STAR/Beyond 2025 - Climate Small Group Meeting
Theme: Cross-Cutting Topics Across Beyond 2025 Small Groups

Thursday, January 25, 2023
10:00AM – 12:00 PM
Meeting Materials: Link

Next steps/action items:

- **Email Breck Sullivan (bsullivan@chesapeakebay.net) by January 31st, 2024 at NOON, if you have any additions or changes to the 2024 STAR priorities.**
- **Feedback for the Climate small group may be added to this document by anyone.**
- **Kristin Saunders (UMCES) and STAC Workshop on Ecosystem Services steering committee – please send recommendations from the report relevant to the Beyond 2025 small groups to the small group leads.**
- **Anyone interested may attend the Clean Water small group listening session on February 1st from 10AM-12PM.**
- **If anyone wants to follow up with Dr. Weisueh Chiu they can email him at wchiu@tamu.edu.**
- **Brooke Landry will share comments that the Shallow Water small group received during their listening sessions about climate with Breck Sullivan, and comments relevant to the People small group with Julia Wakeling.**
- **Anyone interested in discussing the climate and people intersection more can email Julia Wakeling at julia.wakeling@dc.gov.**
- **STAR will connect Dr. Weisueh Chiu and the Climate Resiliency Workgroup leadership for a connection with the Texas A & M landscape architecture department for a future CRWG presentation.**

MINUTES

10:00 AM **Welcome, Introductions & Announcements** – ***Ken Hyer*** *(USGS) and* ***Kimberly Van Meter*** *(Penn State) - STAR chair and vice chair,* ***Breck Sullivan*** *(USGS) STAR Coordinator,* ***Peter Tango*** *(USGS) CBP Monitoring Coordinator*

Ken Hyer (USGS) will be starting a new position as the USGS Chesapeake Coordinator. This was Scott Phillip's previous position. Ken will still be STAR chair.

Announcements

- C-StREAM Fellowship Program applications now open. Applications were due January 28th, 2024.

In addition to the C-StREAM Fellowship, there is another internship opportunity available through Franklin & Marshall college. The deadline is 1/27/24 for their summer internship and their fall internship. In the fall, the students will work remotely or in-person (depending on location) for 10 hours a week. Right now Integrated Trends and Analysis Team (ITAT) is hosting a Franklin & Marshall intern for the spring semester. Chris Guy (USFWS) said the Wetlands Workgroup is putting in an application for a Frankling& Marshall intern, and he asked if Breck wanted to look at the application. Breck said she would take a look at the application.

Chris Guy shared the Delaware Wetlands Conference which will take place on 2/6-2/7/2024.

August Goldfischer (CRC) reminded the group that the STAR newsletter provides quarterly updates for all workgroups in STAR. Newsletter sign-up link.

Upcoming Conferences, Meetings, Workshops and Webinars

- National Conference on Ecosystem Restoration – April 14-19, 2024, Albuquerque, New Mexico.
- Choose Clean Water Conference – May 20-22, 2024, Ellicott City, Maryland. Proposals for presentations, workshops and field trips due January 12.
- Chesapeake Community Research Symposium – June 10-12, 2024, Annapolis, Maryland.
- American Planning Association (APA) Virginia 2024 Conference – July 21 – 24, 2024, Williamsburg, Virginia. Session Proposals due February 23rd.

STAR Agenda Item:

10:05 AM Review and Input of STAR Priorities

Discussion:

Ken Hyer said to let STAR leadership know if anything is missing from the STAR priorities. He added that he hopes STAR leadership can routinely connect with Lee and Lucinda going forward and go back to STAR with what they learn. Peter Tango (USGS) commented in the past, Goal Implementation Team (GIT) funding centered around shorter-term project needs. Some of these priorities, like the auditing, are long-term funding needs which fit under the monitoring program. Are Lee and Lucinda looking for long term needs as well as short term? Breck responded that her understanding is they are open to hearing general funding needs, and more than one-year projects. Kristin Saunders (UMCES) added the confines of the past do not apply for GIT funding, so they will entertain discussion of multi-year and larger dollar value projects. Greg Allen (EPA) added that GIT funding was always multi-year, but it was not used for long-term repeated needs for monitoring programs. Peter Tango said from the Science and Technical Advisory Committee (STAC) Rising Water Temperatures Workshop there was a recommendation to put out a design for a temperature monitoring network. That's another

one of those long term, bigger term items that reflects both the Comprehensive Evaluation of System Response CESR and rising temperatures work.

