Goal Team	SRS Outcome	Need	Completed? (Y/N)	More specific detail	Why is this needed?	Category	Other Goals/Outcomes This Addresses	Current resources/ efforts (Enter "Fully", "Partially", or "None"; and Responsible Party)	Future opportunities/ capabilities that could address this need	Priority (Enter "High" or "Low")	GIS Comment	Relevant STAC recommendations
Please enter any Ecosystem Services needs:		oyster reef restoration benefits and ecosystem services	No	Building on Choptank research by Morgan State - what are the benefits of oyster restoration? Beyond having oyster fishery, water quality, habitat, economic, fishery productivity benefits	to explain to the public/justify costs of restoration, need to synthesize existing results and determine gaps, and implementing oysters as BMP	Synthesis, Research	water quality, habitat	Partially - NCBO funded 8 research projects baywide, ex. study by Tom Ihde and Scott Knoche evaluated the economic benefits of oyster reefs in Harris Creek showed expanded fishery resources!		high		
Sustainable Fisheries	Fish Habitat	~~Potentially modify current BMP matrix to focus on habitat conditions~~		Unclear whether this refers to WIP factsheets, or a quantitative study (e.g. Tetratech)	Not a priority							
		Regional Fish Habitat Assessment: 1. compile habitat and environmental, stressor, biological dataset; 2. analyze biological response data for relevance; 3. pilot fish habitat assessment; 4. conduct watershed regional assessment; 5. ID/develop spatial tools useful to partners	No	Initiated with STAC workshop and FY2018 GIT Funded project, will require extensive long-term effort with support from multiple partners	Needed to quantify existing habitat area and condition, and provide a tool to prioritize areas for conservation and restoration	Analysis	habtiat, water quality	Partially - first steps initiated through STAC workshop and ongoing GIT funded project led by USGS and NOAA	NFHP habitat assessment, MAFMC efforts	high	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?	
	Fish Habitat	~~ID healthy habitat criteria~~		Incorporated under Fish Habitat Assessment								
	Fish Habitat	~~ID spatial tools and datasets to map ranges and stressors~~		Incorporated under Fish Habitat Assessment								
	Fish Habitat	~~Convert fish and habitat survey data to spatial datasets~~		Incorporated under Fish Habitat Assessment								
	Fish Habitat	~~Explore options for monitoring programs to cover range of species~~		multi-species monitoring?								
	Fish Habitat	Explore cost-effective methods/approaches to phytoplankton and zooplankton monitoring	No	Determine key sub-sampling locations for intermittent monitoring, and develop cost-effective methods for collecting snapshots of data, continues to be brought up as a need	Needed to provide data for environmental modeling, and inform ecosystem factors influencing fishery populations	Monitoring	water quality	Dr. Bi at UMCES using sonar and other imaging techniques to understand plankton distributions, previously funded at DNR		low		
	Fish Habitat	Develop shallow water monitoring survey proposal for gaps	No	Develop a shallow water monitoring plan that can incorporate monitoring needs of other outcomes	Needed to identify existing surveys and gaps in tributaries sampled, and	Monitoring	habitat	several surveys exist, conducted by MD DNR and VIMS (always nice to have more data, not critical at		low		
	Fish Habitat / Water Quality	Monitoring vertical water column habitat (DO volume and spatial extent for hypoxia)	No	Methods are being developed through FY2018 GIT Funded hypoxia pilot project	Needed to pair WQ data with living resources	Monitoring		Partially - pilot project initiated for GIT funded study, will need to expand on pilot project to implement on a larger scale		low		
	Fish Habitat	~~Pair WQ data with living resources data~~										
	Fish Habitat	~~Improved fish habitat maps~~		Incorporated under Fish Habitat Assessment								
	Oysters	~~Shoreline indicator development~~		Closely related to shoreline threshold analysis and inventory								
	Oysters	Oyster restoration monitoring	Yes	Research by ORP to develop standardized, cost-effective monitoring restoration methods based on success metrics	Needed to compare methods for restored tributaries across MD/VA, will require long-term planning as more and more reefs need to be assessed. Also need to standardize across states to discuss Baywide restoration goals - needed to assess if restoration is working	Monitoring		partially - NCBO and state jurisdictions support	What will happen after 2025?	high		
	Forage Fish	Shoreline threshold analysis	No	Knowing the threshold is not meaningful without understanding the existing baseline through an inventory of shoreline condition/type (below)	Needed to understand coastal development impacts to nearshore species	Analysis	habitat	Partially - ongoing GIT funded project, need depending on outcome of project recommendations		low		
	Fish Habitat	Baywide inventory of shoreline condition/type	No	Inventory to quantify the amounts/percentage of shoreline type - natural or hardened; more data exist for VA but are lacking for MD	Needed to understand coastal development impacts to nearshore species	Data Gathering	habitat, stakeholder engagement/stewardship	VIMS inventory		low	Will GIS data be developed or assembled? Will this data be made available to partners?	
