Biennial Strategy Review System: Logic Table and Work Plan

Instructions: The following Logic Table should be used to articulate, document, and examine the reasoning behind your work toward an Outcome. Your reasoning—or logic—should be based on the Partnership's adaptive management decision framework. This table allows you to indicate the status of your management actions and denote which actions have or will play the biggest role in making progress.

Some Management Strategies and Work Plans will not immediately or easily fit into this analytical format. However, **all GITs should complete columns one through four** to bring consistency to and heighten the utility of these guiding documents. The remaining columns are recommended for those who are able to complete them. If you have any questions as you are completing this table, please contact SRS Team Coordinator Laura Free (free.laura@epa.gov).

The instructions below should be used to complete the table. An example table is available on the GIT 6 webpage under "Projects and Resources".

1. For the first round of strategic review (2017-2018): Use your existing Work Plan actions to complete the **Work Plan Actions** section first. Make sure to number each of the actions under a high-level Management Approach, as these numbers will provide a link between the work plan and the logic table above it. Use color to indicate the status of your actions: a green row indicates an action has been completed or is moving forward as planned; a yellow row indicates an action has encountered minor obstacles; and a red row indicates an action has not been taken or has encountered a serious barrier.
2. **Required:** In the column labeled **Factor**, list the significant factors (both positive and negative) that will or could affect your progress toward an Outcome. The most effective method to ensure logic flow is to list all your factors and then complete each row for each factor. Consult our Guide to Influencing Factors (Appendix B of the Quarterly Progress Meeting Guide on the GIT 6 webpage under "Projects and Resources") to ensure your list is reasonably comprehensive and has considered human and natural systems. Include any factors that were not mentioned in your original Management Strategy or Work Plan but should be addressed in any revised course of action. If an unmanageable factor significantly impacts your outcome (e.g., climate change), you might choose to list it here and describe how you are tracking (but not managing) that factor.
3. **Required:** In the column labeled **Current Efforts**, use keywords to describe existing programs or current efforts that other organizations are taking that happen to support your work to manage an influencing factor but would take place even without the influence or coordination of the Chesapeake Bay Program. You may also include current efforts by the Chesapeake Bay Program. Many of these current efforts may already be identified in your Management Strategy; you may choose to link the keywords used in this table to your Management Strategy document for additional context. You may also choose to include some of these efforts as actions in your work plan; if you do, please include the action's number and hyperlink.
4. **Required:** In the column labeled **Gap**, list any existing gap(s) left by those programs that may already be in place to address an influencing factor. These gaps should help determine the actions that should be taken by the Chesapeake Bay Program through the collective efforts of Goal Implementation Teams, Workgroups, and internal support teams like STAR, or the actions that should be taken by individual partners to support our collective work (e.g., a presentation of scientific findings by a federal agency to a Chesapeake Bay Program workgroup). These gaps may already be listed in your Management Strategy.
5. **Required:** In the column labeled **Actions**, list the number that corresponds to the action(s) you are taking to fill identified gaps in managing influencing factors. Include on a separate line those approaches and/or actions that may not be linked to an influencing factor. To help identify the action number, you may also include a few key words. Emphasize critical actions in **bold**.
6. **Optional:** In the column labeled **Metric**, describe any metric(s) or observation(s) that will be used to determine whether your management actions have achieved the intended result.
7. **Optional:** In the column labeled **Expected Response and Application**, briefly describe the expected effects and future application of your management actions. Include the timing and magnitude of any expected changes, whether these changes have occurred, and how these changes will influence your next steps
8. **Optional:** In the column labeled **Learn/Adapt**, describe what you learned from taking an action and how this lesson will impact your work plan or Management Strategy going forward.

Toxics Contaminants Research Logic Table and Work Plan

Primary Users: Goal Implementation Teams, Workgroups, and Management Board | Secondary Audience: Interested Internal or External Parties
Primary Purpose: To assist partners in thinking through the relationships between their actions and specific factors, existing programs and gaps (either new or identified in their Management Strategies) and to help workgroups and Goal Implementation Teams prepare to present significant findings related to these actions and/or factors, existing programs and gaps to the Management Board. | Secondary Purpose: To enable those who are not familiar with a workgroup to understand and trace the logic driving its actions.
Reminder: As you complete the table below, keep in mind that removing actions, adapting actions, or adding new actions may require you to adjust the high-level Management Approaches outlined in your Management Strategy (to ensure these approaches continue to represent the collection of actions below them).
Long-term Target: Develop a research agenda and further characterize the occurrence, concentrations, sources and effects of toxic contaminants of emerging and widespread concern.
Two-year Target: Completion of performance targets related to key actions

