Sustainable Fisheries Goal Implementation Team Meeting Summary

Winter 2021

Chesapeake Bay Program
Science. Restoration. Partnership.

Purpose of the Sustainable Fisheries Goal Implementation Team and Our Biannual Meeting

- Deliver emerging science and improve cross-jurisdictional collaboration to improve fishery management decisions
- Lead forums that bring the management and science communities together to learn about the latest fisheries and habitat science, discuss management implications, identify new science priorities, and identify funding opportunities
- Learn more about the Sustainable Fisheries Goal Implementation Team (Fisheries GIT)

Our Team and Workgroups

GIT Staff:

- Chair: Sean Corson (NOAA Chesapeake Bay Office)
- Vice Chair: Marty Gary (Potomac River Fisheries Commission)
- Coordinator: Bruce Vogt (NOAA Chesapeake Bay Office)
- Staffers: Mandy Bromilow (NOAA) & Justin Shapiro (CRC/NOAA)

Workgroup Contacts:

- Chesapeake Bay Stock Assessment Committee (Glenn Davis, MDNR)
- Fish Habitat Action Team (Gina Hunt, MDNR)
- Maryland and Virginia Oyster Interagency Teams (Stephanie Westby, NOAA/Andrew Larkin, NOAA)
- Forage Action Team (Mandy Bromilow, NOAA)
- Invasive Catfish Workgroup (Justin Shapiro, NOAA)

Contents

Day 1: Workgroup Updates and Accomplishments

Day 1 focused on progress toward Fisheries Goal Team outcomes and priorities. Topics covered included oyster restoration accomplishments, invasive catfish management strategy, forage fish indicator development plan, updated blue crab reference points, and fish habitat actions. These presentations represent the backbone of our goals as spelled out in the Chesapeake Bay Watershed Agreement.

Oyster Restoration: Progress in Maryland and Virginia

Presenters: Stephanie Westby (NOAA), Andrew Button (VMRC)

Progress toward 10 restored tributaries: All ten tributaries have completed restoration blueprints as of 2020. Of those, three are restored (Lafayette, Little Choptank, Harris Creek), five are currently being restored (Tred Avon, Great Wicomico, Piankatank, Lower York, Lynnhaven), and two more begin restoration in 2021 (St. Mary's, Manokin). 1,095 acres (~60% of 2025 goal) have been restored between Maryland and Virginia. A bonus 11th tributary has been restored in the Eastern Branch of Virginia's Elizabeth River.

Oyster Restoration Highlights 2020

Maryland reefs produced a great natural spat set in 2020

Despite COVID restrictions, restoration stayed on-target

Virginia announced $10 million in funding specifically allocated toward oyster restoration in the Chesapeake Bay

Monitoring of 3- and 6-year-old restored reefs indicate success metrics are being met or exceeded

Click on the video link at right to see restoration success in the Little Choptank River

Next Steps: Continue implementing reef construction to complete all tributary blueprints and monitor completed projects.

Annual updates from Maryland and Virginia will be posted on the Oyster Interagency Page.

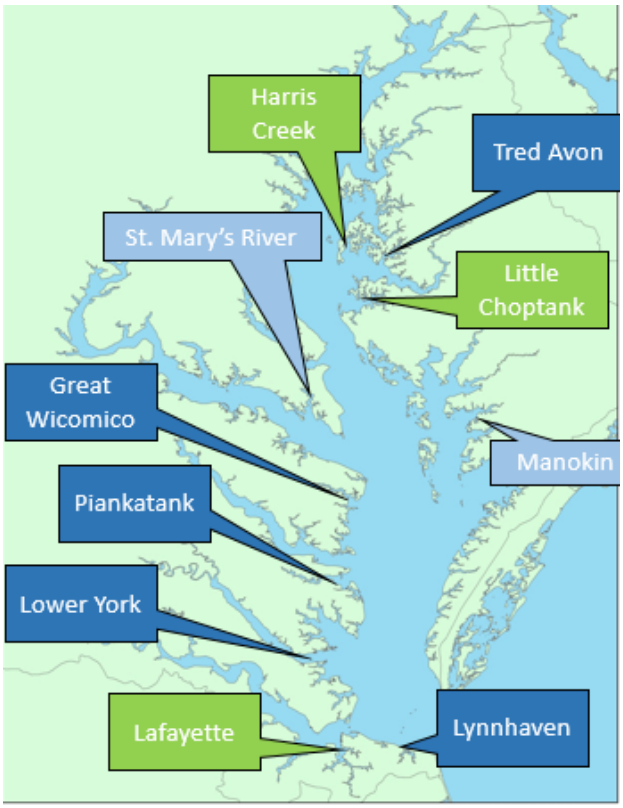


Figure 1: Map of tributary restoration around the Bay (Stephanie Westby, NOAA)

Invasive Catfish Management: Strategy and Population Modeling

Presenters: Mandy Bromilow (NOAA), Corbin Hilling (University of Toledo)

Invasive Catfish Management Strategy: This diverse, multisector workgroup has established four guiding management goals. These approaches will be overseen by recently established subcommittees.

