FishGIT Meeting Minutes
March 25 & 26, 2025

Sustainable Fisheries Goal Implementation Team Meeting: Spring 2025

Video Conference Information

Day 1
Tuesday, March 25 | 9:00am - 4:30pm
Video Link:
https://umces.webex.com/umces/j.php?MTID=m04f9fbf9ed74c65e6368a9c955d772a5
Meeting number: 2862 937 6395
Password: Z3h6ffQztM4
Join by phone: +1-408-418-9388 United States Toll
Access code: 286 293 76395

Day 2
Wednesday, March 26th | 9:00am - 2:30pm
Video Link:
https://umces.webex.com/umces/j.php?MTID=mb23cbd3035a8c6b3e2ca9d94ff051381
Meeting number: 2633 340 9677
Password: 92kVNU9tgMs
Join by phone: +1-408-418-9388 United States Toll
Access code: 263 334 09677

Location: Virtual
Date & Time: March 25th @ 9:00am - 4:30pm & March 26th @ 9:00am -2:30pm

General Info

Meeting goal: Reconvene Sustainable Fisheries GIT workgroups (Chesapeake Bay Stock Assessment Committee, MD & VA Oyster Restoration Interagency Teams, Forage Action Team, & Fish Habitat Action Team) and interested parties to discuss the most recent updates within Fish GIT outcomes and related science, as well as discuss outcome language for Beyond 2025.

Meeting objectives: Provide updates to workgroups, share relevant science updates, and receive feedback on language for each outcome.

Meeting Materials:
All meeting materials are posted on our calendar webpage.

Chesapeake Bay Program
Science. Restoration. Partnership.

Day 1: Tuesday, March 25, 2025

Attendees: Pat Geer (VMRC), A.K Leight (NOAA), Adam Kenyon (VMRC), Adrienne Kotula (CBC), Alexa Galvan (VMRC), Alexandra Fries (UMCES), Allison Colden (CBF), Allison Tracy (UMBC), Alyson Flynn (NCCF), Amanda Bevans (Morgan State), Amanda Small (MDNR), Andrew Button (VMRC), Andrew Larkin (NOAA), Angela Sowers (USACE), Angie Wei (UMCES), Aubrey Moore, Bailey Robertory (UMCES/ MD DNR), Benjamin Simon (GWU), Bob Beal (ASMFC), Branson Williams (MDNR), Brenda Stahl (Profish), Bruce Vogt (NOAA), Cathy Liu (UMD), Chris Jones (MDNR), Chris Moore (CBF), Christina Garvey (CRC/NOAA), Christina Shaner (CCCC/NOAA), Christopher Judy (MD DNR), Clint Morgeson (VDWR), Daniel Ryan (DC Fisheries Mgmt Fisheries & Wildlife), Doug Pirhalla (NOAA), Ed Houde (UMCES), Emily Hoyt (Morgan State), George O'Donnell (MDNR), Gina Hunt (MDNR), Glenn Davis (VA DOE), Hannah Nisonson (NOAA), Heather Lockwood (USACE), Heather Walsh (USGS), Ingrid Braun-Ricks (PRFC), Jack Brooks (CBSIA), Jack Buchanan (VIMS), John Kahn (NMFS), Jay Lazar (NOAA), Jeff Lerner (EPA), Jim Uphoff (MDNR), Joel Carr (USGS), Julia Fucci (CRC/NOAA), Julie Leucke (CBF), Kelly Somers (EPA R3), Ken Hyer (USGS), Kevin Du Bois (DOD), Kevin Schabow (NOAA), Kim Couranz (NOAA), Kinsey Tedford (ORP), Kristin Saunders (UMCES), Lew Linker (EPA), Lynn Fegley (MDNR), Mandy Bromilow (MDNR), Marek Topolski (MDNR), Marjy Friedrichs (VIMS), Mark Monaco (NOAA), Mike Wilberg (UMCES), Allison NG (EPA), Noah Tait (VIMS), Olivia Caretti (ORP), Patrick Campfield (ASMFC), Peg Brady (NOAA), Peter Tango (USGS), Rachel Dixon (VIMS), Randy Feris (Morgan State), Reba Carruth (IPC), Rochelle Seitz (VIMS), Rom Lipcius (VIMS), Ron Owens (PRFC), Ryan Walsh (JRA), Ryan Woodland (UMCES), Scott Newlin (DE DFW), Simen Kaalstad (ASMFC), Thomas Ihde (Morgan State), Tom O'Connell (USGS), Troy Tuckey (VIMS), Vaskar Nepal (WIU), Wilmelie Cruz Marrero (NOAA), Zach Martin (USACE), Stephanie Westby (NOAA)

Summary of Day 1:
Day 1 of the FishGIT meeting focused on information sharing of the latest programmatic and science related updates. A total of 14 presentations (focused on blue crab sustainability, oyster restoration, oyster abundance, and fish habitat) were shared with the group and provided context for where FishGIT outcomes currently stand as well as the current science that could help us achieve future goals in Beyond 2025.

9:00 am Welcome and Introductions (Agenda link **)**

Bruce starts off the meeting reflecting on the work the FishGIT & its partners have done so far. We are a leading voice in living resources in the Chesapeake Bay, and have realized success thanks to our leadership team and we hope to continue being a leading voice moving forward and hearing your thoughts on how we can do that in the coming days.

- *Think about what we have achieved, build what worked well into our next set of outcomes*
- *Take in new info- science, guiding principles, CESR report*

Acknowledgement of the people who got us where we are, all of our partners and staffers

Current outcomes:

- *Blue crab: high functioning team - science workshops, advisory reports, new stock assessment*
- *Oyster restoration: Leading example of successful outcome - established success metrics, quantified ecosystem services and economic impact, on track to finish 10 tributaries*
- *Fish habitat: Focus developing more science to understand how fish habitat is changing over time and how it contributes to fish health in the Bay. Data inventory, fish habitat assessments, habitat thresholds, monitoring (telemetry gates), workshops (better understanding of gaps)*
- *Forage: Focus on identifying most important forage species, understanding status & trends, habitat suitability, potential indicators, links to predators.*

Session 1: Oysters

9:30 am MD & VA Oyster Restoration Updates - *Stephanie Westby & Heather Lockwood*

Bay-wide updates: On track to meet goal by the end of 2025, plus 1 extra tributary from VA (11 tributaries total). 93% of the way done (acreage-wise). Largest oyster restoration project worldwide. Secret Sauce = Partnership is the main ingredient (maximize strength & contributions, durability & momentum), common goal setting & definitions of success (SMART GOAL, Oyster metrics), Reef-level implementation.

MD progress: 4 out of 5 tributaries complete in MD. Main focus on Manokin River (seeding planned for summer 2025). In water cost to date = 92.82 million dollars. Should be able to complete work in Manokin this summer. Maryland monitoring - to make sure reefs are high functioning 6 years later (hiring watermen for scientists to take patent tong/dive samples).

Coordination by ORP. Funding by NOAA and Army Corps Baltimore District. 98% of oyster reefs are meeting the minimum oyster density threshold & 83% meeting higher oyster density targets. Continued momentum among partners to move forward on new projects.

VA progress: 4 out of 5 tributaries complete - Lynnhaven River work is complete as of March 25, 2025. Completing the rest of acreage restoration by the end of 2025. Coordination with federal, local, nonprofits, state agencies (partnership is key). Monitoring by universities & CBF. Continued monitoring planned to document success (>4,000 oysters/m2 seen in Lynnhaven River, secondary production benefits - fish & crabs using reefs as habitat). Looking forward to the next big goal - future projects in Tangier, Pocomoke Sound, etc.

10:00 am MD Oyster Fishery Update – *Chris Judy*

Summary: An overview of oyster fishery harvest & management in MD. Conclusion/Updates: Typical oyster fishery = 200,00-400,000 bushels. Valuable fishery with many interested parties (recent dockside value is around 15 million dollars). Market demand greatly influences harvest. Power dredging is the main gear type for harvest. Dominate harvest area = lower eastern shore. Distribution of harvest is biological driven (impact of oyster spawning/spat set); however, lower eastern shore is still productive during low spat set years. Fishery is driven by natural spat set. MDNR Eastern Bay Project - working together for management & restoration of oysters (re-spark the productivity of oysters in Eastern Bay). Aquaculture recently approved as BMP & discussions on fishery based BMP project (plant seed oysters & document harvest & estimate nutrient production values). Already seeing interest from the industry. Aquaculture summary -94k bushels in 2023. Oyster stock assessment (run every 2 years). Benchmark stock assessment every 6 years.

10:15am Potomac River Fisheries Commission Update *(Ron Owens)*

Summary: Early this year the Commission reconvened its Oyster Strategic Planning Panel to explore upper regions for potential seed relocations, and considered establishing a dedicated seed production area (to help the Potomac be self-sufficient). The planning panel also discussed an updated fisheries management plan to incorporate a rotational harvest zone, & future seed planning & distributions (if successful in producing a seed area). 2025 Oyster Projects: seed planting in Herring Island, Oyster seed planting in Lower Cedar Point, moving ~5k bushels of upper river seed on King Copsico & Cobb Island, designate 10 acre seed production area in portion of Cornfield Harbor & plant $200k worth oyster shells (MD & VA Legislative Funds).

10:20 am Discussion

MD & VA Oyster Restoration Update Discussion:

- *Stephanie Westby (in the chat):* Oyster restoration 'secret sauce' article link shared
- *Kevin Du Bois (chat):* I know you know, but for the CBP to relate this work to the people the value of oyster reefs to recreational fisheries is a great story to highlight. The CBF rod and reef tournament is a great outreach tool.