KEY: Use the following colors to indicate whether a Metric and Expected Response have been identified.	
Metric	Specific metrics have not been identified
	Metrics have been identified
Expected Response	No timeline for progress for this action has been specified
	Timeline has been specified

Factor	Current Efforts	Gap	Actions **(critical in bold)**	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 achieve our outcome?*	*Optional: Do we have a measure of progress? How do we know if we have achieved the intended result?*	*Optional: What effects do we expect to see as a result of this action, when, and what is the anticipated application of these changes?*	*Optional: What did we learn from taking this action? How will this lesson impact our work?*
Different assumptions about fish consumption	Tracking of existing fish consumption advisories based on jurisdictional	Better understanding of different thresholds	Interaction between jurisdictions to better understand differences in fish			

Factor	Current Efforts	Gap	Actions **(critical in bold)**	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 achieve our outcome?*	*Optional: Do we have a measure of progress? How do we know if we have achieved the intended result?*	*Optional: What effects do we expect to see as a result of this action, when, and what is the anticipated application of these changes?*	*Optional: What did we learn from taking this action? How will this lesson impact our work?*
	reporting (PCBs and Hg)	among jurisdictions for advisories;	consumption advisory thresholds.			
Causes of the degradation to fish and wildlife	USGS review of impacts of toxic contaminants to wildlife; progress on understanding impacts of EDCs on fish health.	Assessing effects of individual chemicals and mixtures on health of fish has been difficult	Evolving towards a more source-sector approach with focus on agricultural and urban settings; connection to nutrient and sediment reduction practices			
Lack of consistent information	Jurisdictions have consistent monitoring programs for a suite of toxic contaminants. Suite of contaminants has been expanded through work on USGS EDC project (agriculture sector).	Data synthesis to improve current understanding of extent of toxic contamination	Produce summary report of USGS EDC project; jurisdictions produce biannual integrated reports. Summarize results from these two efforts.			
Lack of toxicity thresholds	USGS study provided insight into potential new thresholds for fish related to EDCs	Work with states and EPA to apply information in further consideration of consistent or new science-based thresholds.	Unsure of potential application of this information in a regulatory context.			

Factor	Current Efforts	Gap	Actions **(critical in bold)**	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 achieve our outcome?*	*Optional: Do we have a measure of progress? How do we know if we have achieved the intended result?*	*Optional: What effects do we expect to see as a result of this action, when, and what is the anticipated application of these changes?*	*Optional: What did we learn from taking this action? How will this lesson impact our work?*
Prioritizing contaminants and addressing mixtures	No current progress, due to complexity of different contaminant mixtures in the environment	Not feasible to address, given multiple contaminants present in mixtures.	Evolving toward a more source sector-based approach, working with the WQGIT and source-sector workgroups (USWG, AgWG, WWTWG)			
Resource constraints	Building on existing state efforts, federal and academic studies. Secured GIT funding for original CSN reports	Coordinate more closely with ongoing academic research	Invite more partners to the TCW, consider a more focused interaction between researchers. (STAC workshop on CECs, panel discussion at ChesRMS)			
NEW FACTOR: overwhelming amount of information but lack of summaries and implications for management options.	Very little current effort	Summarize existing information and provide implications for better management of contaminants	USGS is considering more resources towards synthesis and exploration of other avenues for GIT funding, etc.			

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
Management Approach 1: Supply information to make fish and shellfish safe for human consumption					
1.1	Use existing information to provide overviews of the effects of multiple toxic contaminants on shellfish and fisheries.	NOAA is preparing a National Bioeffects report that will contain a chapter on Chesapeake Bay. NOAA will present the Chesapeake summary to the TCW. Other existing NOAA reports include: http://ccma.nos.noaa.gov/publications/NCCOSTM47.pdf http://www.ccma.nos.noaa.gov/publications/nccoschesapeakebay.pdf	NOAA		
1.2	Generate further information on mercury, focused on determining whether further Chesapeake Strategies are needed to supplement national efforts to reduce its impact on fish and associated consumption advisories.	1.2.1 Establish a Mercury Subgroup that would begin to summarize information to be considered by TCW to minimize effects of mercury.	TCW UMCES, SERC, NOAA-ARL, ERM, Inc., MDE, DNR-PPRP		No progress
		1.2.2 Conduct sampling of mercury in young of the year fish. Results will eventually be used to assess trends.	MDE and MD DNR		A report was completed in September 2016.
		1.2.3 Review and obtain information documented during the establishment of Maryland's proposed Mercury TMDL.	MDE		MDE is still awaiting information from air deposition model. It is anticipated that this information will not be available till early 2018.
1.3	Generate further information on selected pesticides to help TCW	Interact with MD Pesticide network and associated research WG (see Management Approach 4)	MD Pesticide Network		MD Pesticide Network has developed classes of pesticides that might