- Approach #1: Improve public awareness through outreach and marketing campaigns
- Approach #2: Remove processing barriers
- Approach #3: Conduct and synthesize scientific research
- Approach #4: Develop tributary-specific management

Blue Catfish Population Modeling:

Size-based stock assessment model for monitoring blue catfish (James River): Results from this model estimated an abundance of 5.9 million catfish in the James River in 2016 (90% CI: 2.3 – 14.6 million). In its current state, this model provides a good starting point for population assessments and will help to identify key data gaps. Increased monitoring will be very important in determining how the population changes over time.

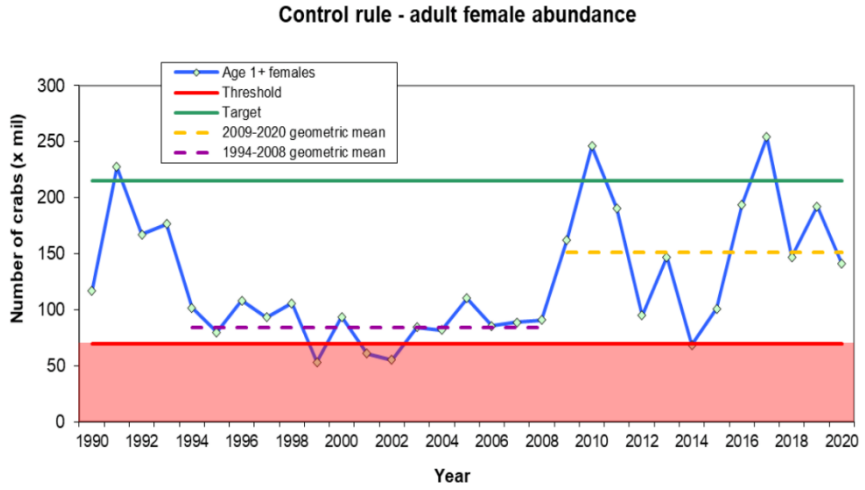

Photo: Matt Roth, Chesapeake Bay Program

Evaluating tradeoffs from management intervention in the James River: This evaluation was conducted using results from the above population modeling. Tradeoffs were evaluated by looking at four measures: harvest, abundance, predation, and large fish. Key takeaways from this evaluation included: minimum harvest length limits (45 cm) resulted in the best harvest and abundance; a 25-60 cm harvest slot limit resulted in the best opportunities for trophy fishing; no harvest length limit appeared to be best for limiting predation of native alosines; and controlling small fish is important for reducing overall abundance. Next steps include establishing specific management objectives and considering ecosystem modeling that considers factors in addition to harvest controls.

Blue Crab Management: Updates from the Chesapeake Bay Stock Assessment Committee

Presenter: Glenn Davis (MDNR)

The Chesapeake Bay Stock Assessment Committee (CBSAC) recently approved updated biological reference points (BRPs) for the (female) blue crab population. In 2017, MDNR conducted an update to the 2011 stock assessment using new data through 2016 (landings) and 2017 (abundance), resulting in slight adjustments to abundance and exploitation reference points. These resulting BRPs are less conservative estimates, but do not represent a significant change. The stock is still not overfished and overfishing is not occurring. The Fisheries Executive Committee and Stock Assessment Committee were in consensus that new reference points represented the best available science and voted to adopt them in October 2020.



Stock Assessment	Female Abundance (Age 1+) (millions)		Female Exploitation Rate (Age 0+)	
	Target	Threshold	Target	Threshold
2011	215	70	25.5%	34%
2017	196	72	28%	37%

Figure 2: Female Blue Crab Abundance and Updated Blue Crab Biological Reference Points

Fish Habitat: Updates from the Action Team

Presenter: Gina Hunt (MDNR)

The Fish Habitat Action Team (FHAT) is involved with local government workshop products highlighting the benefits of clean water and fisheries on the economy (Figure 3).

