Forage Action Team Quarterly Meeting
Tuesday, September 20, 2016 1:00 pm – 3:00 pm
National Park Service Large Conference Room (3rd floor),
410 Severn Avenue, Annapolis, MD 21403
Materials: http://www.chesapeakebay.net/calendar/event/24303/

Participants

Bruce Vogt	Julia Beaty	Katie May Laumann	Paul Spitzer
Emilie Franke	Jim Price	Marty Gary	Peter Himchak
Ed Houde	Jim Uphoff	Matt Ogburn	Ryan Woodland
Jessica Coakley	Kara Skipper	Nancy Butowski	Tom Ihde

Next Steps

- Select a subset of indicators to provide a sense of forage status in the Chesapeake Bay.
- Focus on managed species (ex. YOY weakfish, croaker, spot) and potential application to current management discussions.
- Discuss more in-depth the general trends and potential "red flags" from UMCES Forage Indicators Study.
- Jim Uphoff will present an update on Maryland's striped bass health indicators at an upcoming meeting.
- Develop a chart to summarize available Baywide indicators by species and indicator type.

Meeting Notes

I. ***Introduction***

The Forage Outcome under the 2014 Chesapeake Bay Watershed Agreement is to "continually improve the Partnership's capacity to understand the role of forage fish populations in the Chesapeake Bay, and by 2016, develop a strategy for assessing the forage fish base available as food for predatory species in the Chesapeake Bay."

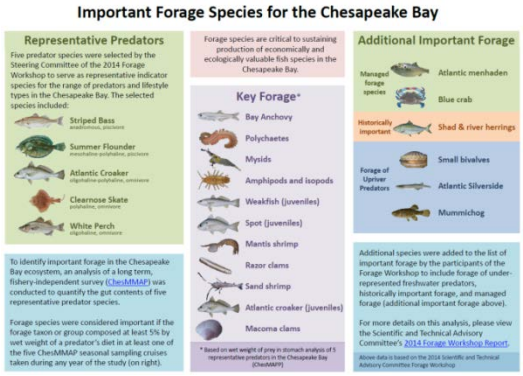
The Forage Action Team, which is comprised of members from academic institutions, state and federal government, nonprofits, and other fisheries stakeholders, developed a 2-year workplan to track progress towards this outcome. The Forage Action Team meets quarterly to discuss about the latest research, update the team on workplan action progress, and address challenges facing the team.

Since 2014, the team has held a STAC Forage Workshop, drafted a management strategy, funded two studies on forage, and developed a 2-year workplan which includes actions for 2016-2017.

II. PRESENTATION: Creating a Science-based Strategy to Manage Chesapeake Bay Forage

Drs. Ed Houde (UMCES-CBL), Tom Ihde (NOAA/ERT), and Ryan Woodland (UMCES-CBL) reviewed key information and findings from the 2014 Forage Workshop, the 2014 GIT-funded study on Forage Indicators and Predator Consumption Indices, and progress on the 2015 GIT-funded study on Drivers of Forage Population Trends.

II.A. Forage Workshop



In 2014, forage experts met at a Scientific and Technical Advisory Committee (STAC) Forage Workshop, where they worked to develop a system-wide scientific synthesis of forage in the Chesapeake Bay and develop actionable recommendations for management. To identify important forage in the Chesapeake Bay ecosystem, a diet analysis of gut content data from the ChesMMAP survey, along with verification from other survey diet data, was conducted focused on five representative predator species. The representative predator species had a range of lifestyle types and habitats within the mainstem of the Chesapeake Bay. Forage species were considered "important" if the forage taxon or group composed at least 5% by wet weight of a predator's diet in at least one of the five ChesMMAP seasonal sampling during at least one year. In addition to this diet analysis, additional forage species were added to the list as important managed forage species, historically important species, and upriver species. Workshop experts developed a list of prioritized recommendations to improve understanding of Chesapeake Bay forage (an abbreviated list of recommendations are listed in the table below; full list is available in the report).