Katie Brownson (USFS) asked if Breck was going to reference the science needs (including needs from the STAC Rising Water Temperatures Workshop) as well? Breck responded yes, she will be sharing the science needs database with Lee and Lucinda, stressing that this is a resource that states needs the GITs have already identified, and the database includes needs identified in the STAC rising water temperatures workshop. Katie Brownson said she was referencing those specific proposals she put together late last year for potential EPA funding and that it might be helpful to refresh their memory that she put those basic project ideas/funding needs together already.

Richard Tian (UMCES) asked if there were priorities listed related to living resources and shallow water. There is a desire for this direction in the program, but not sure if that's part of STAR. Tom Parham (MD DNR) said there will be requests from the Fisheries GIT as well as needs from CESR report follow-ups.

Breck said that was a good point, and since she will be showing the science needs that the GITs already identified to Lucinda and Lee, which aren't all from STAR, those will include living resources and shallow water related science needs.

Julie Reichert-Nguyen asked if the new GIT-funded process is known yet. Breck said it's not, all that's known is that Lee and Lucinda will meet with each GIT plus the Strategic Engagement Team (SET) and STAR to ask about their priorities for next two years plus funding needs. That's why STAR noted funding needs that STAR workgroups have. How they choose which ones they fund, however, is unknown. Julie responded in that case, this could be different pools of money, not just from the Chesapeake Bay Trust, but maybe from Inflation Reduction Act (IRA) funding and other sources. That's helpful because some of the priorities that the Climate Resiliency Workgroup (CRWG) put forward are more expensive than GIT funding would cover. For example, a temperature monitoring network (and adding living resource monitoring on top of any monitoring network). Because climate is cross cutting, Julie wondered if there are any efforts to have conversations with other GITs.

Breck said she wasn't sure about other GITs, but STAR has been talking with Jeremy Hanson for the Water Quality Goal Implementation Team (WQGIT) since there is overlap between the two groups for the Water Quality Standards Attainment and Monitoring (WQSAM) Outcome. Julie emphasized she wants to make sure cross cutting issues are not lost in the conversations.

Kristin Saunders (UMCES) noted that when the GIT Chairs last talked with Lucinda and Lee, the Chairs emphasized they would really like to have the opportunity to look across the GITs and compare information and needs and find ways to connect the work that needs to be done. Despite the fact that there is no process once the conversations with Lucinda and Lee have happened, the February GIT Chairs meeting will be used to talk about collaborations across

needs. The Chairs made it clear they want to have that conversation across the silos and think about how the work can benefit multiple goal teams.

Beyond 2025 Climate Small Group Agenda Items:

10:20 AM **Accounting for Maryland's Ecosystem Services** **– *Elliott Campbell***

Elliott will present on the ecosystem service/environmental accounting efforts at Maryland DNR to integrate the value of nature into decision making.

AMESreportFinal_MDDNR.pdf (maryland.gov)

Presentation summary:

Elliott Campbell (MD DNR) has a background in system ecology and ecological economics. Elliott first went over the difference between neo-classical economics and ecological economics. Ecological economics embeds the economy within the environment itself. Ecosystem Services (ES) are a way to value the way the environment provides benefits to people and the economy. The definition that MD DNR uses is: "Benefits gained by people from the environment that are not already being paid for in a market and are contributing to a marginal increase in human well-being". There are a lot of conversations about integrating people and the environment beyond 2025 in the CBP; ecosystem services are one way to do that, if done well.

