



Creating a Science-based Strategy to Manage Chesapeake Bay Forage

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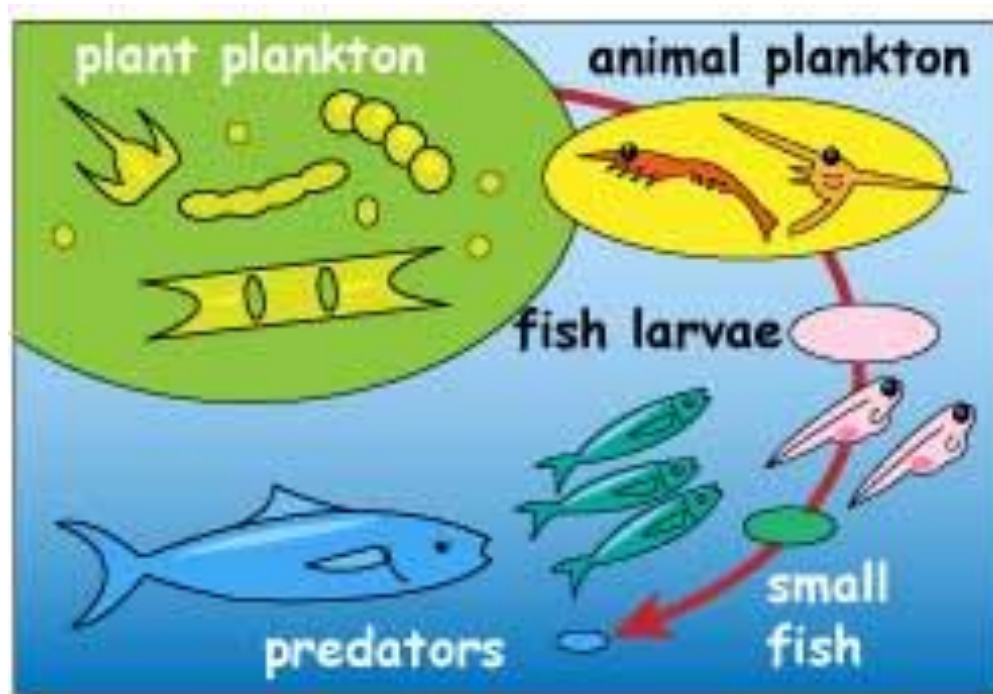
Photo Credit: Aimee Comer, VIMS

Outline

- Outcome and Management Approach
- Timeline
- STAC Workshop results
- Forage Indicator Study (GIT funding)
- Next Steps
- Discussion