MD Oyster Fishery Update Discussion:

- *Bruce Vogt:* Is there a reason why demand has declined?
    - *Chris Judy:* A couple of things come into play. Sometimes oysters are available from the Gulf of Mexico or other states that soften demand, or it could be economic times (people not eating out & eating oysters as much). Variety of issues. We also had ice this winter/ cold weather which can keep people tied up at the dock. Downward harvest trends aren't necessarily because of spat set failure 3 years before/less oysters in the water. A lot of times the dips in harvest can be related to strong decline in market demand (market driven). Beyond biology but an important aspect of the industry.
    - *A.K Leight (in the chat):* Was the dip in demand seen for both natural harvest and aquaculture?
    - *Chris Judy:* I will check on that - I assume that is the case but I will check.
- *Bruce Vogt:* 2018 with spat sets being very poor, was that related to high fresh water inputs, low salinity that year?
    - *Chris Judy:* Sure. 2018-2019 extremely wet. Hatcheries had tremendous problems producing, natural oysters had trouble producing. Most of the bay had a spat set failure except those regions on the lower shore. And we had a couple occasions of back to back freshes, 1993-1994 2003-2004, all of those really upset reproduction. On the plus side, lower salinity water deters XMS & dermo and that is a big benefit.
- *Bruce Vogt:* Is there momentum building with the fishery BMP?
    - *Chris Judy:* Yes. When it was just an aquaculture BMP, people in the fishery were asking, "what about us?" Interested even before it was approved. When it was approved, fast momentum. Lots of interest being shown and serious discussions about projects. The department is developing standard operating procedures on how this will all be documented to meet MDE needs for calculating the credits. Things are progressing & momentum picked up quickly.
- *Chris Moore:* Important to note that it is a defined BMP area and that area has to be defined prior to setting up the BMP, cannot just transplant oyster/spat willy-nilly. Those areas have to be defined. There is also a maximum number of oysters that can come out of those as part of the BMP.
    - *Chris Judy:* Yup, I have read all of the documentation and that is all integrated into our SOP, the area tightly defined, not just coordinates - where actual planting

occurs. All those details that you all have worked on are very much under a microscope. People conceiving/discussing the projects have also read those documents. A lot of hoops to jump through for the industry, and that is what we are paying close attention to.

- *Peg Brady (in the chat):* Can you provide an explanation for re: the different price set for aqua vs public oysters?
    - *Chris Judy:* Out of my lane but will answer based on what I hear from the industry/shuckers/etc. During public oyster season, oysters are abundant (hundreds of thousands of bushels). Watermen often say that even if we could catch a million again we probably couldn't sell them because there is not enough demand. There is an abundance of oysters during the season, but once the season ends, that supply is over. So what restaurants & other establishments rely on is aquaculture up and down the coast. The point is the supply of oysters greatly diminishes as soon as the public fishery season is over. Now you have a tighter supply, and plus good marketing. Aquaculture companies market their oysters - fishery oysters do not have this type of marketing. With branding, good marketing, and tighter supply, you see a higher price.
- *Chis Juday (in the chat):* UPDATE: Why do farmed oysters command a higher price than fishery oysters? First, as stated in the mtg a) the large supply of fishery oyster ends with the end of the season, and at that time the supply greatly lessens. Low supply..higher price. b) marketing. farmed oyster marketed and targeted . Raw bars, restaurants, etc. Fishery oysters often are simply shucked and packed in cans. Minimal special marketing or high end markets. New info (I contacted a buyer during the break) In addition to the above....d) farmed oysters are often sold by the piece, not by large volumes where the price per oyster is low by comparison. e) costs of production for farmed oyster are higher than fishery oyster so the harvested oyster cost more. Farms have multiple staff, sometimes many, they may hire capts/boats to harvest the oysters for them, there are many costs associated with farming that don't occur with a fishery (cost to buy seed, plant seed, run the farm, plant shell to improve the bottom, etc). Fishery areas receive a natural spat set on natural shells and oystermen don't have large staff, etc. Bottomline: it is good that there are multiple sources of oyster to meet year round demand and needs.

Potomac River Fisheries Commission Update Discussion:

- *Bruce Vogt:* Have you had any discussion with your watermen about the oyster BMP?
    - *Ron Owens:* No, I haven't heard that brought up. Ingrid might have some more information on that.
- *Bruce Vogt:* Do you have the mapping data you need to assess those sights? Are there any data needs for determining where those seed/harvesting would occur?
    - *Ron Owens:* We have received some help from MD and VA marine resources for some bottom mapping so we got some commitment from the two states but I appreciate the offer up if we could use you.
- *Lynn Fegley:* Could you talk about the bridge mitigation, that is an interesting

opportunity that arose that could be interesting for folks to hear about?
    - *Ron Owens:* Sure, that project started prior to me coming to the commission. Marty Gary had a lot of input on that - reached out and got funds from the bridge. We received bridge material to create reefs and funds for seed. I am working on the tail end of it but this should complete this project up. It was over 1 million worth of money.
- *Ingrid Braun-Ricks (in the chat):* Harry Nice bridge Project MTDA funded the PRFC with $500,000 in oyster seed funding and donated and deployed 9,000 cubic yards of clean concrete material on the PRFC Hog Island reef site! Great success!

10:25 am **Integrating a Rapid Assessment Protocol (RAP) into monitoring of subtidal oyster reefs-** *Allison Tracy*

Summary: The goal of this project was to understand how to integrate a rapid assessment protocol (RAP) into monitoring a subtidal oyster reef. Hybrid approach would integrate 3 tools (patent tong, diving, RAP) to capitalize the strength of each, use existing metrics (density, biomass, size classes, reef height) & data from RAP. The study showed that high RAP scores successfully capture high oyster density, biomass, reef height, rugosity, and multiple size classes. It also found that the RAP is the most efficient and cost-effective tool across oyster densities and that stakeholders discussions highlight strengths of each tool in the hybrid approach tool kit.

10:40 am **Economic Analysis of North Carolina's Oyster Sanctuaries: 2013–2023 -** *Alyson Flynn*

Summary: Project conducted by the North Carolina Coastal Federation to understand the economic impact of oyster sanctuaries to the NC coast (funded by NOAA). Overall results show that for every $1.00 invested in oyster sanctuaries provides NC with $1.71 in expected benefits (recreational fishing, water quality, commercial fishing). Distribution of benefits were also analyzed and found that 94% of overall benefits were felt immediately in the 20 coastal counties of NC. Recreational fishing benefits experienced by residents and tourists who engage in off-shore fishing. Water quality benefits accrue broadly to residents of coastal communities, tourists, and state taxpayers. Commercial fishing benefits are experienced by individuals who rely on seafood products for livelihood (& those who consume seafood).

11:00 am Discussion

Economic Analysis of North Carolina's Oyster Sanctuaries: 2013–2023 Discussion:

- *Rochelle Seitz (in the chat)*: Are the results published yet? (regarding NC Oyster work)
    - *Alyson Flynn:* They are, I will share a link.
        - Link to Economic Analysis paper
        - Link to NC Coastal Federation resources
- *Bruce Vogt:* What was the interaction with your groups, people who directly received funding? What does the bigger picture engagement with communities look like?
    - *Alyson Flynn:* A lot of recreational fishing opportunities and then on the mainland side and actual communities themselves, multiplier effect of the activity occurring, and having the additional economic activity in the region, the impact is felt immediately through the sanctuary network. The impact is probably felt beyond the sanctuaries but since you can't harvest on the sanctuary the more immediate community impact is felt more throughout the construction and building of the sanctuaries themselves.
- *Bruce Vogt:* How are you measuring the SAV enhancement?
    - *Alyson Flynn:* That is through a benefit-transfer approach. We used a 2011 study - limited studies to turn towards, but this one was a good one and we were able to use a benefit-transfer approach to use previously estimated values to estimate SAV enhancement.
- *Allison Tracy*: Seems to me like $1.70 is a very good return on investment. For these types of restoration projects are there numbers people are aiming for? Or is it not so fleshed out in the literature? Can you contextualize that, or not so much?
    - *Alyson Flynn:* Nothing we are necessarily aiming for. Purpose for this was to communicate with the legislature & tell the story of the benefits of oyster sanctuaries. The data from previous studies was limited, but our hope is that we can do another study in 5-10 years and see if the return on investment has changed over time. We did do a study before that looked at 10 years prior to this, but it wasn't specific to the oyster sanctuary network so it was a bit different but still had an interesting comparison - was like apples to oranges. Happy to see a positive number for sure.
- *Stephanie Westby (in the chat):* NC results written in NOAA web story, and this NOAA web story covers recent economic impact analysis of restored non-harvest reefs in the Chesapeake.
- *Peter Tango (in the chat):* By comparison in my mind, restaurants work on margins that might be 45-ish percent on the dollar while a good, healthy retail small business likes to function at around 70-80% margins. This study would therefore be indicating better than food business world margins and in line with a healthy small business margin :-). Good ROI.

Integrating a Rapid Assessment Protocol (RAP) into monitoring of subtidal oyster reefs discussion:

- *Allison Tracy (in the chat):* Restoration Ecology Paper and IMET press release

- *Bruce Vogt:* One of the reasons we asked Allison Tracy and Alyson Flynn to present is 1) There could be new approaches to monitor success metrics that could be more cost effective/tell us a different story of community structure on the reefs, Allison Tracy's presentation did a great job on that 2) Thinking about how to better engage/include communities in oyster restoration efforts as Alyson Flynn's presentation did. All of this information will help us as we think about our outcomes in the Beyond 2025 process.

Session 2: Invasive Catfish Workgroup Updates

11:15 am ***Invasive Catfish Workgroup*** **general updates -** *Bruce Vogt & Tom O'Connell*

Summary: Updates on ICW. ICW sites under FishGIT and are made up of rec fishing, scientists, managers, processors, distributors, marketing specialists, commercial fishermen, etc. Group has been around since 2011/2012 when blue & flathead catfish were recognized as a large issue in the Bay. Group developed a management strategy in 2020 that recommended reducing blue catfish biomass in a tributary specific way by expanding the fishery. It also had a list of science needs/objectives and ways to move forward. Hiatus during COVID - reconvened and updated goal statement in 2024 as well as developed 4 small teams (rec fishing/charters, science/management, policy, commercial fishing/marketing/processing). Each of those groups has a lead, workplan, and priorities they plan to tackle. We will reconvene with the group later this year to get updates from all of them. Here today is Tom O'Connell to give us an update on the science/management side.

11:15 am **ICW science/management small group updates -** *Tom O'Connell*

Summary: The science/management small group can provide advice & guidance to Chesapeake Bay partners that are concerned about invasive catfish (scientific leadership/coordination, research prioritization, collaboration, development of scientific tools, engagement/communication, adaptive management/decision support etc.). As chair, Tom is reaching out to science/management members one on one to understand challenges & priority science & management needs. Currently, high priority focus areas include: data sharing collaborations, population projection modeling, ecological & socio-economic impact, population control strategies, science to inform alternative market development). Future need for additional resources - working to get more federal resources to the table to raise these issues up to USGS & others and tackle issues.