	Forage Fish	~~Shallow water monitoring plan that can incorporate monitoring needs of other outcomes~~		Addressed above								
	Forage Fish	Forage fish indicator	No	Pilot project based on 2016 GIT funded study	Needed to evaluate relative abundance of key forage species from year to year, informing ecosystem-based management approach	Data Gathering / Analysis		Partially - GIT funded project and quantitative methods now being developed by NCBO		low		
	Blue Crab Abundance	Identify and describe ecosystem factors affecting natural mortality of blue crabs	No	Rank varying factors influence on population dynamics, understand links between habitat, climate, predator-prey, water quality and blue crab population dynamics	Needed to inform ecosystem-based approaches to blue crab management	Analysis	water quality, habitat	GIT Funded research initiated to address this	ecosystem modeling STAR workgroup	low		
	Blue Crab Abundance	Recreational harvest survey	No	After MD DNR adopted new licensing system for recreational crab fishing, there is limited data to inform estimates of recreational harvest - is rec harvest actually 8% of overall harvest?	Needed to quantify/characterize the blue crab recreational fishery	Data Gathering		partially - SERC Matt Ogburn study, DNR contracted survey		low		
	Blue Crab Abundance	Stock assessment update	No	Currently benchmark stock assessment is NOT needed at this time, and scientists are working to finalize a report with updated data included in the existing stock assessment model, and to develop decision tools	Needed to determine when management action is warranted for the blue crab stock	Analysis		Partially - supported by MD DNR and CBSAC		high		
	Blue Crab Management	None										
		Blue catfish predation in tidal reaches of tributaries	No	The impact of invasive blue catfish on native species (e.g. blue crab) is uncertain	Needed to understand the potential ecological impacts of an expanding blue catfish population in the Chesapeake	Research	blue crab abundance	partially - VMRC funded study to examine predation on blue crab		low		
		Climate related changes in fish distribution	No	Fish species range/distributions are changing due to temperature-driven shifts	Needed to determine local impacts of climate change on coastal fisheries, how management can respond	Data gathering, Analysis	Climate Resiliency Workgroup	Part of CRWG workplan, partially related to Woodland et al. GIT funded study		high		
		Gauging public perceptions and commercial fishery stakeholder views on key Bay resources	No	How do we balance the interests of various use groups? Ex: support for oyster sanctuaries or regulations on invasive catfish	In order to gain support for restoration efforts, increase public investment, better understand public opinions and tools to be responsive	research	stewardship, habitat, communications workgroup	Ex: VIMS survey of crabbers on derelict pots		low		
	Stream Health	Support for reporting progress for Chessie BIBI	No	This is requisite of the Bay Program and Stream Health outcome.	To report on Stream Health Outcome.	Data Gathering, Analysis - translation of Chessie BIBI to stream miles	Healthy Watersheds (no overall Bay-wide indicator, scalable in terms of reporting process. Will help to reinforce to their overall goal)	No funding to report on annual progress. Potential USGS end of year money.	Continued in kind support from Jurisdictions for data collection.	High	Is GIS Team assistance desired to map indicator in ChesapeakeProgress? Will this data be made available to partners?	
	Stream Health	Stream Health/Fish Habitat & Passage/Water Quality: Establish guidelines and relationship between stream coordior restoration acivities and functional lift including biological lift. This information will support project slection, design, construction and monitoring to produce better stream health outcomes - biological lift.	No	Stream Cooridor Restoration efforts have demobnstrated ability to reduce sediment and nutrient loadings, however, the abaility to achive biological lift has been more challenging. Build on function based restoration approach to document restoration success stores and lessons learn to guide better design and construction to improve stream health outcomes.	To make progress towards stream health outcome through better restoration efforts. Forum necessary for key stakeholders to discuss best practices for stream restoration.	Data gathering through primary (monitoring) or secondary (literature) research. Synthesis via forum discussion.	Fish Habitat, Fish Passage, Water Quality	Tom Schueler via cooperative agreement with CBP to chair Urban Stormwater Workgroup (alongside input from Stream Health Workgroup members) to determine how stream related BMPs will be verified. The Verification Workgroup will provide recommendations on verification for restoration practices with scope beyond just water quality. Verification Workgroup will begin to explore function uplilft, but it is only one aspect of BMPs.	2019 GIT Funding	High		
	Stream Health	Stream Health/Toxics/Habitat: The identification and extent to which water quality stressors and sources of impairments associated with a TMDL may limit recovery of stream health.	No	Biological recovery is often the outcome by which stream health is measured. Progress towards biological recovery may be limited if stressors associated with sustaining populations are not addressed through management actions. Known stressors may include: toxics, temperature, flow, habitat, pH, chloride, bacteria, DO.	Delivery of N, P and S affects Bay health (Bay TMDL) however there are other local impairments and stressors that affect recovery of local stream health and thus the Stream Health Outcome. Management actions that address both of these desired outcomes need to align resources to address recovery of both local stream and Bay health.	Literature review and interview/surveys with State representatives working on TMDLs	Toxic Contaminants, Fish Habitat.	None. Seed money could provide an intern/graduate student to synthesize this information. Scott Phillips and Scott Stranko are willing to provide oversight to this position.	Full recovery of stream health will result from removal of stressors not limited to nitrogen, phosphorus, and sediment. Current funding per TMDL does not recognize this scope.	High		
	Brook Trout	Cross-GIT collaboration on monitoring efforts (e.g. eDNA, stream health, fish passage, GIT project	N	Collaborate efforts with groups of similar interest.	To ensure accurate Outcome progress	Monitoring, Research, Data	Fish Passage, Stream Health, Fish Habitat.	None. Tried to work with Fish Passage for joint GIT	Can work with BTAT, EBTJV partners on possible	High		
