Forage (DRAFT) – 2022-2024 *[Pre-QPM]*

Long-term Target: (the metric for success of Outcome)
Two-year Target: (increment of metric for success)

Instructions: Before your quarterly progress meeting, provide the status of individual actions in the table below using this color key.
Action has been completed or is moving forward as planned.
Action has encountered minor obstacles.
Action has not been taken or has encountered a serious barrier.

Additional instructions for completing or updating your logic and action plan can be found on ChesapeakeDecisions.

Factor	Current Efforts	Gap	Actions	Metrics	Expected Response and Application	Learn/Adapt
What is impacting our ability to achieve our outcome?	*What current efforts are addressing this factor?*	*What further efforts or information are needed to fully address this factor?*	*What actions are essential (to help fill this gap) to achieve our outcome?*	*What will we measure or observe to determine progress in filling identified gap?*	*How and when do we expect these actions to address the identified gap? How might that affect our work going forward?*	*What did we learn from taking this action? How will this lesson impact our work?*
Scientific and Technical Understanding: Lack an understanding of the presence, abundance, and diversity of forage species in shallow	*State trawl and seine surveys provide some forage abundance data.* *Various GIT- and NCBO-funded research projects*	*Need more comprehensive sampling of forage abundance and nearshore habitat use across the Bay to better understand how populations are*	***1.3:** Identifying key forage species for YOY striped bass/summer flounder/blue crab in shallow water tributaries*	*Increased understanding of factors affecting forage status in the Bay.*	*New information may change, or enhance, the way we assess the status of the bay's forage base.*	

water estuarine habitats and the influence of environmental (with an increased focus on climate change) and anthropogenic factors on forage abundance.	*focused on forage species and habitat*	*affected by environmental factors and habitat availability.* *Mainstem forage fisheries surveys, with appropriate mesh sizes for forage fish sampling are needed* *Plankton monitoring would provide essential information about food availability for forage species in the Bay.* *Better understanding of key forage for early life-stage predator species.*	***2.3:*** *Review forthcoming publications related to the status of mysids in Chesapeake Bay* ***2.4:*** *Evaluate role of avian and marine mammal predators on forage.* ***3.1:*** *Continue to support research efforts related to key forage species and consider how results can be applied to indicator development and management* ***4.1:*** *Refine science priorities*			
Partner Coordination: Coordinated support and participation across CBP partners are needed to facilitate better understanding and management of the forage base and how the team's chosen indices of focus may be best utilized, and built-upon, by the Chesapeake Bay management community. Collaboration on the selection of indicators	*The 2014 STAC workshop identified a suite of potential forage indicator species.* *A GIT-funded study identified a suite of potential forage indicators.* *The shoreline threshold study was presented to the Fish GIT and the Forage Action Team.* *The FAT is supporting the development of*	*Need to identify forage species most important to managers and revisit/refine these prioritized species* *Collaborative input on potential forage indicators from federal, state, and nongovernmental entities is needed.* *Need to collaborate with other CBP workgroups and partners to make cross-cutting,*	***1.1:*** *Implement the forage indicator development plan.* ***1.1:*** Advise CRWG on how forage abundance and distribution may be incorporated into a climate resiliency indicator. ***1.4:*** *Evaluate if the current list of priority forage species needs to be updated in the context of climate change and other new information.*	*Development of forage indicators.* *Increased understanding of factors affecting forage status in the Bay.*	*Forage status and trends are used to inform other workgroups' priorities/decisions.*	

to monitor the forage base would ensure multiple benefits of development and use amongst managers and other CBP partners.	*three potential indicators.*	*mutually-beneficial connections for indicator development and monitoring. (ex. climate resiliency, fish habitat, wetlands, SAV workgroups).*				
Public, Nongovernmental Organization, and Government Agency Engagement: Communicating the importance and status of the forage base is key to ensuring understanding of and investment in a healthy Chesapeake Bay ecosystem. Communicating results of forage research and identifying applications ensures that the best available science is used to inform management.	*The Fish GIT and the Forage Action Team regularly schedule research presentations to inform partners of forage-related projects.* *Communicating science-based linkages between water quality parameters and forage status/trends*	*Need to synthesize and present research in ways that can engage a variety of audiences.*	***2.1:*** *Explore reporting new indicators on Chesapeake Progress* ***2.2:*** *Synthesize research findings and indicators results to communicate what is known about the forage base in the Chesapeake Bay*	*Increased awareness of the importance of forage in the Bay and factors that affect forage status.*	*Considerations of forage status are incorporated into water quality and fisheries management decisions.*	