Discussion:

- *Thomas Idhe:* Need to connect with you about the project we have funded. Should be able to support a lot of your efforts with stakeholder meetings over the next two years. We are funded through the NOAA SK grant and currently looking for the post-doc that will be doing the modeling, but we're working with all of the stakeholders to project preferred management strategies simultaneously throughout the Bay to control blue cat populations. So I look forward to discussing that more with you.
    - *Tom O'Connell:* That is great Tom, I will reach out to you. Great example of things going on that not everyone is aware of but with improved communication & knowledge sharing we can fix that.
    - *Thomas Idhe:* There was a large proportion of the ICW members that signed onto the project but the grant process was so long ago so they probably don't remember. Looking forward to talking to all of those folks again.
- *Thomas Idhe (in the chat):* Re: ICW, Morgan State Univ. was recently funded to work with the stakeholders and do the projection modeling Tom O'Connell was discussing through a facilitated process over the next 2 years
- *Peter Tango:* Per the focus areas, given the new administration's EPA strategy under 5 pillars, data sharing/collaborations/economics for example fits well with Pillar 3 - cooperative federalism and cross agency partnerships. Such work here might further fit under Pillar 1 as well as food web dynamics integrate with water quality in the ecosystem. So there are good cross agency focus areas here. Looking forward to seeing where the momentum goes. Happy to help if I can.
    - *Tom O'Connell:* Thanks!
- *Pat Geer (in the chat):* A size‐based stock assessment model for invasive blue catfish in a Chesapeake Bay sub‐estuary during 2001–2016. Fisheries Management and Ecology. 30. 10.1111/fme.12601.
    - *Tom O'Connell:* In regard to Pat Geer's note here, I spoke to Mary Fabrizio, she mentioned Corben's work so I appreciate you making sure I was aware of that work Pat so thanks.
    - *Bruce Vogt:* Gina Hunt asked me earlier last week regarding a list of the studies done on blue catfish. I think we had a list at one point, but I think it is out of date. So, that falls into the data sharing and putting together a list of what we do have for current research. There is more there - this can be a starting point and we can help with that, would not all fall on you Tom.
- *Bruce Vogt:* Looked to see if there was interest in elevating catfish as an outcome, but did not get a lot of interest. Does not mean the work is stopping and the work cannot be lifted elsewhere. We have heard (from ICW and others) that this coordination and information sharing is really important and we plan to keep it going.
- *Peter Tango (in the chat):* Given blue cats are singular and the issue of invasive species cuts across many taxa throughout terrestrial and aquatic environments of the bay region, maybe down the road a more generalized Invasive Spp Stewardship Outcome could be noodled with recognizing some species like blue cats are the poster children of this cross habitat, cross agency, cross taxa, cross cutting issue. :-)

11:25 am **Preparation for Day 2: Breakout Session Process -** *Christina Garvey*

11:30 am **Break for Lunch**

Session 3: Blue Crabs

12:30 pm **Modeling to support blue crab resilience in Chesapeake Bay -** *Doug Pirhalla*

Summary: This preliminary & collaborative project is largely based on the Chesapeake Bay Program science needs database and has ties to CBSAC science priority to link the drivers to the environmental conditions that are important to blue crab abundance. Project will use data science & machine learning to better understand blue crab resilience in the bay which will help inform the stock assessment. Benefits of the project - portable science solutions and predicting effects on blue crabs, also applied to other resources in the Bay. Work will help track rates & severity of change in some of these key indicators as an outcome. Project plans to show combinations of coastal risk factors important to the blue crab which should provide more guidance in terms of real time awareness of some of these key conditions.

Discussion:

- *Rom Lipcius*: Nice project, Doug. As the coordinator of the blue crab winter dredge survey at VIMS, I would be glad to work with you on the project with our database. MD portion is through MD DNR we put all the data together for the stock assessment. Some students and I worked on atmospheric forcing in the Gulf - I can send that to you, although those papers are a bit older now.
    - *Doug Pirhalla:* Thank you, that sounds great.
- *Bruce Vogt:* This is one of the research priorities that came out of the blue crab science workshop, this is one of the areas that will not be fully incorporated into the benchmark stock assessment, we are trying to tick off some of these science priorities that will not be part of the terms of reference for the benchmark in other ways, this being one example. We want to discuss how you mentioned that this has broader implications, can you talk about what that means- tying it to other fisheries that are reliant on coastal conditions or other ways of assessing fish habitat condition on the coast and how that may be changing over time? Something that could definitely feed into our fish habitat outcome. Regarding blue crab outcome - trying to achieve a certain abundance, but blue crabs impacted by more than just fishing pressure - so how are we going to handle how environmental change may influence the abundance we are trying to achieve? How can we incorporate existing projects but what else should we think about to address blue crab science that helps support that outcome.
    - *Rom Lipcius:* We also have an NSF grant focused on blue crab population in coastal lagoons as it pertains to the effects of disease (Amendoim) on the population. In the past it has caused collapse in some of the coastal lagoon and eastern seaboard. We are very interested in what is going to happen with climate

change, because this disease does better under warmer conditions and higher salinity, one of the things we are trying to model with our demographic models in there. There is a lot of interest in what Doug and his group are doing. In terms of the benchmark stock assessment, we do have term of reference #9 that deals with environmental drivers etc., we will try to summarize what is known through the present, but this project will advance that quite a bit. I commend you for having a project like that.

- *Peter Tango:* What duration of years is this strictly being applied? Forecast mode? I know you said you need to build up the training dataset, so are the climatologies for that set of years in the training dataset going to be part of the ranking elements and would that be available to consider in light of many of the other important indices that we would like to look at, just like blue crabs, for their alignment?
    - *Doug Pirhalla:* It is really about the retrospective at this point. Most of our datasets go back to the early-80s and even the 70s. So we really think that the SST frontal products that we are working with and the variability terms will provide a lot in terms of the understanding of the historical. No plans to go into forecast mode. We have in the past with sea level, but not envisioning that at this point to go into forecast mode. So what you would get is a historical perspective on these key events that could be driving the abundance. All of this data would be available as far as the ocean satellite climatologies and the ranks/ patterns.
- *Peter Tango (in the chat):* Basically thinking like Bruce here, if the climatology rankings are based on similarity/differences such that we might look at ranking climatology with other habitat measures like annual hypoxia, duration of hypoxia, severity of temperature anomalies, etc - I think there are many opportunities to consider climatology insights with many parameters of interest around bay and living resource condition measures, indices.

12:55 pm Benchmark Chesapeake Bay Blue Crab Stock Assessment - *Mike Wilberg*

Summary: This presentation provided an update on the Benchmark Chesapeake Bay Blue Crab Stock Assessment. Concerns were raised due to a lack of expected increase in population - need to update the benchmark stock assessment model. The team is making progress on the terms of reference and working on developing a population model that synthesizes a combination of datasets simultaneously to estimate abundance & mortality (fish mortality) rates of blue crabs over time. The rest of 2025 will focus on completing index standardization, finalizing catch data, & completing model development & testing. Goal to have assessment models by May/June 2025, completed assessment & report by December 2025, and peer review in Jan 2026.

Discussion:

- *Ed Houde (in the chat):* What is the difference between state-space model and not space-state?
    - *Mike Wilberg:* The difference between state-space model and the traditional stock assessment model is that state-space includes both observation and

process error. Observation error gives us a difference between our model predictions and our data because our data are sampling from the environment so they do not describe the exact truth that we are basically measuring everything with some amount of variability. Process error part comes in where we say the population does not exactly follow the dynamics equations in the model. In a state-space model it is trying to tease out the relative amount of variability for each of those types of errors, so that is where it comes in. Many of the more modern state based models like WAM (NE Center) or SAM (in Europe) are state-spaced versions of models that allow for both the process errors and observation errors and tend to work a bit better than non-state space. They are more robust to the errors and assumptions about the model dynamics equations.

- *Doug Pirhalla:* You mentioned climate influences as one of your objectives, we are going to be diving into atmospheric forcing into blue crab abundance, would be great to touch base with you about how to share what we find out, maybe we can share some ideas.
    - *Mike Wilberg:* Absolutely. Matt Ogburn is part of our team so might be good to talk about what you are doing at one of our upcoming team meetings. We also have a term of reference group that is going to be looking at categorizing environmental drivers (or alternative environmental drivers) on various aspects of blue crab biology dynamics- good opportunity to be involved in that- Matt is also on that committee.

Session 4: Fisheries Science Updates

1:30 pm **Developing Chesapeake Bay specific abundance estimates for striped bass & spot-** *Mike Wilberg*

Summary: This project helps fill a large knowledge gap related to bay-wide estimates for species in the bay. The model created as a result of this project was able to develop spatial models that estimate abundance and mortality rates for striped bass and spot in the Chesapeake Bay (model estimates were found to be sensitive to model assumptions). This project will help estimate the effects of environmental drivers on population dynamics. Models and methods are in the process of being submitted to journals and abundance estimates will be publicly available soon.

1:45 pm **Forecasting the effects of climate change on Chesapeake Bay fisheries using physiological informed habitat models** *(Vaskar Nepal & Marjy Friedrichs)*

Summary: Project to predict the effect of climate change on Chesapeake Bay fishes that uses physiological response curves, repeated surveys, and high-resolution climate data to inform a mechanistic habitat suitability model. This project aims to quantify suitable habitats for five Chesapeake Bay species (bay anchovy, striped bass, white shrimp, Atlantic menhaden, Atlantic

croaker) under historical and present-day climate conditions, and to project and quantify suitable habitats to study species under future climate conditions. Preliminary results of the model show that small croaker are impacted most by hypoxia (with future management drastically improves habitat area). This project is still in the early stages- there is still a lot of future analyses to be done (e.g. creating habitat suitability maps).

2:00 pm Discussion

Developing Chesapeake Bay specific abundance estimates for striped bass & spot discussion:

- *Lynn Fegley:* I noticed the shrimp bycatch information for spot , I wonder if you incorporated the same for croaker? Were accounting for the shrimp trawl bycatch for young croaker?
    - *Mike Wilberg:* We only have done spot and striped bass for our modeling, we have not done croaker, so the estimates for shrimp trawl bycatch for croaker are being used in the benchmark stock assessment that is currently ongoing for croaker and the estimates for spot that we are using were done using the same ones for croaker so they would be similar in that respect, but I have not looked closely at croaker.
- *Jim Uphoff:* For the striped bass modeling, you had time varying natural mortality and variation in age, but I believe you would have estimated F and M independently in that model which is quite a feat, was there an external estimate or something to start that process, like a tagging model that would have given you some treads, but was that just the best fitting combination and they're estimated independently or was there an external driver for natural mortality rates?
    - *Mike Wilberg:* In the age structured model, we used estimates of M from the tagging model. In the one where it wasn't time varying, we used the same M's that are assumed in the current stock assessment and then in the time varying one we were using the M's that were estimated from the tagging model. We were not estimating the M's internally in the A- structure model.
    - *Jim Uphoff:* Okay because that had quite an influence on the later trajectory here on abundance which was interesting. This helps, thanks.
    - *Mike Wilberg:* One of our takeaways was to highlight the sensitivities of the results to some of these assumptions so hopefully when the next benchmark assessment is done they can further consider these things as well as, we develop tools that can be used through tagging model as well as spatial-age structured model.
    - *Jim Uphoff:* It's a very difficult stock assessment task but not dealing with the changes in natural mortality that have been demonstrated in earlier tagging, it can have major consequences for management or mismanagement.
- *Patrick Campfield:* For both projects- excellent work, and on behalf of the Atlantic States Fisheries Commission I wanted to thank Mike and Rob and your graduate students for developing these models. We have been struggling to conduct a coastwide spot stock assessment attempting some fairly simple production models in the past, so the work you

all have done for catch and age models should be really useful for the next coastal stock assessment that we will begin work on in 2026 and the striped bass spatial work should be useful as well for the 2027 assessment. Vaskar and Marjy, also very innovative and interesting results, we would be curious to see more results for the other species we would be happy to follow up with you after this meeting.