The term ecosystem services was coined in the 1980s and popularized in the 1990s. It is well-codified in federal decision making, and there are many different approaches to decision making. They can be spatial in nature, and they don't always have a dollar value on it, but decision makers will understand it better when a dollar value is attached. However, economic benefit is an imperfect measure. A downside of ecosystem services is that it is difficult to consider equity within a typical ecosystem services assessment, and the results could be actually used to exacerbate inequity. For example, if the benefit of a wetland in reducing flooding is assigned a dollar value, that dollar value is tied to the infrastructure value. The value of infrastructure will be higher for wealthier residents and lower for poorer residents, which exacerbates existing inequality. For example, say a wetland in Dorchester County, Maryland, is doing a good job of attenuating wave energy and protecting a community like Cambridge. Compared to a wetland in Anne Arundel County that is performing less of an actual attenuation service but is protecting homes that cost four times as much, it would have a lower ecosystem service value even though the actual attenuation is greater. Another downside is that ecosystem services can be difficult to communicate about with the public and have high uncertainty.

Elliott went on to describe the work MD DNR does with ecosystem services in Maryland. They've mapped services including air pollution mitigation, carbon sequestration, groundwater recharge, nitrogen removal, flood prevention/stormwater mitigation, and wildlife habitat. Elliot explained the methodology used in the research, which was looking at a number of different ways people are benefiting from the environment. Many researchers only look at one specific

way. Adding many different ways can lead to double counting, so instead the researchers created an index and divided the ways they're benefiting to calculate an average benefit for each category such as water or wildlife. It's important to make the distinction that this is not market value, but it is instructive to use in decision making as reflective of a social value these services are making to society.

Next, Elliott shared DNR's new project, Updating Maryland's Green Infrastructure, completed with the Chesapeake Conservation Innovation Center this past year. First, they used high resolution land cover/land use data to update their green infrastructure map. They also took the ecosystem services model and translated it to areas that could be suitable for restoration. They considered carbon sequestration, air quality, climate resilience, water supply protection and wildlife habitat. For climate resilience, they are still working on flooding, but they did look at heat mitigation. They also included a layer using the Center for Disease Control's (CDC) Social Vulnerability Index. They did not take the extra step for economic valuation, somewhat due to its controversial nature as well as that these restoration projects are theoretical at this point, which makes measuring their economic benefit difficult.

Finally, Elliott shared potential applications to CBP's Beyond 2025 efforts and general advice for using ecosystem services. He cautioned that studies that use different methodology are not directly comparable. On the positive side, national datasets and Federal tools like the Enviro-Atlas and Watershed Resource Registry make a Chesapeake Bay wide assessment possible that is consistent and could be maintained regularly. Valuation of the ecosystem services, however, would require additional research. CBP should be intentional regarding the intended use/applications, methodological approach, scale and acceptable uncertainty.

Discussion:

Discussion Questions:

- How may these efforts expand beyond Maryland and be incorporated into the Chesapeake Bay Program framework?
- How does the Chesapeake Bay Program currently assess tradeoffs, and how can we better consider tradeoffs in our decision-making process?

John Wolf (USGS) asked how did Elliott choose the ecosystem service to quantify? Was it based on data availability that could be used with various ecosystem services assessment methods? Elliott responded that it was based on data availability and economic significance. One topic they were missing was pollination. Elliott had an economic value on it, but it was small. He thinks that was a failure of the method to value it [since it is known that pollination is very important ecologically and economically].

Greg Allen (EPA) shared that The Budget and Finance Workgroup is working on a STAC workshop proposal re: state of the science to support market-based approaches. Breck asked if

this workshop is already in the works or if it's being put in for the call for proposals? Greg clarified that it's being put in for the recent call for STAC proposals.

Richard Tian asked, should the happiness of people be taken into account in ecosystem service valuation? Because a clean or dirty environment changes how people feel. Elliott responded he thinks it would be useful, and there is a whole field of ecosystem services that goes into cultural services. Surveys have been done on how people feel according to different aspects of the environment.

