Joint Scientific, Technical Assessment and Reporting (STAR) and Coordinator & Staffer Meeting

Tuesday, November 16, 2021
9:30 AM – 12:30 PM

Meeting Materials:
https://www.chesapeakebay.net/what/event/joint_c_s_star_november_2021_meeting

This meeting was recorded for internal use to assure the accuracy of meeting notes.

ACTIONS

- ✓ All GITs will let Breck Sullivan (bsullivan@chesapeakebay.net) and Peter Tango (ptango@chesapeakebay.net) know which option they would like to use to message the monitoring needs for each of their outcomes by **December 10th**. Then provide the final product (i.e. database info, paragraph, or 2 page summary) by **December 17th.** Please see the email "STAR Meeting Action Items" as well as content below in these minutes for details.
- ✓ All STAR members will let Breck Sullivan know if they know of programs similar to University of Maryland, Baltimore County (UMBC) Interdisciplinary Consortium for Applied Research in the Environment (ICARE) program, and what the timelines for those other programs are.
- ✓ STAR and Goal Team members interested in participating in the ICARE program as a mentor or to learn more should reach out to Breck.
- ✓ Bill Dennison will organize a meeting with Greg Allen, Scott Phillips, Peter Tango, Kevin Sowers and Breck Sullivan to discuss Kevin's research interests in Polychlorinated Biphenyls (PCBs) and potential ICARE student projects which would help address needs of the Toxic Contaminants Workgroup.
- ✓ All GITS will update the DEIJ efforts document for the Chesapeake Bay Program Office – to update, comment on the document linked here, or email Briana Yancy (yancy.briana@epa.gov)

AGENDA

9:30 **Welcome, Introductions & Announcements – Bill Dennison** (UMCES) and **Scott Phillips** (USGS)-STAR co-chairs, **Peter Tango** (USGS) CBP Monitoring Coordinator, **Breck Sullivan** (USGS) STAR Coordinator

Announcements -

- Communications Update - Marisa Baldine

There were no communications updates.
Breck Sullivan commented that that there is an Executive Council meeting on December 15th.

Scott Phillips said that the communications team is working on a blog on how radiation affects streams. He also noted that United States Geological Survey (USGS) finished a synthesis on nitrogen in the watershed, a look back on changes from 1950 to present and forecasting up to 2050. A link to that report has been sent out to STAR. This work will be presented at the January 2022 Water Quality Goal

Implementation Team meeting. Bill said the USGS nitrogen report is excellently done. Scott said this report is known as a circular and is geared towards both scientists and water quality decision makers, so there are more conceptual diagrams trying to explain concepts. Bill said he was impressed with amount of data in there. Scott said they will offer some printed copies.

Greg Allen commented that USGS has another great product, the geonarrative for contaminants of emerging concern. This will be shared with STAR.

Tom Parham said they are wrapping up the end of the year hypoxia report, and that will be coming out soon. Bill Dennison asked how we did on the hypoxia this summer. Tom Parham responded in the chat that the results in brief are that there is a longer duration of hypoxia in 2021 (late October) with total annual hypoxic volume slightly larger than average. Forecasted hypoxia was to be slightly less than average. Bay partners are currently working together on draft.
Peter Tango commented that there will be a report put out by the communications team on the vertical profilers that National Oceanic and Atmospheric Administration (NOAA) is coordinating the deployment of.

Upcoming Conferences, Meetings, Workshops, & Webinars -

- Maryland Water Monitoring Council Annual Conference - December 2-3, 2021, Virtual.
- A Community on Ecosystem Services - December 13-16, 2021, Virtual.
- American Geophysical Union Fall Meeting - December 13 - 17, 2021, New Orleans, LA and Virtual.
- Sustainable Agriculture Conference - February 10-12, 2022, Lancaster, PA. (Virtual pre-conference in January).
- Chesapeake Community Research Symposium - June 6-8, 2022, Annapolis, MD. (Hybrid: virtual and in-person. Subscribe here for updates.) **Session proposals due December 1, 2021.**

9:45 - 9:55 2020 Tidal Trends - Breck Sullivan

Breck will provide an update on the 2020 Tidal Trends and show where to access them.