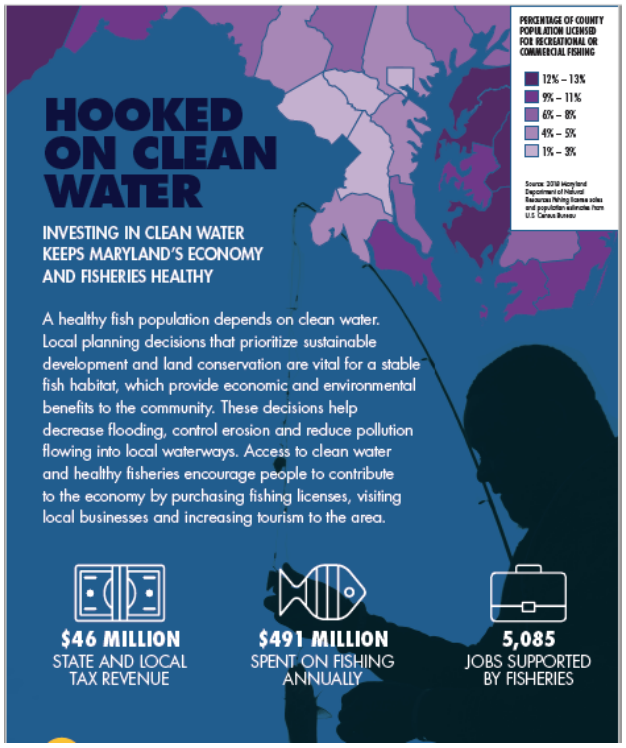


Figure 3: Chesapeake Bay Program Local Leadership Pamphlet: MD Hooked on Clean Water

The FHAT is coordinating with the Bay Program GIS team to develop a percent hardened shoreline threshold map for Virginia and Maryland. This is based off of research from VIMS associating 10-30% hardened shorelines as a threshold for lower species abundances. This inventory and GIS mapping layer is complete for Virginia and under development for Maryland. This layer can be used by local decision makers to evaluate shoreline development in the context of maintaining fish habitat and associated benefits.

In conjunction with other Bay Program workgroups, a recent project, Social Marketing to Improve Shoreline Management, was completed. By surveying shoreline property owners, researchers found that homeowners respond most strongly to actions of neighbors, and found permitting to be the greatest barrier to action. This final report recommends a tiered approach to behavior change, by first targeting owners to keep existing natural areas intact. A Fish Habitat project, funded by the Chesapeake Bay Trust, will build on these findings by establishing a communications and guidance program for shoreline owners. That project is planned to kick off in February 2021.

Forage Fish: Development of the Forage Indicators

Presenter: Mandy Bromilow (NOAA)

Tier 1: Abundance	Species of Interest
Benthic Invertebrates	Polychaetes
Demersal Finfishes	Atlantic croaker
Pelagic Finfishes	Bay anchovy Atlantic menhaden
Tier 2: Habitat and Environmental Factors	**Species of Interest**
Springtime Warming	Bay anchovy Polychaetes
Habitat Suitability Index	Bay anchovy
Hardened Shorelines	Juvenile blue crabs
Tier 3: Predator Consumption	**Species of Interest**
Diet Profiles	Striped bass

Figure 4: Tiered Forage Indicator Approach (Mandy Bromilow, NOAA)

The Forage Action Team has recently published its Forage Indicator Development Plan, laying a framework for the build-out of various indicators tracking the Bay's forage abundance. These indicators are sorted into three tiers: forage abundance, quantifying habitat and environmental relationships, and predator-prey consumption. Within these three tiers are seven total indicators, each being developed under the context of important Bay forage species. On the next page, read about the Habitat Suitability Index that was just completed. Other indicators are funded and under development.

Day 2: Ongoing Fish and Habitat Science

This group of presentations brought focus to ongoing research answering questions related to forage and fish habitat suitability for species such as bay anchovy, summer flounder, and striped bass. The team also heard updates on the progress of the Fish Habitat Pilot Assessment, a priority of the Fish Habitat Action Team.

Habitat Suitability Index: Modeling for Four Key Forage Species

Presenter: Mary Fabrizio (VIMS)

This model was focused on four forage species; bay anchovy, juvenile spot, juvenile weakfish, and juvenile spotted hake. Nine environmental variables (including salinity and habitat) were used as model inputs, answering questions about the distribution/abundance of forage species and seasonal variation in forage production. Results showed a correlation between habitat extent and forage abundance. Also, seasonal variability was more pronounced than annual variability.

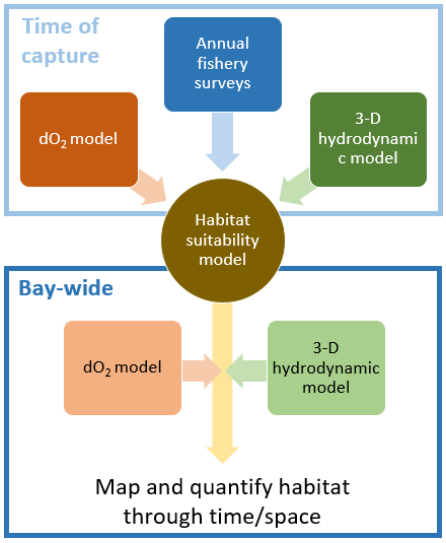


Figure 5: Modeling approach to quantify habitat suitability (Mary Fabrizio, VIMS)

Quantifying Shallow Tributary Forage Habitat for Striped Bass and Summer Flounder

Presenter: Matt Ogburn (SERC)

Striped Bass: This project looks to quantify the quality of shallow tributary habitats for young-of-year (YOY) striped bass based on forage potential (diet data). Gut analysis is being conducted, including traditional morphological analysis as well as genetic barcoding, providing more specifics about individual species presence. Initial genetic analysis show varied diet compositions, including key shallow tributary forage species. Gut contents also varied by tributary, maybe due to salinity or habitat differences.