John Wolf said he's always been a big fan of the GreenPrint tool and asked, can the GreenPrint approach be translated to other geographic boundaries beyond parcels (Hydrologic Unit Codes/HUCs, catchments, counties, etc.)?

Kristin Saunders (UMCES) commented that Elliott's work is one of several methods the STAC workshop on quantifying ecosystem services reviewed and will be incorporated into the final report recommendations (coming out soon). The stakeholders they talked to said that if quantifications were available, they would definitely consider the information in their decision making. They also talked about the need to build incentives (like credit in CAST or additional payments) to drive decisions toward broader ecosystem considerations beyond the typical approach to low cost, high nutrient removal in order to intentionally get projects that serve multiple outcomes. Kristin Saunders said at that workshop they talked about the idea of having a tool like Maryland's approach that would serve the entire watershed. It will be one of the recommendations to consider.

Larry Sanford (UMCES) asked, are there specific aspects of ecosystem services that could be replicated across the watershed? For example, the report that just came out of the CBP that says CBP's forest goals are way behind. The tree planting would be useful, or the flooding vulnerability index is valuable for the program as a whole. Elliott responded that there is no reason why that can't be done. First you would need to figure out what decision you want to influence, and then decide on the appropriate methodology to influence that decision. It's relatively straightforward to decide on the areas with the highest flooding vulnerability. There is a variation of the carbon sequestration benefits that is US-wide. The same is true for flooding. Elliott's research team is still working on flooding, but they are using national data sets. It can be done for the watershed.

Larry asked if the project considered both tidal and stormwater flooding. Elliott responded he would like to consider fluvial driven flooding but there's not a good dataset. They're looking at coastal flooding. They're looking at a MD specific flood plain and a study that raised flood plain up to 3 feet. They call it the climate ready action boundary. Those are the sources of inland flooding they're looking at now, but Elliott would like to find something with more of a saltwater trend.

John Wolf said there is the potential to leverage structured decision making (SDM) to help decide on what ecosystem services to consider, with connections to the Watershed Agreement

(or future "agreement") as part of the criteria. Breck responded that the Climate Small Group has discussed the need to bring SDM more into their decision making, and it is great to consider it in terms of ES.

Breck added that in Elliott's presentation he explained the connection to climate vulnerability. He looked at what could impact climate resiliency, but did he have data that actually measures the resiliency of something? Elliott asked for clarification, resiliency of the population or of the infrastructure? Breck said the climate small group is struggling with how to track and measure resiliency, and what metrics to use for it instead of just showing what is impacted by climate. Elliott said that's really difficult to do. They tried to look at building footprint and they might incorporate that into the flood piece. They have some data on base flood elevation for buildings. It's not a publicly accessible dataset at a level that's useful to them. What they end up quantifying is the vulnerability to climate disruptions and how do they want to use that information to better their operations and make goals that are more actionable.

Julie Reichert-Nguyen added that the Climate Resiliency Workgroup for years now have been trying to sort out quantifying the effectiveness of adaptation strategies in addressing climate vulnerabilities. It is a challenge for sure.

Breck said for people working on the report Kristin mentioned, they should please send recommendations relevant to the small groups.

11:05 AM **Overview of U.S. Climate Vulnerability Index** – ***Dr. Weihsueh Chiu (Texas A & M)***

The U.S. Climate Vulnerability Index shows where action and resources are most urgently needed. The tool visualizes how drivers of cumulative vulnerability disadvantage communities across the United States to equip communities and policymakers with actionable data.

https://climatevulnerabilityindex.org/

Presentation summary:

Dr. Weisueh Chiu explained that the Climate Vulnerability Index's (CVI) goal is to integrate, visualize, and prioritize climate impacts. First, he shared examples of Environmental Justice screening tools that preceded the Climate Vulnerability Index. EJScreen has the ability to pick and choose factors but lacks ability to aggregate. On the other hand, CalEnviroScreen helps aggregate factors, but doesn't necessarily show which factors are most important. Regarding taking action to mitigate, a lot of focus has been on chemical pollution side. Existing approaches have difficulty zooming in and out from individual factors to cumulative impact. It can be difficult to identify key stressors and key places to intervene to mitigate the impacts of these effects. They identified a critical need for a tool that can equip policy makers to effectively prioritize resources and interventions and give communities access to data at the census tract level to help self-advocate. The project's goal in making the Climate Vulnerability Index was to

identify local climate vulnerabilities on a national scale through a data-driven, GIS-based mapping tool integrating cumulative impacts of climate change, health, and environment. They wanted to disentangle the factors contributing most to climate vulnerability and inequity.