Summary

Breck Sullivan showed the Integrated Trends and Analysis Team (ITAT) webpage. There is a team made up of the Maryland Department of Natural Resources (MDNR), the Virginia Department of Environmental Quality (VADEQ), and the District of Columbia (DC), along with analysts from University of Maryland Center for Environmental Science (UMCES) that have worked together to create the 2020 Tidal Trends. This is coordinated through sample water quality collected on a bimonthly or monthly basis for over 130 stations in the Chesapeake Bay and has been collected starting in the 1980s.

There are 4 different categories for the parameters of nutrients, Secchi, dissolved oxygen (DO), and chlorophyll - A. This is using generalized additive models (GAMs) which helps describe nonlinear seasonality with varying changes over time. There is long term change from 1985-2020 and short-term change which is over the last 10 years (2010-2020). They also have flow adjusted change which takes into account the year-to-year variations on streamflow and salinity, which helps with understanding the

influence of watershed management actions on the estuary. 2020 was a more average flow year after two preceding wet years (2018-2019), but in general, the patterns are consistent over the last few years. Long term nutrient improvements have levelled off in recent years, and there has been short term improvements in bottom DO and surface chlorophyll-A. All of these maps can be viewed on the ITAT web page. They are in PNG format so they can easily be put them into presentations. If you're interested in previous year tidal trends like 1985-2019, you can reach out to Rebecca Murphy or Breck Sullivan.

With the 2020 trends there were a few months of missing data due to covid. The field and lab people were not allowed to collect samples or run tests. However, this was only 2-3 months. The team was able to run some tests and compare subsampling of 2019 data as if it was 2020 to compare with the full results. It showed there was a limited impact of the missing few months of data because we have such a long-term extensive data set. Huge shoutout to all the field and lab techs who followed covid protocols and made sure they could go out through challenging circumstances so we could get this data and continue to see how management decisions are influencing the Bay. There will be a presentation by Rebecca Murphy at the ITAT meeting to go more in depth on these results. They're hoping to come back to STAR and find connections on how this work can integrate with other workgroups. If you want more information, attend the ITAT meeting or reach out to Breck (bsullivan@chesapeakebay.net) or Rebecca (rmurphy@chesapeakebay.net).

Scott Phillips commented that ITAT tries to integrate information on watershed inputs and how this affects response in the estuary, and this work is foundational for whether we're going to make our water quality standards or not. Breck is now co-leading this group.

Breck commented that ITAT is working with contractors to produce a summary document and once that's finished, they'll work with the communications team to distribute it.

9:55 - 10:05 Introducing UMBC ICARE - Breck Sullivan

Breck will introduce the University of Maryland, Baltimore County (UMBC) Interdisciplinary Consortium for Applied Research in the Environment (ICARE) as one potential route to match Chesapeake Bay Program (CBP) science needs and mentors with UMBC faculty and incoming students.

Summary

Scott commented that during 2022 they want to focus on finding academic institutions to fill some of the science needs. They will bring these needs to the Scientific Technical and Advisory Committee (STAC) and they'll be working more with the Chesapeake Research Consortium (CRC) to work with their member institutions to align their research interests with science needs.

Breck gave a presentation on an opportunity to work with UMBC's master's program ICARE. ICARE is working with partners outside the university to understand what their needs are and provide research insight through their students. ICARE is a master's program that just started this past fall with a cohort of 7-10 students. They receive funding from the National Science Foundation (NSF) for 5 years, and they are committed to increasing the diversity of the environmental workforce while engaging local community in research projects, with a focus on research in and around the Baltimore Harbor. Through this master's program they would like the research team to consist of a university faculty member from UMBC, a non-academic scientist from a government agency, nonprofit or industry, and one or more community members with a stake in the research. Through this program they want to make sure the research project for the student has purpose and it provides input to somebody who needs this information to then use it and expand on it. That's why they want to go to the partners and understand

their needs and see if there are any connections with faculty interests. Then they connect that with a student who's applied for the ICARE program.

The CBP already has a resource saying what their science needs are. So STAR can assist Goal Implementation Team (GIT) members find the connection between the CBP science needs and faculty interests, and then find a student to work on it. The project would need to fit around a 2-year timespan for the master's program and focus in and around the Baltimore Harbor. The research interest for the UMBC faculty members include policy, conservation biology, environmental engineering, socio-environmental systems, and urban ecology and hydrology. Working with the program manager for ICARE, Breck has been discussing some potential science needs connecting with interests of faculty members. These include: Forage fish and fish outcome's need to determine local impacts of climate change on fisheries, toxic policy/prevention's need for an improved understanding of PCB sources and fate in the environment, and the diversity outcome's need to identify measures of success toward the outcome beyond the diversity indicator. STAR is working to identify more science needs and interested faculty members and students.