Summer Flounder: This research aims to quantify shallow tributaries as foraging habitats and nurseries for YOY summer flounder in the Bay. Diet samples are ongoing and will be reported out similar to the striped bass results described above. Additional work looking at catch per unit effort highlighted spatial variation by tributary and by season, showing highest abundance numbers in the Tangier and Pocomoke sounds (and declining abundance at lower salinity sites). Overall, YOY abundance is stable or increasing in contrast to the coast-wide recruitment index.

Habitat Utilization and Ecosystem Connectivity in the Mid-Atlantic Bight

Presenter: Adena Schonfeld (VIMS)

Disproportionate increases in ocean heat content in the Atlantic Ocean is leading to increased Chesapeake Bay hypoxic events and a shift of marine species poleward. When looking at adult summer flounder, the stock is not overfished and overfishing is not occurring, but abundance in the Bay has declined. This phenomena leads to this research, aiming to quantify habitat utilization of summer flounder in the Bay by examining a number of abiotic habitat variables. Results showed a bimodal relationship with temperature, leading the investigators to believe that hypoxic events in cooler, deeper waters may be forcing flounder to warmer, shallower waters. Next steps include further investigation into the relationship between dissolved oxygen, temperature, flounder abundance, and other drivers of poleward shifts.

Striped Bass Nursery Habitat Suitability Assessment

Presenter: Rachel Dixon (VIMS)

This Fisheries GIT-funded research aims to understand what nursery conditions support the recruitment of striped bass in the Bay, and will specifically look into annual variability due to environmental conditions and the relationship between abundance and habitat extent. YOY and juvenile (age 1-4) striped bass will be examined. The model will use a similar framework to the habitat suitability index summarized above. Next steps will be to identify the most important factors driving relative abundance within habitats and to build a habitat suitability model from these variables. The team will work to establish threshold levels to classify habitat numbers as unsuitable, suitable, and optimal.

Regional Fish Habitat Assessment: Tidal and Non-tidal Updates

Presenters: AK Leight (NOAA, NCCOS), Steve Faulkner (USGS)

Tidal Framework: A 2018 STAC workshop underscored needs for additional habitat assessments in tidal and non-tidal waters, leading to a number of actions outlined under the Fish Habitat Outcome. This resulted in the Choptank Pilot Project as the assessment team's candidate tributary. Building off of this pilot, virtual workshops were hosted, aiming to obtain design, data, and applications feedback from technical experts. Many points of feedback were collected, but a reiterated theme was "*What question are we trying to answer?*" From here, the tidal assessment team will develop recommendations from workshop feedback and report findings to the FHAT.

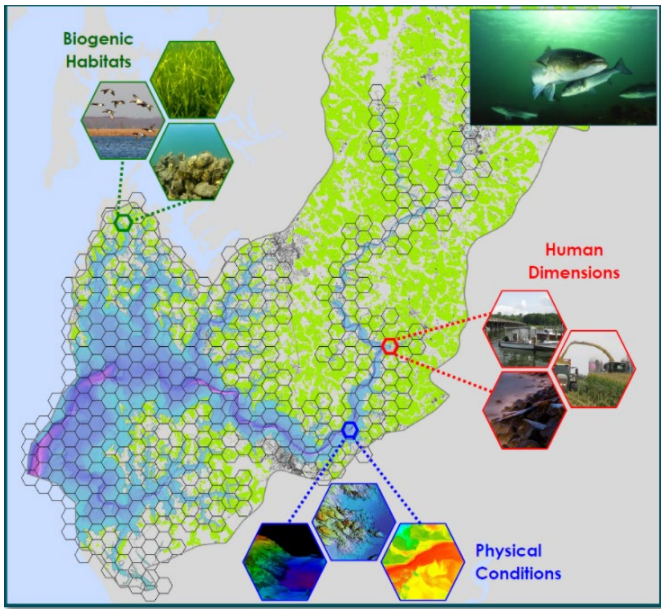


Figure 6: Tidal assessment framework conceptual map (AK Leight, NCCOS)

Non-tidal Framework: The non-tidal team began by evaluating the scales/resolution of a test area in the Shenandoah region, as mangers noted that finer scales are beneficial and relevant to decision-making (this allows visualization of much smaller streams). A key finding was that 11% of biological data was missing from coarser spatial data, as streams were being completely unaccounted for. From here, the team will work on the watershed-wide non-tidal portion of the assessment and will continue finalizing a species occurrence map for non-tidal portions of watershed. Next steps will include completing the watershed-wide assessment and coordinating its cross-GIT applications with other workgroups.