The project team pulled together 184 datasets with national coverage, mostly at the census tract scale. Because there was so much data, they organized the data into baseline vulnerabilities related to community resilience, and climate change risks that are direct or indirect impacts on communities. The impacts were divided into different domains, with subcategories and individual indicators. This allows for zooming in and out geographically and in terms of indicators. Each climate impact has its own geographic pattern. Once the team compiled a paper, they contracted with Darkhorse Analytics to develop the CVI web tool. Dr. Chiu demonstrated a few ways to use the CVI.

The other part of this project was connecting this data to policy. Within the paper, the team tried to match indicators and domains in the CVI with resources from the Inflation Reduction Act (IRA), the Infrastructure, Investment and Jobs Act (IIJA), and Justice 40. They aimed to not just provide the data but provide a roadmap for communities for where they can get resources to improve their resilience and reduce their vulnerabilities. Going forward, CVI aims to help communities and policy makers identify where mitigation and intervention are most needed, what are the most critical factors underlying cumulative vulnerability, and how to match vulnerabilities and resources and develop targeted strategies that improve resilience to climate change. They envision specific areas augmenting with localized data that they have available that isn't available nationwide. Dr. Chiu provided an example of a community in Illinois that was able to do this.

Discussion:

Discussion Questions:

- How can the CBP build broader definitions of resilience into their work, such as measures of public health and social and economic well-being (as defined by the community). What value does the CBP add to tackling these issues?
- How can CBP elevate protection of people most at risk from the impacts of climate change in its work to restore and protect the Bay?
- What models and case studies could CBP draw from to help guide our efforts?

Coreen Weilminster (MD DNR) shared an interesting new vulnerability/risk resource for individual property owners: https://riskfactor.com/

Peter Tango (USGS) thanked Dr. Chiu for the presentation, and said that something that is really helpful with the indicator is to look at the overall scoring, and then drill down to factors or domains, which is really helpful to informing what needs attention more specifically, where and why.

Bill Dennison (UMCES) commented that UMCES started using the Social Vulnerability Index for their annual report cards. They're all drawing from the same socioeconomic databases, and he wondered what's the overlap and differences. Dr. Chiu responded that they've incorporated most of their underlying data from indices like the SVI into the CVI. Ultimately, they want people to create their own customized index using the CVI datasets. They partnered with some community partners that suggested different datasets they included.

Joseph Galarraga (TNC) shared research conducted by EDF on truck traffic pollution and warehouses - EDF Report: Air Pollution from Warehouse Trucks Places Unequal Burden on Communities of Color and Areas of Low Wealth and Making the Invisible Visible : Shining a Light on Warehouse Truck Air Pollution.

Bill Dennison said UMCES always start their conversation with communities with what are the values and threats. He applauds the CVI team's goal of making it for local consumption. Dr. Chiu responded that people are free to download the individual indicator data. However,for many communities, it's a big lift to develop their own indices, so they wanted to provide a prepackaged version. In the paper they did some simple clustering analyses. There were six representative clusters of types of patterns of indicators. Cluster A is where there is an intersection of heightened climate risk and heightened social disparity.

Coreen Weilminster asked if Dr. Chiu would address the use of these tools for addressing the National Climate Assessment (NCA) 2024 recommendations for shifting From Incremental to Transformative Adaptation: Incremental = Bias towards preserving the present state; minor shifts in usual practices; small geographic areas; single hazards; limited ability to address multiple sectors; technical, social, and economic barriers. Transformative: May use a systems approach across multiple sectors; address the root cause of vulnerabilities; consider multiple and compound hazards; inclusive of the needs of diverse stakeholders; centers equity and addresses historic injustices; community led. Dr. Chiu responded that is a great question. He said their process incorporated a lot of these points (e.g., community-led, equity and historical injustices, multiple and compound hazards, root cause of vulnerabilities), but he hasn't done a detailed crosswalk. He added he is happy to follow up more with Coreen.

