Addressing Additional Outcomes that need Coordinated Monitoring

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10 Watershed Agreement Goals

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- Sustainable Fisheries
- Vital Habitats
- **Water Quality**
- Toxic Contaminants
- Healthy Watersheds
- Climate Resiliency
- Land Conservation
- Stewardship
- Public Access
- Environmental Literacy

Maintain Success of Existing Monitoring Network

12 Outcomes

Examples
Blue Crabs
Oysters

Enhance Efficiency and Capacity of Monitoring Network

12 Outcomes

Examples
Wetlands
Stream Health

Establish a New Coordinated Monitoring Network

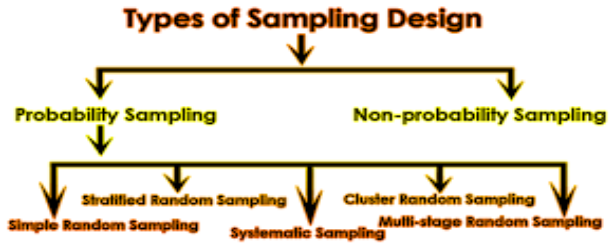
7 Outcomes

Examples
Climate
Local Leadership

Process of developing recommendations for outcome monitoring needs

Needs assessments from Science Needs Database and meetings with Goal Implementation Teams

Structure of need by group varies from topic of interest to monitoring design considerations



Develop costs for need based on proposed designs

COST MANAGEMENT CATEGORY	Year 1
Salaries and Wages (Data management, regression development)	$21,520
Salaries and Wages (Installation of QW sondes)	$ 21,300
Equipment and Installation Supplies	$105,000

Collate cost estimates

Total cost

		Maintain	Enhance	Establish
Goal	**Nontidal/Watershed Related Outcomes**			
Sustainable Fisheries	Fish Habitat		x	x
Vital Habitats	Wetland		x	
	Black Duck		x	
	Stream Health		x	
	Brook Trout		x	
	Fish Passage	x		
	Forest Buffers	x	x	
	Tree Canopy	x	x	
Healthy Watersheds	Healthy Watersheds	x		
Climate Resiliency	Climate Monitoring and Assessment	x	x	x
	Climate Adaptation			x
Land Conservation	Protected Lands	x	x	x
Stewardship	Stewardship	x		
	Local Leadership			x
	Diversity		x	x
Public Access	Public Access Site Development	x		
Environmental Literacy	Student	x		
	Sustainable Schools	x		
	Environmental Literacy Planning	x		

Examples: Nontidal/Watershed-related Outcomes Monitoring Needs

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Stream Health

- The priority monitoring need for the Stream Health workgroup is the collection of freshwater macroinvertebrate data from under-represented catchment types. Only about 7% of stream catchments (< 200 km2 drainage area) in the Chesapeake watershed are sampled and some catchment types such as high-quality streams are under-represented. Freshwater macroinvertebrate data from under-represented catchment types are critically needed to fill in monitoring gaps and improve model predictions.

Brook Trout

- The Brook Trout Outcome requires a more accurate and comprehensive monitoring program for quantifying gains and losses in brook trout habitat across the Chesapeake Bay Watershed. Multiple agencies, nongovernmental agencies, and other practitioners implement restoration projects with the objective of creating or expanding brook trout habitat. However, there is often little monitoring to determine pre-project baselines or the actual presence of brook trout post-project to document project success and efficacy. More effort and resources are required to develop monitoring protocols (e.g., sampling design, methodologies like eDNA, etc.) that can document results of on-the-ground restoration projects. This will also provide information to help identify the most cost-effective actions to increase brook trout occupancy.

Which CBP outcomes does your agency have interest in that require more coordinated monitoring?

		Maintain	Enhance	Establish
Goal	**Tidal Related Outcomes**			
Sustainable Fisheries	Forage Fish		x	x
	Fish Habitat		x	x
	Oysters	x	x	
	Blue Crab Abundance	x	x	
	Blue Crab Management	Outcome is complete		
Vital Habitats	Wetland		x	
	Submerged Aquatic Vegetation		x	
Climate Resiliency	Climate Monitoring and Assessment	x	x	x
	Climate Adaptation			x
Stewardship	Stewardship	x		
	Local Leadership			x
	Diversity		x	x
Public Access	Public Access Site Development	x		
Environmental Literacy	Student	x		
	Sustainable Schools	x		
	Environmental Literacy Planning	x		

Examples: Tidal-related Outcomes Monitoring Needs

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Forage Fish and Fish Habitat

- Plankton monitoring is a priority monitoring need. One option is to develop a reduced-scale zooplankton survey over a series of years that duplicates some of the stations monitored in the past which showed declines in key zooplankton species and a shift in dominant phytoplankton to cyanobacteria before bay-wide programing was discontinued. Another approach is to explore new in situ and remote (satellite) technologies that are available today (e.g., National Oceanic and Atmospheric Administration and could allow for faster cheaper sampling along a bay transect and/or in targeted locations (as striped bass spawning areas and mysid sampling). Further, new research is being supported by Maryland Sea Grant on methods to improve mysid assessment. The array of options requires further discussion to ensure they are coupled to fishery and other management objectives.

Climate Monitoring and Assessment

- A primary monitoring need is the establishment of an Ocean Acidification Monitoring Network. There is no long-standing monitoring network for ocean acidification (OA) in the Bay, but there are current assets where additional monitoring could be implemented to make OA a feature captured and reported. Recommended steps for establishing bay-wide baseline conditions includes coordination between state agencies (MD, VA, DE, DC) and scientists to determine a suitable monitoring design and sampling strategy, and if there are discrepancies among methods between the states then working to align methods and outputs to support a regionally consistent story about OA measures and effects.

Which CBP outcomes does your agency have interest in that require more coordinated monitoring?