JUNE 2019

Fisheries GIT Meeting Summary

Held at the Horn Point Laboratory
University of Maryland Center for Environmental Science
Cambridge, MD
June 26-27, 2019

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Sustainable Fisheries Goal Implementation Team

The Sustainable Fisheries Goal Implementation Team (Fisheries GIT) brings together a diverse group of interjurisdictional fishery managers, scientists, and other stakeholders to improve management and recovery of oysters, blue crab, forage fish, and fish habitat in the Chesapeake Bay. The group focuses on advancing ecosystem-based fisheries management (EBFM) by using science to inform sustainable fishery management decisions across state boundaries.

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Key Takeaways

The Manokin River in Maryland was officially approved as the tenth of 10 tributaries to receive large-scale oyster restoration by 2025. Planning is now under way with the Maryland Oyster Workgroup to determine exactly how much area will be restored.

On recommendation by the Oyster Best Management Practices (BMP) Expert Panel, oyster reef restoration will soon be able to receive credit for achieving water quality goals through states' Watershed Implementation Plans. At the meeting, the Fisheries GIT endorsed estimates for how much nitrogen and phosphorus is removed from the system by healthy restored oyster reefs. Oyster aquaculture was previously approved as a best management practice.

The 2019 Blue Crab Advisory Report was endorsed, an annual update on the status of the population, this year showing positive trends for blue crab in the Chesapeake Bay. Abundance estimates for adult females and juveniles are high, and the overwintering mortality was low.

Protecting fish habitat is critical for sustainable fisheries. The Fisheries GIT is interested in understanding where the most important habitats for fish are to prioritize conservation and restoration in those areas. Toward this end, a new proposed project would focus on nursery habitat for young striped bass. Water column is also important fish habitat to consider, for example, as low dissolved oxygen conditions force fish into smaller areas during hypoxic conditions. Moving forward, the Fisheries GIT will support collaborative partnerships to incorporate water quality data in studying trends in fish populations.

Actions

The Chesapeake Bay Stock Assessment Committee (CBSAC) and Fisheries GIT Executive Committee will meet to develop a plan for regular blue crab stock assessment updates, prioritze science needs and discuss ways to fill research gaps for blue crab. CBSAC will continue to evaluate membership and scope based on capacity.

The Invasive Catfish Workgroup will convene with expanded membership for an in-person meeting to identify priorities and determine actions.

Blue Crab Stock Assessment

2019 Blue Crab Advisory Report
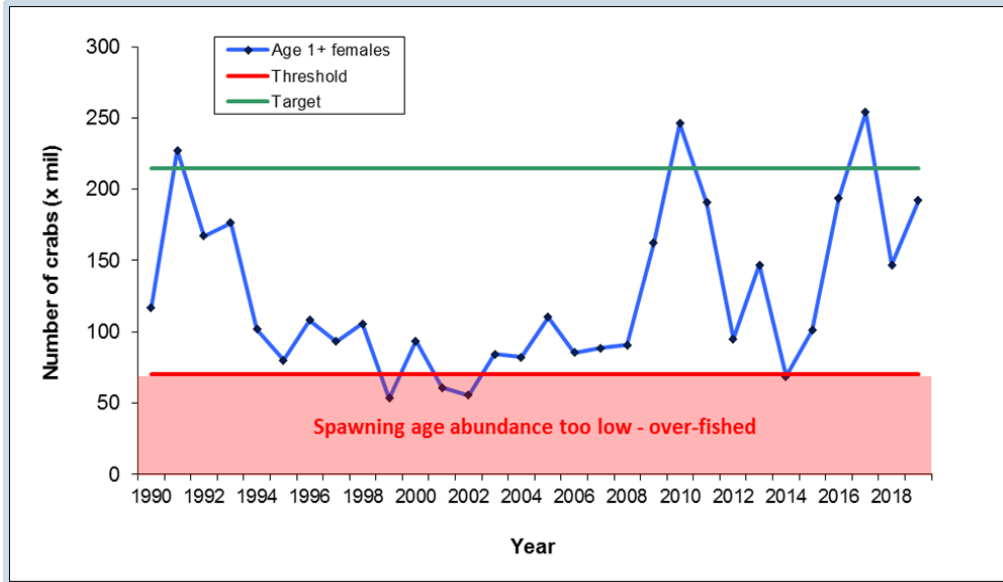
The Chesapeake Bay Stock Assessment Committee (CBSAC) finalized the 2019 Blue Crab Advisory Report that summarizes the 2019 winter dredge survey results and the 2018 harvest data as well as management recommendations and research needs.