ACTIONS – [2022-2024]					
Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
Management Approach 1: Identify and prioritize forage species					
1.1	Implement the forage indicator development plan.	Complete analysis for benthic invertebrates, springtime warming, shoreline development threshold and bay anchovy and juvenile spot habitat suitability indicators	Mandy Bromilow, Ryan Woodland, Mary Fabrizio, Justin Shapiro, Aaron Bever (NCBO,	Baywide	Fall 2022

			UMCES, VIMS, AQEA)		
		Advise CRWG on how forage abundance and distribution may be incorporated into a climate resiliency indicator.	Mandy Bromilow, Ryan Woodland, Mary Fabrizio, Justin Shapiro, Aaron Bever (NCBO, UMCES, VIMS, AQEA)	Baywide	Ongoing
1.3	Identifying key forage species for YOY striped bass/summer flounder/blue crab in shallow water tributaries	Complete analysis of key forage taxa for these species in shallow tributaries.	Matt Ogburn (SERC)	Baywide for striped bass. MD tributaries for summer flounder and blue crab	Fall 2022
1.4	Evaluate if the current list of priority forage species needs to be updated in the context of climate change and other new information.	Dedicate at least one FAT meeting to review the current list and determine if revisions are required based on new data and changing bay conditions (for example white shrimp increasing in abundance).	Bruce Vogt, Justin Shapiro, FAT (NCBO)	Baywide	Fall 2022
Management Approach 2: Evaluate and communicate status of priority forage species.					
2.1	Explore reporting new indicators on Chesapeake Progress	Initiate the Status and Trends Team indicators approval process for those indices listed in action 1.1.	Bruce Vogt, Justin Shapiro (NCBO)	Baywide	January 2023
2.2	Synthesize research findings and indicator results to communicate what is known about the forage base in the Chesapeake Bay	Explore the development of a summary report that integrates and synthesizes findings from recent studies and all four indicators. Evaluate what is needed to develop an annual report based on the "Blue Crab advisory report" model. Assessment should include model and data update requirements for the indicators, identification of contributing authors, and costs.	Mandy Bromliow (NCBO), CBPO Communications Team	Baywide	January 2023
		Conduct presentations and briefings for the Fisheries GIT and other target audiences such as the Chesapeake Bay Commission	FAT	Baywide	January-June 2023
2.3	Evaluate the role of mysids as forage prey in Chesapeake Bay	Coordinate a discussion at a Forage Action Team meeting to review forthcoming publications related to the status of mysids in Chesapeake Bay	Ryan Woodland (UMCES)	Maryland Tributaries	June 2022
2.4	Evaluate role of avian and marine mammal predators on forage.	Invite researchers quantifying forage needs/utilization of other predators to a FAT meeting. Compile existing literature.	FAT	Baywide	Ongoing

Management Approach 3: Inform management decisions to better address sustainability of the forage base.					
3.1	Continue to support research efforts related to key forage species and consider how results can be applied to indicator development and management.	Explore incorporating research and indicator findings into the Mid Atlantic State of the Ecosystem Report to support EAFM efforts of the Mid Atlantic Fishery Management Council.	Bruce Vogt, Mandy Bromilow, Mary Fabrozio, Ryan Woodland (NCBO, UMCES, VIMS)	Baywide	July 2022
Management Approach 4: Maximize the efficiency of monitoring programs and build on existing efforts.					
4.1	Refine Chesapeake Bay Program Forage Outcome science priorities in coordination with STAR.	Review the current science priorities list and revise as necessary.	Bruce Vogt, FAT (NCBO)	Baywide	January-February 2022
4.2	Provide specific recommendations to improve plankton and other forage monitoring.	Explore standardized shallow water and mainstem sampling methods for forage (gears to use, dimensions (e.g., mesh sizes), optimal habitats, etc and possibly pilot networks of sampling locations.)	Ryan Woodland, Tom Idhe, Mary Fabrizio, Rochelle Seitz, Ed Houde (VIMS, PEARL, UMCES)	Baywide	Ongoing
		Explore adding methods of forage sampling to existing samping projects, such as Poplar Island.	Bruce Vogt, Mandy Bromilow, David Bruce, Wilmelie Cruz Marrero (NCBO)	Maryland	Ongoing
		Submit a paragraph on plankton and shallow water monitoring needs for the 2022 PSC monitoring review.	Bruce Vogt, Justin Shapiro, (NCBO)	Baywide	January 2022
		Explore potential opportunities for tagging large migratory forage species (e.g. Menhaden) in Chesapeake Bay and tracking with existing telemetry arrays.	Matt Ogburn, Wilmeilie Cruz Marrero, Bruce Vogt (SERC, NCBO)	Baywide	2023