Breck said that if you're considering you'd like to be part of this partner interaction with the ICARE program, there are a few requirements to be a mentor. You need to meet with students monthly or biweekly. They prefer a PhD mentor but will discuss if that is really a requirement. You'll need to participate in exercises around concept mapping and systems thinking, and mentor training with a focus on mentoring students from under-resourced communities. They would like to have a partner example to put on their website while students are applying because applications for students are due January 1st. If there is someone very interested in being a mentor this would be great. The next cohort will not be until fall 2022 which means there is more time to work through this more and match science needs with interested faculty members and students. This is a great way to broaden STAR and CBP's connection with academia while supporting Chesapeake science needs, strengthen pipeline for students coming in, and gain insight on science needs that are missing capacity. If you're interested in being a mentor, reach out to Breck (bsullivan@chesapeakebay.net), or if you're interested and want to learn more, also reach out. If you know of another program or department interested in something like this let Breck know, as this is something STAR hopes to do with other universities as well.

Breck noted that the 3 science needs are examples – and there are more interested faculty, not just these 3.

Bill Dennison emphasized the need to relax the PhD requirement because there are a lot of good members who could be mentors who don't have PhDs. He is happy to serve in a role if they want someone with a PhD to oversee. Bill said he wants to get together with these 3 faculty members and have a general discussion and do the matchmaking and convince them there is a good match that doesn't have a PhD. He stated STAR should make an effort to make at least one work to get this up and running and build momentum.

Greg Allen is interested in meeting with Kevin Sowers regarding PCBs. Greg commented that the toxic contaminants group is under-resourced and needs capacity, and Kevin Sowers sounds like a great match with his research interests.

Bill noted that Kevin Sowers works at the Institute of Marine and Environmental Technology (IMET). There are a lot of graduate students in that facility. He's closer connected than the main campus folks to Bay relevant activities so Kevin is a good starting point. Bill will organize to meet with Greg, Scott, Peter

Tango, Kevin Sowers and Breck. Peter has been working on the academic advisory board for this project ever since meeting with Tamra Mendelson from UMBC.

Breck described the next steps for this initiative. If goal teams see that their science needs lines up with a faculty member, they should reach out to Breck saying they would like to be a mentor or know someone who will be. They can go to the UMBC website to get an idea of what the research interests are of faculty members. The time commitment of being a mentor depends. Mentors need to meet with the student at least once a month. Mentors also have two mentor trainings, and two systems thinking/concept mapping trainings. Otherwise, the time commitment depends on the student. Sometimes the faculty member takes the lead, sometimes the industry member, sometimes the student. If someone wants to be a mentor but knows they'll have less time commitment to be the lead, they can bring that to the faculty member and see if the faculty member can take a larger role.

Scott asked if any other research institutions in CRC had similar programs. Denise said Penn State had a similar program for undergrads. Their master's program for GIS is also looking for research needs. Breck noted Salisbury University has similar program and asked if anyone else knows of other similar programs to please speak up.

Katheryn Barnhart commented that she is currently pursuing a master's at UMBC in their GES department and knows some current ICARE students, so she could help get some feedback from the student-side on the program and how science needs from CBP could be woven into their project proposal discussions.

Scott asked if STAC could also see if there are other programs like this. Kathy Boomer said this model of connecting researchers with external partners is a good funding model.

Peter commented to keep in mind it's a good opportunity for people to be bringing their work in front of STAR and interacting with the CBP.

10:05 - 10:35 **Presentation on Monitoring Needs Update, and Options for Presenting Unmet Monitoring Needs to the PSC**

STAR members will discuss the desired scope and messaging for the monitoring needs section of the report to the PSC. Most of the discussion will focus on how to present the unmet monitoring needs that are not covered by existing CBP networks.

Summary

Peter Tango explained that this is a two-part discussion. The report is due to the PSC in February, but Lee McDonnell will be giving them an update on the progress next Tuesday. When the PSC first requested it, they wanted it to focus on the 5 existing networks. The monitoring team has been saying there are a lot of monitoring needs not addressed by these networks, and asked if there was a way to get these in front of the PSC. They've come down to tiers of information on what they want to say. One option is to use the science needs database and show the big picture. Another option is goal teams write a short paragraph on what the urgency is and how it would be used. The most detailed option is the cost of what you want to do so it's actionable.