Forage Outcome

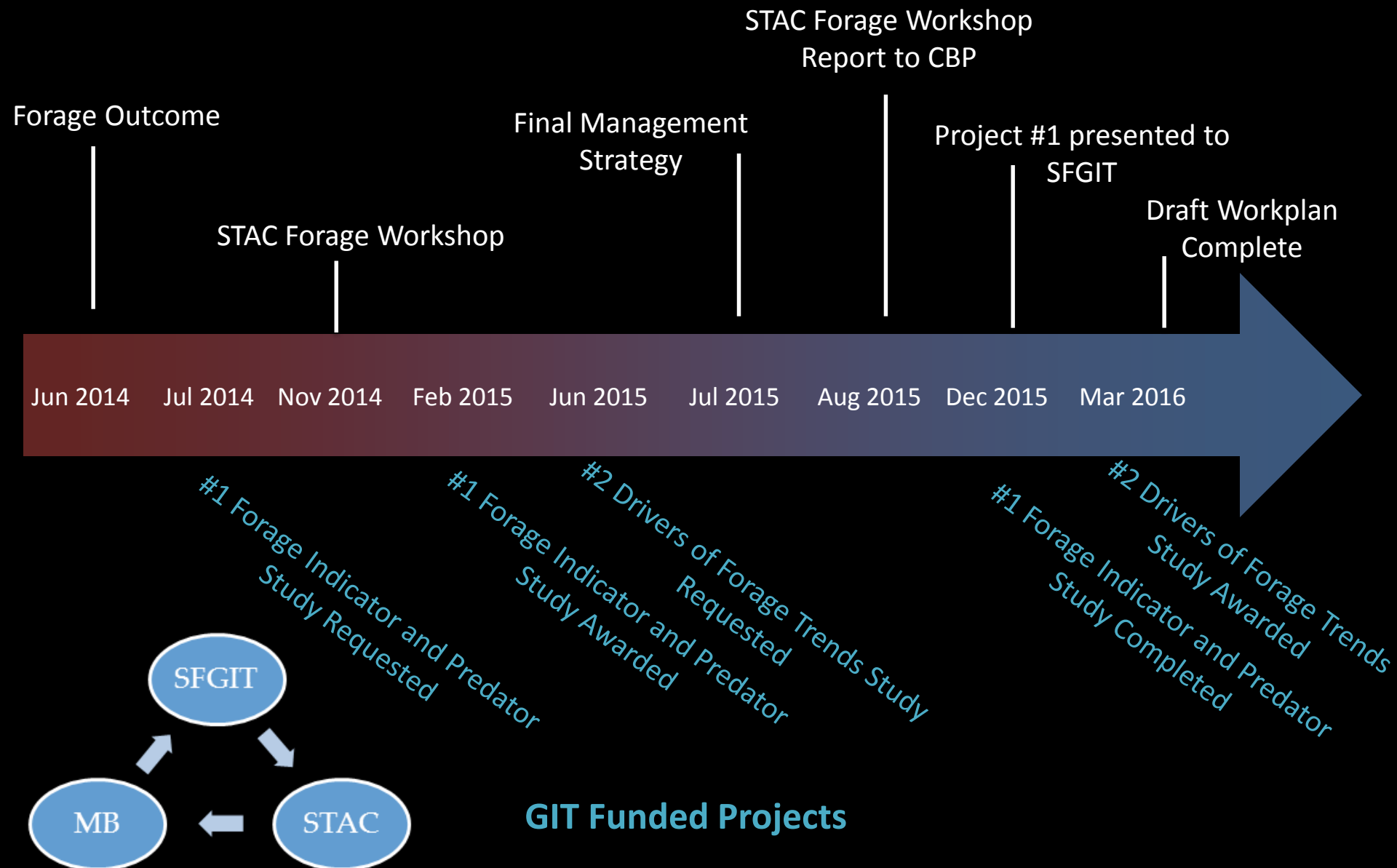
Continually improve the Partnership's capacity to understand the role of forage fish populations in the Chesapeake Bay. By 2016, develop a strategy for assessing the forage fish base available as food for predatory species in the Chesapeake Bay.



Management Approach

- Define forage species and what comprises the forage base
- Determine the status of the forage base including a definition of “balanced” state
- Inform management decisions to better address sustainability of the forage base
- Maximize the efficiency of monitoring programs and build on existing efforts