	Brook Trout	Funding for brook trout monitoring	N	Funding to support data collection by partners, research eDNA, other monitoring methods, etc.	To ensure accurate Outcome progress reporting, identify geographic priority areas; tied directly to indicator.	Monitoring, Research, Data Gathering, Analysis	Fish Passage, Stream Health, Fish Habitat.	None, no funding secured.	New USGS Project eTrout designed to use virtual reality and crowdsourcing platforms to collect data on brook trout occupancy, abundance, behavior, and habitat use for ecological analysis and engage students/citizen scientists educational opportunities. Pilot project in 2018-2019 in selected Chespeake Bay watersheds including Shenandoah National Park, Catoctin Mountain Park, and various Trout Unlimited restoration projects. This effort could be expanded to include video collection by visitors to recreational areas (e.g., National/State Parks) as well as NGO partners throughout the Bay Watershed.	High		
Habitat	Brook Trout	Expand spatial-temporal groundwater model to rest of Chesapeake Bay Watershed to predict groundwater influence in headwater streams.	N	Current groundwater modeling only applies to Shenandoah National Park. Additional data are needed to parameterize current model to other landscape settings/geologies.	Groundwater can mitigate stream temperatures providing more suitable habitat and prevent loss of Brook Trout occupancy due rising temperatures from changes in climate and land use. Identifying those stream reaches with significant groundwater upwelling is important to informing management and restoration efforts.	Research, Data Gathering, Analysis, Modeling		None	None in the near term	Low		
	~~Wetlands~~	~~Work with partners (NRCS, Chesapeake Conservancy, etc.) to explore development opportunities (e.g. expansion of USC wetland mapping model) and compile the most accurate and up to date wetland GIS information available. Prioritize the use of this data to identify large scale project opportunities.~~	~~N~~	~~The Wetland Workgroup needs STAR's assistance to compile best existing data, explore and pursue data development opportunities with partners.~~	~~The Wetland Workgroup needs updated data and data development to identify areas of opportunity in order to fulfill Workplan action items.~~	~~Data Gathering, Analysis, Research, Synthesis~~					Will GIS data be developed or assembled? Will this data be made available to partners? Is this relate to existing geospatial support agreement with Chesapeake Conservancy?	
	Black Duck	Development of new black duck indicator: new baseline, acreage target	N	Currently, CBP does not have a habitat-based acreage/baseline. No A&M filed yet. Will use ACJV Bioenergetics model to adopt a habitat-based indicator. We need STAR's assistance to develop this (using ACJV's bioenergetics model).	Adopting a habitat-based indicator will better reflect Outcome language and progress. With the adoption of a new indicator, an accompanying baseline/acreage target with which to work toward progress with becomes necessary.	Analysis, Modeling, Data Gathering	Wetlands	None	None	High	Is GIS Team assistance desired to implement ACJV bioenergetics model? Will GIS data be developed or assembled? Will this data be made available to partners?	

Color key	
	SRS-identified need
	GIT-identified need

Category	Description
Modeling	Need requires some sort of modeling effort, either with CBP modeling team or outside support
Monitoring	Need is pertaining to monitoring efforts including new efforts, utilizing existing efforts, coordinating efforts, etc.
Research	Need requires to original research to address or generation of new data
Synthesis	Need requires synthesizing existing research or advancing science by pulling from multiple current lines of research
Analysis	Need requires new analysis be conducted on existing data or information
Data Gathering	Need requires identifying, finding, consolidating, etc. existing datasets or data layers
Coordination	Data, information or efforts exist or are ongoing, but coordination is needed between groups
Training/Outreach/Communication	Scientific need is met, but resources are necessary to disseminate information, data, product, etc.
GIS Analysis and Mapping	Items where the CBPO GIS team could provide support.
Other	Does not fit into the above categories; please feel free to assign your own.

	SAV	Assessment of future SAV habitat availability in relation to climate change, sea level rise, shoreline alteration, and nearshore development to determine if segment-specific and Bay-wide SAV restoration goals are feasible.	N	This project would use the 1 meter resolution land cover data combined with bathymetry data, SAV data, and future sea level rise projection scenarios to determine if the segment-specifc and Bay-wide SAV restoration goals are feasible. Results would inform potenial updates to the goals.	Chesapeake Bay restoration success is measured by a number of factors, one of which is SAV acreage in the Bay and its tributaries. Each of the 92 CBP segments has an SAV restoration target, and significant resources are allocated to SAV restoration - both direct and indirect restoration efforts. If climate change impacts, such as sea level rise, coupled with population growth and development in the watershed will prevent SAV from being fully restored in any or all segments, this analysis will inform a review of the goals and any changes deemed necessary.	Data Gathering, Analysis	As SAV provides a number of ecosystem services, including the provision of food and habitat for a number of commercially and ecologically important fish and shellfish, as well as resident and migrating waterfowl, erosion control and sediment stabilization, oxygenation of the water column, carbon sequestration, and buffering of coastal acidification, an inability to restore SAV to the designated acreage level will impact the overall restoration of bay health. Multiple fisheries will be impacted and other ecosystem services will be lost to varying degrees. Achievement of the water quality, fish habitat, blue crab, black duck, oyster, forage, and wetland outcomes could all be impacted. Because SAV is one of the most easily visible indicators of water	This analysis has not been conducted, nor is any effort being taken to complete it at this time.	Becky Golden, Md DNR, is a co-PI on a proposal w/ GMU and TNC for a project entitled "FY2019 Quantifying the benefits of natural and nature-based features in Maryland's Chesapeake and Atlantic Coastal Bays to inform conservation and management under future sea level rise scenarios." This proposal will be submitted to NOAA once the federal shutdown is over. Some of the objectives of this project include re-running the SLAMM model with the SAV component and mapping SAV habitat under future sea level rise scenarios. If funded, this "need" would be at least partially addressed as part of this project.	High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Fish Passage	None										