Peter Tango presented a dry run of the PSC monitoring needs update. The feedback needed from the PSC in November is the scope of the report and what format of recommendations is best so they are actionable.

Peter explained this started with Lee McDonnell's presentation to the PSC in March on current funding levels for the monitoring networks. The needed information to improve monitoring networks includes status and threats, what's needed for improvement, what's already available to address capacity shortfalls, and opportunities for CBP monitoring network to address multiple outcomes. The report and recommendations will be presented to the PSC in February of 2022.

Peter showed a summary slide with the key issues in the 5 core networks as well as gaps and applications for the networks, and options and innovations. He also addressed opportunities for CBP networks to address multiple outcomes including indicator assessments, BMP effectiveness assessments, and living resource response, and examples of ongoing projects that address multiple outcomes. Peter outlined the 3 sections of the report to the PSC, which go from less detailed to more detail intensive. The questions asked of the PSC at the November update are what format of recommendation style is actionable for you, and does the tiered approach meet your needs and those of the CBP?

Kristin Saunders recommended a "bottom line up front" and big picture approach. She recommended that this effort tied to the anticipated Comprehensive Evaluation of System Response (CESR) report from STAC. She noted that for a PSC member there is a slim chance of them wading through all this. The takeaways she's arrived at are something like "without investments in the monitoring system of xyz, we are not able to demonstrate the changes in shallow areas". Kristin recommended saying to them, if you don't do x and invest in this, we are not going to be able to do this program. Then jump into detail. Forefront it as why they should care and what they should do.

Scott said right now it's hard to find just one bottom line, but there can be a handful. Kristin suggested using the word AND a lot to string it together.

Bill said the tiered approach makes a lot of sense. The Chesapeake Monitoring Cooperative (CMC) has adopted this and people understand it. It also provides an opportunity to come up with different financial thresholds. Bill agreed with Kristin and added it would be good to go back and re-emphasize the basics of why is monitoring important.

Scott commented since there are 5 networks to consider, there are up to 5 bottom lines. Things like "for the tidal network, we can't even measure attainment of standards".

Scott asked, how can the report reference all the different outcomes? There are so many outcomes that have monitoring needs that haven't even been addressed at all and need to be addressed in the future.

Breck Sullivan went over the options for presentation of goal teams' monitoring needs to the PSC along with examples of each option. Breck said that for the report they need to know how, out of the following 3 options, goal teams would like to message their monitoring need, and also what is their priority monitoring need. Other monitoring needs will be put in the appendix of the report, but they need to present the priority monitoring need up front.

Breck stated that the first option for presenting monitoring needs is a table of monitoring needs with the information already addressed in the Science Needs database. This would include why it's needed, any potential resources and what goal team it connects with. The second option is a short paragraph highlighting the priority need, getting into a bit more detail with what exactly is needed to achieve this

monitoring request. Option three is a two-page summary addressing the monitoring networks consideration. These are design consideration, objective of the monitoring network, and remaining gaps that wouldn't be addressed by existing data. This option will go into more detail on the when, why, and even the cost.

Breck walked through some examples of each method of presenting monitoring needs. Breck noted that if goal teams select option one, they should include any new monitoring needs in the Science Needs database by sending Breck a description of the need, why it's needed, and any potential or currently engaged resources.

Breck gave an example of option two, a short paragraph providing a little more detail. Peter and Breck can draft the short paragraph for goal teams and the goal team leads can edit it. If goal teams choose this option, they should tell Peter and Breck what are their priority monitoring needs.

Option three is the most in depth. There is an example of this on the STAR calendar page website. This is a two-page summary answering 6 questions: the need for the network, the network objectives, monitoring design considerations, existing monitoring that can be utilized, remaining gaps that can't be filled by existing data, and options to address gaps. Also, cost estimates on how to make it operational are helpful to include. If goal teams have a GIT funded project connected to a monitoring need, they've already broken down the costs for that proposal, so they can use that to help estimate cost. Essentially, they're answering when, where, how, and how much money. If they select this option, they should tell Breck and Peter if they plan to develop a two-page summary so a spot on the report can be saved. They should also let Peter and Breck know if they are answering all 6 questions or just some, and if they have cost estimates.

Peter commented that regarding the hypoxia estimate - this was an estimate example provided by the contractor in our GIT project deliverable as guidance for planning purposes.