Chesapeake Bay Program



OUR FOOD CHAIN

AND THE LITTLE FISH
AT THE BASE OF IT

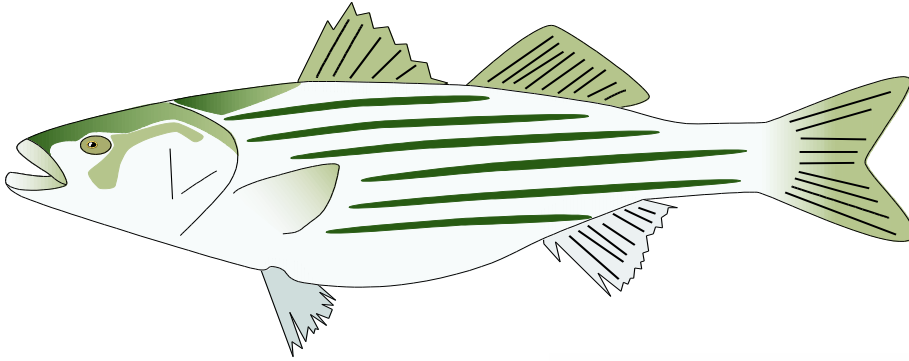


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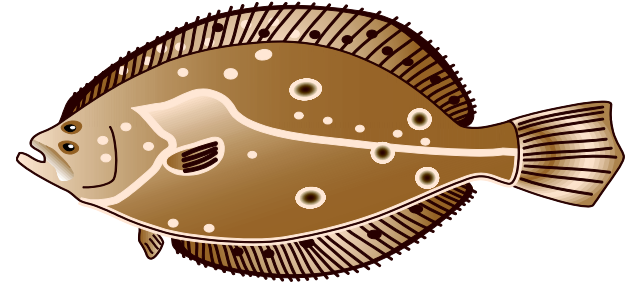
POLITICO Universal Uclick

Is This True?

Indicator Predators



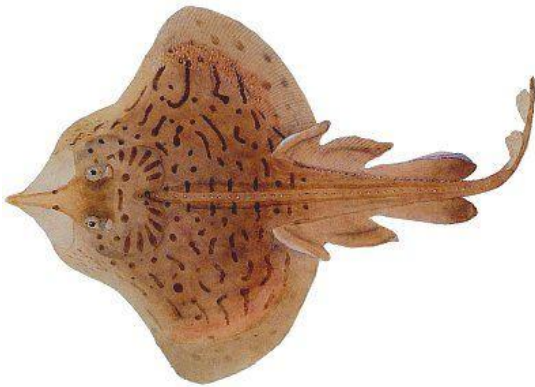
Pelagic Piscivore



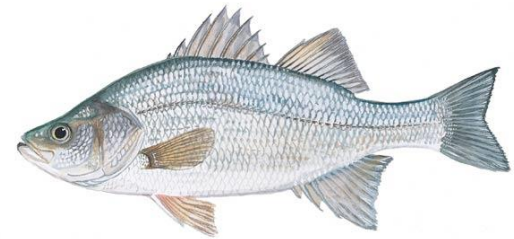
Benthic Piscivore



Benthic Predator



Lower Bay



Upper Bay



2014 STAC Workshop Results

Key Forage Species / Groups:

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- Bay Anchovy
 - Polychaetes
 - Mysids 
 - Razor clams 
 - Amphipods and isopods 
 - Weakfish (juveniles) 
 - Spot (juveniles)
 - Mantis shrimp
 - Sand shrimp
 - Atlantic croaker (juveniles)
 - Macoma clams

- 
- Atlantic menhaden
 - Blue crab
 - Shad & river herrings
 - Small bivalves
 - Atl.Silverside 
 - Mummichog 

Managed forage species

Historically Important

Upriver

*Based on wet weight of prey in stomach
analyses from ChesMMA (VIMS)*

- ½ species are invertebrates
- Many not usually “forage”

Factors Influencing

- Habitat
- Shoreline hardening/ armoring / protection
- Land use and watershed development
- Climate change and sea level rise
- Water quality
- Predation (including birds)
- Food resources for forage species (including plankton)
- Fishing and catch removals
- Socioeconomic factors (including perceived value)

Indicators/Metrics

Developed a list of 13 types of indicators/metrics that:

- 1) reflect the status and trends of forage and inform setting targets and thresholds
- 2) are linked to trends in habitat and water quality
- 3) are collected routinely (emphasis on existing data sets)
- 4) are actionable (i.e. inform management actions)

Prioritized Recommendations:

- 1 Strategic review and data-mining of all available current data to support forage quantification
- 2/3 Re-establish zooplankton monitoring to develop an index of feeding conditions for key forage (e.g., Bay Anchovy, Menhaden) and to develop abundance indices for key forage taxa (e.g., mysids);
- 2/3 Develop a standard set (suite) of metrics and indicators
- 4 Relate forage trends to predator trends
- 5 Improve understanding of forage dynamics & trends, especially those with limited or no current data (e.g., mysids), system-wide & habitat-specific scales
- 6 Establish shallow water monitoring of forage in soft-bottom, marsh, and SAV habitats (including up-tributary habitats)