	WQGIT/Modeling	Finer scale modeling	N	1) refine urban phosphorus sensitivities & 2) investigate the impact of urban BMPs using SWAT and/or SWMM models.	1) to come up with a more robust representation of parameters that govern phosphorus simulation in urban areas 2) improve stream bank erosion simulation	Modeling						
	WQGIT/Modeling	Implement a estuary model in local waters	N	Investigate if other models can better represent tidal tributaries	to assist tidal jurisdictions with local waters assessments and implementation efforts	Modeling						
	WGIT/Modeling/Climate	Characterize uncertainty in the removal performance of BMPs due to climate change	N	http://www.chesapeake.org/stac/workshop.php?activity_id=280		Modeling						
	Toxics Policy/Prevention	Explore establishing a consortium to share information on addressing PCB TMDLs and reducing their impacts	N	Many CBP stakeholders and jurisdictions have local PCB TMDLs. There is a need have a consortium for facilitation and technical exchange throughout the lifecycle of the PCB TMDLs for more effective reduction of PCBs.	Providing an opportunity for direct technical exchange between scientists and stakeholders, and between stakeholders to implement the local PCB TMDLs	Data gathering and synthesis						
	Toxics Policy/Prevention	Improved understanding of PCB sources and fate in the environment to better inform PCB mitigation	N	Summarizing best practices for PCB track down, informing stakeholders of findings of ongoing studies in various source sectors, status and change in the environment as more data become available using EPA 1668 analytical methods.	Contribute to achieving local PCB TMDLs and their overall reduction to improve conditions for fish and aquatic resources.	Research and synthesis						
	Toxics Policy/Prevention	Improved understanding of BMP effectiveness for removal of PCBs	N	Quantifying co-benefits for PCBs from most commonly used practices for nutrient and sediment reduction.	Helpful to identify and encourage use of BMPs that may provide PCB removal in addition to nutrient or sediment reduction	Research and synthesis						
	Toxics Research	Generate further information on mercury in the watershed (water, sediment, fish tissue)	N	Use Create a story map to summarize impairments due to mercury, and communicate ongoing studies of mercury and fish in the watershed. Inventory data to help document status and trends of mercury.	Determine whether further Chesapeake strategies are needed to supplement national efforts to reduce mercury impact on fish and fish consumption advisories.	Synthesis and Data gathering						
	Toxics Research	Assess the effects of toxic contaminants on fish and shell fish in tidal waters	N	Need to inform presence of certain contaminants of emerging concern in fish and shell fish; ongoing studies to inform health of particular fish species in urban environments	Understand the influence of contaminants in degrading the health, and contributing to mortality, of fish	Research, monitoring, data gathering						
	Toxics Research	Synthesize and communicate information to document fish health and wildlife conditions in the Bay watershed	N	Report and communicate results of studies to improve understanding of the influence of contaminants and other factors degrading the health of fish, EDC compounds and effects on fish conditions, risk assessment of EDC compounds with occurrence of intersex and other fish health conditions.	Provide technical summary/ies to stakeholders of results for management decisions. Many of these summaries will be completed in FY19.	Synthesis						
	Toxics Research	Document occurrence, concentrations, and sources of contaminants in different landscape settings	N	Inventory monitoring efforts by jurisdictions and groups for toxic contaminants and contaminants of emerging concern in surface waters, fish, and oysters and hooked mussels and identify any co-occurrence with nutrients and sediments in urban and agricultural settings	Understand occurrences and sources of toxic contaminants in landscape settings, and their relation to nutrients and sediment, to infer appropriate targeting of future resources for monitoring and mitigation	Data gathering and monitoring						
	Toxics Research	Prioritize options for mitigation of toxic contaminants to help inform policy and prevention	N	Summarize further information about direct and co-benefits for mitigation of toxic contaminants and nutrient and sediment reductions, and compile quantitative assessments of toxic contaminant removal by BMPs. Further interaction between toxic contaminant workgroup and other source sector groups (i.e., agricultural, wastewater, and stormwater).	Helpful in prioritizing BMP selection and quantifying co-benefits from nutrient and sediment BMPs in urban and agricultural settings. Work	Data gathering						
	Toxics Research	Gather information on issues of emerging concern in the watershed to prioritize and identify related tasks	N	information needed on new issues and potential concerns for action by CBP. Issues include pollinator toxicity, microplastics, and unconventional oil and gas; expand to also inform state of the science for harmful algal bloom toxins, chloride from road salt, perfluorinated compounds (PFAS), and coal combustion residuals.	Helpful to stay informed of emerging issues that may have impacts in the Bay watershed in the years ahead	Other - informational						
	2017/2015 WIPs	Determine cost and timeline for updating CAST BMP cost info	N	CAST does not have updated state specific BMP cost information beyond 2010.	Needed to improve cost quantification in CAST, and facilitate accurate understanding of funding needs	Data gathering and synthesis, potentially some analysis						
Water Quality	Standards Attainment and Monitoring	Compare observed and expected trends in watershed where differences were identified in the SRS presentation	N	Some divergences were identified between model predicted load-trend patterns and monitoring data.	Investigation was requested	Analysis						Is GIS Team assistance desired to represent trends in attainment geographically? Will this data be made available to partners?