Bruce Vogt said they should make sure both existing monitoring gaps are captured. For example, a huge monitoring priority for the Fish GIT right now is oyster monitoring because they need to assess whether reefs they restored are performing to the standard they set. This is the number one priority across the goal team. But then they get into where they see monitoring gaps and taking advantage of emerging opportunities. Hypoxia is a gap they're looking to fill and they see opportunities there to use that information to better assess fish habitat condition in the Bay. Then there are things like phytoplankton/plankton that have been raised as gaps. They don't have the information now or would be able to put together in a summary. They always hear it raised as a need, but they don't have the ability to write a strong justification for why they need it and what clear products they need from such monitoring, and what a new design of the system would look like and what information is needed to fill the gap and cost estimate. For hypoxia they could articulate the need and the cost. For plankton, they don't want that to go away, but they're not able to articulate it now.

Peter replied that maybe they should get Sean's last zooplankton panel outputs that he thinks had recommendations with a price tag.

Scott said that they could use option one or option two for plankton - put it in there either as a need in the table or say the details will come later. Breck commented that phytoplankton is already in the database, and they could put plankton as option one and oysters as option two.

Bruce asked, are you asking the goal teams to look through the monitoring needs and put them under option 1, 2 or 3?

Breck responded yes, they're trying to identify them under outcomes to narrow it down for the PSC. If goal teams could identify at least for 2 or 3 the outcome that would be helpful, but if they have ones that don't fit in that they can go with option 1 and this can be provided as a table format.

Gina asked when STAR needs this information. Peter responded that they'll showcase this to the Management Board in January, so they need to know between now and the end of December.

Scott said it will be on the goal team leadership to get this done, although leadership can send it out to the whole goal team if you want.

Justin Shapiro commented they've also chatted with Fisheries ExComm about plankton in the context of specific species, areas, time of year. High level details like this may be helpful for that number 2 option.

Greg Allen said the toxic contaminants group has created a toxic contaminants two-page summary – is this the same? Scott replied yes, the two pager is what they'd like to see in the PSC report. For other water quality aspects, it would be covered in discussions Peter has been having around standards attainment and nutrient reduction monitoring.

Peter responded yes, they have a collection of specific items, some with detail and some more conceptual.

Renee Thompson commented that an action item for the Healthy Watersheds outcome is to take what's in their science needs presentation and put it in the STAR science needs tracking database. Renee said that they went through all the healthy watersheds metrics and identified monitoring needs.. The only thing she was unclear about is when they start thinking about land change monitoring needs, it's a need, but they're doing a lot of this work or have plans to. Does that go in the database? Do they only put things that they don't have ideas or plans to work on in the database? Renee said she thinks option 1 is the easiest way to share that information, but she'll work with Breck. She already has it distilled in slides and bullet points.

Breck said she's happy to work with Renee and says that a short paragraph would be appropriate for the healthy watersheds monitoring needs because they could share what monitoring data they need continued support the CBP tools.

Scott said that land change is not even considered part of the core five networks, but they want to make it known that it's an important piece so saying here's the need and it's being addressed in these ways is something that they want to highlight. Peter agreed that it's very important to highlight this. Scott said it could even be considered a #6 core network.

Julie commented for the Climate Resiliency Workgroup that the most that workgroup could probably do is option 1, maybe 2. They don't have just one priority, they have multiple. For the indicators they have a lot of gaps. They've done a lot of work identifying and prioritizing the indicators, but out of the 8 that's been identified they have 2 that they have a data stream they've been able to update with a partner. But for the other 6 they need to find partners, find data sources, develop methodologies, come up with a maintenance plan, etc. They range from different topics from sea level rise effects on wetland extent,

marsh migration corridors, stream temperature and effects on fish habitat, brook trout, flood indicators, Bay water temperature change indicator (working with STAC workshop to identify utility), and tree canopy. Julie said she would see working with Breck and trying to update that in the science needs spreadsheet. It's critical that they identify partners and resources. They are working across workgroups as well to do that. She said she is struggling to prioritize them because they're all important, but she thinks they can do option 1. They also have some exploring needs like ocean acidification (OA) monitoring which is in the early stages of discussion and they can't provide a lot of detail yet.