Other Important Findings

- Connect with Habitat GIT to study, map, and manage habitats and areas critical to forage
- Define formal management objectives: (targets and thresholds)
- Align efforts with Atlantic States Marine Fisheries Commission and Mid Atlantic Fishery Management Council
- Develop integrative models
- Improve communications to show importance of forage (video; web)

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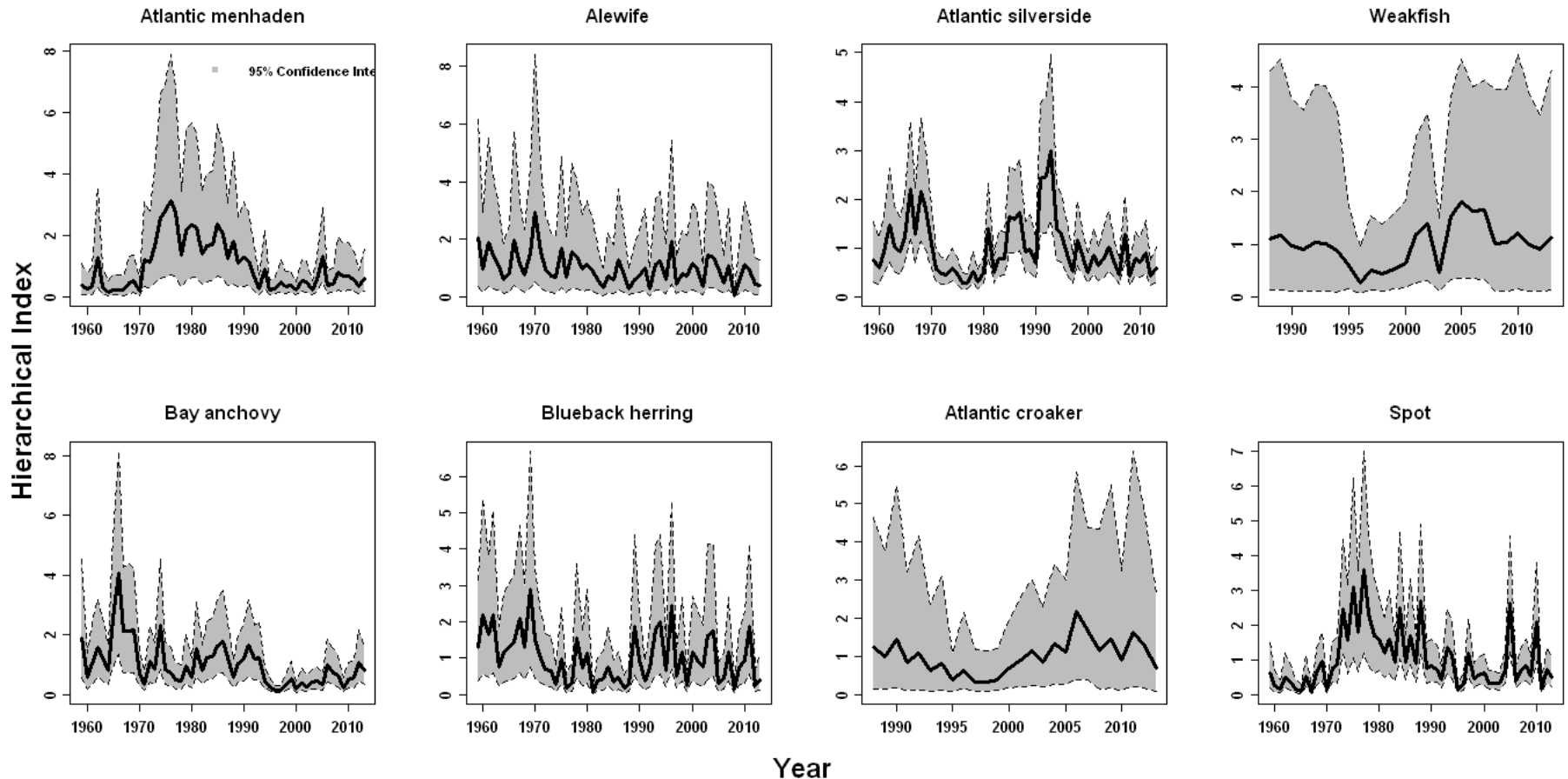
Forage Indicators Study Year 1