- *Bruce Vogt:* What do you think the next steps are to look at what might be driving mortality or abundances? You said we might need Chesapeake Bay specific abundances to start to look at what might be changing and affecting that variability, so curious what you see as next steps to see whether or not change in the bay is actually influencing some of what you showed?
    - *Mike Wilberg:* One of the steps we took was to put in a proposal to Sea Grant to look at potential ecosystem drivers of natural mortality in the tagging model, basically integrate ecosystem data into the tagging model to help it estimate natural mortality rates. Because right now that model is just estimating natural mortality rate in decade long chunks, so it is the average for each decade that we are getting out of it. That is one of them. We have done a variety of other analyses to try and look at ecosystem drivers, the most interesting one was for spot. We did quite a bit of looking at whether we could detect ecosystem drivers that corresponded with either recruitment or other population processes but couldn't identify anything that seemed to correspond with the patterns we were estimating. So for spot not sure where we go from there, but for striped bass this project gives us our first estimate of total abundance for striped bass that could be used to look at land use effects or other things like that on striped bass recruitment. It will be interesting to compare those with previous work that primarily looked at trends in sein surveys and things like that. Quite a bit to do still but got that first stage to now have something that does not only give us a relative trend but also an absolute level.
- *Bruce Vogt:* You are already in touch with ASMFC but some of your models were very different, how does that get sorted out? When you have results that differ that much, how do choices get made on which one to choose in regard to the stock assessment?
    - *Mike Wilberg:* Those are two different sorts of questions. First part - we weren't able to drill down to the base data and rebuild the data sets in a way that would fit in the way we wanted to do the model due to time, data complexity, and what the states provide to the assessment. So because of that, there are some data issues that might be underlying some of the differences we see in the model. The data issues need to get worked out first. After that it is the stock assessment committee process that would make the decisions about which aspects of our model they want to carry forward and how they would evaluate the evidence in favor/or not of them. So that is a product of the committee. Exactly where it goes is hard to predict, but everyone we have talked to seems interested and surprised by some of the results. A lot there for people to think about. We now have an alternative spatial framework - previous attempt in a previous benchmark to develop spatial assessment model - but we have moved the ball quite a bit farther close to those goal posts as well. That is something the ASMFC has wanted for quite a while.

- *Bruce Vogt:* Looks like a number of things are in prep. Do you have a list of what is coming out? We had a striped bass workshop a couple of weeks ago and are working on the report now. If nothing else, it would be nice to show whatever does exist or is in prep to make sure we are capturing this work with the GIT.
    - *Mike Wilberg:* Sure, I can send you our list of papers that we are getting ready to submit by the end of today.

2:15 pm **15-minute Break**

Session 5: Fish Habitat

2:30 pm **Shallow water recommendations related to fish habitat** *(Gina Hunt)*

Summary: An overview of the fish habitat related recommendations that came out of the Beyond 2025 Shallow Water Habitats Small Team Report.

Discussion:

- Link to shallow water recommendation report
- *Kevin Du Bois:* Is the overall thought in the partnership to substitute climate with 'changing conditions?' I don't know how that will go forward, have you talked about that at all? Even last week they were talking about adaptation and not using climate. Confused on how as a group we will address that elephant.
    - *Gina Hunt:* When the small group met and made this report out, it was before there was any direction in regards to climate. Throughout the presentation you see the word "climate" but that is because this is from a year ago. Moving forward, I think the bay program is cognizant of how all partners can be engaged on this, and have seen most people use "changing conditions" and that can refer to a lot of different things (climate influenced). It isn't going away because it is a reality we have to address when coming up with recommendations for outcomes- want to make sure the outcomes are realistic and take into account changing conditions. and we want to make sure people take environmental change into consideration. Is the word climate going to show up in the document? I don't know, but regardless we will have to account for it.
- *Benjamin Simon (in the chat)*: Is there a plan for getting estimates of ecosystem service values?
    - *Gina Hunt:* Good question for the GIT but I would say the bay program currently doesn't have a plan to work on more ecosystem service values. There is not a project underway that I know of
    - *Kristin Saunders (in the chat)*: We have done a few STAC workshops to get to ecosystem service values, and I do think a proposal was being prepared for EPA funding consideration but not sure it will go anywhere given uncertainty around ORD. We keep trying as Bruce said.

    - *Bruce Vogt*: Benjamin we have a couple of studies, one you will hear about a little later that is estimating ecosystem services and in this case more fishery value of habitats. We have some other case studies looking at wetlands and shoreline conditions and how those natural shorelines are more valued by recreational fishers than hardened shorelines and it does put a dollar figure on those habitats linked to recreation fishing. The answer is yes to an extent. Could those be applied more broadly as a metric? We have done oyster reef ecosystem services work in the field to collect field data on oyster reefs to see how they are benefiting the environment around them (water clarity, fish habitat use). Some metrics are easier to monitor and assess than others, but still something we are interested in looking at as we continue with oyster restoration. We do have success metrics for oysters that look at changes on the reef (abundance achieved?) but doesn't get into things like fish habitat use or fish productivity. There are other linkages we would be interested in exploring. Would be interested in SAV enhancement related to oyster habitat (refer to NC Coastal Federation work), if we can restore one habitat and get improvement in another habitat - is that something we should be thinking more about in the design of restoration? A lot there for conversation.
        - *Gina Hunt:* There is a lot to unpack with ecosystem services. Highlight that this small group for shallow water, it is just shallow water but yet you will see ecosystem services come up in different conversations among other groups. It is a need, it is not going away - a great way to communicate to the government, decision makers, and the general public so they understand the impacts of land use decisions for climate impacts. Information right now is very limited so as a metric it is limited for what you can use. That doesn't mean, moving forward, in the updated agreement we wouldn't hopefully be developing more.
- *Jeff Lerner (in the chat):* Does the group see a need to protect any areas of intact shallow water habitat (i.e., the shorelines) or combining restoration and protection?
    - *Gina Hunt:* I do not know the answer to that
    - *Bruce Vogt:* It is something we have talked about with respect to the tidal fish habitat outcome. One conversation we have had is to think about both restoration and conservation so the idea is that we would do a tidal living resource assessment that would identify where the good, poor, and marginal areas are within the Bay. And then have conversation, which areas would benefit from restoration and which areas would be more cost effective to maintain because they are still functioning at a high level - which would bring in a conservation/protection component to it. That is the direction we plan on going.
- *Kevin Du Bois (in the chat):* "People love what they know, and they will protect what they love" Is there any discussion about collaborating with groups like "Take a Kid fishing" to boost engagement?

2:50 pm **Connecting Water Quality and Living Resources in Shallow Waters with a Water Column Hypoxia Monitoring System: A 2025 Update** *(Jay Lazar)*

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Summary: An overview of water column hypoxia monitoring efforts in the Chesapeake Bay for 2024 and future monitoring plans for 2025. The project's overall goal is to connect this data to living resources - doing this by building off of focused restoration and maintaining robust partnerships.

Discussion:

- *Peter Tango (in the chat)*: Thinking about how we speak about the measures of change - rising temperatures, SLR, increases in precipitation, storm intensity. In some places such specifics may be more helpful, valuable, and appropriate than the generality of using an umbrella term.
    - *Bruce Vogt (in the chat):* Agreed Peter. We've been talking about using specific terms that people have already noted are concerns such as temp and flooding which span tidal and non tidal areas but in different ways wrt to the crwg outcomes.
- *Bruce Vogt:* I definitely appreciate how Jay is working in ways to link this data to living resources. It certainly has application to the water quality issues that Peter mentioned and the different tools that are being developed to assess that. But water quality criteria are based around living resource needs, so we are thinking about how we can take this data and place-based efforts (like the Choptank - which is an important fish habitat area) and try to link up this information with what may be changing there/improving/getting worse etc. and think about what that may mean for fisheries and other living resources. Looking forward to where we go with that. Mentioned earlier on how we might do a tidal habitat assessment (scored each of the 92 segments for habitat suitability) - there are models that can help us with that, we saw some examples earlier, and then there is also the institute monitoring that is critical to help assess what is happening in each segment. Thinking about how we can pair existing information with monitoring data to help us get there. Something great to think about for our fish habitat outcome.
    - *Peter Tango:* In terms of fish habitat assessment and segment specific work, you mentioned the criteria are designed off of living resource (survival, growth, reproduction) needs in terms of habitat conditions - some of the information for the criteria assessment now looks at the baseline criteria that we can assess and then we can see if they meet the criteria or whether there is a buffer (are conditions so much better or so much worse). We call it a deficit. As you get into those discussions, we can look at those segment maps that take the 40 year time series and parse it spatially and temporally and think about how that fits with your needs there as well.
    - *Bruce Vogt:* Absolutely, thank you.
- *Peter Tango (in the chat):* Those spatial-temporal DO criteria evaluations are already available through R-Shiny app outputs. When the time and discussions are ripe happy to bring those products and results into the discussions to help with habitat insight and assessment over the entirety of the bay since 1985. We have a few publications to share that help summarize those insights.

- *Kristin Saunders:* Looking at habitat focus area, and I know you all at NCBO have done a lot of work in pulling in stakeholders/organization in the area to participate/amplify the work and this has been the key to success in the places you have done this targeted focus area with people on the ground doing restoration work. Our stewardship folks are talking about their project to network map (how to visually map out the network of practitioners, stewardship and non-profit orgs doing work on the ground). I think there may be an opportunity there once that is fully finished, to look at what you find in the habitat focus areas. What pops up when you look at habitat suitability and look at it in the context of what communities are doing work on the ground and what communities are really activated around certain kinds of activities to improve the environmental conditions in their area because it might set us up for more success if we know where those people are where that work is happening. Pinning that thought for when we are further down the road - hopefully we can get this approach adopted throughout the watershed. Could be untapped potential for us to explore moving forward.
    - *Bruce Vogt:* I certainly agree. We should look at that network analysis and think about how some of these areas align and tap into where the energy is and where we need support for living resource improvements. I think we found that the place-based approach works and happy to see that moving forward more.