In 2019, the abundance estimate of adult female blue crabs (age 1+) was 191 million, which is above the threshold of 70 million crabs and near the target of 215 million. The female exploitation fraction (percentage removed by fishing) in 2019 was 23%, which is below the target of 25.5% and the threshold of 34% for the 11th consecutive year. Therefore, the **blue crab stock is not depleted and overfishing is not occurring.**

The GIT Executive Committee approved the 2019 Blue Crab Advisory Report. See press release from Chesapeake Bay Program for more info about the report.

2017 Stock Assessment Update

A blue crab stock assessment update was initiated in 2017 to examine the suitability of the 2011 model and reference points for winter dredge survey data and harvest data through 2016-2017. The update was completed and approved in 2019. The results of this assessment model update indicate that the current reference points are still appropriate and blue crab management has been effective. CBSAC and the GIT Executive Committee will further discuss the criteria and methodology for incorporating updated reference points into the stock assessment.

CBSAC Science

The 2019 Advisory Report and stock assessment update offer a combined list of 20 research needs that will improve our understanding of blue crab population dynamics and our ability to assess the stock. Research needs include evaluations of winter dredge survey efficacy, sources of natural mortality, harvest accountability, and biological parameters. CBSAC will prioritize these needs and develop a plan for addressing them at its fall meeting in October.

Ecosystem Factors Influencing Blue Crab

Drs. Tom Miller and Dong Liang of the University of Maryland Center for Environmental Science (UMCES) presented results of their study evaluating the influence of environmental factors on the Chesapeake Bay blue crab population. The study used a modeling approach that examines the effects of biological factors, like abundance and predators, in combination with environmental factors, like river discharge, on blue crab abundance and resilience with an empirical network framework.

Overall, the results suggested that natural biological factors are stronger than ecosystem factors in determining blue crab recruitment. Specifically, stock size (adult abundance) is the key to high recruitment levels (age-0 abundance), while recruitment variability (resilience) is driven primarily by predation. Although climatic patterns and water quality have some influence on blue crab recruitment, the underlying mechanism is not fully understood.

Fish Habitat

NOAA-Funded Research

The NOAA Chesapeake Bay Office funded a suite of projects through a FY2018 federal funding opportunity focused on inshore-offshore habitat connectivity for fish utilizing Chesapeake Bay habitat areas. Projects are focused on Summer Flounder and Black Sea Bass, and are ongoing through end of 2020. PIs presented an update to the Fisheries GIT on progress for each team.

The Value of Shallow Tributary Habitats of Upper Chesapeake Bay to the Summer Flounder (SERC)

Habitat Utilization & Ecosystem Connectivity in the Southern Mid-Atlantic Bight (VIMS)

Characterization of Nursery Habitats Used by Black Sea Bass and Summer Flounder in Chesapeake Bay and the Coastal Lagoons (VIMS)

Examining Movement Ecology & Habitat Utilization of Black Sea Bass in Chesapeake Bay Using Telemetry Techniques (Coonamessett Farm Foundation)

Regional Fish Habitat Assessments in the Atlantic

Tools for Habitat Prioritization

Chesapeake Bay Fish Habitat Assessment, a NOAA and USGS collaborative effort led by the Fisheries GIT, was presented by project lead A.K. Leight (NOAA). The Chesapeake assessment will use a data-driven approach including biological, stressor, and habitat data at the best available spatial resolution, building from the national-level assessment. A GIT-funded contractor, Tetra Tech, recently began work to inventory metadata and conduct preliminary analyses, to inform pilot studies in 2020, and later, the full Chesapeake Bay Fish Habitat assessment. The end product will guide conservation and restoration for the Chesapeake Bay watershed, including land use planning and BMPs. The project team is using stakeholder surveys to guide efforts and coordinating with other assessments.