Bill said that for future monitoring needs, the climate group is still formulating those needs. These will be evolving needs and monitoring is going to have to be adapted to cope with climate. As a result, a separate section about climate change is needed. Bill thought it's important to not just focus on existing data needs but rather this broader spectrum that we're going to be facing in the future. Scott agreed and added given the climate directive, it would be good to have a box on climate in the report.

Breck noted that it seems people are leaning towards option 1 but made sure to let people know she is volunteering to write this paragraph for option 2. Breck just needs to know what goal teams want the PSC to see. If they're interested in option 2, know that Breck is here to help to write it, but she needs to know what goal teams want to highlight.

Bruce said he thinks the fish GIT can categorize our monitoring needs around these three options. Sometimes there's a need and they hear about it, but it's difficult to make a clear management connection. If they put anything under option 2, it's that they have to work more closely with the management community to make sure they know what that it is. He commented that he would just want to make sure that they have a really clear management objective behind it and they're not just putting it forward as a monitoring need for science purposes, but a monitoring need that's tied to a real management outcome. That's his hesitation here thinking about how to categorize this. Scott replied yes, it's important to tie each of these to a CBP outcome because each of these outcomes have some kind of management objective.

Justin asked to clarify, if groups do have a couple of the #2 options, within those do they need to tell Breck and Peter what the number one priority is? Breck said yes, that would be helpful for the report, and that they're thinking of having the section categorized by outcomes.

Katie Brownson said some of their needs for the forestry outcomes might be addressed under land change monitoring if a sixth category was added.

10:35 - 11:20 Highlights of Healthy Watershed Assessment StoryMap - Renee Thompson (USGS) & John Wolf (USGS)

The Maintain Healthy Watersheds GIT has been working proactively to determine the best way to communicate the work of the goal team to CBP partners, cross goal teams, stakeholders and to general interests. John has been working behind the scenes to compile and present the umbrella of resources developed through the years by the GIT. Using ESRI StoryMaps and additional visualization tools, a comprehensive set of StoryMaps has been compiled that not only describe the history and importance of the GIT, their work, and the adaptive management framework, but also embeds the Chesapeake Healthy Watershed Assessment, cross outcome coordination, and emerging climate, DEIJ and administration priorities.

Summary

Renee Thompson and John Wolf presented the highlights of the Healthy Watershed Assessment StoryMaps, showing the maps to the group and walking through them.

Renee introduced the collection of maps by explaining, they've been working on this project for a few years. They had the idea as they were refining the healthy watersheds assessment. They wanted to make sure people had background information on how healthy watersheds are tracked, where the data is coming from, and potential management applications. As they started to move forward with this project, they realized it's not just the healthy watershed assessment but the whole idea of adaptive management – why are they working as a goal team to sustain and identify healthy watersheds, what have they learned through this process, and what types of science they are bringing to the table. The healthy watersheds assessment is a piece of that, but there are other pieces in terms of how to apply it for co-benefits and collaboration. John Wolf has been exposing them to ways to organize and share information. Through the iterative process of creating the StoryMap, they thought the Strategic Review System (SRS) process lends itself well to a StoryMap collection.

Story Map Collection (Maintain Healthy Watersheds)
Direct links to Story Maps:
Chesapeake Healthy Watersheds
Adaptive Management
Chesapeake Healthy Watersheds Assessment
Co-Benefits and Collaboration
Feedback Survey

John commented that they're hoping to leverage this filtering capability alongside this healthy watersheds assessment data. They'd like to leverage the expertise of STAR and other workgroups and goal teams to determine some out of the box filters and criteria – what are some criteria that are important to your goal team that might have a preset threshold that you consider. They're hoping to come up with some example management questions of how this information could be used.

Kristin Saunders commented in the chat that maybe we could do a few little working sessions in coordinator/staffer meetings to play with the story maps.

Bruce commented, the Nature Conservancy (TNC) work on tidal habitat piques his interest. He said he needs to learn more about what that layer means but could tie to some work we are doing with forage, striped bass. Both of those have shallow water components and looking to see how the results of those might or might not match up with the areas TNC is determining are vulnerable to change, whether that's based off salinity changes or other drivers.