	Standards Attainment and Monitoring	Adjust, sustain and grow monitoring programs that are supporting water quality modeling and monitoring assessments	N	Tidal, (includes long term main channel, shallow water & SAV) and Nontidal WQ Monitoring Programs have been eroding	WQ Stds Attainment support and watershed-bay wq-living resource assessment support	Other - network planning						
	Standards Attainment and Monitoring	Improve understanding of source sector contributions to N,P,S loading	Ongoing (Y, but N)	Ongoing interest in best available understanding of load sources	The models, analyses that track change and inform targeting of BMPs are only as good as the data	Analysis						
	Standards Attainment and Monitoring	Improve understanding of bay wq response to loads and BMPs	Ongoing	Ongoing interest in restoration progress to management actions/climate influences	Understanding bay response to watershed management is core to our adaptive management framework.	Analysis						
	Standards Attainment and Monitoring	improve understanding of bay living resources to watershed and bay management effects	Ongoing	Ongoing interest in actual and forecast living resource responses in the ecosystem that affect ecosystem function, commercial and recreational interests.	Understanding bay response to watershed management is core to our adaptive management framework.	Analysis						
	Standards Attainment and Monitoring	Tracking/Explaining attainment/attainment deficit patterns and trends	Ongoing	WQ Indicator needs/ongoing interest in tracking wq progress	Analysis results provides for understanding of progress in bay response to BMPs and directs targeting of monitoring and management resources	Analysis						
	Standards Attainment and Monitoring	Further analyses comparing expected trends in Bay water quality and watershed	Y									
	Standards Attainment and Monitoring	WQ Criteria Attainment patterns summary	Y									
	Standards Attainment and Monitoring	Update in patterns in WQ standards attainment DO, clarity/SAV and chlorophyll	Y									
	Standards Attainment and Monitoring	Publish WQ Criteria Tech Addendum	Y									
	Standards Attainment and Monitoring	Implement new process to quantify trends in tidal WQ parameters	Y									
	Standards Attainment and Monitoring	WQ results attained from 2 of 6 high flow events for mid point assessment	Y									
	Standards Attainment and Monitoring	Monitor high flow events at Conowingo	Y									
	Standards Attainment and Monitoring	Conowingo impacts on WQ monitoring plans	Y									
	Standards Attainment and Monitoring	125 sites of nutrient and sediment samples	Y									
	Standards Attainment and Monitoring	Update loads and Trends USGS	Y									Is GIS Team assistance desired to update nontidal website and/or WIP data dashboard? Will this data be made available to partners?
	Standards Attainment and Monitoring	USGS to update reporting/communicating of loads to Bay	Y									Is GIS Team assistance desired to update nontidal website and/or WIP data dashboard? Will this data be made available to partners?
	Standards Attainment and Monitoring	expand on BEI report for add'l monitoring needs	Y									
	Standards Attainment and Monitoring	Incorporate Citizen Science Monitoring for WQ standards	N									
	Standards Attainment and Monitoring	develop targeted shallow water monitoring strategy	N									
	Standards Attainment and Monitoring	Test watershed factors influencing WQ trends in tidal waters	Y									
	Standards Attainment and Monitoring	Release report/communication of nitrogen sources	Y									
	Standards Attainment and Monitoring	Compare observed and expected trends in watershed	Y									
	Standards Attainment and Monitoring	Improve knowledge of sed and N sources	Y									
	Standards Attainment and Monitoring	Use WQ data to assess PA's progress	Y									
	Standards Attainment and Monitoring	WQ functions of wetlands	Y									
	Standards Attainment and Monitoring	Improve understanding of tidal water response to load changes	Y									
	Standards Attainment and Monitoring	Develop land cover dataset	Y									What does this mean?
	Standards Attainment and Monitoring	Enhance watershed and SPARROW model	Y									
	Standards Attainment and Monitoring	Examine Susquehanna reservoirs' impact on N and sed transport	Y									
	Standards Attainment and Monitoring	Assess N and sed response to management practices	Y									
	Standards Attainment and Monitoring	Incorporate BMP efficiencies and land cover/use	Y									
	Standards Attainment and Monitoring	Conduct STAC peer reviews	Y									

	Standards Attainment and Monitoring	Run scenarios and modeling tools	Y								
	Forest Buffers	None									Is GIS Team assistance desired to calculate unbuffered/buffered area in riparian zone? Will GIS data be developed or assembled? Will this data be made available to partners?
	Tree Canopy	None									Is GIS Team assistance desired to quantify geographic distribution of tree canopy cover?will this be a ChesapeakeProgress indicator? Will this data be made available to partners?