The Atlantic Coast Fish Habitat Partnership (ACFHP) Northeast Assessment is led by ACFHP through Atlantic States Marine Fisheries Commission (ASMFC), was presented by Lisa Havel. Focused on prioritization of diadromous and estuarine-dependent fish habitat, the Northeast assessment covers Maine to Virginia, including the Chesapeake Bay. The work will focus on scoring existing data layers to identify project priority areas for riverine, shellfish beds, SAV, and tidal vegetation habitat types. The final product is expected by December 2019, and will help ACFHP and partners identify where best to invest future project funds.

The Northeast Regional Marine Fish Habitat Assessment, led by Mid-Atlantic Fishery Management Council (MAFMC) and others including NOAA and ACFHP, was presented by Jessica Coakley (MAFMC). The goal of the three-year assessment, covering North Carolina to Maine, is

"to describe and characterize estuarine, coastal, and offshore fish habitat distribution, abundance, and quality using a partnership driven approach."
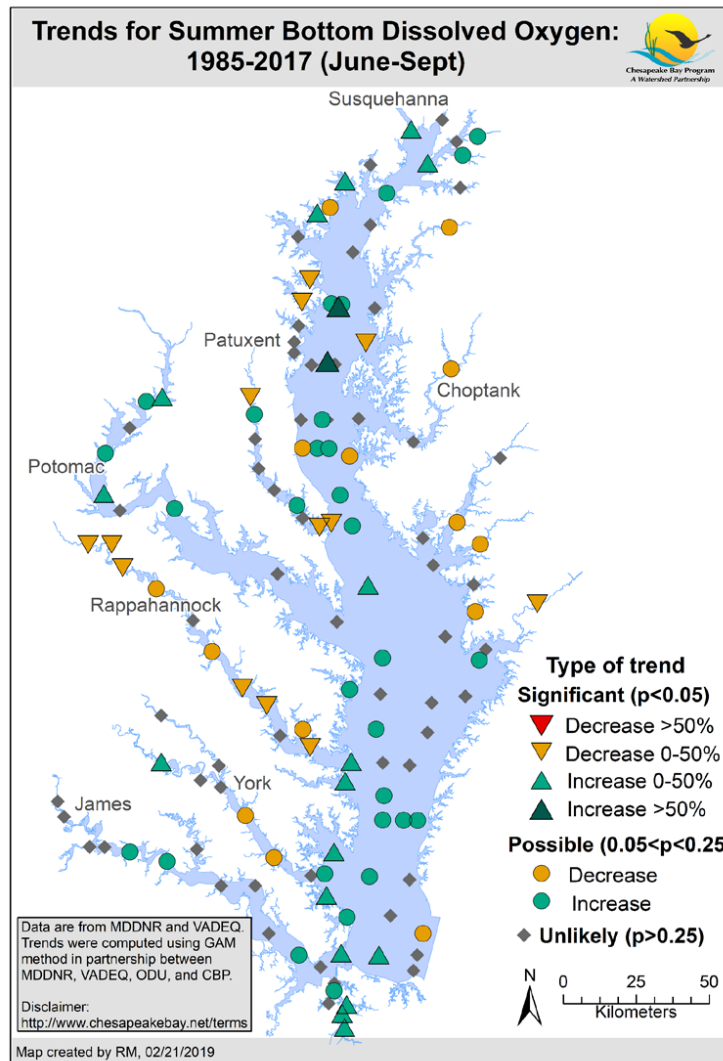
Another effort led by NOAA Fisheries, the Habitat Climate Vulnerabilty Assessment, will use expert opinion process and scoring rubrics to evaluate vulnerability (exposure and sensitivity) of key habitats to climate stressors. Each of these assessments contributes to better habitat science.