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
	consider a future management strategy				inform management approaches. That information can be brought to the workgroup for review in 2018.
1.4	Consider the development of a PCB mass balance model for the Chesapeake Bay.	Discuss utility, feasibility and practicality of developing a mass-balance model for PCBs.	TCW and science partners		No progress, but this item may be appropriate for a STAC workshop.
1.5	Monitor levels of PCBs in fish and shellfish and move contaminated sites towards cleanup.	(Please see the Toxic Contaminants Policy and Prevention Workplan- Management Approach 1, Key Action 1)	(See Toxic Contaminants Policy and Prevention Workplan)		(See Toxic Contaminants Policy and Prevention Workplan)
1.6	Better delineate PCB sources from diffuse sources of land, release from deposits in stormwater pipes, and atmospheric deposition.	(Please see the Toxic Contaminants Policy and Prevention Workplan- Management Approach 1, Key Action 1)	(See Toxic Contaminants Policy and Prevention Workplan)		(See Toxic Contaminants Policy and Prevention Workplan)
Management Approach 2: Understanding the influence of contaminants in degrading the health, and contributing to mortality, of fish and wildlife					
2.1	Assess the effects of contaminants on fish and shell fish in tidal waters	2.1.1 Continue studies of tumors found in Bullheads catfish	FWS		The report on bullhead catfish was submitted in January 2018 for review. Once report is published, the TCW can be briefed on

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
					the report and findings. published
		2.1.2 Evaluate findings from condition of Yellow Perch in urban areas.	FWS, MD DNR, USGS		FWS has started yellow perch sampling in several rivers. The most dramatic finding was abnormal yolk and abnormal chorion about ten years ago when the study was last conducted. FWS will update those findings with new data, with additional molecular analysis, analyzing lesions and movement over time. This project is expected to span about two years.
2.2	Generate information to document fish health conditions in the Bay watershed.	2.2.1 Conduct studies to understand the influence of contaminants and other factors degrading the health, and contributing to mortality of fish. Products include summary of fish health conditions (including intersex) over the last 10 years in the watershed. Studies have partners in several states (see below)	USGS		Links to data series published so far have been made available to the workgroup. The data series and work so far were presented to the TCW at the

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
					January 10, 2018 conference call.
		2.2.2 Better understand the influence of endocrine-disrupting compounds (EDCs) and their effects on fish conditions. Focus on agricultural areas in 2016-17 with urban areas addressed in 2018-19. (in collaboration with project listed above)	USGS		The data have been reviewed on estrogenic contaminants for adult fish. We are compiling some data on skin lesions, and integrator site information (to be published in about a year). The paper coming out is for both young of the year (YOY) and adult information for historic trends. The next piece will be the data from the integrator sites, which may be considered for inclusion in the 2018-2019 workplan.
		2.2.3 Continue monitoring of fish conditions in areas of concern within jurisdictions (most in cooperation with USGS projects listed above)	PA DEP, MD DNR, WV DEP		

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
		2.2.4 Continue studies on the relationship between the amount of impervious surface and the impact on fish conditions	MD DNR		
		2.2.5 Continue stream IBI studies as part of the Maryland biological stream survey to evaluate health of fish communities and identify potential linkages to toxic contaminants.	MD DNR and MDE		
2.3	Assess the effects of toxic contaminants on wildlife by summarizing existing studies and considering additional research activities. Information will be used to TCW on implications for relative risk (see management approach 4	Complete and present review of EDC found in wildlife within the Chesapeake watershed. Based on results consider additional studies.	USGS		The review was completed in 2016. No progress since.
		Publish results from the recently published Chesapeake Bay osprey food study. Assess if results from the Delaware-based osprey food study are applicable.			Work on ospreys is complete.
Management Approach 3: Document the occurrence, concentrations, and sources of contaminants causing fish and wildlife degradation					
3.1	Better define the sources and occurrence of EDCs and other contaminant groups that are affecting the health of fish and wildlife in the watershed.	Conduct projects to identify the sources and occurrence of toxic contaminants contributing to degraded fish health. Prepare initial summary of the occurrence and sources of contaminants based on information collected by USGS over the last 10 years in the Bay watershed. Assess the potential association with nutrients. Studies have partners in several states (see below).	USGS		Links to data series published so far have been made available to the workgroup. The data series and work so far were presented to the TCW at the January 10, 2018 conference call.
		Continue study of sources and occurrence of EDCs in agricultural watersheds (same locations as USGS fish	USGS		Ongoing sampling (2016 status)