Recommendations from Forage Workshop
•Strategic data review to support forage quantification
•Re-establish zooplankton monitoring to develop an index of feeding conditions and abundance indices
•Develop a standard suite of metrics and indicators
•Relate forage trends to predator trends
•Improve understanding of forage dynamics and trends
•Establish shallow water monitoring of forage in soft-bottom, marsh and SAV habitats

II.B. Forage Indicators and Predator Consumption Profiles Study

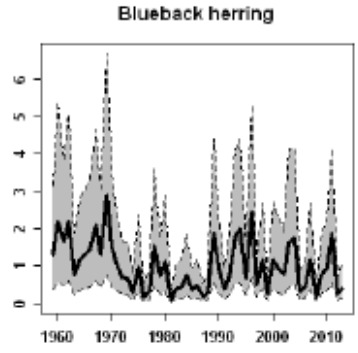
The University of Maryland Center for Environmental Science (UMCES) conducted a study to develop a suite of forage indicators and consumption profiles for representative predators in the Chesapeake Bay. Types of indicators of forage status and trends included:

1) Relative prey abundance/biomass,
2) Diet-based indices,
3) Prey/Predator ratios, and
4) Consumption/Prey ratios.

Data were compiled from multiple surveys and included diet-based indices from 6 predators. Researchers noted the variability through time and offered the recommendation to focus on invertebrates.

II.C. Drivers of Forage Population Trends and Consumption Patterns

UMCES along with Humboldt State University and the Virginia Institute of Marine Science are currently investigating environmental drivers of forage population trends at various spatial and temporal resolutions. Building on the results of the previous forage study (above), researchers are utilizing six surveys to develop models to analyze forage-environment relationships both baywide and regionally. Environmental indices include climate indices, water flow, temperature, chlorophyll concentration, hypoxic conditions, and other water quality conditions. Further objectives include identifying regional patterns in predator consumption and associated the environmental and biological correlations.



Relative prey abundance/biomass for Blueback herring. Gray shading represents the 95% confidence interval values. (Buchheister & Houde 2016)

III. Recommendations and Discussion

III.A. Forage Population Trends Study

Forage team members stated that the season component of the forage population trends study will be critical to the analysis. Members suggested the use of the Oxford Lab Plankton survey in the current study if timing and resources allow.

III.B. Plankton Monitoring Needs

Team members are interested in determining the application and contribution of plankton surveys. The broad question is if there are large shifts in predators and prey as a result of plankton abundance and distribution. If there is a causal effect, the team would like to provide managers with the necessary information to reinitiate these zooplankton and phytoplankton monitoring efforts. Members suggested looking at the State of the Ecosystem report presented to the Mid-Atlantic Fishery Management Council's (MAFMC) as an example of how to summarize key ecosystem indicators for managers. On a more regional level, MD DNR is continuing to track the health of striped bass specifically in the Maryland portion of the Chesapeake Bay and this can provide a more regional perspective to the overall coastal striped bass population. MAFMC has previously used indexed based approaches for increasing and decreasing harvests. As they move towards habitat and forage indicators, they are working towards identifying what is driving these changes.

III.C. Potential Forage Indicators

Team members suggested that a suite of indicators should be used as opposed to choosing a single indicator. The prey/predator ratios would be the easiest to derive and could have longer-term datasets. Consumption data will also be needed to make the indicators effective. Challenges could be ensuring that there is consistent diet data available. Team members noted that there is a significant data gap with evaluating the effects of water quality and other issues on forage populations.

Reports

Buchheister A. & E.D. Houde. 2016. Forage indicators and consumption profiles for Chesapeake Bay fishes. Final report submitted to the Chesapeake Bay Trust. University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory. Solomons, MD. 52pp.
http://www.chesapeakebay.net/publications/title/forage_indicators_and_consumption_profiles_for_chesapeake_bay_fishes_final

Ihde, T.F., E.D. Houde, C.F. Bonzek, and E. Franke. 2015. Assessing the Chesapeake Bay Forage Base: Existing Data and Research Priorities. STAC Publication Number 15-005, Edgewater, MD. 198 pp.
http://www.chesapeake.org/pubs/346_Ihde2015.pdf