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?*

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?*
Communicating the potential impacts of consuming contaminated fish and addressing their causes. The jurisdictions have different assumptions about human exposure through fish consumption, which can limit comparability across the watershed	Tracking of impairments, which lead to fish consumption advisories based on jurisdictional reporting of PCB impairments.		Interaction between jurisdictions to ensure there is consistent efforts to reduce contaminants, which contribute to fish consumption advisories.			
Multiple factors affecting health and mortality of fish and wildlife. There are multiple contaminants and additional factors are causing the degradation (and mortality) of fish so trying to identify specific causes is extremely difficult.	Studies addressing the multiple causes of factors affecting fish and shellfish, including EDCs and fish health; surveys of toxic contaminants and oysters. Limited information on wildlife;	Evolving towards a more geographic approach to focus in areas where fish health issues are most prevalent. Greater emphasis on linkage between factors affecting fish habitat and health, including toxic contaminants	More integrated studies to address the topic. Increase collaboration with academic institutions conducting research. Working with partners to plan potential studies to address selected topics.			
Lack of data on the occurrence and trends of toxic contaminants. There is no watershed-wide monitoring program on the condition of fish and wildlife that is	Jurisdictions have monitoring programs for selected toxic contaminants, but mostly not	Longer-term, and comparable monitoring for selected toxic contaminants through design of an integrated monitoring network. Data synthesis to improve	Better utilize jurisdictions monitoring that is used for biannual integrated reports; Design an integrated monitoring network			

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?*
integrated with water and sediment sampling.	adequate for trends.	current understanding of sources, status and trends of toxic contaminants, and their relation to nutrients and sediment.	to improve long-term information			
Limited information of the practices to mitigate contaminants, and their potential co-benefits with nutrients and sediment reductions	Some academic partners looking at contaminant mitigation from selected BMPs. Fact sheets on potential co-benefits between toxic contaminants, nutrients, and sediment. Developed reports on ag and urban contaminants.	Increased interaction with WQ GIT to develop and promote joint approaches to reduce toxic contaminants, nutrients, and sediment.	Focused source-sector approach with emphasis on agricultural and urban settings; Generate more information on potential co-benefits and explore use of CBP decision tools (such as CAST).			
Resource constraints. The constraints include (1) minimal capacity within the CBP to address contaminants; (2) an emphasis on nutrients and sediment that limits the opportunity for increased	Coordination of efforts between members of the Toxic Contaminant WG.	Expand capacity through increased coordination with ongoing academic research, state, and federal efforts. Increase emphasis on toxic contaminants within CBP monitoring and modeling	Invite more partners to the TCW. Have more focused interaction between researchers and stakeholders such as through workshops (such as STAC,			

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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?*
CBP focus on toxic contaminants; and (3) minimal funding opportunities to conduct additional studies.		teams. More focus on co-benefits.	ChesRMS) and GIT WGs.			
Synthesis. This is a new factor which recognizes the findings from technical articles and reports need to be summarized and communicated to be used effectively by resource managers	Very little current effort	Summarize existing information and provide implications for better management of contaminants	USGS is considering more resources towards synthesis. TCW needs to consider other possibilities (such GIT funding, etc.).			

WORK PLAN ACTIONS					
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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					

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1.1	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.	Summarize existing impairments in the watershed through the creation of a story map for mercury. Jurisdictions supply information and the CBP GIS team and Monitoring team integrate into a story map.	TCW; MDE, PA DEP, VA DEP, DOEE, WV DEP, DNREC. CBP GIS team and monitoring team.		2018-19
		Inventory available mercury monitoring data (water, sediment, fish tissue) to inform status or trends. Have CBP Monitoring team lead the inventory and assessment of data.	TCW; MDE, PA DEP, VA DEP, DOEE, WV DEP, DNREC. CBP monitoring team.		2018-19
		Communicate information from ongoing study of mercury and fish consumption advisories in the watershed.	USGS and partner states		2019-2020
		Conduct sampling of mercury in young of the year fish. Results will eventually be used to assess trends. Reported annually.	MDE and MD DNR		Ongoing; annual sampling and reporting
		Review and obtain information documented during the establishment of Maryland's proposed Mercury TMDL. Additional fish tissue collections are planned in 2018 to determine if the remaining waters listed for mercury are impaired. Hg TMDL development will be delayed in Maryland until listing reassessment is completed.	MDE		MDE information will not be available until early 2019.
1.2	Inventory any ongoing progress of regional PCB models within the Chesapeake Bay.	Stay informed on progress of models in James River, Anacostia, upper Potomac, any others as they may inform adaptive management decisions/areas of focus for others in the watershed. Assess if information could be used to inform co-benefits and	TCW partners constructing models and USGS.		2018-2020