Linking the Assessments: The American eel pilot habitat assessment is being used as a context to develop an overlap between non-tidal and tidal frameworks. Combining linear stream segments and hexagonal tidal polygons proves to be an ongoing challenge being addressed by NCCOS and USGS.

Day 3: Observations in the Bay and Connections to Fisheries Management

Day 3 focused on highlighting connections between Bay observations and living resources management. We kicked off with developments surrounding the establishment of an acoustic telemetry array in the Chesapeake and a pilot approach to vertical hypoxia monitoring. We ended the presentations with a look at how ecosystem data is being streamlined in a context that is useful for resource managers. These presentations set up a discussion section asking participants to suggest applications of the observations and indices to management and conservation needs.

Developing a Chesapeake Bay Acoustic Telemetry Array: Deployment, Management, and Applications

Presenters: Kevin Schabow (NOAA), Kim Richie (SERC), Chuck Stence (MDNR)

Deployment: A series of acoustic telemetry receivers are being placed in the Chesapeake Bay, creating a backbone in key strategic locations. These receivers are important for tracking species and obtaining long-term data. 16 receivers will be deployed at the mouth of the Bay in spring 2021, and will be managed by VMRC. An additional five to six receivers are required to form a Bay Bridge array. These will be managed and deployed by MDNR. Finally, UMCES received a donation for receiver deployments at Cedar Point, forming a mid-Bay array (for spring 2021).

Data Management: Spatial data collected from these new arrays will be collected by SERC and cataloged into the Mid-Atlantic Telemetry Observation System (MATOS) and then into the Atlantic Cooperative Telemetry Network (ACT). This ACT database serves as a resource for scientists and managers and features work from more than 58 researchers and 657 receivers and includes 6 million individual animal detections to date.

Applications: An example of telemetry in action is MDNR's work tagging Atlantic sturgeon in the Nanticoke River. Tagging and tracking this small population provides important insights about upstream spawning locations and behavior of sturgeon. DNR is working with UMCES to utilize this data to develop spawning run estimates.

Figure 7: NCBO map of telemetry array sites

Hypoxia Monitoring in the Bay: Pilot Approach to Vertical Monitoring

Presenter: Peter Tango (USGS)

This pilot project aims to establish reliable, high-frequency point estimates of dissolved oxygen (DO) to improve our understanding of living resource relationships to Bay conditions. Traditional monitoring in the Chesapeake Bay is designed for annual and seasonal insight, but what about short-term dynamic events in the Bay (e.g., hypoxic summer dead zones) and resulting fisheries insights to be gained? It was these questions that led to a 2020 GIT-funded project to pilot a portable, cost-effective sensor array for open Bay, real-time water quality data collection—specifically, vertical profiles of dissolved oxygen at 10-minute intervals (as opposed to traditional profiles providing a DO reading every 14 days). Readings at these fine scales are critical for understanding habitat utilization and effects of environmental conditions on fish movement/habitat use. Next steps include considering sensor distribution and sampling design. Existing research shows that two stations will provide relevant DO data, but what locations are the best choice? Monitoring and modeling need to be integrated to tackle water quality standards assessments at all required temporal scales (ranging from instantaneous minimums to 30-day means).

Population Abundance Estimates of Key Species in the Chesapeake Bay – Exploring Effects from the Environment

Presenter: Mike Wilberg (UMCES)

The Bay community is in need of reliable species abundance estimates and long-term data sets in order to examine interactions that drive community dynamics. Other than blue crab, we do not have reliable yearly numbers of key species. The goal of this study is to develop population estimates for ecologically and economically important species in the Bay over time, by first focusing on two species (one of which will be striped bass). New technologies in observation and modeling make this work more possible than ever. Studies will be conducted to estimate environmental drivers on population dynamics and to improve understanding of how fish in the Bay respond to habitat shifts due to climate change, land use changes, and nutrient impacts. This current pilot, funded by NCBO, will take two to three years. A major goal of this long-term study is to make all estimates publicly available to facilitate other research.

NOAA's Mid-Atlantic State of the Ecosystem Report (SOE)

Presenter: Sarah Gaichas (NOAA Northeast Fisheries Science Center)

This product aims to improve and streamline ecosystem information and synthesis for fishery managers by linking ecosystem indicators to management objectives. This short, nontechnical report synthesizes the big picture status of the mid-Atlantic and relates takeaways to management implications. The report includes items such as ecosystem energy removed, commercial fishing engagement, recreational catch effort, and aggregated movement of fish biomass. The 2020 Chesapeake-specific narrative highlights how high precipitation affected salinity, oysters, and invasive catfish distribution. There is a sustained interest in estuarine water quality resource impacts as well as nearshore habitat conditions. NCBO and the Fisheries GIT are engaged in providing bay-specific narratives for the 2021 report and the Mid-Atlantic Fisheries Management Council uses this product to help guide its ecosystem approach to fisheries management. Any suggestions for Chesapeake-specific input are more than welcome.