Healthy Watersheds	Healthy Watersheds	Increased capacity for individual jurisdictional efforts to monitor, assess, and determine watershed health	N	Need continued assessments to determine if state-identified healthy waters and watersheds are still healthy and if additional waters and watersheds have become healthy. Lack of funding for increased monitoring for unassessed waters. Current progress: Utilize TT PHWA to help assess current conditions and continued health where jurisdictions have identified this need	Speaks directly to outcome and being able to determine whether or not healthy watersheds have remained healthy over time. Available data varies across jurisdictions.	Analysis	Stream health	None, HWGIT, Jurisdictions	unknown	Medium	
	Healthy Watersheds	Develop and apply tools or methods that integrate various inputs to characterize watershed vulnerability to future high-level risks including development and climate related stressors.	N	Need more information on watershed condition, urban growth proximity/pressure, energy development trends, water demand forecasts, invasive species threats, upstream activities, land ownership type, future transportation infrastructure plans, climate change, sea level rise, and other factors.	Speaks directly to outcome and being able to determine whether or not healthy watersheds have remained healthy over time and which are most vulnerable and in need of management responses. Available data varies across jurisdictions.	Synthesis and Analysis	Land Use Options Evaluation, Land Use Methods and Metrics, Climate	Partially (Contractor and HW GIT) Current progress: Utilize TT PHWA to help assess vulnerable healthy watersheds (1 GIT funding project with a wealth of data)	Work with GIT to assess contract deliverables and determine next steps (likely additional GIT funding and HW Staff support), ideally this "tool/data" will be integrated with other CBP related geospatial data	High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Healthy Watersheds	~~Work with STAR team to identify and incorporate key datasets related to watershed health and vulnerability indicators for incorporation into the Tetra Tech PHWA GIT funding project~~.	~~Y~~	~~The GIT funding project is ongoing, HW Staff and TT contractors worked with Peter Tango and Emily Trentacoste to identify and secure datasets.~~	~~Speaks directly to outcome and being able to determine whether or not healthy watersheds have remained healthy over time. Available data varies across jurisdictions.~~	~~Data Gathering and Coordination~~					Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners? (No task proposed to be deleted)
	Healthy Watersheds	Work with TT to train staff on how to utilize, update, and maintain the PHWA to inform progress toward goal.	N	It is becoming clearer that the current core team may not have the technical skill to maintain and independently update the final products (database and associated files). A training workshop and/or additional phase of grant is necessary to ensure independence and understanding. Initially, TT is meeting with Renee Thompson to begin this transfer of knowledge	Speaks directly to outcome and being able to determine whether or not healthy watersheds have remained healthy over time. Available data varies across jurisdictions.	Training	Cross-GIT, Fish Habitat and Assessment, Stream Health, Protected Lands	Partially	Coordinate with CBP GIS team and other related decision support tool efforts to identify how to integrate this data and information with other efforts	High	
	Healthy Watersheds	Upon completion of TT PHWA GIT funding project work with HW GIT staff to assess results and begin to determine appropriate tracking framework for potential HW sustainability indicator.	N	Could be coupled with training workshop. Additional funding and technical knowledge from the TT contractor may be needed to determine the best way to host, share and provide the information in the CB PHWA	Speaks directly to outcome and being able to determine whether or not healthy watersheds have remained healthy over time. Available data varies across jurisdictions.	Analysis		Partially (HW GIT and CBP GIS team)	TBD	High	
	Healthy Watersheds	~~Compile and publish bi- annual CBP Protected Lands dataset (Renee Thompson~~)	~~Y~~	~~STAR can help to communicate the completion and availability of the dataset as well as help to coordinate additional analysis to meet the needs of CBP teams. (I am not sure what this would be, the Chesapeake Conservation Partnership fulfills this role). Most recent dataset was completed on Oct 2018~~	~~Cross-GIT need~~	~~Synthesis, Analysis, Outreach~~					
	Healthy Watersheds	Determine a way to identify and track "marginally healthy" waters and watersheds. Shared data gap with Stream Health workgroup	N	This is a continued data gap and not yet addressed by Stream Health or Healthy Watersheds groups.	Cross-GIT need	Analysis	Stream health	None	This was an idetified need in MS however, time and resources have not allowed for in depth exploration.	Low	
	Land Use Methods/Metrics	Change in land use needed for informing other Outcomes, particularly Healthy Watersheds, Stream Health, Climate Resilience, Tree Canopy, Forest Buffers, Wetlands, Fish Habitat, Oysters, Brook Trout, and Black Duck.	N (Y for Tree Canopy)	The information produced by this indicator directly inform many other Outcomes either explicitly or implicitly. (listed as a "gap" in MS and SRS)	The "So What" of this Outcome are the impacts to habitats, watersheds, and communities.	Synthesis, Other, GIS	Healthy Watersheds, Stream Health, Climate Resilience, Tree Canopy, Forest Buffers, Wetlands, Fish Habitat, Oysters, Brook Trout, and Black Duck.	USGS, and CBP GIS will likely compute metrics	CBP GIS Team	High	
	Land Use Methods/Metrics	Engagement from individual outcome representatives to help relate LUMM and interprete what rates of change mean to individual outsomes.	N	Need to determine what the exact metrics are for each outcome. Input is need to inform customizaion and sensitivity to the metrics. It matters to some outcomes whether a watershed is 9% or 10% impervious. Precision and accuracy of those metics are needed. Context, threshholds, level of precision needed by these other outcomes.	To make LUMM relevant and useful for informing other outcomes. Land use change is listed as a key factor for MANY outcomes.	Synthesis, outreach, analysis GIS	Healthy Watersheds, Stream Health, Climate Resilience, Tree Canopy, Forest Buffers, Wetlands, Fish Habitat, Oysters, Brook Trout, and Black Duck.	CBP GIS and LUWG will need to work with individual workgroups and GITs to get input. It will be the responsibility of the WG or GIT to provide input.	CBP GIS Team, LUWG	High	
	Land Use Options	None									
Stewardship	Citizen Stewardship	Training and assistance with strategies on how to integrate social science into work (no action needed at this time)	No	2018 GIT Funding awarded to fund a Cross GIT effort with major support from the CBP Communications Office.	Gaps exist with CBPO knowledge and ability to incorporate behavior change and social science into workplan implementation.	Synthesis	All Watershed Agreement Goals and Outcomes	Fully. CBP Communications, GIT 5	CBPO Staff, Management Board?	High	