Katie Brownson (USFS) commented that looking at overall climate vulnerability in the CVI, it looks like the Chesapeake isn't particularly vulnerable (comparatively) but if filtering for climate impacts -> extreme events, much of the watershed pops up as "highest vulnerability". So working to improve resilience to those extreme events through natural infrastructure, etc. could be an important role for the Bay Program. Peter Tango responded to Katie that he thinks of the variance in the system that really drives impact rather than the mean. Hurricane Agnes changed the Bay, extended hot temperatures change eelgrass distribution with just short duration (days) events, arrival of West Nile Virus slammed blue jay, crow, and other populations for nearly a decade, etc. Extremes, anomalies drive a lot of change, while long term means drive shifting baselines and are conceptually important to managing the system.

August Goldfischer (CRC) asked, how do these indices account for non-geographically clustered populations that are more vulnerable to climate impacts? Dr. Chiu responded that each census tract is an independent score, but vulnerable populations are part of the CVI. Of course, socioeconomically vulnerable (like poverty, etc.) but also veterans, homeless, disabled, single parent households. Not all of these are available at the census scale, though. So, tracts with more of these populations are rated more vulnerable.

11:25 AM **Weighing the Options: Beyond 2025 Climate Recommendations - *Round Robin with small groups and other participants***

The Beyond 2025 Small Group effort is tasked with developing 5 recommendations for each group while considering topics including climate change. This discussion time will be used to understand the climate considerations of other small groups and main themes coming out of the Climate small group. An online resource such as jamboard/google docs will also be available for input.

Breck started off by sharing the scope and purpose of the climate small group and the questions they've been discussing. She shared the topic areas they've discussed so far:

- Defining resilience, adaptation, and mitigation/carbon stewardship
    - Emily Trentacoste (EPA ORD), Elliott Campbell (MDDNR)
- Climate vulnerabilities
    - Dr. Weihsueh Chiu (Texas A&M)
- Food security and agriculture
    - Matthew Houser (TNC), Lisa Blazure (Stroud Water Research)
- Decision science
    - Mike Runge (USGS), David Martin (TNC)
- Adaptation Frameworks—RAD (Resist, Adapt, Direct) and Climate Change Response (Resistant, Resilience, Transition)
    - Danielle Shannon (NIACS), Andy Miller (EPA ORD), Joel Scheraga (EPA Office of Policy)
- Integrating climate factors into CBP work
    - David Wood (Chesapeake Stormwater Network), Nicole Carlozo (MDDNR)
- Ecosystem Services
    - Elliott Campbell (MDDNR)
- CBP Climate Capacity and Structure
    - Small Group Experts

Breck shared the feedback received from the Healthy Watersheds small group. They said they are interested in integrating climate into all of their recommendations. They are envisioning characterizing a spectrum of watershed health across all sub-watersheds of the basins. They think they can do this through the Chesapeake Healthy Watershed Assessment and other

available data to help local communities understand if their local watershed needs to be protected or restored. They understand climate will have a huge impact on what can be protected and restored and where they should be providing their resources. The Clean Water group has draft recommendations. Breck highlighted their second recommendation which is where they provide climate considerations into establishing a tiered approach to achieving Total Maximum Daily Load (TMDL) targets that promote prioritization of efforts that align with state or local water quality priorities, anticipated habitat, living resource and human well-being responses, cost effectiveness and climate resiliency.