Figure 8: Summary page of 2020 SOE report

Takeaways from Group Discussion: Connecting Living Resources to Fisheries Management

Question: Given what we've heard about monitoring and modeling capabilities, and the habitat information we have about forage (bay anchovy, juvenile spot), striped bass and summer flounder…

What are the applications of telemetry and hypoxia measurements to fisheries management?

- Prioritization of habitat conservation/restoration areas
- Fisheries management decisions such as closures, advisories, and location-based harvest limits
- Better quantifying fish habitat use, distribution, and abundance (by observing behavioral avoidance, environmental drivers)
- Using sensors to manage water quality and establish criteria thresholds

What management questions can the habitat suitability index and stock assessment answer?

- Pushing for the general theme of ecosystem-based fisheries management
- Determine the impacts of management actions on population dynamics
- Provide context for recruitment variability that is coupled with management strategy evaluation
- Establishing sustainable thresholds for commercial forage fisheries by better understanding abundance/health of species. (e.g., menhaden)
- Integrating habitat suitability for summer flounder into the State of the Ecosystem Report to guide MAFMC priorities
- Determine areas needing more protection and less harvest pressure
- Quantifying striped bass spawning habitat availability and climate change effects on spawning success
- Understanding climate impacts on the distribution of Bay species (e.g., regime shifts, abundance shifts)
- Helping to inform about impacts of invasive species on fisheries resources

Are there other priority topics or species that should be considered?

- Increased shallow-water surveys and understanding of nearshore habitat use
- Assessment of existing surveys to develop forage indices
- Harmful algal blooms
- Penaeids (becoming more abundant in Virginia)
- Mysids
- Menhaden
- Alosines (shad, herrings)
- Blue crab
- Dolphins
- Spot
- Bay anchovy
- Sharks
- Zooplankton
- Sea nettles (prey on fish larvae)
- Largemouth bass

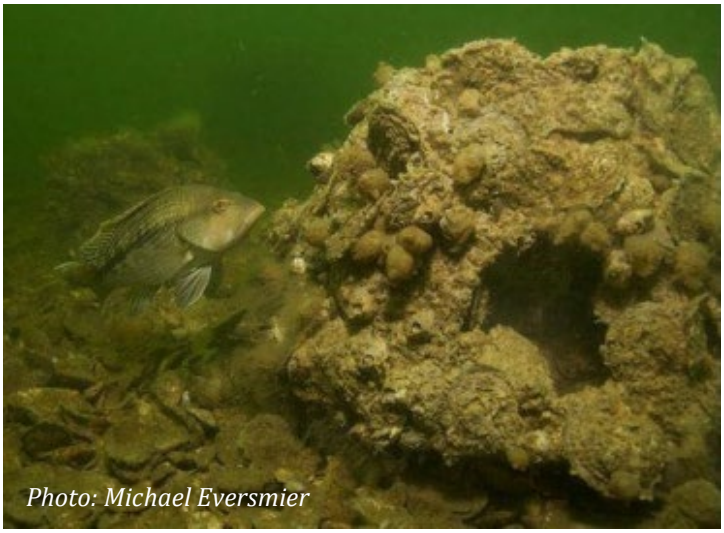


Photo: Michael Eversmier

Appendix A: Other Updates from Around the Watershed

The Chesapeake Bay Program partnership ranges far and wide across the watershed. Even with 15+ presentations over the duration of the meeting, we were not able to hear about all of the exciting and applicable projects from across the Bay. Below are some other highlights.

Hog Island Shoreline Habitat Project

Contact: Andrew Larkin (NOAA)

In late December, the Middle Peninsula Public Access Authority (MPPAA) finalized the design for the "Hog Island Shore and Habitat Restoration Living Shoreline Project." This project, if implementation funding can be secured, would protect Hog Island, a rapidly eroding island near the confluence of the York River and Mobjack Bay in Virginia. The island currently protects two aquaculture operations, and a small community, from coastal storm surges. Its shoreline, marshes, and adjacent SAV beds provide habitat for fish, shellfish, and waterfowl. The $40,000 design for the project was funded by the NOAA Chesapeake Bay Office, through the Virginia Coastal Zone Management Program. MPPAA contracted with VIMS Shoreline Studies Program to complete the design.