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Water Quality, Habitat, and Fisheries

Trends in Chesapeake Bay Tidal Water Quality

Rebecca Murphy (UMCES) and Jeni Keisman (USGS) presented on the long-term coordinated water-quality monitoring efforts in the Chesapeake Bay, tracking changes in nutrients, chlorophyll-a, dissolved oxygen, secchi depth, salinity, temperature, and other environmental variables. Using generalized additive models (GAMs), the Tidal Trends Analysis Team produces visual tools showing change over time (**Example:** map of Summer Bottom DO). Annually produced trends maps can illuminate the site-specific and Bay-wide process for seasonal and longer-term periods. The Fisheries GIT expects that these data products will be useful for better understanding historical changes in water quality in relationship to habitat change and patterns in fish distribution.

Trends for Summer Bottom Dissolved Oxygen: 1985-2017 (June-Sept)

Type of trend
Significant (p<0.05)
- ▼ Decrease >50%
- ▼ Decrease 0-50%
- ▲ Increase 0-50%
- ▲ Increase >50%

Possible (0.05<p<0.25)
- ● Decrease
- ● Increase
- ◆ Unlikely (p>0.25)

Data are from MDDNR and VADEQ. Trends were computed using GAM method in partnership between MDDNR, VADEQ, ODU, and CBP.

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Map created by RM, 02/21/2019

Fish Habitat Action Team

Communications Strategy

The Fish Habitat Action Team (FHAT) has identified communication with partners as a challenge to success, and is working to develop a communications strategy focused on fish habitat stressors and the economic value of fisheries and fish habitat on a local level. FHAT Coordinator Gina Hunt (MD DNR) shared an outline of the communications strategy, with an example factsheet showing socioeconomic benefits from the Dorchester County fishing economy.

Living Shorelines

Hardened shorelines have been identified as priority stressors to fish habitat. The Fish Habitat Action Team is interested in developing communications messaging about living shorelines uses and benefits to promote using a nature-based alternative to hardened shorelines. If selected for FY2019 funding, the project would build on several previous GIT-funded projects related to living shoreline project design, social marketing to improve shoreline management, and shoreline condition threshold.

Fish Movements in a Changing Chesapeake

Tom Parham (MD DNR) shared examples from Maryland's Click Before You Cast program, which aims to assess Bay conditions for priority species. Through a weekly forecast for fishers, Click Before You Cast provides online resources to catch more fish based on the preferred environmental conditions and physical tolerances from Maryland Tidal Water Quality Monitoring, satellites, NOAA CBIBS buoys, and other available sources.

For example, a combination of poor habitat conditions in deep waters and less availability of bottom-dwelling prey (polychetes, spot, and croaker) may be related to changes in striped bass movement observed leaving the Potomac River early. System-level changes can also be considered, with climate variability impacting hypoxia dynamics, aggregating fish. Maryland DNR's work shows that fish distribution is closely tied to short- and long-term changes in Chesapeake Bay conditions.

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Oysters

Selection of the 10th Tributary for Restoration

The Oyster Advisory Committee recommended the Manokin River as the tenth tributary to meet the oyster restoration. The **endorsement by the Fisheries GIT Executive Committee** makes progress toward the oyster outcome goal: Restore oyster reefs in 10 tributaries of the Chesapeake Bay by 2025.
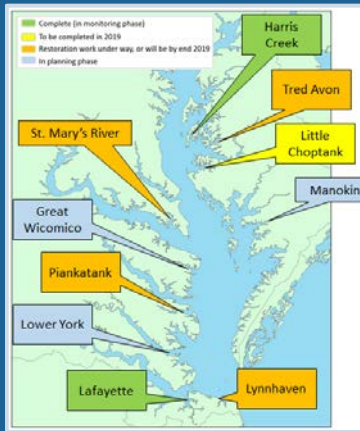
The low mortality rate and consistent annual spatset in the Manokin were key factors of its selection. Recent patent tong surveys indicate that there may be oyster reefs that already meet the restoration metrics. Construction is expected to begin in 2020, and planning is under way with the Maryland Oyster Workgroup. Restoration is proposed to end in 2024 with monitoring and assessment of reseeding beginning in 2025.

"This is a first-time connection between a living resource in the water, TMDL requirement, and habitat… Having these planning targets [included in the WIPs] at this high profile time is important... Linking the crediting scheme to oyster reefs and thinking about both aquaculture and restoration could be a turning point in working with different administrations and could really become a game changer for oyster recovery."

