	Support development and implementation of two-year milestones.	Final 2020-2021 milestones and final status report on 2018-2019 milestones  Use of USGS's new modeling approach to identifying sediment source to aid in targeting sediment sources and management actions	Jurisdictions, WQGIT and source sector workgroups, EPA, CBPO, STAR, Habitat GIT, co-benefit GITs	Chesapeake Bay Watershed and jurisdictions	Jan 2020
1.3	Continue to incorporate additional/more recent local land use data.	Updated land use data in the Phase 6 model, as approved by the PSC, to inform the 2020-2021 milestones (referring to July 2018 Stopping Rule decision).	Land Use Workgroup, Watershed Technical Workgroup, WQGIT, state and local jurisdictions	Chesapeake Bay Watershed and jurisdictions	2019
1.4	Modeling tools will be updated with new information every two years, to coincide with two-year milestone development. These updates will be consistent with the decisions approved by the PSC in July 2018. Phase 6 suite of modeling tools released and approved by the CBP partnership for management application in the Phase III WIPs and two-year milestones.	Work with CBPO to identify the soil P data made available to CBPO and subsequently incorporated into the Phase 6 Model as approved by the PSC.  Identify possible additional sources of county-level soil phosphorus data	AgWG and CBPO	Chesapeake Bay Watershed and Jurisdictions	2018/2019

**Commented [PL22]:** Completed for the development phase.

**Commented [PL23]:** PADEP Comment: Recommend Yellow. The Phase 3 WIPs aren't implemented. I can understand the support for the development as "completed", but this factor includes implementation as well.

**Commented [PL24]:** Final 2020-2021 milestones submitted. Need STAR to update sediment actions.

**Commented [PL25]:** PADEP Comment: Recommend Yellow. See note above. If it is specifically "development of" then it could be green, but it is not complete due to ongoing implementation.

**Commented [PL26]:** Updated land use data incorporated into Phase 6. Work underway and on schedule to collect updated high-resolution land cover data to inform next version of CAST (i.e., CAST 2021)

**Commented [PL28]:** Work has been initiated in tandem with retrieving alternative sources of fertilizer information. Unsure of status

**Commented [PL27]:** Work ongoing. CAST 2019 currently under Partnership review. Need update from AgWG on soil P data and where that work stands (Lucinda to reach out to Loretta).

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
1.5	Document current state and local programs, policies, and strategies to address climate change	Draft and final WIPs and 2-year milestones			
1.6	Development and implementation of a Conowingo WIP, two-year milestones, and financing strategy to achieve the nutrient and sediment load reduction targets because of Conowingo dam reaching its trapping capacity.	Draft and final Conowingo WIP	PSC, RFP award recipient	Susquehanna Basin	TBD pending PSC decision
1.7	Improve the quality and representation of soil P input data in the Phase 6 watershed model to improve development of Phase III WIPs.	1. The AgWG will work with CBPO to identify the soil P data made available to CBPO and subsequently incorporated into the CBP Phase 6.0 Watershed Model. Updating modeling tools may not be consistent with the PSC decision on the stopping rule and freezing planning targets through 2025. Modeling workgroup and WQGIT will consider options in April and May 2019.	AgWG and CBPO	Chesapeake Bay Watershed and State Jurisdictions	2018/2019
		2. Identify possible additional sources of county-level soil P data.	AgWG and CBPO	Chesapeake Bay Watershed and State Jurisdictions	2018/2019
		3. Address CBP Management Board's Recommended Path Forward: Incorporating Soil Phosphorus in the Phase 6 Model (Sept 21, 2017)	AgWG	Chesapeake Bay Watershed and State Jurisdictions	2018/2019
		Management Approach 2: Chesapeake Bay TMDL Accountability Framework to ensure cleanup commitments are established and met, including WIPs, and short and long-term benchmarks.			
2.1	Annual implementation progress reporting for inclusion in modeling tools and annual reporting on progress on programmatic milestones.	Final progress data submission and annual programmatic milestone report.	Jurisdictions, CBPO, EPA	Chesapeake Bay watershed and State Jurisdictions	December 1, 2018 and December 1, 2019 (progress reports) and

**Commented [PL29]:** Completed for Phase III WIPs and jurisdictions will incorporate climate change considerations (including numeric loads) starting with their 2022-2023 milestones.