	Citizen Stewardship	Online Stewardship Tool to access data (no action needed at this time)	Ongoing	2018 GIT Funding awarded to GIT 5 to hire contractor Green Fin Studios to help develop the online tool. This project also includes collaboration from CBP's Creative Team and Communications Office.	Currently, there is not a tool to help stakeholders access and utilize the data does not exist.	Synthesis	Water Quality, Stewardship	Fully. GIT 5, CBP Creative Team, CBP Communications, Green Fin Studios	Practitioners, CBPO staff, watershed advocacy groups	High	
	Citizen Stewardship	Stewardship Data collection support every 3-5 years.	No	Potential contract for Stewardship Outcome data collection is being considered and is under development.	Collection of data every 3-5 years is needed to understand behavior change trends and to recalculate indicator.	Data Gathering	Water Quality, Stewardship	None		High	
	Citizen Stewardship	Path forward for advancing social science approaches	Might remove, can discuss	2018 GIT Funding awarded to fund a Cross GIT effort with major support from the CBP Communications Office.		Synthesis				High	
	Citizen Stewardship	Use results from stewardship index to help model relations of human attitudes/behaviors toward consumption, restoration and conservation.	Might remove, can discuss			Synthesis	All Watershed Agreement Goals and Outcomes		CBPO staff, watershed advocacy groups	High	
	Public Access	Identify public access sites and potential effects from climate change (sea-level rise and flooding)	No	GIS Project	To assist communities in addressing vulnerable sites.	Monitoring and Analysis	Climate resiliency goal, Stewardship	None	CBPO staff, state agencies, local governments	Medium	Is GIS Team assistance desired? Will GIS
	Diversity	Diversity Indicator Target/Goal for 2025 using American Community Survey Data (Overlaying state Demographic and Economic census block data over Chesapeake Bay Watershed)	No	GIS Project	To determine progress on goal.	Monitoring and Analysis	CBPO staff	Partially, EPA	EPA, CBPO staff	High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Student Environmental Literacy	None									
	Environmental Literacy Planning	Percentage of Local Education Agencies (LEAs) that are "Well Prepared" or "Somewhat Prepared" to implement environmental education program(s).	Ongoing	Information from this tool was used to determine local education agency (LEA; also referred to as school district) capacity to provide systemic environmental education. The Chesapeake Bay Program (CBP) first screened data to include only LEAs that have 25% or more of their geographic area within the Chesapeake Bay Watershed.	Determining the degree of preparedness to offer MWEEs in public schools across elementary, middle, and high grade bands enables the Education Workgroup and CBP leadership to determine workplan priorities.	Monitoring and Analysis	Environmental Literacy Goal	Fully, Education workgroup, selected contractor	CBPO staff, state departments of education, local education agencies	High	
	Sustainable Schools	Quantify and support BMP installation and restoration at schools to contribute directly to Bay restoration goals.	Ongoing	2018 GIT Funding awarded to hire a contractor to help develop a workplan implementation project for metric development and tracking of BMP installation and restoration at schools in the watershed.	Schools are often overlooked as viable options for BMP implementation, and even when BMPs are installed, this data is not often captured for CBP indicators and metrics.	Monitoring and Analysis	CBPO staff	Fully, Education workgroup, contractor TBD	CBPO staff, state agencies, local education agencies	High	
	Protected Lands	Expanded analysis and mapping of projected climate impacts	No	Threats to existing protected lands and unprotected high conservation value lands, such as development and climate change.	A changing environment -- precipitation regimes, storm patterns, and temperature changes -- will greatly affect the CCP Values (farms, forests, habitat, heritage, and health).	Analysis	CBPO staff	None	CBPO staff, Chesapeake Conservation Partnership	High	
	Protected Lands	Filling the Cultural and Scenic Landscapes Documentation Gap	In progress (additionai needs identified)	A recent National Forum on Landscape Conservation identified the enormous gap in documenting scenic and cultural landscapes. While these landscapes are often what many people value the most, the methods for identification and documentation are typically time-consuming, manual, and expensive.	Support more effective and strategic landscape scale conservation in the Chesapeake watershed. This will build on exploratory analysis the Partnership has already conducted using 1.2 million Flickr images from the watershed.	Analysis	Chesapeake Conservation Partnership	Partially, Chesapeake Conservancy, Chesapeake Conservation Partnership	CBPO staff, Chesapeake Conservation Partnership	High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Protected Lands	Development of improved methodology for data collection of Chesapeake Bay Protected Lands indicator. There is also a need to improve tracking CCP tracking toward priority layers as well as regular updates of the "Landscape Reporting Tool".	In progress	Data collection, reporting and tracking toward indicator continues to be soley the responsibility of the CBP GIS team, GIT funding project to assist with this effort is underway. In addition, there are other tracking, analysis and reporting needs beyond just the CBP indicator that would benefit from a consolidated approach.	Support more effective and strategic landscape scale conservation in the Chesapeake watershed. Jurisdictions need to improve methods and attributes for tracking land protection and understanding progress toward various conservation related goals.	Analysis	CBPO staff	Fully, Chesapeake Conservation partnership, GIT 4 Healthy Watersheds, contractor TBD		High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Protected Lands	Chesapeake Watershed Conservation Finance Intensive Workshop	In progress	This multi-day course will offer in-depth information about innovative, sophisticated land and resource conservation funding mechanisms in both the public and private spheres—helping participants explore and begin to implement the most relevant strategies for their land conservation efforts overall and to meet specific project challenges.	Protecting new land requires conservation partners to have the tools and knowledge to access new, innovative, and more complex sources of land protection funding from both public and private sources.	Training		Fully, Chesapeake Conservation Partnership, PA Land Trust Alliance, contractor TBD		High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?