Sean Corson, Fisheries GIT Chair, NOAA Chesapeake Bay Office

Oysters as Best Management Practices

Jeff Cornwell, UMCES researcher and Oyster Expert Panel chair, presented the results of NCBO-funded ORES research projects that quanitfied the removal of nitrogen and phosphorus from the water column by oysters. Data from these projects were used to inform planning estimates as policy is being developed to help jurisdictions receive TMDL credit under the Oyster Reef Interim BMP.

The majority of Executive Committee members endorsed the estimates for use in the Oyster Interim Best Management Practice.

Oyster aquaculture has been established as a BMP. Oyster tissue contains nitrogen and phosphorus, so these nutrients are removed from the system during harvest. Estimating the tissue on reefs requires site-specific assessments of reefs to
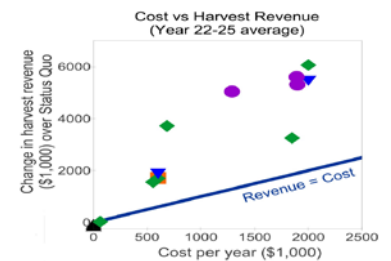
Cost-effective methods to determine the site-specific numbers require futher consideration. Nitrogen and phosphorus removal rates are affected by biomass but thresholds have been noted in this research.

"Live oyster tissue and shell biomass on average remove **57 lbs N per year by denitrification** and **24 lbs N per year by assimilation**."

Seasonal variation suggests that 57 days may be creditable. These numbers should only be used as planning estimates at this stage until the next steps for site evaluation are completed. A final report will be available in August and will be useful in models to determine the credits that could be integrated into Phase III Watershed Implementation Plans.

Oyster Futures

Elizabeth North presented the consensus solution process used by OysterFutures that brings stakeholders, scientists, and managers together to make recommendations to government. Using a computer model that included scientific and stakeholder knowledge allowed the group to assess the policy options and forecast outcomes.
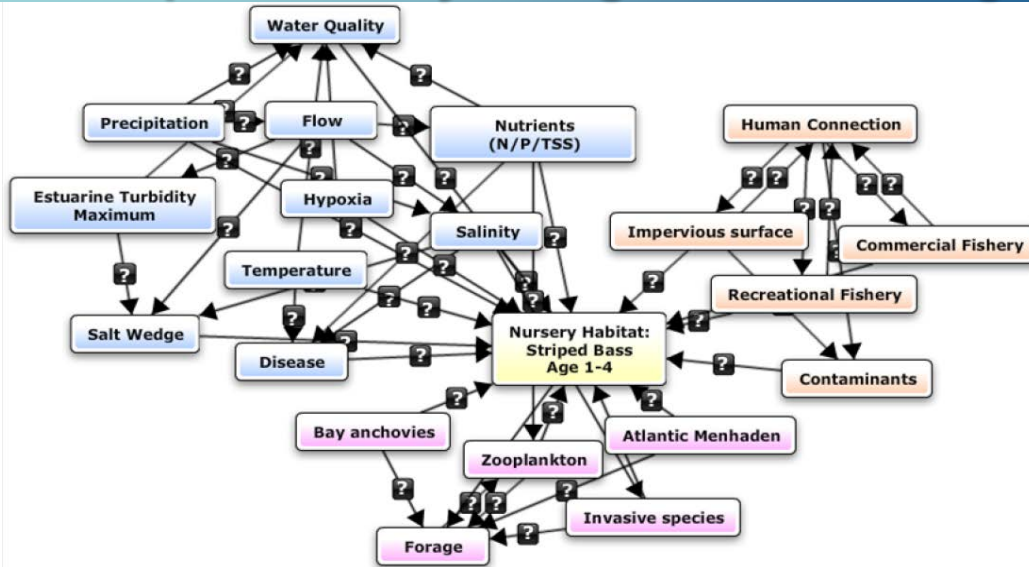

In the simulations, management options had a stronger effect on harvest than oyster populations. Most strong positive benefits were not realized for 10 years, but combined options had the best overall performance.