The people small group does not have set recommendations yet. Julia Wakeling (DC DOEE) said that the people and climate group have been going about the work similarly. They've broadly viewed people and climate as the cross-cutting topics. They started off thinking climate and people are inherently in all of the things the small groups are talking about but, as they progressed, they want to make sure we're specifically calling out these topics in a couple areas. A couple areas they want to highlight the connection of climate and people is in climate adaptation and resilience, areas of high climate vulnerability and EJ communities. They also want to think about the effectiveness of social science use in the CBP's decision making. Also, the focus on TMDL and chemical pollution as an EJ theme throughout the CBP. Julia said they want the thinking going forward to be broader in scope, so the people small group is asking for input from subject matter experts. As they move forward, they'll be in contact with the other small groups. Breck commented she would like to see alignment between all the small groups' topic areas and recommendations for climate and people considerations.

Coreen Weilminster said that MD DNR Chesapeake and Coastal Services recently completed a Market Analysis and Needs Assessment for Climate Change Education and Coastal Training, and this might support some of the considerations for the "people group".

Greg Allen (EPA) shared science questions related to toxic contaminants: 1) Improved understanding of BMP effectiveness for removal of PCBs in a climate-impacted system, (expanded to include PFAS, and other prioritized toxic contaminants); 2) The impact of climate-related physiochemical changes (e.g., temperature, salinity, acidity) in risk from toxic contaminants due to influence on mechanisms such as pollutant transformations, persistence, synergistic effects when multiple pollutants are present.

Julie Reichert-Nguyen asked Julia if cultural heritage come up in the People small group, and how climate impacts will affect areas in such a way that may require people to retreat or loss in habitats that provide cultural ES (e.g., fishing communities). Julia responded that it definitely has, and they're hoping to address cultural ecosystem services in one of our recommendations. Julie thanked Julia and said they heard a lot on that during last week's Marsh Adaptation Workshop - a lot of discussion on how to prioritize, while emphasizing cultural significance of the marsh resource.

Jeremy Hanson (CRC) noted that the Clean Water small group has a listening session next Thursday.

Tom Parham said there was a report from the inspector general last fall that had a recommendation for EPA to develop mechanisms to hold states accountable for reducing nonpoint source pollution. Is there any progress on that? Is it going to be similar to how it was previously, or do you see any new sharp stick guidance/regulation or will it be all voluntary to help make sure we meet nutrient reduction goals? Ken Hyer responded that question is for EPA and the Bay Program Office to work out. Jeremy Hanson shared the response letters for that Office of Inspector General (OIG) report that Tom was referencing. Jeremy added that the Clean Water small group's recommendations are baking in aspects of that response (like "Lead the development of a strategy to address nonpoint sources of pollution, in coordination with the Chesapeake Bay Program").

Melissa Sines (Colmena Consulting) asked about the impact of migration - people are on the move, looking for more climate resilient areas, and into more rural areas with the shift to remote work. Katie Brownson responded that was a good point and was not sure they've really delved into the topic of "managed retreat" where communities are being strongly encouraged to relocate. While this may allow for some additional habitat restoration, she was sure there are impacts in terms of loss of community cohesion/cultural ecosystem services, etc. Melissa Sines added to that in addition, the impacts of those folks moving to rapidly developing rural/suburban communities. Elliott Campbell said his recent report on managed retreat was for the Gulf Coast but he thinks it has some great lessons for the Chesapeake Bay region.

Breck asked if there is a way to define resilience more broadly that is more relevant to the public. Julie Reichert-Nguyen said that for the Climate Resiliency Workgroup (CRWG), flooding has a huge impact, so CRWG focuses on that a lot. Another question they focus on is how to communicate nature-based solutions and their performance in protecting communities from flooding and knowing what's actually achievable and what's not achievable.

Susan Minnemeyer (Nature Plus Solutions) commented that she was interested in a greater cross collaboration between CBP and climate community in terms of quantifying goals around climate resilience and mitigation. For example, how land management can contribute towards goals to reduce greenhouse gas emissions and supporting that communication and set these goals as a way to encourage practices with the greatest benefits for climate and water quality. Susan added there is a lot of increased capacity – Elliott's presentation highlighted some of this – where the focus is a little more on achieving quantifiable goals relative to climate as they fit in with CBP goals.