4 Indicators of Forage Status & Trends:

- Relative prey abundance / biomass
- Diet-based indices
- Prey / Predator ratios
- Consumption / Prey ratios

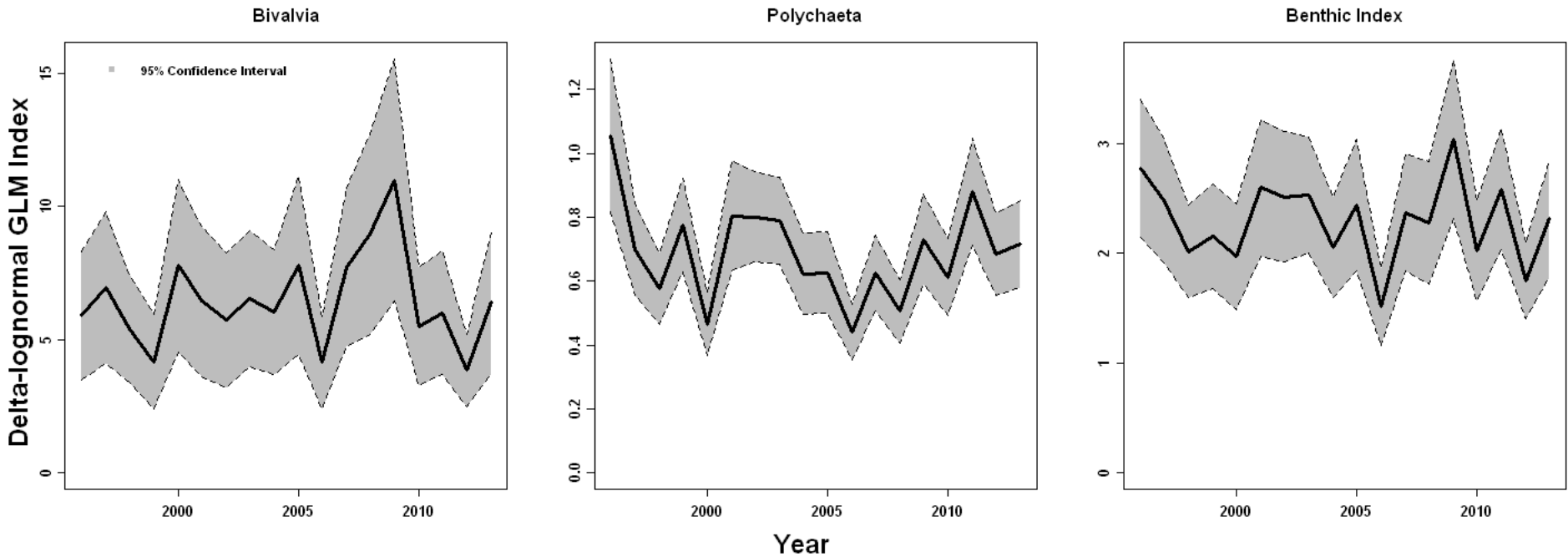
Forage Indicators Study Year 1