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Striped Bass Nursery Habitat

NCBO intern and UMCES-IMET PhD student, Shadaesha Green, introduced a project proposal to futher understand the condition of nursery habitat for juvenile striped bass (age 1-4) in the Chesapeake Bay that support recruitment and survival for the adult population. She has drafted a conceptual model that identifies stressors that could become indicators or metrics for habitat suitability and resilience following further research. Habitat assessments could determine historical trends, areas, and conditions of nursery habitat for striped bass.

Outcomes of this project include estimates or reference points of juvenile striped bass habitat condition and potentially carrying capacity.

The draft conceptual model (above) is based on a single species brief from Maryland Sea Grant Ecosystem Based Fishery Management, which has undergone further development through review of current literature and conversations with experts.

The Executive Committee endorsed this as the first priority project for GIT funding.

Effects of Altered Shorelines

Shoreline armoring has become common practice as homeowners protect their land from erosion, but research has demonstrated it has negative effects on habitats and fish.

A GIT-funded project was awarded to Virginia Institute of Marine Science (VIMS) researchers to quantify threshold values of shoreline condition at which forage quality is compromised.

Troy Tuckey and Mary Fabrizio are using a sub-estuary approach focused on the York River. Results are mixed, showing that forage quality metrics vary by fish species and that shoreline amoring was not correlated to relative abundance.

Rochelle Seitz's team is researching shoreline threshold effects from a Bay-wide approach. She observed declining linear relationships in crab with increasing shoreline development, but a threshold is not defined. Other species' thresholds ranged from 10% to 30% shoreline development, with a mean of 17%. The team will continue working to develop key messages for results.

Living Shorelines Outreach

Gina Hunt (MD DNR) presented a proposal to develop educational content about the benefits of living shorelines for landowners in alignment with the Sustainable Fisheries GIT and Vital Habitats GIT goals. This information aims to increase awareness in coastal communities as they look for shoreline erosion control options. An evaluation of the materials currently available to the public indicate that the information on this topic is not easily accessible to private landowners.

Communications would focus on:

- ecological impacts of hardened shorelines
- benefits of nature-based approaches
- permitting pathways for living shorelines specific to Maryland and Virginia
- success stories and examples, informed by GIT-funded social marketing research

The Executive Committee endorsed this as the second priority project for CBP funding.

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Fisheries GIT Updates

Thank You!

Thank you to all the presenters, facilitators, members, and attendees for your active engagement and participation in the June 2019 meeting!

Adaptive Management

• **What is the Strategic Review System?**

The Strategy Review System (SRS) was created to help the Chesapeake Bay Program apply the adaptive management decision-making framework to its work toward the Chesapeake Bay Watershed Agreement. Goal Implementation Teams (GITs) developed Management Strategies for the outcomes that explain how the outcomes are to be accomplished and how the progress will be monitored, assessed, and reported. The Strategy Review System is the process of adaptively managing and implementing the Management Strategies and their long-term goals through short-term action. To learn more about the Strategy Review System, visit ChesapeakeDecisions.

• **What is my role in adaptive management for the Fisheries GIT?**

GIT members serving on workgroups and action teams will be asked to provide feedback during meetings to help focus actions and make sure we are on the right track for the upcoming two-year cycle to achieve outcomes.

Upcoming Meetings

July 30: GIT Chairs Funding Decision Meeting
See information on FY2019 GIT funding process and past projects.

August 15: Fish Habitat outcome presents to Management Board
First outcome for Adaptive Management review in 2019-2021 cycle.

August 21: Forage Action Team meeting
Conference call to review past progress and determine next steps for developing a forage indicator.

August 27: Invasive Catfish Workgroup in-person meeting
Given the sense of urgency at June meeting, the Invasive Catfish Workgroup will meet in person to determine next steps and assign actions with expanded membership.

October 7: Joint CBSAC and Executive Committee meeting
One of the June meeting follow up actions is to convene CBSAC and Fisheries GIT Executive Committee for decision making related to blue crab stock assessment and science needs.

November 14: Blue Crab, Oysters, Forage outcomes present to Management Board
Remaining outcomes for Adaptive Management review in 2019-2021.

December TBD: Next In-Person Fisheries GIT Biannual Meeting
Tentative location in Baltimore, MD.

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