Morgan State's Patuxent Environmental and Aquatic Research Laboratory (PEARL)

Contact: Tom Ihde (PEARL)

Economic impact analysis of oyster restoration in Maryland's Choptank Habitat Focus Area:

- PEARL recently submitted a manuscript on study results for publication in *Frontiers in Marine Science* titled "Informing Oyster Restoration Management Policy with a Coupled Ecological-Economic Model" as part of a special issue on "Using Ecological Models to Support and Shape Environmental Policy Decisions." The paper is currently in review.
- A NOAA Technical Memo on the study/results was published several months back. "Estimating Ecological Benefits and Socioeconomic Impacts from Oyster Reef Restoration in the Choptank River Complex, Chesapeake Bay" is now available for download.
- Working with undergraduate technicians from the College of Southern Maryland, PEARL has recently completed a new data integration and analysis of the George Abbe Blue Crab pot study. Examination of female condition data that has previously received relatively little attention over the 50+ years of the survey, documents how sponge crab (i.e., egg-bearing) occurrence has varied over time. Additional analyses are ongoing.

Vulnerability of Oyster Aquaculture and Restoration to Ocean Acidification

Contact: Marjorie Friedrichs (VIMS)

Coastal acidification and its associated costressors present a serious and credible threat to the success of both oyster aquaculture and restoration in the Chesapeake Bay. Recent research provides a clearer understanding of the physiological sensitivity of different economically and culturally valuable shellfish species to ocean acidification (OA), but we still lack a basic understanding of how vulnerability differs across the range of shellfish-reliant stakeholders, specifically participants in oyster aquaculture, the growers, watermen and coastal restoration managers. This basic knowledge gap motivates this proposed Regional Vulnerability Assessment (RVA) in the Chesapeake Bay, which aims to:

1. Assess the vulnerability of the oyster aquaculture industry and oyster restoration to OA and other costressors, and
2. Produce the information required by regional communities to aid in adaptation to these stressors.

In achieving these goals, we will better understand which shellfish stakeholders will be able to successfully adapt, which will seek alternative livelihoods, and what specifically causes the difference between these two disparate outcomes. We will build upon our previous Chesapeake Bay Option 2 RVA grant by using an approach that combines a sociological analysis with a high resolution OA-oyster modeling system to develop an RVA for this region. Specifically, this proposal frames OA as a problem of social-ecological resilience. This social-ecological systems framework considers resource systems, such as oyster aquaculture, as complex, adaptive systems that are generally stable, but when shocked by disturbances (e.g., OA) can rapidly shift from one state to the next. Our five project objectives are:

1. Identify locations of oyster aquaculture leases, public harvest sites, and sites of existing and future restoration activities *where* critical OA thresholds for oysters will be routinely exceeded.
2. Identify the approximate year *when* critical OA thresholds will be routinely exceeded at oyster aquaculture leases, public harvest sites, and sites of existing and future restoration activities.
3. Characterize effects of OA on the resilience of different types of aquaculture stakeholders.
4. Characterize *where* and *at what threshold of OA* do stakeholders *abandon* oyster reliance.
5. Identify assets available to enable adaptation to the impacts of OA for the most vulnerable.

The first two objectives will be achieved through the combination of data synthesis and simulations of OA exposure and oyster response using a high-resolution coupled physical biogeochemical-oyster modeling system. These scenarios will identify when and where specific critical OA thresholds will be passed. Social-science field campaigns will be undertaken each year, involving semistructured interviews and will include an expert mapping activity. Information from the interviews will be used to identify ecological and social thresholds, and capacity for adaptation. Using stakeholders' definitions of "success" and "abandonment," we will calibrate our coupled model to predict when the Chesapeake Bay reaches social-ecological OA thresholds. Throughout the project, we will coordinate with our Stakeholder Advisory Panel to ensure that the project's products are coproduced with a wide range of shellfish-reliant stakeholders. Project outputs and outcomes include web-based geovisualization with accompanying documentary footage that explains oyster health and OA risk in both technical and stakeholder-centered terms.

Updates from The Nature Conservancy (Virginia and Maryland)

Contact: Andy Lacatell (TNC)

TNC's Mid-Atlantic Fisheries Scientist, Kate Wilke, is working, through her seat on the ASMFC's Habitat Committee to help identify Fish Habitats of Concern for Commission-managed species. Fish Habitats of Concern are a subset of fish habitats that are particularly ecologically important, sensitive, vulnerable to development threats, and/or rare, which is the same criteria as federally designated HAPCs but necessarily/automatically have the legal protections as the federal counterpart. Kate also represents the Commonwealth of Virginia on the Mid-Atlantic Fishery Management Council and is working to improve management of recreational fisheries, among other Council initiatives.

On the offshore wind development front, TNC Spatial Ecologist, Marta Ribera and team are creating a visualization tool, building on spatial data from the Ocean Data Portals and NOAA's Ocean Reports that adds context to marine fish and habitat data to inform offshore ocean use.

The Nature Conservancy in Virginia also played a small role in the Piankatank River, funding $35,000 of oyster restoration work carried out by the Virginia Marine Resources Commission. TNC Virginia Chesapeake Bay Director Andy Lacatell, worked with VMRC to complete the grant. Additionally, TNC and Pew Charitable Trusts are working together to implement the SOAR program which has purchased and continues to purchase surplus oysters from growers in several states, from Maryland to Maine, to be used in oyster restoration projects. The SOAR program hopes to be able to expand into other states in 2021.

