



Chesapeake Bay Program
Science. Restoration Partnership.

Sustainable Fisheries GIT: Forage

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Through the Chesapeake Bay Watershed Agreement, the Chesapeake Bay Program has committed to...



Goal: *Sustainable Fisheries*



Outcome: *Forage*

Continually improve the Partnership's capacity to understand the role of forage fish populations in the Chesapeake Bay. By 2016, develop a strategy for assessing the forage fish base available as food for predatory species in the Chesapeake Bay.



What We Want



-  Recommend STAC develop a threshold analysis for tidal shoreline throughout the bay
-  Prioritize shallow water forage monitoring including invertebrates. Charge STAR with developing a shallow water forage monitoring strategy.

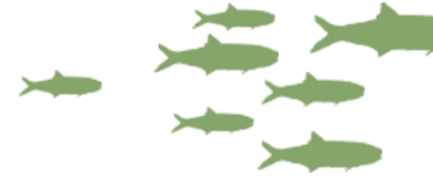
1

Setting the Stage:

What are our assumptions?



Logic Behind Our Outcome



Following the Decision Framework:

Factors

- Shoreline condition impacts
- Monitoring/survey costs
- Relationship between forage base and managed species

Current Gaps

- Understanding of forage/shoreline relationship
- Lack of forage monitoring data

Management Approaches

- Conduct research to link habitat condition to forage population status
- Develop forage indicators to inform fisheries management.

2

Progress:

Are we doing what we said we would do?



What is our progress?



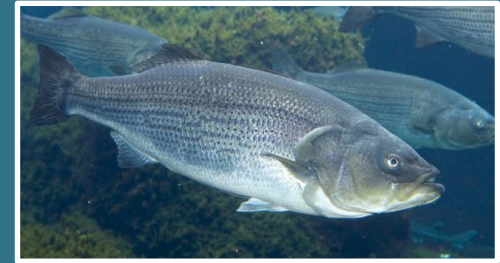
STAC Workshop and Report

Identified important forage and provided recommendations for further action



GIT-Funded Studies

Developed a suite of forage indicators and predator consumption profiles
Investigated environmental drivers of forage population trends



Partner Collaboration

Developed striped bass indicators
Designed two small-scale citizen monitoring efforts for forage fish and benthos

3

Challenges:

Are our actions having the expected effect?



Challenges



Need to improve understanding of the relationship between forage species and shoreline condition



Increased monitoring is needed to improve understanding:



Forage species monitoring data Baywide (especially invertebrates)



Predator diet data from tributaries and shallow waters



Plankton monitoring data




4

Adaptations:

How should we adapt?





**Based on what we've
learned, we plan to...**

-  **Continue working with citizen scientists to increase monitoring data**
-  **Look for further funding opportunities to continue advancing our knowledge of forage species and increase monitoring data collection**
-  **Sponsor research linking forage and habitat condition**



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Discussion

Extra Slides




Analysis

What forage species are important in the Chesapeake Bay?

- 10 important forage species from analysis plus 6 species selected by experts
- Half of the forage species are invertebrates
- Many are not typically considered “forage”

Important Chesapeake Bay Forage

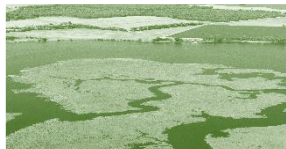
	Bay Anchovy	Managed forage species
	Polychaetes	 Atlantic menhaden
	Mysids	 Blue crab
	Amphipods and isopods	Historically important
	Weakfish (juveniles)	 Shad & river herrings
	Spot (juveniles)	Forage of Upriver Predators
	Mantis shrimp	 Small bivalves
	Razor clams	 Atlantic Silverside
	Sand shrimp	 Mummichog
	Atlantic croaker (juveniles)	
	Macoma clams	

Top 10 Important Chesapeake Bay forage species according to an analysis of representative tidal water predator species are pictured at left. Additional important forage at right were selected by experts to include managed, upriver and historically important species.



Analysis

What factors are influencing forage populations?



Habitat



Water Quality

Shoreline
hardening



Predation (human,
fish, birds)



Land Use/
Development



Food resources for
forage

Climate Change/
Sea Level Rise



Fishing and Catch
removals

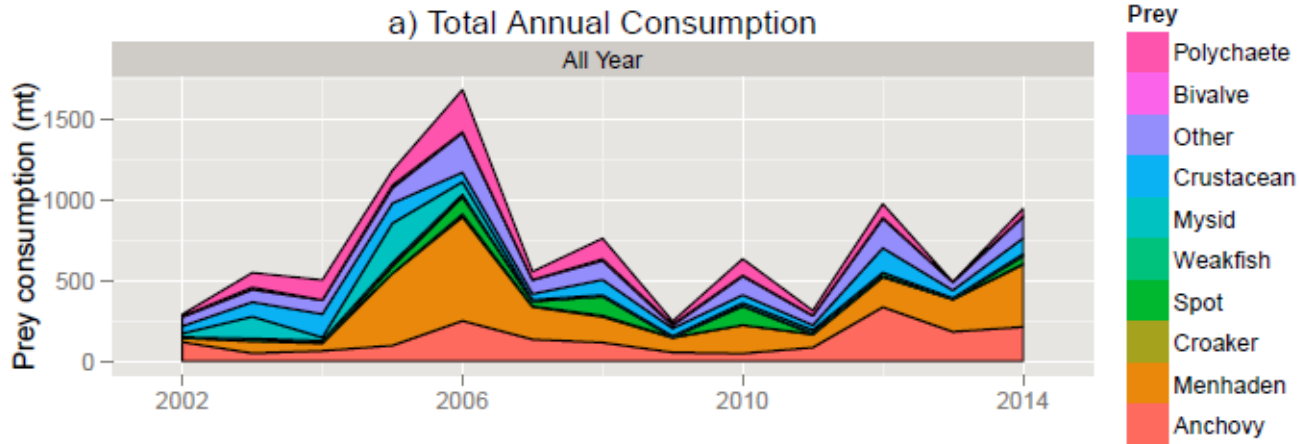




Analysis

What is the predator response to forage?

Striped Bass – Total Annual Consumption



Predator consumption changes over time; likely due to prey availability

- General decrease in mysid consumption across studied predators
- Increase in bay anchovy and polychaetes consumption in fish diets

Agreement Goals and Outcomes



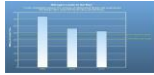
Sustainable Fisheries

- Blue Crab Abundance
- Blue Crab Management
- Oyster
- Forage Fish
- Fish Habitat



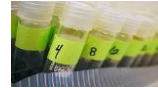
Vital Habitats Goal

- Wetlands
- Black Duck
- Stream Health
- Brook Trout
- Fish Passage
- Submerged Aquatic Vegetation (SAV)
- Forest Buffer
- Tree Canopy



Water Quality Goal

- 2017 Watershed Implementation Plans (WIP)
- 2025 WIP
- Water Quality Standards Attainment and Monitoring



Toxic Contaminants Goal

- Toxic Contaminants Research
- Toxic Contaminants Policy and Prevention



Healthy Watersheds Goal

- Healthy Waters



Stewardship Goal

- Citizen Stewardship
- Local Leadership
- Diversity



Land Conservation Goal

- Protected Lands
- Land Use Methods and Metrics Development
- Land Use Options Evaluation



Public Access Goal

- Public Access Site Development



Environmental Literacy Goal

- Student
- Sustainable Schools
- Environmental Literacy Planning



Climate Resiliency Goal

- Monitoring and Assessment
- Adaptation Outcome