Brooke Landry (MD DNR) said she could go on for hours about the cross-cutting nature of the Shallow Water Habitat small team and climate. She pointed out that in multiple listening sessions with the stakeholders and workgroups they received over 700 comments, many of which were climate related. They distilled the info down by theme and then ran it through some AI for consolidation. Five goals and eight strategies emerged. Two of the strategies are specifically related to climate: Climate-driven restoration and Climate-resilient habitat management and adaptive planning. Each of those strategies have multiple sub-components. She's not sure how these will translate to our ultimate recommendations at this point, but in the meantime will share these strategies related to climate with Breck and any notes related to people with Julia. Bill Dennison said he'd be interested in hearing more about the results from

these listening sessions at a future meeting. Brooke said to Bill that his "edges" concept has been a hit. A forefront to a lot of the conversation is that the edges are moving and that needs to be taken into account for everything.

Amy Freitag (NOAA) said she was still thinking about the comments on stormwater data from Elliot's presentation; this is increasingly a huge point of discussion in the intersection of people and climate.

Weihsuah Chiu commented that his university, Texas A & M, has an active landscape architecture department that works with communities to develop green infrastructure that protects against flooding. That may be of interest to the climate small group. They do a lot of data analytics to try to quantify benefits from green infrastructure as well. Julie Reichert-Nguyen responded that the Climate Resiliency Workgroup would be interested in a presentation from landscape architects.

Richard Tian commented wondering if CBP do something similar or part of it [to the CVI] for both ecosystem services and climate vulnerability.

Breck responded that people seem interested in what data could be used to make it more watershed wide, but that is something that could be taken into consideration for the climate small group recommendations to develop a more specific Bay wide version of the tool.

12:00 PM Adjourn

Next Meeting: February 22, 2024

The next meeting will also be centered around the climate small group effort.

Participants:

Adrianna Berk (Tetra Tech), Alexander Gunnerson (CRC), Alison Santoro (MD DNR), Amy Freitag (NOAA), Angel Valdez (MDE), Angie Wei (UMCES), Ann Foo (UMCES), Ari Engelberg (MD DNR), Arianna Johns (VA DEQ), Ashley Longrie (EPA), August Goldfischer (CRC), Bailey Robertory (CRC), Bill Dennison (UMCES), Breck Sullivan (USGS), Britt Slattery (NPS), Brooke Landry (MD DNR), Camryn Arnstein (MD DNR), Carl Friedrichs (VIMS), Carla Fleming (MD DNR), Chris Guy (USFWS), Christina Lyerly (MD DNR), Christine Knauss (UMCES), Coreen Weilminster (MD DNR), David Wood (CSN), Don Phillips, Doug Austin (EPA), Dylan Burgevin (MD DNR), Elizabeth Hoffman (MD DNR), Elliott Campbell (MD DNR), George Doumit (DNREC), George Onyullo (DC DOEE), Greg Allen (EPA), Greg Barranco (EPA), Jackie Specht (MD DNR), Jamileh Soueidan (CRC), Jasmin Muriel (EPA), Jeff Lerner (EPA), Jeff Sweeney (EPA), Jeremy Hanson (CRC), Jillian Seagraves (MD DNR), John Wolf (USGS), Joseph Galarraga (TNC), Julia Wakeling (DC DOEE), Kate Vogel (MD DNR), Katie Brownson (USFS), Kayli Ottomanelli (Alliance for the Chesapeake Bay), Kaylyn Gootman (EPA), Keith Bollt (EPA),Kelly Gable (EPA), Ken Hyer (USGS), Kevin McLean (VA DEQ), Kristen Wolf (PA DEP), Kristin Saunders (UMCES), Larry Sanford (UMCES), Laura Cattell Noll (Alliance for the Chesapeake Bay), Leo Lutz (Columbia Borough, PA), Lew Linker (EPA), Lindsey Humphrey (Frederick County, MD), Liz Chudoba (CMC), Liz Hiett (Tetra Tech), Lorenzo

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