3:10 pm **Acoustic Telemetry Fish Movement Projects** *(Wilmelie Cruz Marerro)*

Summary: This presentation is an overview of NOAA's passive acoustic telemetry efforts in the Chesapeake Bay. Three different projects were discussed during this presentation (1.Climate-projected distribution models for Chesapeake Bay, 2. Fish movements across natural and restored environments, and 3. Demonstrating the value of Chesapeake Bay arrays in collaboration with fish taggers). Future goals include: creating long-term connections to support Chesapeake Bay fisheries by strengthening partnerships, and incorporating data into Chesapeake Bay seasonal summaries & Mid-Atlantic State of the Ecosystem Report to support management strategies.

Discussion:

- *Pat Geer:* We still have 16 receivers out there right now, we replace them when they go out. We have 7 striped bass that we tagged in either the Rappahannock or James River that have made the migration out of the Bay and up to fish Long Island, Block Island and back. We've had three fish that have done it at least twice. One fish has done it three times. Then we have had three fish that have gone all the way to the Gulf of Maine. And it is almost always the same timing each year - off of Long Island in June, off of Block Island in July, back down to DE Bay in the fall, and back in the upper spawning areas in the James by the beginning of January/February and they stay there until April. Neat some of the information we are getting from these now.
    - *Wilmelie Cruz-Marrero:* Definitely. Ethan is a great collaborator and very active within this project.

- *Bruce Vogt:* Important to recognize, you can get fine scale habitat use but it is a different design. You have to have a lot of receivers in one place to understand that fine scale habitat use. But then something like the Chesapeake Bay array gets at something like what Pat was saying- where you can look at interconnectivity between the Chesapeake Bay and the coast, the marine environment for a number of species that both use the coast and estuarine environment. A lot of different things to look at (changing seasonal patterns influencing migration timing) - fish coming from Alabama and Canada- there is a lot of movement and showing connection between marine and estuarine habitats is an important feature. It depends on what your question is and what you try to answer. We have projects attempting to get at both those scales (larger and finer scale habitat use).
- *A.K Leight:* I appreciate all of the effort that is going into the telemetry work in the Chesapeake Bay, looking forward to seeing how that data can help inform the models we have been talking about in the tidal waters (refers to Mike's presentation). For some species there is not a lot of distribution/abundance data from the fisheries independent surveys so the more information we have on where they are and where they are going, the better off we are in understanding the habitats they frequent.

3:30 pm **The Ecological and Economic Impacts of Estuarine Habitat Change in the Middle Peninsula, Virginia** *(Tom Ihde)*

Summary: This presentation provides an overview of the results of a study aimed at understanding ecological and economic impacts of oyster restoration restoration in VA (Middle Peninsula) in the context of warming water and simultaneous change in seagrass habitat. Study found that gains in oyster restoration/growth and eelgrass will provide the most economic benefit ($3.1 million/year).

Discussion:

- *Rochelle Seitz:* Can your model be ground truthed with data from the Bay? Given that oyster restoration has been going on for a while now pretty intensely, oyster populations are coming back, but if you look at blue crab harvest I don't think they are tightly correlated. Wondering if the model can be ground truthed given that we have all of these long term datasets?
    - *Tom Ihde:* We looked at doing that in MD, which has been established longer. Due to the way data is reported, we can't parse out the restored area with blue crab harvest. Blue crab specific harvest?
        - *Rochelle Seitz:* Yes, that is what I was thinking.
    - *Tom Ihde:* We did look into doing that and it didn't work because the data is not precise enough to get at these fairly limited areas- essentially by NOAA code. It is just not there. I would love to do that if we could get the data in the right resolution. All we have is anecdotal reports of substantially more trout lining that is happening in the areas of the restoration. But it is all anecdotal.
- *Rochelle Seitz:* For your increases in blue crabs with increased oyster restoration in your model- is that based on gut contents of blue crabs knowing how many oysters

they are feeding on? How do you get those numbers to put in the model?

- *Tom Ihde:* This is based on a variety of different studies including many out of your lab which I appreciate, but it's not just oysters they are eating, it's all the other forage species that are also co-occurring with the oyster restoration. If you are trying to track down why they are increasing, which we have done, it is actually the smaller invertebrates (mud crab, oyster spat, young barnacles) forage critters (many crustaceans) that they are benefitting from that is certainly driving the growth in the blue crab population. As complicated as it is, this is a relatively simple approach because it is really focused on the food web. The seagrass scenarios- blue crabs benefit from eating the encrusting animals as well as the other blue crabs, being cannibals. These are gut content studies that parameterize the model to start with, if that addresses your question.

4:00pm **Recap & Next Steps** *(Bruce)*

Focus on fisheries but heard a lot about habitat and socio-economic studies today. Management of fisheries happens external to the Bay - we have been trying to zero in on what can we do to enhance managed fisheries but also enhance unmanaged things (forage).

We heard about good ways to better connect with people and things. As well as ecosystem services, new monitoring data and approaches (telemetry arrays, video to assess oyster reefs).

How do we actually combine this information (habitat suitability models, monitoring data around fisheries) to help inform living resource assessment (scoring 92 tidal segments). How do we leverage what we have to understand the current conditions?

How do we take into consideration how things are changing (temperature & other parameters)and build that into restoration design and management approaches?

Better targeting - use data and information to better target and focus on places where we think we can really improve through restoration and/or protection

Tomorrow- Refine outcome language. More space to discuss outputs and indicators

4:30 pm **Recess**

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Day 2: Wednesday, March 26, 2025

Attendees: Pat Geer, Adam Kenyon (VMRC), Adrienne Kotula (CBC), Alexandra Fries (UMCES), Allison Colden (CBF), Allison Tracy (UMBC), Amanda Bevans (Morgan State), Amanda Smalls (MD DNR), Andrew Button (VMRC), Andrew Larkin (NOAA), Angela Sowers (USACE), Benjamin Simon (GWU), Bruce Vogt (NOAA), Chris Moore (CBF), Christina Garvey (CRC/NOAA), Christopher Judy (MD DNR), Clint Morgeson (VDWR), Emily Hoyt (Morgan State), Frank Rodgers (Cacapon Institute), Gina Hunt (MD DNR), Hannah Nisonson (NOAA), Heather Lockwood (USACE), Ingrid Braun-Ricks (PRFC), Jack Buchanan (VIMS), Jason Kahn (NMFS), Jay Lazar (NOAA), Jennica Moffat (ORP), Jim Uphoff (MDNR), Julia Fucci (CRC/NOAA), Julie Luecke (CBF), Julie Reichert-Nguyen (NOAA), Kevin Du Bois (DOD), Kevin Schabow (NOAA), Kinsey Tedford (ORP), Kristin Saunders (UMCES), Mandy Bromilow (MDNR), Marek Topolski (MDNR), Allison NG (EPA), Olivia Caretti (ORP), Peter Tango (USGS), Randy Feris (Morgan State), Reba Carruth (IPC), Rese Cloyd (DC), Rochelle Seitz (VIMS), Rom Lipcius (VIMS), Ronal Owens (PRFC), Simen Kaalstad (ASMFC), Thomas Ihde (Morgan State), Tom Parham (DNR), Ward Slacum (ORP), Stephanie Westby (NOAA)

Summary of Day 2:
Day 2 of the FishGIT meeting focused on discussing outcome language for the updated/novel outcomes moving forward in the updated Watershed Agreement. In the morning, the group was divided into four breakout rooms to discuss language for the four updated/novel outcomes (Blue Crab Sustainability, Oyster Restoration, Oyster Abundance, & Fish Habitat). In the afternoon of Day 2, the group reconvened in a report-out session to discuss outcome language with all participants. The FishGIT meeting adjourned with a summary of what we have learned throughout the two days and next steps moving forward.

9:00 am Welcome and Introductions - *Bruce Vogt*

Background from Day 1: Presentations from yesterday were selected as they could have an influence on our outcomes. Presentation on oyster restoration and oyster reef ecosystem services, economic impact. Fish Habitat presentation with new fisheries science that could help us address the new fish habitat outcome moving forward. Presentations on blue crab - background on where the stock assessment is going and environmental variability and how it can influence recruitment. Keep those presentations in mind and how what you learned yesterday could be helpful when thinking about outcome language, outputs, and indicators.

For today: Today we are focused on Beyond 2025 (process to update current 2014 Agreement - modify or add new outcomes). We are at a point now to refine outcome language, and make outcomes smarter. Outputs and indicators- creativity and ideas welcome.

9:10 am Review of Beyond 2025 & Outcome Development - *Bruce Vogt*

Beyond 2025 timeline/upcoming meetings: Goal is to have draft language by April 10th, executive committee meeting April 21st, final draft language submitted May 7th or 8th. MB meeting tomorrow to discuss final disposition of outcomes.

Definitions to aid in breakout session: Find definitions here.

Fish GIT outcome disposition update:

> ***Blue Crab Management,*** *REMOVE*
> *Due to completion of outcome*
>
> ***Blue Crab Sustainability****, UPDATE*
> *Factors influencing = changing environmental conditions*
>
> ***Fish Habitat,*** *UPDATE*
> *Focus on tidal waters to make outcome more specific*

Forage, *RECLASSIFY*
Forage would no longer be an outcome, but output under fish habitat

Oyster Restoration, *UPDATE*
Building off of previous 10 tributaries goal
Encouraging large-scale restoration but with more flexibility of where restoration is done

Oyster Abundance Outcome, *NOVEL OUTCOME*
Goal to better engage/integrate industry
Considering BMP & place-based approach

Connectivity of Outcomes: Infographic (still in draft form) to show how the outcomes are interconnected and how they connect to outputs and indicators. Link to infographic here.

Tidal Fish Habitat Interconnectivity Map: Map to communicate to the Management Board the interconnectivity of the fish habitat outcome to other outcomes within the CBP. Demonstrates how habitat information can come together and drive smarter conservation and restoration efforts in specific places. Link to Interconnectivity Map here.

9:50 am **Breakout group assignment & Instructions -** *Christina Garvey*

10:00 am **Break Out Group Discussion (1.5 hr)**

Blue Crab Sustainability Breakout Group

Group Attendance:
Ingrid Braun Rick, Adrienne Kotula, Amanda Small, Mandy Bromilow, Pat Geer, Benjamin Simon, Randy Feris

Chat Discussion:
Adrienne Kotula: Manage for a stable and productive crab fishery including working with the industry, recreational crabbers and other stakeholders to improve commercial and recreational harvest accountability. By 2018, evaluate the establishment of a Bay-wide, allocation-based management framework with annual levels set by the jurisdictions for the purpose of accounting for and adjusting harvest by each jurisdiction.