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		CBP tools (such as CAST), (see Management Approach 4).			
1.3	Science to support PCB Policy and Prevention (Please see the Toxic Contaminants Policy and Prevention Strategy and Workplan for further details).	-Improve understanding of sources and fate of PCBs in the environment to inform mitigation options [includes summarizing best practices for PCB track down studies, informing stakeholders of results of atmospheric deposition studies, WWTP biosolids and effluent loads as well as reporting of other potential sources such as demolition/construction, dredged sediments], -Status and change in environment through the more prevalent use of the 1668 congener based analytical method, communicate lessons learned from innovative monitoring approaches, and gather data from TMDL implementation plan progress to assess changes over time, and -BMP effectiveness for removal of PCBs, including co-benefits from nutrient and sediment BMPs and explore use in CBP decision tools (such as CAST). (Please see the Toxic Contaminants Policy and Prevention Strategy and Workplan for further details).	(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	Inform presence of select UV filters, hormones, and antibiotics in eastern oysters and hooked mussels in urban streams and the Chesapeake Bay mainstem.	UMBC, USDA FS		2018-2020

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		Inform presence of select CECs in bivalves in the estuarine waters investigated as part of NOAA Oxford study.	NOAA Oxford		2018-2020
		Communicate results of Bullhead catfish tumor study, which showed a dramatic decrease in the tumor prevalence in the Anacostia River.	FWS		2019
		Continue study and evaluate findings from condition of Yellow Perch in urban areas. Specifically, FWS and UMD conducted yellow perch sampling in Fall 2017-Winter 2018 in the Severn, Choptank, and Mattawoman. The sampling will be repeated in Fall 2018-Winter 2019. The goal is to determine whether the findings of abnormal yolk and abnormal chorion about ten years ago in the Severn are still apparent. FWS will update those findings with new data, with additional molecular analysis, analyzing lesions and movement over time.	FWS, MD DNR, USGS		2018-2020
2.2	Generate information to document fish health conditions in the Bay watershed.	Report and communicate results of study to understand the influence of contaminants and other factors degrading the health, and contributing to mortality of fish. The final publication on the retrospective analysis of the relationships between fish health, estrogenicity and land-use will be completed. Final outcomes will be communicated to the TCW.	USGS		2019
		Report and communicate results of study examining the influence of endocrine-disrupting compounds (EDCs) and their effects on fish conditions. The data collected at the integrator sites (2013-2017) is being	USGS		2019

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		compiled, analyzed and published as a series of journal articles. The first is compiling long term, integrative indicators at the South Branch Potomac site, which could be a template for subsequent information. This information will be summarized with other data collected by the USGS into a series of synthesis powerpoint presentations.			
		Continue monitoring of and communicating results of fish conditions in areas of concern within jurisdictions. Specifically, USGS is working with PA, MD and WV. One summary paper on disease issues and potential immunosuppression was published in 2018. In addition, WV and PA are collaborating with USGS to assess the immune response of wild smallmouth bass.	PA DEP, MD DNR, WV DEP		2018-2020
		Communicate results of risk assessment study of EDCs compounds with occurrence of intersex and other fish health conditions. Young of the year fish data and model results from PA are being used in this investigation, as well as long-term historical trend data.	USGS		2019
		Continue studies and evaluate the relationship between the amount of impervious surface and the impact on fish conditions. During 2014 – 2018 the MBSS is re-sampling streams that were sampled 20 and 14 years ago. The data will be used to examine for potential change over time in stream biological, physical habitat, and chemical conditions.	MD DNR		2018-2020

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		Continue stream IBI studies as part of the Maryland biological stream survey to evaluate health of fish communities in 2019-2020.	MD DNR		2019
2.3	Assess the effects of toxic contaminants on wildlife	Publish results of study examining EDCs found in wildlife within the Chesapeake watershed.	USGS		2019
		Interact with state federal wildlife service agencies to assess priority needs related to contaminant effects on wildlife	TCW; DE, MD, PA, VA, WVA, working with Habitat Goal Team.		2019-2020
Management Approach 3: Document the occurrence, concentrations, and sources of contaminants in different landscape settings					
3.1	Better define the sources and occurrence of EDCs and other toxic contaminant groups in different landscape settings	Communicate results of study to identify the sources and occurrence of toxic contaminants contributing to degraded fish health. Chemistry data collected at the integrator site is being compiled into a data release. These data will be summarized is at least one journal article and will be added to the synthesis efforts.	USGS		2019
		Communicate results of study of sources and occurrence of EDCs in agricultural watersheds (same locations as USGS fish health studies). Initiate planning for study of urban watersheds, focusing on impact of BMPs on EDCs in the environment.	USGS		2018-2020
		Communicate GIS analysis to identify toxic contaminant “hotspots” based on land use. Vulnerability metrics are being detailed and will be communicated in the synthesis reporting.	USGS		2019