Chesapeake Bay Program's Plastic Pollution Action Team: Ecological Risk Assessment for Microplastics and Striped Bass

Contacts: Bob Murphy (Tetra Tech), Ryan Woodland (UMCES), Matt Robinson (DOEE)

Tetra Tech, working with the newly established Plastic Pollution Action Team, is currently refining an ecological risk assessment model for microplastics on Potomac River striped bass, with broad applicability across the Chesapeake Bay. The semi-quantitative model seeks to identify pathways for microplastics to enter the food chain for striped bass age classes 0-2, based on models developed by CBL-UMCES. Focus on this age class is because these are resident, nonmigratory individuals, and are expected to ingest microplastics only within the Potomac estuary during their natal time. Many unknowns are associated with the fate and transport of microplastics, leading to additional complexities and uncertainties related to considering exposures that may occur after age 2, when striped bass migrate to different geographic areas with variable hydrological conditions. While there is a paucity of data on microplastic ingestion by striped bass and their prey items, understanding trophic pathways and integrating studies of similar taxa can provide insight to the potential impacts of microplastics on striped bass populations and potential recruitment impacts. The conceptual model is currently being refined and will be finalized this spring. Results of this work will include the development of a science strategy for the Chesapeake Bay Program. This strategy will address important data gaps and identify opportunities for further research that will provide insight into the risk of microplastics in the Chesapeake Bay and its watershed.

Updates from the Chesapeake Bay Foundation

Contact: Chris Moore (CBF)

The Maryland Oyster Restoration Team planted ~14 million spat on shell in the Tred Avon River in support of the 10 tributaries goal and 500,000 oyster gardening oysters throughout Maryland.

CBF continues to collaborate with Northrop Grumman to develop remote and rapid assessment tools for oyster reef monitoring. We expect hand-off of sensors and software to take place in 2021. CBF, NCBO, and SERC are coconveners on a special session (submitted) on these efforts for the 2021 CERF conference in Richmond, Virginia.

CBF partnered with aquaculture members of the Chesapeake Oyster Alliance to adapt to challenges due COVID-19 to offer pop-up sales at local community events. Members of the public were able to buy fresh, locally-grown oysters at events throughout the Chesapeake Bay region.

CBF began a project on the Nansemond River to study various alternative substrates and shoreline protection techniques in partnership the Nansemond River Preservation Alliance.

CBF put our cutting-edge floating oyster restoration facility (also known as the "oyster barge") into full operation in 2020. Officially called the Prudence H. & Louis F. Ryan Mobile Oyster Restoration Center, the new facility sits atop two barges that travel to rivers where oyster restoration is taking place, increasing efficiency.

Despite switching to a contact-free program, CBF's 444 Virginia oyster gardeners returned 146,378 oysters. This year's oysters were planted on reefs in the Lynnhaven, Lafayette, Rappahannock, and York rivers, and on Virginia's Eastern Shore.

Appendix B: Membership and Public Attendance for Fisheries GIT Meeting

A.K. Leight (NOAA, NCCOS)
Adam Kenyon (VMRC)
Adena Schonfeld (VIMS)
Adrienne Kotula (CBC)
Alexa Kretsch (VMRC)
Alexis Park
Alicia Logalbo (USACE)
Allison Colden (CBF)
Allison Tracy UMBC)
Andrew Button (VMRC)
Andrew Larkin (NOAA, NCBO)
Andy Lacatell (TNC)
Ann Swanson (CBC)
Ben Landry (Ocean Fleet Services)
Bo Lusk (TNC)
Bob Murphy (Tetra Tech)
Breck Sullivan (CRC/CBP)
Brian Richardson (MDNR)
Bruce Vogt (NOAA, NCBO)
Bryan Chase (CBF)
Bryan King (DOEE)
Caitlyn Johnstone (Alliance for the CB)
Chris Adriance
Chris Guy (FWS)
Chris Moore (CBF)
Christine Densmore (USGS)
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Corbin Hilling (University of Toledo)
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Erik Zlokovitz (MDNR)
Ethan Simpson (VMRC)
Garrett Stewart (CRC/CBP)
Gary Shenk (USGS/CBP)
Genine McClair (MDNR)
Gina Hunt (MDNR)
Glenn Davis (MDNR)
Greg Casten (Pro Fish)
H. Ward Slacum (ORP)
Hank Liao (VMRC)
Henry Legett (SERC)
Jake Solyst (Alliance for the CB)
James Gartland (VIMS)
James Uphoff (DNR)
Jason Kahn (NOAA)
Jay Lazar (NOAA, NCBO)
Jodi Baxter (MDNR)
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Michael Wilberg (UMCES)
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Monty Deihl (Omega Protein)
Nancy Roth
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Pat Campfield (ASMFC)

Pat Geer (VMRC)
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