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Fish Habitat Breakout Group

Group Attendance: Chris Moore, Alexandra Fries, Clint Morgenson, Jason Kahm, Julie Reichert-Nguyen, Kinsey Tedford, Kristin Saunders, Marek Topolski, Reba Carruth, Rese Cloyd, Rochelle Seitz, Tom Parham, Simen Kaalstad

Chat Discussion:

Kinsey Tedford: I'm the Fisheries Program Manager at the Oyster Recovery Partnership and manage our sustainable fisheries program.

Jason Kahn: I also have competing meetings with FEMA right now, so I may have to navigate between the two.

Rochelle Seitz: I'm Rochelle Seitz from VIMS and I work with food-web dynamics and habitat important for fisheries species. I worked with the forage committee.

Kristin Saunders: I can help translate "bay program world" if folks need

Julie Reichert-Nguyen: I believe Habitat GIT is putting forward a new novel outcome that is non tidal fish habitat. It seems like this one would be more focused on tidal fish habitat.

Kristin Saunders: Tom, do you think this "maintain" is meant to look at the longer term once standards are achieved? And do to do that through restoration and restoration for durable

Julie Reichert-Nguyen: Striped bass, blue crab are two iconic species to include. Also since there is a blue crab outcome, this work in fish habitat can support that outcome.

Julie Reichert-Nguyen: 4D estimator

Kristin Saunders: 4D interpolator is the official name I thought

Julie Reichert-Nguyen: I think you are right Kristin

Simen Kaalstad: Is it worth considering the language to include precipitation regimes (in addition to temperature increases) for key species like blue crab?

Kristin Saunders: We have been using "changing conditions" to capture those things and it would include precipitation as well as the other mentioned

Reba Carruth: How will climate and energy impacts be used to inform conservation and restoration work on CB fish habitat?
Renewable offshore wind energy

Reba Carruth: Atoms for Appalachia nuclear energy production cluster

Jason Kahn: Water withdrawals for data centers

Tom Parham: Draft outcome to consider: "Achieve and maintain shallow water habitat area for X key species through focused water quality, conservation and restoration improvements by XXXX." Draft outputs to consider: "Achieve bay water quality standards (DO, Clarity), Achieve SAV goal acreage, identify key habitat areas for x species, identify and implement conservation and restoration improvements to restore and protect key habitat areas for x key species"

Reba Carruth: Link to Atlantic Council - Atoms for Appalachia

Reba Carruth: Link to BOEM Offshore Solar

Reba Carruth: Society for Ecological Restoration … Mid-Atlantic Chapter

Kristin Saunders: "Fish don't care" is going in my great quotes list
Julie Reichert-Nguyen: Within the CBP - Wetlands, SAV, Climate Resiliency workgroups to help consider overlaps and how each group can contribute
Julie Reichert-Nguyen: For non-tidal, stream health workgroup and healthy watersheds GIT

Oyster Restoration Breakout Group

Group Attendance: Kevin Shabow, Ronal Owens, Allison Colden, Allison Tracy, Andrew Button, Andrew Larkin, Angela Sowers, Heather Lockwood, Jennica Moffat, Julie Luecke, Kevin Du Bois, Olivia Caretti, Rom Lipcius, Stephanie Westby

Chat Discussion:
Kevin Du Bois: What is the baseline for the 1800 acres?
Angela Sowers: Suggest "while maintaining the 10 tributaries completed by 2025"
Julie Luecke: I agree, Angela. Or "the reefs restored in the 10 (11) tributaries completed by 2025"
Andrew Larkin: Agree with Angie's proposed edit
Kevin Du Bois: Good point Olivia
Kevin Du Bois: Good point Rom
Andrew Larkin: Suggestion that we call the outcome: Oyster REEF Restoration Outcome, since that's really what we're talking about - it would also further distinguish this outcome from the oyster abundance outcome.
Kevin Du Bois: Starting Jan. 1 2026?
Rom Lipcius: Are harvested reefs going to be considered in the count or only sanctuary reefs?
Kevin Du Bois: Agreed Kevin S. Can you put that concept into draft text?
Heather Lockwood: Norfolk District/VMRC are planning large scale work in Tangier/Pocomoke with harvest and non-harvest reefs. I imagine we would just report non-harvest to this outcome and harvest to the oyster abundance outcome - it'd be up to us and the workgroup to decipher which reefs apply to each outcome.
Olivia Caretti: Current draft oyster abundance text - "Enhance the capacity of oysters to improve water quality through increased oyster abundance in the sustainably managed fishery and aquaculture"
Allison Tracy: I think we need to add non-harvested to this language
Olivia Caretti: I liked Rom's language "restore, maintain, and protect" - that implies non-harvest
Allison Tracy: It's implied but it could be clearer I think.
Olivia Caretti: Agree with Julie - we know that large scale regional restoration works. We need to maintain this, with the option of expanding and including smaller efforts.
Andrew Button: "Restore, conserve OR protect 1800 acres of NEW oyster reef…"
Olivia Caretti: We have outputs and indicators that accompany the outcome. I'd like to advocate for adding strategies and publishing those with the outcome. A lot of what we are discussing would fit within this category and help drive the approach to accomplishing the overarching outcome.
Rom Lipcius: Can we see the output and indicator language?

Olivia Caretti: *Link to draft outcome language document*
Olivia Caretti: *One strategy could address the coordinated effort that Allison brought up*
Heather Lockwood: *That's a good Allison, didn't think of it that way! Can't imagine any of us being okay without any restoration work being done moving forward especially since we're already underway in some areas!*
Olivia Caretti: *Regardless of approach, all 1800 acres will be in addition to the existing acreage in teh 10 tributaries. So it's all new whether it's restored first then conserved, or just conserved*

Oyster Abundance Breakout Group

Group Attendance:
Bruce Vogt, Adam Kenyon, Amanda Bevans, Christopher Judy, Jay Lazar, Ward Slacum

Chat Discussion:
Bruce Vogt: *Enhance the capacity of oysters to improve water quality through increased oyster abundance in the sustainably managed fishery and aquaculture*
Chris Judy: *EDIT from Lynn - manage oysters to enhance their capacity to improve water quality through sustainable fishery and aquaculture practices.*
Jay Lazar: *Is there a scenario where a fishery sets a benchmark of biomass that it sought to maintain, recognizing that total abundance fluctuates? I think one of the goals is ensure that the resource is not over harvested - maintaining a level of ecosystem services.*
Jay Lazar: *Could that benchmark conceivably increase incrementally? Potentially using a multi-year rolling average to help address interannual variability*
Chis Judy: *MD also has baseline info from our Fall survey. It feeds our stock assessment and shows trends. Seeding for BMP would add on top of that.*
Adam Kenyon: *Enhance the capacity of oysters to improve water quality through increased oyster abundance in the sustainably managed fishery and aquaculture. Maintain a sustainable bay wide blue crab fishery through cross jurisdictional coordination that supports fishing communities by achieving abundance and harvest rate targets as determined by the benchmark stock assessment. Communicate progress toward achieving abundance and harvest rate targets through the annual blue crab advisory report, and refine targets through 20xx based on best available science.*

11:30am **Lunch (1 hr)**

12:30pm **Blue Crab Sustainability Report Out (*Ingrid Braun-Ricks*)**

Outcome Language

- "Manage for" important - due to potential new results coming out of new benchmark stock assessment coming out- may not have a sustainable fishery

- Wanted to make room to achieve that again in case reference points change
- Not just communicating progress towards stock status- but also assessing and communicating it
- End goal- prefer end goal be through the next stock assessment - ideally every 3-5 year stock assessment. Could be more open ended to maintain and manage at a sustainable level- want to continue this for a long time

Outputs:

- Outputs capture desired timeframe for benchmark stock assessment- do not always have resources to do it at desired frequency.
- Elaborated on what research needs and key outputs (climate change, predator change, habitat)
- Research informs what actions managers should take to achieve outcome

Indicators

- Blue crab abundance and exploitation rates are standar
- Replaced economic value with socioeconomic factors
    - Economic value may not represent a negative stock status
    - Socio-economic factors are easier for us to measure throughout our timeframe by looking at number of participants on stockside value and impact to regional and local economies

Factors Influencing

- Changes to factors influencing language to make it more specific
    - Characterize known changes in environmental conditions:
        - Water quality
        - Rising water temp
        - Shifting ocean currents
        - Sav habitat loss
        - Disease rates
        - Predator prey interactions
    - Surveys may be less efficient

Pulse Check

- Group is comfortable with direction outcome is going
- Did not identify any additional groups to share language with- reflected current process pretty well
- Next iteration - can go to advisory committees (this may produce more drastic changes to what we have now)

Discussion

- *Peter Tango (in the chat):* Some of the language in the outcome might be more at an activity level
    - *Peter Tango:* (regarding comment in chat) I am not the mind-reader of the PSC and MB perspective on how rigid or flexible they will be at applying the logic framework, but at the moment observing that as a contrast between your two

statements there- TBD as to if they are going to be more rigid or not. Well put together summary - wait and see what comes out of the next few days and if there is more guidance from PSC and MB if we need to be more concise or not.

- *Thomas Ihde (in the chat):* I would suggest the addition of EG in the examples for things affected by temp since there are other factors as well.
    - *Ingrid Braun-Ricks:* I think that is a good addition too
    - *Thomas Ihde:* Along the lines of other things you were doing to generalize and make it more flexible so that we are not restricted to any specific factors that you outlined.
- *Rom Lipcius:* I know you plan to have additional time to look over it, assuming we will have a chance to look over the language again and send back comments?
    - Bruce: Yes. We don't need to submit the final language until April 25th. We will send around the slide deck from today for you to look over it and send in additional comments.
- *Rom Lipcius:* Every year we run the models and update it - how is that dealt with here?
    - *Ingrid Braun-Ricks:* We think that is included in our annual blue crab advisory report- we are not changing reference points every year but we think that is incorporated.
    - *Rom Lipcius:* There is the possibility that the reference points themselves will change when we rerun the model- not sure what the goal is. Maybe somebody could address that - would everytime we update the assessment, we would still have the assessment model and does that mean we would then update the reference points? We have sometimes done that, like in 2019 and so on, without the full benchmark stock assessment. I would not want to preclude updating the reference points with some of the updated stock assessments.
    - *Mandy Bromilow:* Does the developing protocols for updating the reference points…assessment period answer your question? Or is your question about the outcome?
- *Rom Lipcius:* The last fishery management plan was a long time ago - we haven't really used the fishery management plan but that is something we need to be doing more. We had the ecosystem fishery management plan and that whole document. I wonder if that is something that requires updating. We used parts of that in management when we look at how many menhaden need to be saved for striped bass etc. Is that what the intent is in "amendment to fishery management plan"?
    - *Ingrid Braun-Ricks:* Maybe "fishery management plan" isn't the right word. Tried to say "amendments to our fishery regulations" - what really is the tool that we would achieve, changing exploitation rate, is actually putting in regulations that would accommodate what we are trying to do. Fishery management plan isn't the right word because it sounds like an existing product that the CBSAC could work on updating
    - *Rom Lipcius:* Yeah that should be updated and it would include both regulations and laws.
    - *Gina Hunt (in the chat):* Maybe fishery rules?
    - *Adrienne Kotula (in the chat):* Or management actions?

