Water Quality Standards Attainment and Monitoring Outcomes – 2021 - 2022

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?*
Sustaining and enhancing Monitoring in tidal and nontidal waters. Sustaining and enhancing the current **CBP** networks is needed to adequately assess water-quality standards in all tidal segments, and better detect and link watershed changes to management actions.	-CBP Tidal monitoring network in MD, VA and D.C.. -CBP nontidal network for nutrients and sediment in the watershed. -Additional monitoring done by local entities, citizens groups, government agencies in selected areas supporting new data streams and interpretation algorithms. -NRCS/EPA/USGS Federal water-quality team developing recommendations for enhanced	-Funding not adequate to maintain current tidal and nontidal networks, or to enhance networks to address gaps listed below. -Inadequate tidal monitoring to assess all attainment in all segments needs to be addressed. -Challenge presented by nontidal monitoring sites being mostly in areas draining over 100 square miles so difficult to assess effects of management actions from other watershed	Management Approach 1 contains actions 1.1-1.10 for this factor.			

	monitoring in agricultural areas. -Data assurance and management by CBP office QA and data management specialists.	influences needs to be addressed. -Gaps in monitoring and interpretation in below fall line areas to understand loading to tidal segments need to be addressed. -Processes to use additional citizens and local data, remote sensing, coincident software supporting assessment of alternative data streams need to be developed to help assess all applicable criteria or watershed status and changes.				
Improved analysis and reporting of attainment and trends results. Results are needed to assess progress toward attainment of water-quality standards, and changes in watershed loads due to management actions,	Annual analysis and reporting of estimated standards attainment and tidal water quality trends for the entire Bay and tidal waters. Annual analyses and reporting of nutrient loads and trends at River-Input Stations, and 2-year updates of trends for the CBP sites in the watershed.	-More in-depth methods and analysis of tidal data are needed to assess incremental progress towards standards attainment. -More in-depth analysis of nontidal watershed response to nutrient and sediment reduction efforts and targeting of management practices. -improve interactions with WQ GIT and jurisdictions to apply monitoring results to inform decision making	Management Approach 2 contains actions 2.1-2.10 for this factor.			
Improve understanding and	Explaining trends in tidal and nontidal waters	-More analysis and application using monitoring	Management Approach 3 contains actions			

communication of the factors affecting the water-quality and influence of management practices. More in-depth analysis and communication is needed to inform jurisdictional decisions on nutrient and sediment practices for the WIP 2025 outcome.	with and to multiple science partners. Jurisdictional meetings are being held for technical support.	and modeling tools to better relate tidal and nontidal water-quality response to nutrient and sediment reduction efforts. -Enhanced communication of the factors affecting trends interactions with jurisdictions on their decisions toward nutrient and sediment practices for the WIP 2025 outcome. -Better aligning and applying of tidal and nontidal monitoring results to inform watershed and estuary modeling efforts.	3.1-3.25 for this factor.			
Improve understanding of Co Benefits between water-quality practices and other CBP outcomes. Interaction with multiple goals teams needed to improve information on co-benefits between water quality and other selected outcomes.	Several GIT funded projects (e.g., Toxics in Urban Areas; Tetra-Tech project on BMP relation to other outcomes) provide information on co-benefits. -Previous materials include fact sheets developed on co-benefits for select outcomes and STAC Workshop on co-benefits. -CBP data dashboard contains information for selected outcomes.	-Improve the understanding of the relation between nutrient and sediment practices with climate change and selected toxic contaminants. -Increase communication of co-benefits between water quality and selected living resources outcomes including fish habitat and SAV. -Increase use of ecosystem services to improve understanding of co-benefits.	Management Approach 4 contains actions 4.1-4.7 for this factor.			