**Commented [PL30]:** This work is ongoing by the CWIP Steering Committee and grantees. However, there are delays on releasing the draft and final CWIP that will require the overall schedule to be revised.

**Commented [PL31]:** PADEP Comment: Geographic Location needs to be reviewed, based on CWIP discussions. It may not just be Susquehanna Basin.

**Commented [PL32]:** Gary Shenk talked to the AgWG in Sept 2018 about the soil P data that had been made available to the CBPO up to that time. The MB's Recommended Path Forward document makes clear that additional soil P data can be used to update the model during the milestones. Perhaps it is time to raise it to the AgWG.

**Commented [PL33]:** Work is underway internally (Lead: Mark Dubin) and NY partners had reached out to the CBPO earlier this year on how to go about providing additional soil P data for the next milestone period. The states have expressed concern about the lack of soil P data available to appropriately inform the model but no additional data have been provided to create a more accurate soil P profile across the counties.

**Commented [PL34]:** Comment from Loretta Collins:  
--Data uncertainty: All of the states got the option to adjust their uncertainty thresholds for soil P and most did, as I recall.  
--Future Data Collection: See above.  
--STAC Workshop: Perhaps next funding cycle and raise to the AgWG and the USWG of this recommendation and see if there is appetite to submit for such a workshop in 2021 or 2022. We would have to identify a willing Chair for such a workshop.

**Commented [PL35]:** This process occurs on an annual basis and has been completed for 2018 and 2019. Jurisdictions' submissions and EPA's draft evaluations of 2020-2021 milestones is complete. Final evaluations are currently under development.

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
					January 15, 2019 and January 15, 2020 (programmatic)
2.2	Quantifying changes in Best Management Practices (BMP) performance over time through verification	Provide support for development and implementation of jurisdictions' BMP verification plans	Jurisdictions, Source Sector Workgroups, BMP Verification Committee, CBPO, EPA		
2.3	Planning targets developed for the James River for dissolved oxygen only. Any additional actions needed to meet new chlorophyll-criteria will be developed separate from the Phase 3 WIP planning process.	Final planning targets for the James River	VA DEQ, EPA	James River estuary	
<b>Management Approach 4: Enhance analysis of modeled and monitored data to better target pollution reduction practices and to better measure progress towards attaining Water Quality Standards.</b>					
4.1	Refine information on the factors affecting the changes in sources and loads through the Bay watershed, and their delivery and impacts on the estuary. Better understand response times to management of nitrogen, phosphorus, and sediment.		USGS, STAR Integrated Trends and Assessment WG, WQGIT, State Agencies		2019-2020
4.2	Better predict future impacts of population growth and climate change in the Bay watershed and impacts on water quality.	More detail in Climate Resiliency Strategy and logic table/workplan	STAR Climate Resiliency Workgroup, and Modeling WG		2019-2020
4.3	Quantifying the effect of variations in watershed properties (such as soils, geology) on nutrient and sediment reduction practices				

**Commented [PL36]:** Concerns have been raised on verification reporting and documentation. A BMP verification ad-hoc action team has been established to address the verification concerns raised by the WQGIT. However, funding and technical support continues to be provided to the jurisdictions for implementation of verification programs.

**Commented [PL37]:** This is partially complete.

**Commented [MD38R37]:** I don't believe the "additional actions" to address chlorophyll a are completed. Perhaps we need to check with the modeling workgroup and VA on this one.

**Commented [PL39]:** MDE comment: What is the current status of this action?

**Commented [PL40]:** Updated climate assessment is complete. Population growth continues to be tracked and addressed in the partnership's Phase 6 suite of modeling tools and through the jurisdictions' WIPs and two-year milestones.

**Commented [PL41]:** Comment from Jeremy Hanson: Why green for this one? We already have this to some degree (most effective basins), but I am unclear if there's still more needed and what other ongoing efforts are tied to this.