Relative Prey Abundance Through Time



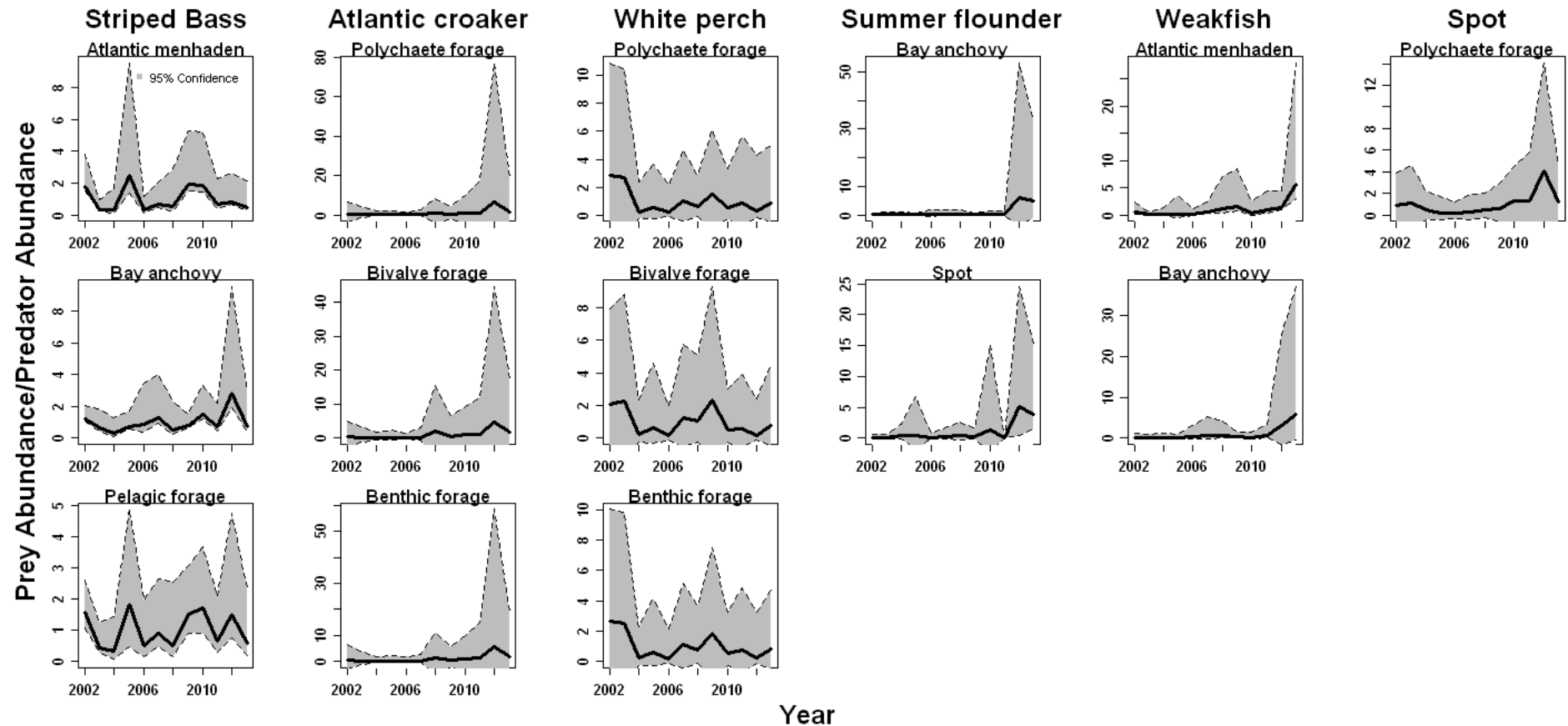
Forage Indicators Study Year 1

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Forage Indicators Study Year 1