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		Continue Pennsylvania studies on occurrence of pesticides and hormones and other toxic contaminants in surface water.	PA DEP USGS		2018-2020
		Inform presence of select CECs in sediment, water, and bivalves.	NOAA Oxford		2018-2020
		Inform presence of select UV filters, hormones, and antibiotics in eastern oysters and hooked mussels in urban streams and the Chesapeake Bay mainstem near both agricultural and urban landscapes.	UMBC, USDA FS		2018-2020
		Inventory jurisdiction toxic contaminant monitoring efforts by individual groups	TCW and states, DOEE		2018-2020
		Evaluate outcomes from Anacostia River sediment investigation to improve understanding of contaminants other than PCBs in urban environments.	TCW, DOEE, USGS, UMBC, FWS		2018-2020
3.2	Examine the co-occurrence of toxic contaminants with nutrients and sediments to inform co-benefit analysis (see MA 4)	Inventory co-located data, spatially analyze to evaluate possible contaminant associations and source, and use results to inform co-benefit understanding (also see MA4)	TCW; USGS, MDE, VDEQ, DOEE, DNREC, PA		2018-2020
3.3	Loading rates of toxic contaminants for use in CBP models	Interact with CBP Modeling group to assess data needs required to inform loading rates of toxic contaminants in various landscape settings	TCW		2018-2020
Management Approach 4: Science to help prioritize options for mitigation to inform policy and prevention					
4.1	Summarize further information about direct and co-benefits for mitigation of toxic contaminants, and nutrient	Inventory case studies where innovative remediation of sediments/water have occurred in the watershed and evaluate how they could be adapted or implemented for TMDL compliance.	USGS, working with academic and state partners		2018-2020

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	and sediment reductions. (also see Science portion of the Policy and Prevention Strategy and Work Plan)	Investigate the impact of Stormwater Best Management Practices (BMPs) on PCB loadings to waterways.	MDE funded study.		2018-2020
		Further evaluate findings from the CSN literature review on the potential toxic contaminant reductions provided by traditional stormwater BMPs and Ag BMPs. Decide on most appropriate findings for additional outreach from these and CBP fact sheets.	TCW partners, USGS		2018-2020
4.2	Monitor/survey efficiency of BMPs to remove toxic contaminants (mostly PCBs) (also see Science portion of the Policy and Prevention Strategy and Work Plan)	Bioretention efficacy and optimization for removal of toxic contaminants	UMCP		2018-2020
		Design/testing of enhanced media in stormwater control structures for degradation of toxic contaminants	UMCP		2018-2020
		Riparian forest buffer removal of toxic contaminants	PSU		2018-2020
4.3	Explore use of CBP decision tools to include selected contaminants	Prepare a matrix of information needed for inclusion of selected contaminants (begin with PCBs) in CAST, and assess availability of information.	EPA and TCW		2018-19
4.4	Interact with source teams to communicate and apply findings on the co-benefits for mitigation of nutrients, sediment, and toxic contaminants	Communicate with agricultural, stormwater, and wastewater source teams to identify synergies with nutrient/sediment and toxic contaminant mitigation options	TCW chairs with selected investigators.		2018-2020
4.5	The Chesapeake Bay Commission will work collaboratively with the Bay Program partners to identify legislative, budgetary and	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		2018-2020

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	policy needs to advance the goals of the Chesapeake Watershed Agreement.				
Management Approach 5: Gather information on issues of emerging concern.					
5.1	Continue to investigate previously identified issues of emerging concern including contaminant toxicity to pollinators, microplastics and UOG.	Attend, summarize microplastics workshop	STAC, TCW		2018-2020
		Track progress USGS NE region microplastics study and identify relevance to CB.	USGS, TCW		2018-2020
5.2	Prioritize new issues of emerging concern and identify tasks to complete	Track research progress by USGS and NOAA on the toxins that are produced from algal blooms	USGS, NOAA, TCW		2018-2020
		Aggregate and analyze recent regulations and management approaches related to UV filters, hormones, and antibiotics in other states to help outline possible strategies for CB	UMBC, TCW		2018-2020
		Determine the nature and extent PFAS data in CB watershed, track progress fish consumption advisories neighboring watersheds (DRB) to help outline possible strategies for CB	USGS, TCW		2018-2020
		Provide technology Transfer from MD to other jurisdictions on successful efforts to reduce chloride impacts due to road salt application while maintaining public safety.	MDE, TCW		2018-2020
		Provide technology transfer from MD to other jurisdictions on successful efforts to find beneficial reuse of fly ash produced from coal combustion and minimize disposal in CCR facilities.	MD DNR, TCW		2018-2020

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