**Commented [PL42R41]:** Changed to yellow



## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
4.4	Evaluating the potential future impacts of climate change on BMP performance		STAR Climate Resiliency Workgroup, and Modeling WG		2019-2020
4.10	The WQGIT will collaborate with the Climate Resiliency Workgroup to pursue research, policies and practices to address climate impacts in the Watershed with regards to water quality management practices.	More detail in Climate Resiliency Strategy and logic table/workplan	WQGIT and STAR Climate Resiliency Workgroup		2019-2020
4.11	Provide enhanced focus how population changes and economic influences may affect nutrient and sediment loads, and estuary changes.				2019-2020
4.12	Improved understanding of uncertainty associated with model projections. The partnership needs to have a better understanding of uncertainty quantification. Performance targets will be developed in future time periods, as the partnership develops additional data/information on uncertainty associated with model projections. The partnership will decide what to do with uncertainty quantification in future time periods.		CBPO Modeling Team, STAR Modeling Workgroup		2019-2020
4.13	Continue to refine the estimate of pollutant load changes due to 2025 conditions so that jurisdictions will be able to meet the expectation to account for these additional nutrient and sediment pollutant loads beginning in 2022.		CBPO Modeling Team, STAR Modeling Workgroup		2019-2020

**Commented [PL43]:** This work is ongoing (e.g., NOAA project to identify and better quantify climate-resilient BMPs). However, further research is needed to support the jurisdictions' efforts to address climate impacts (particularly as the work to incorporate these impacts starting with the 2022-2023 milestones).

**Commented [PL44]:** PADEP comment: Recommend Red. What metric results from this enhanced focus?

**Commented [PL45]:** PADEP Comment: Recommend Red. There still is uncertainty with uncertainty. What is the quantification?

**Commented [PL46]:** Continues to be updated every two years and provided to the jurisdictions.

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
4.14	Updating the high-resolution land cover and land use datasets to remap the Chesapeake Bay Watershed.		The Chesapeake Conservancy		2019-2020
4.15	Provide analyses of Conowingo and estuarine monitoring through 2018 high flows to support Conowingo WIP development		USGS UMCES		2019
<b>Management Approach 5: Phase III WIP implementation of actions jurisdictions will take to have all practices on the ground by 2025 to achieve their respective Phase III planning targets.</b>					
5.1	Evaluation of the Phase III WIPs and 2-year milestones		Jurisdictions, WQGIT, Source Sector Workgroups, Finance Workgroup, LGAC, CBC		
5.2	On-going sharing of lessons learned to help inform future 2-year milestones from WIP development and implementation		Jurisdictions, WQGIT, Source Sector Workgroups, Finance Workgroup, LGAC		
5.3	"Return on Investment" analysis of installed BMPs from data in grants (costs and pollution reductions) to better target BMPs and funding		WQGIT		
5.4	Evaluation of BMP implementation and maintenance costs and actual nutrient and sediment reductions	On-going sharing of lessons learned to help inform future 2-year milestones; reporting and/or sharing of select BMP monitoring studies	Jurisdictions, WQGIT, Source Sector Workgroups, BMP Verification Committee, CBPO, EPA		

**Commented [PL47]:** Work underway and on schedule to inform the next iteration of CAST (e.g., CAST 2021).

**Commented [PL48]:** I believe the project is complete.

**Commented [PL49]:** Phase III WIP evaluations completed and milestone evaluations underway.

**Commented [MD50]:** I don't think we do this or have done this on WQGIT calls. Perhaps it is done at the workgroup level. I understood this action to be a sharing of success stories on a routine basis. I think it is a good idea and I have been advocating for it but we don't really talk about implementation on the GIT calls, mainly modeling.