Bruce added he is also interested in how they might use some of the Environmental Justice layers around a priority the fish GIT has established to better connect with recreational anglers and improve fishing opportunities in underserved areas. The fisheries GIT has focused on recreational fishers, and they want to also focus on the subsistence fishing community, getting a more diverse group involved in tournaments as well as outreach around human health. He's been thinking about where data exists on demographics and looking for places that they have more intentional outreach. Maybe the data Renee and John pulled together can help the fish GIT with targeting. Bruce commented he was also curious where shoreline development lives. Bruce stated that they do have a threshold around shoreline

development; can they think about shorelines in the same context as was done for freshwater nontidal fish habitats, and that would maybe make that layer they've been developing with John and his team even more meaningful. Right now, it doesn't have a home, it sits on its own, so trying to integrate it with an existing tool would make it more useful.

Renee responded that they do have thresholds and so communicating and understanding what those thresholds are is important so they can build them into their decision support tools. Or, if they're making a filtering tool and they want low, medium, high, for example if they bring shoreline development in, they want to make it easy for the user to not just pick some number they think is good, but build science-based thresholds into the filtering and symbology. Another important piece is that having this informative data but not really knowing where it should live or how it interacts with other datasets. They've run into that a lot with the healthy watershed assessment. Their solution with this work they're doing with Tetra Tech is to create overlay categories. These are specific selected datasets that take it a step further. Maybe it's a dataset that doesn't lend itself well to catchment area but they still want to know where vulnerable communities are so they might bring an overlay to look at this. They might be able to create a metric like amount of shoreline hardened per catchment, but not sure how meaningful that is. Might be good to bring the hardened shoreline in as an overlay.

Renee commented, this requires each of us to understand what the other one is doing and what we have available so we can talk about how we might combine this information in a meaningful way. There is confusion around a cross outcome example in the healthy watersheds assessment, and cross GIT mapping. John and Renee are in charge of both of those efforts and if they get great information from everyone that applies to cross GIT efforts, they'll apply it to that project. They want to focus on what are the datasets that are important to groups to interact with healthy watersheds assessment. What are the threshold values that they're seeing? What are the important numbers? Is it 80% riparian forest buffer or is it a different number? Do they want to have 3% impervious surface built in as a threshold for brook trout? Stream health has examples like that, for example within the metrics that they collect, some of them are important to monitoring stream health and stressors, and so how can they integrate the thresholds related to stream health within the existing healthy watershed metrics. A role of STAR is to help make those connections between what is the science telling us that thresholds mean for something to decrease whether it be biotic integrity or a specific habitat variable or a critter. What are those thresholds and how to combine them to communicate that spectrum of health and threat.

Peter Tango commented in the chat to second Bruce's note, and that there is for example a Community Waterbird Integrity Index that defines good/poor nearshore and riparian habitat elements that could potentially produce a map that complements black duck needs with broader bird community integrity. See Prosser et al. 2016, DeLuca et al 2004, DeLuca et al. 2008 for habitat filters. There would be complementary value for SAV restoration management, fish forage habitat, and more.

Katie Brownson commented in the chat, on the Catchment Filter application, it might be interesting to be able to toggle between "is greater than" and "is less than" options- for example to identify riparian zones that are both well forested and not well forested.

Julie Reichert-Nguyen commented in the chat that she's heard about the TNC Resilience Landscapes layer, but also need time to dig in and understand how they are assessing "least resistant" versus "more resistant". There is interest around nearshore coldwater refugia related to habitat for fish and SAV and where are there landscape-driven hot water plumes. Marsh migration corridors in relation to adjacent land use is another interest for climate resilience assessments. For the coldwater refugia - they can use

threshold identification from the rising water STAC workshop. For wetland migration, they can check with folks on thresholds related to elevation.

Kristin Saunders commented in the chat, it is really clear from discussions about phase 7 model and CAST that some of the things outcomes or goal teams are looking for may appropriately be addressed through the model while others may be better addressed through the story maps and healthy watershed assessment story maps so be thinking about what Renee asked for!

Peter asked Kristin - as story maps grow, do we have a Managers Guide list of questions addressed by spatial analysis? Something like that so folks don't spend a lot of time doing something that is available at the touch of button.

Kristin responded that she didn't know but thought this was a good idea.

11:20 - 12:30 Coordinator/Staffer Updates - Garrett Stewart and Greg Barranco
Upcoming CBP calendar items will be highlighted in addition to general updates, a GIT Funding update, SRS status updates, and Strategic Science and Research Framework Updates.

12:30 Adjourn

Next Meeting Date: Thursday, December 16th, 2021 (Aquatic Life Cohort Science Needs)
Please note this date is earlier than the regularly scheduled STAR meeting due to the holiday.