- *Mandy Bromilow:* I do like management actions
- *Peter Tango (in the chat):* I do like flexibility of rules. Possible actions more than planning.

12:50pm Fish Habitat Report Out (*Chris Moore*)

Outcome Language

- Biggest change was the need to say "achieve and maintain suitable shallow water habitat"- based on recognition that there are a lot of areas that do not have habitat standards - make sure areas that are not meeting those standards, get those up first and then we maintain those. And that we are not in a situation that we maintain habitat at a level that is degraded.
- Talked about a number of different species that could be included under key species (croaker and spot are data rich and iconic species)- other discussion included white perch and striped bass, etc.
- Want species that cover a variety of habitats
  - Three separate habitat areas (non tidal freshwater, tidal fresh, tidal)
  - More focus on tidal areas in the past - but need to encompass all types of flow regimes
  - New tools in the future to assess outcomes
- What the suitability of habitat will look like based on changing conditions - Thinking on a 10 year time frame - but with what is happening in the ecosystem- what is suitable now may be different in 5,10,15 years. How do we account for that moving forward?

Outputs

- More that will be added in the notes (not reflected right now- people sent in new recommendations)
- Achieve bay water quality standards - water quality assessment is robust and will provide additional information on how we look at these habitats in regard to fish habitat. One of the most basic things we can do is achieve well defined bay water quality standards.
- Forage goal - used to be an outcome, switched to output - a lot of work has been done and already has language to assess forage trends and project, but what are we doing with that info? Language change here needs to be included to ensure there is a defined output moving forward.
- Need to identify key habitat areas for critical life stages - are we always worried about adult of a certain species? Or do we need to think about where are the juveniles? Other life stages? Identify habitats that harbor those critical life stages that may be different as you move into adults and juveniles. More information on that in the notes.

Indicators

- Temperature - as it changes will affect salt water, tidal freshwater, and freshwater areas - discussion on marine heatwaves and changes to freshwater species like brook trout
- Dissolved oxygen
- Salinity = how habitats may be changing due to changes in salinity
- Fisheries surveys - species we would like to monitor
  - Redrum, shrimp, cobia - entering the bay

    - Time thinking about species that would be leaving the bay (striped bass reproduction challenges) - want to make sure to monitor those species leaving
    - More time thinking about tidal species vs. non tidal species

Pulse Check

- Group is comfortable with where we are going with the outcome
- Interest in integrating these recommendations into state water quality standards - how to take this information and affect change at the state level?
- Fish habitat is integrated into so many other goal teams - information sharing needed (Habitat GIT, Healthy Watersheds GIT)
- Work with USGS (and other partners) and integrate collected data into outputs and indicators

Discussion

- *Peter Tango:* Appreciating the thought going into this and where this is going. There is some complimentary information that has been presented about information available on key stressors and what that may mean for suitability of habitat. There have been publications that show the watershed wide distribution and cases of anomalies from backgrounds that would be considered as stressful. Just consideration in the discussion in the coming weeks about whether that fits as a compliment to the tidal side that is well developed. Other element I spoke to was on the indicator side- importance of structural elements and how that affects species - great work from NOAA and others on shoreline hardening and integrity as part of that habitat suitability and structural dimension of species needs- maybe that fits in there with your temp, salinity, DO portfolio of measures that can inform form for shallow water. I think the debate on shallow water will continue.
    - *Chris Moore:* I think that is very helpful. We had a robust discussion on - what is shallow water? Had discussion about oysters and including depth of 5m.
    - *Peter Tango:* It will probably come up in trying to define what that outcome means - we will keep at it, good work
    - *Bruce Vogt:* Important when developing habitat suitability for the segments- We have been more in the 5 m boat because of oysters , but you can see (in the interconnectivity map) it is still a small portion of the segments. I showed the Choptank as an example, shallow water further constricts the area we are talking about if we say it is 5m.
- *Allison Colden:* Glad to see how this has progressed and happy you all are discussing new species moving into the bay - we have been deep in that world, working on menhaden stuff with the commission. With respect to forage abundance and habitat availability for forage of key species - are key forage species looked at for the previous outcome/agreement still the same key forage species that will be important moving forward as the predator assemblage changes overall? I know some other predators coming in (redrum and cobia) have very little diet data in the Chesapeake Bay. How do we resolve that or be very explicit that understanding those needs so that we can tie them back to those key forage species and what their habitat needs are- that needs to be a part of this as well.

    - *Chris Moore:* From our discussion, we didn't quite get into those types of changes - You had a good point on how forage will change (not as new species come in but also how our forage species have different migration times/resident times etc.). That was encompassed a lot under what is our planning horizon - next 5 yrs, 10 yrs. Need to be flexible enough to account for the changing conditions of forage and changing makeup of forage complex moving forward.
- *Kristen Saunders:* MB level update - members of MB looking at fish habitat outcome and questioning whether it should be tidal vs non-tidal - Don't want people to be caught off guard if these ideas look different from what comes out on the other end of this process of outcome review. Tried in discussion to daylight the things that might crossover in terms of outputs/indicators that incorporate both tidal and nontidal perspective. Spoke with the group to think of different options. I don't know where this will go but I think we will be ready either way. Tom Parham took a stab at creating a quick visualization to see how this all fits together if we focus in on the outcome, outputs, indicators etc.
    - *Tom Parham:* (Presenting visual) This is stuff we put together last minute - no means consensus. Put together outputs that go directly with outcomes- worked on general level indicators that would roll into that. Looked at specific outputs/indicators for key individual species. One of the reasons you see a lot of water quality components in there is that even with these species level indicators, it allows modelers to run scenarios (nutrient loading, climate change scenarios) that directly relate to changes in how these fish habitats would be impacted. That is a benefit. Because fish habitat is cross-cutting with a lot of other GIT groups, it uses some of these similar indicators, so any activities done in any of these other groups would also benefit fish habitat. Rolled up from outcome, to output, to indicators. It also includes a bit about CESAR since they were saying nutrient sediment reduction is not the only stressor - there are other current and emergent threats that can impact different species over different life stages. This is just a quick type up of what I gathered from different discussions, just something to consider.
    - *Chris Moore:* Highlight watershed conditions and land conversion. There are a whole host of factors resulting (or could result) in big changes from intakes like data centers, land conversion for energy production, etc. Talks about what Peter spoke about with shoreline changes - thinking about changes happening in the watershed is important as well. Glad Tom captured some of that here.
    - *Bruce Vogt:* Great work everyone. I will also add that invasives and toxics was on Tom's last slide and I know toxics is doing a revamping of their outcome but we do not have invasives outcome so trying to tie that in as a potential stressor for fish habitat might be good to show that we are not ignoring invasives in this process.

1:10 pm Oyster Restoration Report Out (*Kevin Schabow*)

Outcome Language

- Robust conversation but more wordsmithing expected to happen

- From when to when?
    - What is the timeline and can we achieve 1800 acres in that time?
    - 1800 was from the last ten years - still achievable
    - When are we starting? Work going on now that is not in the 10 tribs?
        - Appropriate to include some of those acreages
    - Healthy thriving oyster reefs - should count towards goals.
- Do we want to also include areas that are currently thriving oyster reefs and moved to more protection status?
- Defining what we mean by protect and conserve
    - Is it clear enough that one outcome will be restoration (non-harvest) and the other outcome refers to harvest areas.
- How much detail do we need in the brief outcome goal vs. what can we clarify in outputs and indicators (words like "non-harvest", "maintain", "restore and protect") - and can we define them further down in outputs and indicators?
- Two different oyster outcomes - do not want to mix them
- "Restore" meaning reef restoration goal and "replenishment" refer to actions that happen specifically on harvest reefs
- One change from last generation goal to current - total number of acres, did not talk about tributaries or focus areas, it was grouping them all together. Ecological reasons to group them - do we need them specified in the language? If we do not put it in outcome language- can put it in the output?
- Spoke the most about "protect, conserve, restore" and what do those mean.
    - Thought it was important to make room for conservation (healthy reefs but do not have protection)
    - In previous outcome, VA did have around 500 acres of pre-met reefs that were added in, but they do not have legal protection - we wanted to allow for that with "restore, protect, conserve"

Outputs

- Success metrics- plan to clarify this for non-harvest reefs within the output
- Selection of focus areas - at some point in the output language - idea behind this is large scale - but we do not want to exclude small community based projects and want a space for that - in the 1800 acres do we specify what amount will be large v. small scale?
- Artificial Reef Program - need to be in areas with high probability of success & contributing as much as possible to large scale restoration if applied to this outcome
- Recognize that the restoration plans will have the specificity of what the outcome is - outcome needs to be concise so important to have blueprints and outputs that outline with more detail.