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
		health studies). Collect samples for Gather information for GIS analysis of sources and occurrence of EDCs in the watershed. Begin planning for study of urban watersheds, focusing on impact of BMPs on EDCs in the environment.			
		Continue Pennsylvania studies on pesticides and hormones.	PA DEP		EDC work in PA continuing 2013 through 2017 and continuing into 2018
		Continue studies on the impacts of algal toxins on fish kills in West Virginia and identify potential links to toxic contaminants.	WV DEP (working with USGS)		
		Evaluate outcomes from Anacostia River sediment investigation to improve understanding of contaminants other than PCBs.	DOEE		The RI report preparation continued in 2017 with draft report underwent internal reviews. The RI report is planned for release for public comment in Summer 2018.
3.2	Better define sources and occurrence contaminant groups occurring in tidal waters	-use new Chesapeake bio-effects summary and Utilize information from existing NOAA documents http:// ccma.nos.noaa.gov/publications/NCCOSTM47.pdf	NOAA		No progress.
Management Approach 4: Assess the relative risk of contaminants, and options for mitigation, to inform policy and prevention					

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
4.1	Develop approaches to assess the relative risk of contaminants to help inform policy and prevention strategies.	4.1.1 Develop approaches to assess relative risk to help inform policy and prevention strategies.	EPA Office of Water, Office of Science and Technology		No progress.
		4.1.2 Begin to develop methods for summarizing existing information on Hg, pesticides, PAHs, for future consideration within the Policy and Prevention Management Strategy.	TCW		No progress.
4.2	Share approaches for assessing relative risk with the TCW so that they can consider options for mitigating impacts of toxic contaminants.	4.2.1 Develop a lessons learned document based on the results from the Anacostia River study.	DOEE; TCW		Study continues.
		4.2.2 Begin a risk assessment study of EDCs compounds with occurrence of intersex and other fish health conditions	USGS		Progress on risk assessment for bass in Susquehanna basin.
		4.2.3 Conduct GIS analysis to identify toxic contaminant “hotspots” based on land use. Relate to areas of nutrient loading	USGS		Data has been released in 2017. More work still needs to be done on spatial analysis and map products.
		4.2.4 Evaluate outcomes from the literature review on the potential toxic contaminant reductions provided by traditional stormwater BMPs, and conduct outreach efforts to share those results.	CSN; TCW		Report was released in 2016. Insights from the report were incorporated into the WIP III co-benefits two-page fact sheet for Toxic Contaminants Policy and Prevention outcome.

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
		4.2.5 Have MD Pesticides share methodology for prioritizing pesticides. Work with them to assess use for TCW	MD Pesticide Network (research workgroup)		Work to prioritize and categorize pesticides will be shared with the TCW. Potential for integration with USGS endocrine disruptor synthesis project.
4.3	The Chesapeake Bay Commission will work collaboratively with the Bay Program partners to identify legislative, budgetary and policy needs to advance the goals of the Chesapeake Watershed Agreement.	CBC will, in turn, pursue action within our member state General Assemblies and the United States Congress. See CBC Resolution #14-1 for additional information on the CBC's participation in the management strategies.	CBC		The CBC and its members are still interested in the topic, and there was a hearing in PA on this topic. CBC does not have a specific focus on toxic contaminants, but is willing to work with partners in the watershed as toxic contaminants management-related items rise to the policy level.
Management Approach 5: Gather information on issues of emerging concern.					
5.1	Better delineate potential impacts of UOG activities.	Conduct research on impacts of UOG activities (part of wider studies of UOGs)	SGS with partners		The intial work was completed by USGS on land change and

WORK PLAN ACTIONS					
Green - action has been completed or is moving forward as planned Yellow - action has encountered minor obstacles Red - action has not been taken or has encountered a serious barrier					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
					risk to streams. Larger efforts was discontinued due to shifts in federal budgets. FWS is investigating vegetative changes related to UOG activities in PA. FWS is looking to expand the program to other areas of UOG activity as well.
	Address micro plastics	Conduct synthesis	STAC		Completed