**Commented [PL51]:** PADEP Comment: How is this sharing of lessons learned accomplished/quantified?

**Commented [PL52]:** I don't believe this work has been initiated?

**Commented [MD53R52]:** Yes, I believe you are correct. I am not aware of any work in this area. I made the suggestion to do this work and 5.1 This was added to the list but the WQGIT never took this on. It would be a good project but we never really fleshed it out when it was added to this list. While CAST has cost data in it, it would be useful to do a study of BMPs/costs from, say, the NFWF grants to get a better idea of actual costs in CB.

This is where I really think for the next 2-year cycle, the WQGIT has to put down in its workplan only those things it thinks it can do and has somewhat of a game plan to do it.

**Commented [PL54]:** Comment from Jeremy Hanson: While the cost data in CAST has been updated, it seems like this is action asks for more? Only a few BMPs like stream restoration have protocols that quantify "actual reductions" and the costs of those practices could be assessed in more detail. Perhaps a future GIT-funding project could look into the implementation and maintenance costs from a range of representative SR projects in the ...

**Commented [PL55]:** The implementation, operation, maintenance, and land costs have been updated in CAST.

**Commented [PL56]:** PADEP Comment: Where did the maintenance costs come from? Do they include personnel/assistance?

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
5.5	Provide Support for continued BMP implementation, tracking and reporting on agricultural loads	1. NRCS will continue to support voluntary actions by farmers and landowners to improve water quality by providing financial and technical assistance from the Environmental Quality Incentives Program (EQIP), Regional Conservation Partnership Program (RCPP), Agricultural Management Assistance (AMA) Program, Agricultural Conservation Easement Program (ACEP), Conservation Stewardship Program (CSP), and Conservation Technical Assistance (CTA) funds.	USDA	Chesapeake Bay Watershed and Jurisdictions	2018/2019
		2. Support the development and implementation of agricultural certainty programs in Bay watershed states.	USDA, EPA and State Agencies	Chesapeake Bay Watershed and Jurisdictions	2018/2019
5.6	Work with other federal agencies to build capacity that will support an efficient and robust trading market	Participate in calls and meeting with other federal agencies providing advice and suggestions regarding the use of nutrient and sediment credits. (e.g. use of oyster reef creation / restoration as a means of generating nutrient credits).	EPA, USDA, DOT, USACOE	Chesapeake Bay Watershed and Jurisdictions	2018/2019
5.7	Guide development of jurisdictions' trading and offset programs	Issue draft "MS4 and construction mitigation" technical memoranda setting forth EPA expectations for the Bay jurisdictions' offset and trading programs and explore means for addressing "interstate trading" considerations.	EPA	Chesapeake Bay Watershed and Jurisdictions	2018/2019
Management Approach 6: Approaches targeted to local participation including municipalities, counties, soil and water conservation districts, and local private sector groups and individuals.					
6.1	Communication of funding needs to elected officials		State Agencies, WQGIT, LGAC		

**Commented [PL57]:** Financial and technical assistance support continues for Ag implementation but concerns about NRCS 1619 agreements (and lack of those agreements) have led to difficulties in verifying and reporting certain BMPs.

**Commented [PL58]:**

**Commented [MD59R58]:** These activities have been occurring on an as-needed basis (POC: Pat Gleason, Trading and Offsets Workgroup Coordinator)

**Commented [PL60]:**

**Commented [MD61R60]:** EPA has been working with the states on an as-needed basis. Determined that there was no need to develop the technical memoranda identified in Action 5.7.

**Commented [PL62]:** PADEP Comment: Is CBC included as a lead entity? PA works with our CBC delegates and local entities work with their commissioners. What are the metrics?

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
6.2	Development of success stories/lessons learned to share with local entities (focus on local water quality, improvements in flood protection, livability, economic growth, in addition to improvements to the Bay)				
6.3	Developing and supporting state or regional approaches to improve local implementation (e.g., circuit rider programs)		State Agencies, WQGIT, LGAC		
<b>Management Approach 7: Cross-outcome collaboration and multiple benefits</b>					
7.1	Optimization tools for co-benefits will be explored. An optimization framework with respect to cost and water quality in CAST is under development, and this framework is being built to be flexible enough that we can incorporate co-benefits, as optimization goals or constraints, once we have quantitative information regarding the ecosystem services. So, incorporating co-benefits in an optimization procedure will be possible once the co-benefits are quantified	See 7.3 as it relates to CAST.	CBPO Modeling Team, CAST Team, WQGIT		2019-2020
7.2	Develop approaches to better quantify co-benefits with other outcomes into decision-support tools	See 7.3 as it relates to CAST.	CBPO Modeling Team, CAST team, Cross-Outcome Coordination Team, and selected WGs from other Goal Teams		2019-2020