Indicators

- Nothing new to report

Discussion

- *Peter Tango:* In the timeline and smartification work - the "continually increase" words that was a concern - recognizing that you have a decade of 1800 acres and you are looking to do 1800, seems like a translation there is an anticipated rate of recovery that you can look at at a decadal scale - this is sort of the comfort zone of your expectations. Another way to craft it is at a rate of 1800 acres per decade. Then gives you flexibility to think beyond just one decadal hop. Helps you be a little more forward in terms of the years ahead and expectations for re-building. Also, are these all sanctuaries or are they fishable? What level of protection is there and what does this translate to in terms of the existing fishable reefs?
    - *Kevin Schabow:* That is the heart of the issue and one of the reasons we will talk about the abundance outcome next. In MD sanctuaries - harvest is not allowed.VA - there is a mix. Some of these are built on public fishing grounds that could technically be harvested but are not because of how they are built or due to cooperative agreement language, technically they are not legal oyster sanctuaries. Different legal framework in each jurisdiction.
    - *Peter Tango:* That does add a nuanced factor - language wise. But good work.
- *Gina Hunt:* Have you talked about language "restored oyster populations". "Restored" makes me think of some historic level (benchmark of restoration) but I do not think that is what we mean there - I think we mean to increase ecosystem benefits from the work being done by restoration activities. Restored implies we are done.
    - *Kevin Schabow:* It's not about restoring population - it is about restoring reefs.
    - *Gina Hunt:* It is just the word "restored" in general. The group didn't get hung up on that work, it is just me?
    - *Kevin Schabow:* We did not hear anything
    - *Stephanie Westby:* Gina, you are right, on an absolute level, what does restored mean? In the last round we defined that - for this policy goal, it was oyster reefs 6 years post-restoration that meet these 6 metrics will be considered "restored". Thought is to review those metrics and have something to resolve this at the front so that ten years from now we are not debating what is restored or not. I think we handled it by having a technical definition. We could also use another word, I am not taking that off the table.
    - *Gina Hunt:* I don't mind "restore" in the next sentence because that speaks to new acreage. This is speaking to ecosystem benefits and increasing those benefits - the more oysters you have in the water the more benefits. I think it is used differently. If you can define what restored oyster populations means that would clear it up. This is the language that goes into the Bay Agreement, to me it screams we restored them and now we are working on ecosystem benefits. I am more sensitive to the word because this is what will be in the agreement.
    - *Kevin Schabow:* I think restored oyster populations really muddies the waters between this and the abundance outcome
    - *Gina Hunt:* Yeah
    - *Bruce Vogt:* But you are hung up on the word "restored" - so it is "benefits from oyster reefs" and strike out restored?

- *Gina Hunt:* Yes
- *Bruce Vogt:* Because then you say, how are you going to do that? Well you are going to protect or restore the set number of acres of new oyster habitat.
- *Gina Hunt:* Right
- *Kevin Schabow:* Good catch Gina

1:30pm Oyster Abundance Report Out (*Bruce Vogt*)

Outcome Language

- New Outcome - nothing in current agreement that speaks to oyster fishery
- Great to better engage oyster fishery industry and aquaculture - this outcome is a way to do that and make it distinct from restoration efforts
- We flipped the oyster abundance language - did not change much just flipped
- Focused on enhancing oysters to improve water quality - the condition we are seeking to change is water quality
- How would you actually measure that change?
  - Abundance can fluctuate through time but we may be able to get similar water quality benefits
- Discussion around what does sustainable mean?
  - Sustainably manage and also have water quality benefits
- BMP for aquaculture and wild fishery - could be one strategy to track water quality changes (specific requirements to meet BMP)
  - But do not want to tie this solely to the BMP
- Adam Kenyon mentioned that VA has 130 acres of private aquaculture fishery leases - would be great to enhance that/give credit to that
- How are jurisdictions enhancing certain areas (shell replenishment) - use this information to estimate what the nitrogen, sediment credits are attached to those enhancement efforts
  - Create a baseline of what currently exists and see if we are enhancing beyond that baseline
- Need to better define what "sustainable management practices" means
  - There is an interest (from both jurisdictions) - what sort of sustainable management practices could be developed to achieve the outcome?
- VA - monitoring information to capture public fishery area - private aquaculture is tougher nut to crack
- MD - stock assessment, and fall survey (can help gather data for the benchmark and track change over time)

Outputs

- Important outputs:
  - Setting benchmark & baseline is key to show going beyond (MD stock assessment, VOSARA in VA)
  - Develop & apply sustainable fishery practices

    - Increase industry areas - public and aquaculture
    - Training to develop new fishing and aquaculture capacity
    - May need a workgroup
- Establish workgroup to flesh details out more and have coordination among jurisdictions

Indicators

- Potential indicators:
    - Can mean/median age of people engaged in the fishery (public/private) be an indicator? - address observed age decrease in industry
    - % engaged in BMP program
    - Economic output
        - Looked at blue crab as example, how many enhancement projects going into the water vs how many oysters are coming out of the water
    - Inputs and harvest
    - Measures of nutrient reduction
- There can be other accounting that can be done to track and credit for enhancements - not just BMP focused

Pulse Check

- People are comfortable with direction
- Need to define what implementation looks like
- Chris Judy and Adam Kenyon would communicate this to OAC and blue ribbon panel and brief their reps.

Discussion

- *Olivia Caretti:* I wanted to provide some context on oyster harvest BMP - still a lot of work needed to be done before effectively implemented. Something to consider - doesn't mean it cannot happen in the timeframe that this outcome is developed. Putting that out there as someone who has spent a lot of time working on the BMPs.
    - *Bruce Vogt:* In our group we were talking mainly to fishery folks, but doesn't BMP include folks like VA DEQ and MDE? Going back to pulse check slide, are there other people that need to be involved?
    - *Olivia Caretti:* Working mostly in MD, I am most familiar with the players here. Obviously, DNR & MDE is involved. MDE really manages all of the BMPs for mitigation - so they will need to be involved as well. I am sure there is an equivalent in VA - I cannot remember off the top of my head.
    - *Chris Moore:* DEQ would be involved in VA - we already set up in VA through DEQ for the aquaculture piece. We do not have the public fishery option available in VA due to differences in spat set and the way that happens. Bigger discussion in MD right now although there are a few localities that have submitted oysters through their TMDL action plans.
- *Kevin Schabow:* Is there a BMP specific output that would be associated with this?

    - *Bruce Vogt:* That was one of the strategies that we thought of. We did say that the BMP has to be additive. Have to show that you are doing something that is enhancing to better oyster populations. Would be one piece but not the whole thing.
    - *Kevin Schabow:* Yeah, I think that is the way I said it in the materials I will be giving the MB tomorrow
- *Gina Hunt:* I wanted to clarify, we do not need output language now. There is more discussions to be had in MD about BMP's shortly. We can have a better handle on what is measurable/additive here shortly but not by May. Wondering if we put in some kind of blanket BMP language and VA and MD talk and figure out what can we actually measure and then update the output- or do we need an output yet? Not sure from MB of when they would expect this kind of detailed language. This is not what goes into the agreement - not sure if they will give us more time for that. Need clarity on that.
    - *Kevin Schabow:* Hopefully dust will settle soon in the next couple of weeks. Especially in a novel outcome like this - a lot of work is to go into this before we have outputs.
    - *Gina Hunt:* On MD , we can work on this moving forward but not in the short timeline for outcomes. I don't know if VA is going to want to put in something that they think would be more measurable for BMPs. We are not prepared to come up with that language right now. Unless it is broad - it could be broad.
    - *Bruce Vogt:* Good to have conversation about outputs because it helps provide clarity when talking about the outcome among ourselves, but more work to be done there and not something we are submitting to MB at this time.
    - *Jay Lazar:* Keeping this open. BMP is an opportunity to engage folks - BMP not a requirement to move forward/engagement. More like we have this thing, how can we make it work for us?
    - *Kevin Schabow:* We may find out tomorrow because novel outcomes will be discussed (at MB meeting). This is one of very few new outcomes - we do not know if they are on different timelines/being treated differently. For oyster abundance, it is going to need more time to craft outputs that are meaningful and realistic.
    - *Gina Hunt:* Okay that is all I needed. Just wanted to make sure we were not on the hook for anything very specific on BMPs. Thanks
- *Bruce Vogt:* We did not decide on the name but it is leaning more towards sustainable harvest, or sustainable fisheries or something related to that because we took the abundance language out.
- *Kevin Schabow:* I think that is good because it is further distinction from the blue crab abundance outcome.
- *Bruce Vogt:* Yeah, we actually looked at that. Since this one (oyster abundance) is tied to more water quality. Blue crab is tied to maintaining that sustainable fishery and harvest. Oyster abundance outcome has a fishery component and water quality component so it is different.
- *Kevin Schabow:* Bullet point asking about creating a workgroup for this. I do think it would require a new workgroup (would have different people). Question back to the

jurisdictions - do we have the people and the time to put in that workgroup. This is a big effort, and will take a village. I may get that question at the management board meeting tomorrow (who is going to do this)- and can point to this meeting and host of partners referenced here.

- *Bruce Vogt:* I can imagine this being a workgroup that has a lot to do the first year and then looks more like CBSAC where you are tracking progress towards outcome. As long as we established these things up front (sustainable practices we create/develop, outputs) once you flesh those out it might be a workgroup that meets less frequently. Cross-jurisdictional coordination.
- *Jim Uphoff (in the chat):* Could water quality be construed as competing with harvest? That might not go over well with harvesters and growers.
    - *Jay Lazar:* Industry would like the recognition that how the fishery is managed and how they are running their operations does provide ecosystem services and they would like to be recognized for that. Did not seem like it would be in conflict - they are contributing to the overall health of the Bay. Recognizing that we would also like more oysters to pull more of them out and have more services while they are in the water.
    - *Bruce Vogt:* From what we heard from some industry representatives they see this as a benefit and as a marketing tool.
    - *Gina Hunt (in the chat):* More ecosystem services
- *Gina Hunt:* Going back to Bruce's question from earlier. When you say, who will champion this? Right now the Fish GIT is championing it. For a new workgroup, I suspect on a jurisdiction level, it's going to be some of the same folks that we send to this workgroup that we send to the next. The difference is there are more people that are not currently on an oyster workgroup that would need to be included in this that are more specific to what the outputs are. I agree with Bruce, this will be a very heavy lift from the beginning and then maintains itself moving on. Big difference for a workgroup is that we need additional folks - unique folks that are not usually in FishGIT coming to this one.
- *Kevin Schabow:* 100%
- *Bruce Vogt:* Curious if we want to shop this with the Water Quality folks/GIT… there is also CAST where the BMP's are in. Does CAST also track implementation of BMPs? Are there existing tools that the water quality folks have that might help track this?
- *Peter Tango:* Might be good question for Tom and folks in VA. If it is a BMP that has been approved in the modeling world then it has tracking requirements so I would expect annual reporting but that is as much as I can offer.
- *Gina Hunt:* I think it is in CAST but it is not currently being used right now. Moving forward I do not think it would be a heavy lift to track BMPs as one metric because it is already going to be reported - someone is entering it into CAST to get the credit.

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2:00 pm Wrap Up

Thank you to everyone for your attendance and participation

Next steps:

- *Sharing materials (meeting notes, presentation slides, draft outcome language)*
- *Might ask you all to weigh in a little bit more on outcome language as we prepare to submit final language to MB*
  - *April 25th date is our timeline*

This discussion from this afternoon seemed very robust. Appreciate everyone leaning in- we represent you all and it is crucial that we hear from you and get input. Thank you.

2:30 pm Meeting Adjourns