ACTIONS – 2021 - 2022					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
Management Approach 1: Enhance monitoring for standard attainment and tidal and non-tidal water quality and produce quality data.					
Management Approach 2: Assess and report changes in attainment of water quality standards, and nontidal and tidal trends.					
2.5	Conduct and/or process annual analysis of water quality trends at long-term monitoring stations throughout the Bay and tidal tributary waters, using the *baytrends* R package. Trends are updated annually for the previous calendar year.	Generate annual update of tidal water quality changes over short- and long-term for all stations and parameters by collaborating with MD and VA on any modifications to methods, processing MD and VA deliverables, QA of results, and combining bay-wide results. Results for all analyzed parameters are posted on the CBP ITAT website. A summary presentation and briefing document will be released annually. Explore computation and incorporation of tidal trends for any additional stations with long enough water quality records, including stations in Washington D.C.	CBP monitoring team working with MD and VA	Chesapeake Bay Tidal Waters	annually
2.6	Report and communicate findings on tidal trends for management-relevant time frames (annual, summer and spring seasons for chlorophyll *a*, summer and annual for DO, SAV growing season and annual for Secchi depth, annual for N, P, TSS and temperature).	Generate annual updates on ITAT websites to maps and summary presentations, submit annual updates for graphics and trends on Data Dashboard; communicate results in Tributary Reports; explore creating annual summary document of tidal trend results for distribution on a CBP website; and explore other opportunities such as possible collaboration with CBP indicator efforts. Communicate results to CBP stakeholders	CBP Monitoring Team, ITAT, STAR Status & Trends Workgroup, CBP Communication Team	Chesapeake Bay Tidal Waters	annually
Management Approach 3: Further explain and communicate the factors affecting trends and better understand response to management practices.					
3.13	Analyses of interacting endogenous and exogenous factors	Summary report of findings from the Patuxent River test case integrating GAMs, SEMs,	ITAT (Keisman lead)		

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	affecting nutrient and chlorophyll *a* concentrations in tidal waters	and exploratory statistics of water quality and phytoplankton populations. Assess utility of application to the Rappahannock River and Upper Bay, and execute if recommended. Insights will be incorporated into tributary reports as appropriate.			
3.14	Comparative analysis of changing patterns over time across tidal tributaries in N, P, chlorophyll *a,* and DO concentrations	Results of cluster analysis comparing water quality changes over time within and across tidal tributaries and the mainstem. Insights will be incorporated into presentations to partners and into tributary reports as appropriate.	ITAT (Keisman lead)		
3.15	Analysis explaining influence of RIM loads and below-RIM WWTP discharge on estuarine N and P concentration trends and changes in nutrient limitation	Publications including analysis of nutrient load effects on nutrient concentrations in tidal waters; nutrient limitation patterns and changes in the mainstem Bay and major tributaries.	ITAT (Murphy and Zhang leads)		
3.16	Using jurisdictional technical meetings to discuss priorities for watershed-estuary integration topics	Identify potential items for analysis over the next two years.	CBP monitoring team and ITAT		
3.18	Preparation of Tributary Reports	Potomac Tributary report and associated story map will be released. Discuss scope of future tributary reports with stakeholders to balance expedient release of integrated results with lagged development of integrated explanations focus mostly current results and less on explanation. Other basins to be discussed based on stakeholder input and CBP capabilities. Candidate reports include	CBP monitoring team and USGS		

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		Susquehanna/upper Bay; and Rappahannock.			
3.19	Improving understanding and build capacity for analysis and communication of linkage between watershed changes (including BMPs and land change), to loads to tidal waters, and estuary response.	Initial focus on communicating and extending South River analysis to local landscape and potentially comparison with Severn River as well as producing preliminary findings on case study shallow water locations with potential links to local watershed. Continue with Osborn Cove analysis Determine future coastal plain landscape-to- tidal tributary analyses based on jurisdictional input and CBP capacity. Conduct collaborative planning meetings between groups including ITAT, USGS, modeling workgroup to link the watershed and estuary in other places, fisheries habitat team, and SAV workgroup.	STAR ITAT, USGS, UMCES, CBP monitoring and modeling teams, Land Use Workgroup		ongoing
3.20	Maintain commitment to enhanced and multidisciplinary synthesis efforts that provide updated information on ecosystem response to management actions to inform decision-making. Next synthesis cycle estimated to be 2025-2026.	Communication of insights from recent syntheses of tidal and nontidal research, including USGS nutrient trends factsheet; ITAT tidal tributary reports; products from STAC gap analysis of TMDL, shallow water synthesis project and other academic efforts (UMCES, VIMS, and others). Preliminary conceptualization of priorities for next cycle of synthesis efforts.	STAR ITAT, USGS, working with WQ source sector WGs, UMCES		ongoing
Management Approach 4: Contribute to better understanding of co-benefits of water-quality restoration to selected habitats and living resources.					
4.4	Include Tidal Trends data in STAC workshop on Water Temperature	Explore use of Water Temperature Tidal Trends as Bay Wide Temperature	CRWG, ITAT, STAC		

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		Indicator for Climate Resiliency Workgroup physical indicator through the STAC workshop			