	Protected Lands	Develop additional health criteria and document those values as key inputs to conservation planning and implementation.	Not Started	CCP has established a core conservation goal associated with human health that encompasses access to the water and to parks. The Partnership seeks to expand this to incorporate additional public health values including protecting source areas for public drinking water, increasing recreation corridors between urban areas and surrounding landscapes, and issues such as equity and environmental justice.		Analysis		None	CBPO staff, Chesapeake Conservation Partnership	High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Protected Lands	Improve understanding of indigenous cultural landscapes.	No	The NPS and the Chesapeake Conservation Partnership have been breaking new ground for a decade in working with Chesapeake tribes to identify indigenous cultural landscapes. This project will assemble all of that work, create a composite approach for ICL documentation and use two landscapes -- one in Virginia and one in Maryland -- as test beds for how the protection of ICLs can integrate with and expand upon ongoing habitat conservation and restoration efforts throughout the region.	Improved documentation, conservation and restoration of indegenous cultural landscapes.	Synthesis		None	NPS, Chesapeake Conservation Partnership	High	Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
6	Local Leadership	None									
Climate	Climate Resiliency Monitoring	Detailed statement of data/research needs for climate resilient BMPs and siting design	N	Design and function of BMPs under new climate reality. **This is a pressing and ongoing research need of the CBP and all coastal watersheds and is in direct response to a PSC directive to the CBP to, "Develop a better understanding of the BMP responses, including new or other emerging BMPs, to climate change conditions"**. The number of high priority votes received for this topic out of the total number of votes was 100%*.	**December 2017 PSC Policy Decision:** By 2022/2023, the CRWG will provide information to CBP about how BMP efficiencies are changing as a result of climate.	Research, Monitoring, and Modeling	Water Quality, others				
		Better understanding of precipitation changes with regards to intensity, annual amounts, seasonal impacts, storm events and stormwater management	N	The number of high priority votes received for this topic out of the total number of votes was **56%***	The work here would be particularly useful for maintaining and supporting the current and future investment that all the CBP partners have in stormwater management facilities by sizing and designing them correctly for future precipitation and flood risk.	Research, Monitoring, and Modeling	Water quality, stream health, flood reduction co-benefit				
	Climate Resiliency Monitoring	Detailed list of specific science/data needs for Citizen Science programs	N	Prioritized list of climate research needs for the Chesapeake Bay Program	Essential to determine prioritization for Climate Resiliency Workgroup workplan development and to feed into CBP research needs and prioritization	Analysis	All				
	Climate Resiliency Monitoring	Better understanding of sea level rise and subsidence impacts in changing climatic conditions	N	The number of high priority votes received for this topic out of the total number of votes was 44%*	The management implications of tidal wetland loss from future sea level rise is important to Bay water quality and ecology	Research and monitoring	Tidal wetlands, SAV, and water quality				Is GIS Team assistance desired? Will GIS data be developed or assembled? Will this data be made available to partners?
	Climate Resiliency Monitoring	~~Protocol support and development of indicator~~s	Y	Completed September 2018							
	Climate Resiliency Adaptation	Social Science - human behavior - implications of the human response (positive and negative) to climate change, flooding, sea level rise as well as motivation and needs of communities to adapt	N	The number of high priority votes received for this topic out of the total number of votes was **50%***		Research	All				
	Climate Resiliency Adaptation	Changing climate conditions and their impacts on SAV	N	The number of high priority votes received for this topic out of the total number of votes was 6%*		Research	SAV				
	Climate Resiliency Adaptation	Changing climate conditions and their impacts on invasive species	N	The number of high priority votes received for this topic out of the total number of votes was **0%***		Research	Vital Habitats, Healthy Watersheds				
	Climate Resiliency Adaptation	Impacts of SLR, coastal storms, increased temperatures and extreme events on BMPS (maintenance, shelf life, etc.)	N	Better understanding of precipitation changes with regards to intensity, annual amounts, seasonal impacts, storm events, and stormwater management		Analysis	Water Quality, others				
	Climate Resiliency Adaptation	Green infrastructure performance including increased sediment due to climate change	N	The number of high priority votes received for this topic out of the total number of votes was 33%*		Research	Water Quality, others				
	Climate Resiliency Adaptation	Changing climate conditions and their impacts on wetlands	N	The number of high priority votes received for this topic out of the total number of votes was 19%*		Research	Wetlands				
	Climate Resiliency Adaptation	Climate impacts to key aquatic fish species abundance, life cycle and habitat	N	The number of high priority votes received for this topic out of the total number of votes was 13%*		Research	Sustainable Fisheries				

***percent represents the number of high priority votes received for each topic out of the total number of votes**