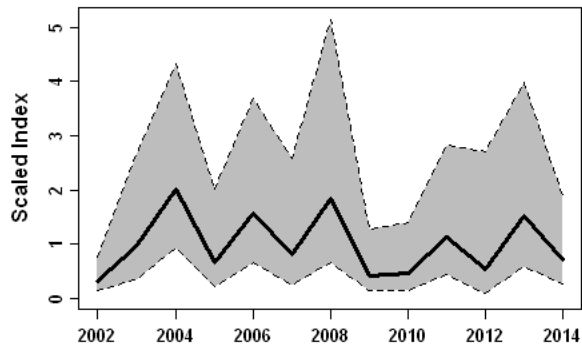
Prey to Predator Ratio



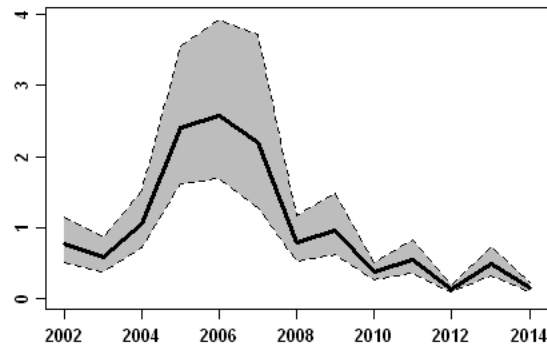
Forage Indicators Study Year 1

Predator Abundance Over Time

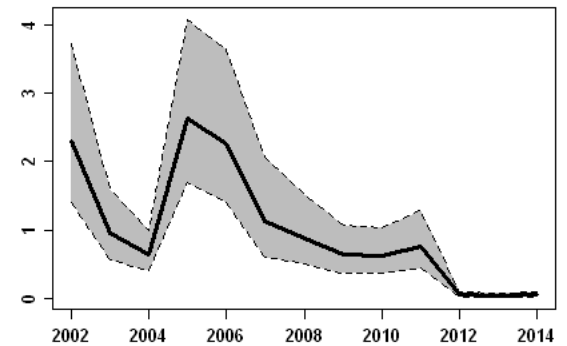
Age 2+ Striped Bass



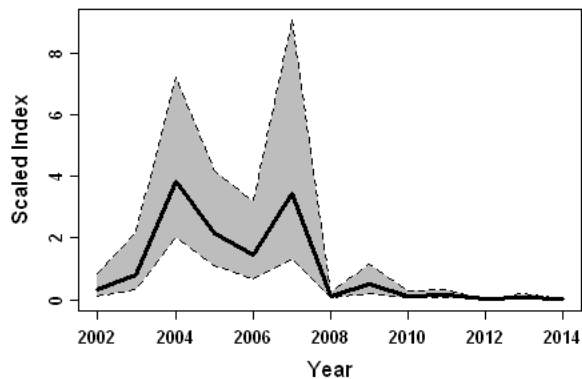
Age 1+ Spot



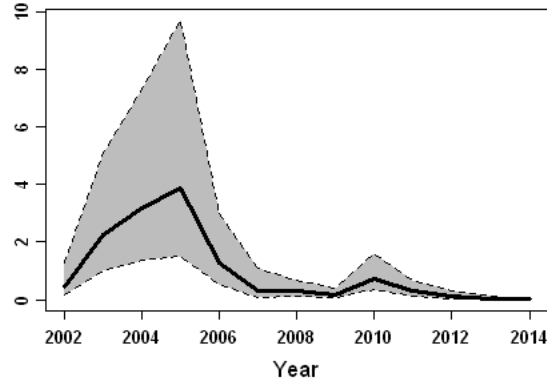
Age 1+ Summer Flounder



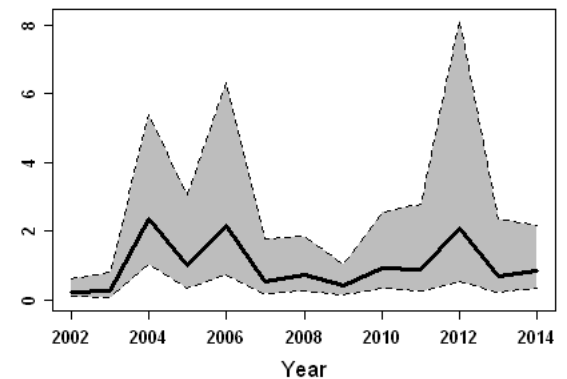
Age 1+ Atlantic Croaker



Age 1+ Weakfish

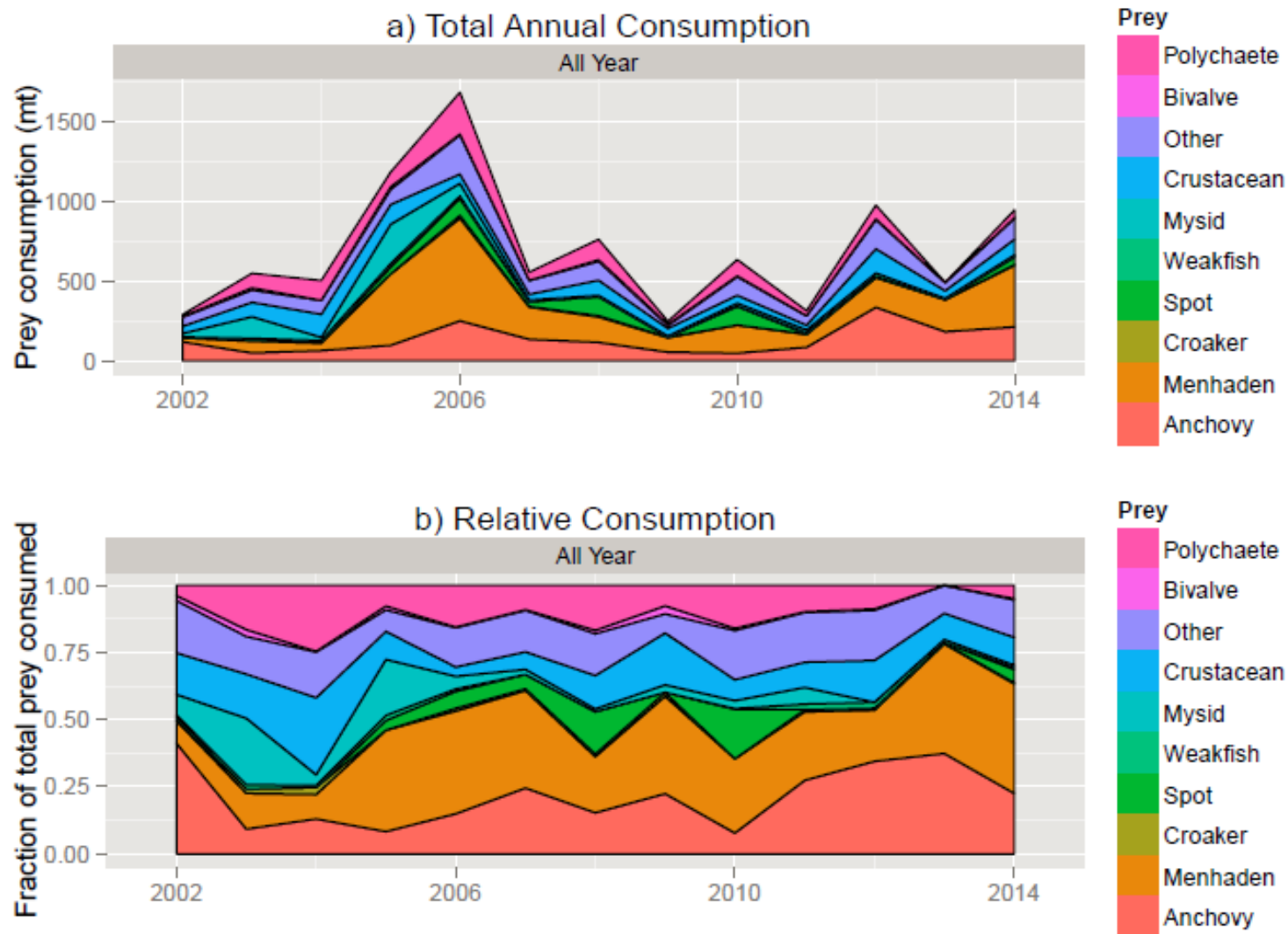


Age 0+ White Perch



Forage Indicators Study Year 1

Striped Bass – Total Annual Consumption



Forage Indicators Study Year 2

- Variability – effect on predators
- Environmental drivers related to/causing variability

Next Steps

- Apply indicator and metric results to workplan
- Define formal management objectives
- Communicate results to Bay partners
- Identify collaborative opportunities with other GITs

Issues for Management Board

- Environmental factors (habitat loss, climate change)
- Monitoring (plankton and shallow water)
- Cross-GIT connections
- Communication and education

Questions