**Commented [PL63]:** MDE comment: in the works with the communications team. I would label this **green** as this work is being done and is growing in effort. LGAC and the Local Leadership Workgroup have discussed this with members and a contractor is now developing watershed education material for local elected.

**Commented [PL64]:** I believe this work is ongoing.

**Commented [MD65R64]:** Good idea but not aware of any work in this area.

**Commented [PL66]:** PADEP Comment: Ongoing. Who are the lead entities (CBPO Communications Office? State Agency Communications?) What are the metrics?

**Commented [PL67]:** MDE Comment: LGAC held a [Local Government Forum in 2018](#) on filling the gap for WIP implementation -- appendices [here](#) -- and recommended a circuit rider approach or other models for technical assistance. Jurisdiction reps were at the Forum sharing their thoughts. This report was shared with the EC, PSC, and MB. I would label this **yellow** as nothing happened since then that I am aware of.

**Commented [PL68]:** PADEP Comment: The factor seems broader than just circuit rider programs. Need further information regarding what this action is referencing.

**Commented [PL69]:** Work is underway on the optimization system and we have the Tetra Tech co-benefits report, but further work and quantification is needed to incorporate into CAST.

**Commented [MD70R69]:** For the work that is underway, will the WQGIT need to report on the expected completion date?

**Commented [PL71]:** Work is underway but more time is needed to identify and apply approaches.

## ACTIONS – 2018-2019

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
7.3	Develop improved understanding of the potential benefits, and risks, of selected practices and policies to provide benefits to multiple outcomes.	Quantification of the Value of Green Infrastructure Hazard Mitigation Related to Inland and Coastal Flooding RFP to develop the following. Purpose of the research: Demonstrate how to quantify or monetize the value of natural assets (BMPs) to help planners realize this value and make decisions to optimize for considerations beyond just cost effectiveness; Improve ability to identify and quantify ecosystem services associated with natural green infrastructure and with watershed agreement outcomes; Identify methods for quantifying and valuing ecosystem services in such a way that values can be associated with BMP implementation levels in CAST and for future CAST optimization models; Delineate a process or methodology by which the Bay Program can identify ecosystem services associated with the watershed agreement outcomes or with other goals and priorities, identify which of these services can be quantified or valued, associate services with nutrient and sediment reduction BMPs, quantify services for use in CAST.	Cross-Outcome Coordination Team, selected WGs from other Goal Teams, USGS		2019-2020
7.6	Review and refine stream restoration technical protocols in order to preserve and enhance ecological function in stream restoration, floodplain connection, and urban stream practices.		USWG, Stream Health Workgroup, Wetlands Workgroup and WTWG		
7.7	Ecosystem Services Valuation Project		WQGIT, Cross-GIT Coordinators, CAST team		

**Commented [PL72]:** The report on GI Hazard Mitigation will soon be finalized. However, the process for identifying and quantifying ecosystem services is ongoing – further work and resources are needed.

**Commented [PL73]:** Comment from Jeremy Hanson: I believe this will be done once the SR-protocol memos are complete. However, the Ag Workgroup needs to convene its ad hoc group to look into non-urban SR issues as they've discussed in recent months.

**Commented [PL74]:** Work is underway and ongoing by the USWG.

**Commented [MD75R74]:** Possible GIT funded project in the works for FY20 which involved WQGIT, Forestry WG, USWG, Stream Health WG reps.

**Commented [PL76]:** PADEP Comment: Does the non-urban stream restoration EPEG fall into this category?

**Commented [PL77]:** Project is almost complete.

**ACTIONS – 2018-2019**

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline