



Chesapeake Bay Program's (CBP)
Scientific and Technical Advisory Committee (STAC)
Quarterly Meeting Minutes
December 5-6, 2023; Virtual
[Meeting Webpage](#)

Tuesday, December 5th

Attendance:

Members: Matt Baker (UMBC), Kathy Boomer (FFAR), Charles Bott (HRSD), Chris Brosch (DE DA), Tony Buda (USDA-ARS), Kathy Bunting-Howarth (NY Sea Grant), Shirley Clark (PSU), Bill Dennison (UMCES), KC Filippino (HRPDC), Kathy Gee (Longwood University), Ellen Gilinsky (Gilinsky, LLC), Kirk Havens (VIMS), Ben Hayes (Bucknell University), Jason Hubbart (WVU), Jeni Keisman (USGS), Christine Kirchhoff (PSU), Scott Knoche (Morgan State, PEARL), Ellen Kohl (UMBC), Yusuke Kuwayama (UMBC), Erin Letavic (Herbert, Rowland, & Grubic, Inc. [HRG]), Theo Lim (VT), Mark Monaco (NOAA), Greg Noe (USGS), Efeturi Oghenekaro (DOEE), Leah Palm-Forster (UD), Joe Reustle (Hampton University), Kenny Rose (UMCES), Larry Sanford (UMCES), Tess Thompson (VT), Valerie Were (CIRA), Joe Wood (CBF), Weixing Zhu (Binghamton)

Guests: Isabella Bertani (UMCES), Katie Brownson (USFS), Sarah Brzezinski (EPA), Nicole Christ (MDE), Peter Claggett (USGS), Douglas DeFlicht (Douglas DeFlicht Consulting, LLC), Joseph Delesantro (PSU), Marla Emery (NINA), Melissa Fagan (CRC), Jeremy Hanson (CRC), Amy Hruska (Underwood & Associates), Ashley Hullinger (PA DEP), Lew Linker (EPA), Christina Lyerly (MDE), Pam Mason (VIMS), Lauren McPhillips (PSU), Kathleen Michels (Sligo Headwaters Civic Association), Laura Cattell Noll (Alliance for the Bay), Allison Prost (CBF), Kristin Saunders (UMCES), Jenna Schueler (CBF), Jillian Seagraves (National Park Service), Chaopeng Shen (PSU), Gary Shenk (USGS), Breck Sullivan (USGS), Richard Tian (UMCES), Sarah Wolek (MD Delegate), John Wolf (USGS), Qian Zhang (UMCES/EPA)

Administration: Meg Cole (CRC), Tou Matthews (CRC), Denice Wardrop (CRC)

Call to Order, STAC Business, Announcements – Larry Sanford (STAC Chair – UMCES)

STAC Chair Larry Sanford (UMCES) called the meeting to start at 9:40AM with a round of introductions and an outline of the meeting agenda. STAC Members were invited to give an update on any ongoing STAC efforts and/or funded activities, and Sanford asked members to share any announcements on upcoming partnership activities and events of potential interest to the committee. The September STAC Quarterly Meeting Minutes and October and November Executive Board Meeting Minutes were approved without comment.

- Member Announcements:
 - Sanford: STAC Staff held an orientation for new STAC members on November 20th, 2023

- Ben Hayes (Bucknell University): The 18th Annual River Symposium on “[Navigating the Flow: Sustaining River Communities and the Health of the Bay](#)” was held November 3-4, 2023, at Bucknell University in Lewisville, PA. Hayes shared important lessons from native voices and Denice Wardrop’s (CRC) contribution as keynote speaker.
- Joe Wood (CBF): The USFWS celebrates the completion of a [project to create 3D models of freshwater mussels](#) to be used in education and conservation, which had been initiated from a [FY19 STAC Workshop](#).
- Mark Monaco (NOAA): The National Ocean Service (NOS) has released a new [strategic plan](#).

DECISION: September 2023 Quarterly Meeting Minutes approved; October 2023 Executive Board Meeting Minutes and November 2023 Executive Board Meeting Minutes approved.

Updates from Principals’ Staff Committee Meeting / Executive Council Meeting

– *Larry Sanford (UMCES)*

Sanford updated STAC on the recent [Principals’ Staff Committee \(PSC\) meeting](#) on September 26, 2023 and the [Executive Council \(EC\) meeting](#) on October 19, 2023.

The PSC discussed the draft report, “[Charting a course to 2025](#)”, that was approved by the Chesapeake Bay Program (CBP) for presentation at the EC meeting, and the recently formed [Beyond 2025 Steering Committee](#). The Beyond 2025 Steering Committee has split into small topic groups though the entire steering committee will convene in-person on February 28th and 29th to draft a final report for the EC by October 2024. Sanford expressed urgency for STAC’s involvement as the Beyond 2025 Steering Committee is the best venue for influencing the direction of the Bay Program after 2025. The PSC also discussed final recommendations for leading up to and beyond 2025 for [Chesapeake Assessment Scenario Tool \(CAST\)](#), and recommended the formation of an advisory committee on agriculture to the Bay Program.

At the EC meeting, the chairs of each advisory committee briefly highlighted the recommendations from their respective Letters to the EC. As was discussed by STAC at the [September Quarterly Meeting](#), Sanford’s brief of the [STAC Letter to the EC](#) focused on implications and recommendations from the [Comprehensive Evaluation of System Response \(CESR\)](#) report, similar to the [Local Government Advisory Committee \(LGAC\)](#) and [Stakeholders’ Advisory Committee \(CAC\)](#) reports to the EC. Sanford remarked on the need to explore innovative approaches such as “sandboxing,” reconsider the meaning of Bay restoration, increase focus on shallow nearshore waters and wetlands, and incorporate adaptive management into Bay Program decision-making.

Discussion:

- Wood: CESR has garnered a lot of positive response but also confusion and doubt as to how to implement recommendations. I think policy makers need direction from STAC on what to do with the implications from the report. **Gary Shenk** (USGS): Agree. The partnership would like to count measurable outcomes and it is the question of how to do that remains unanswered. **Kristin Saunders** (UMCES) [chat]: Agree.
 - Sanford: The theme discussion tomorrow will focus on how STAC can interface with the Bay Program and how we can turn the recommendations of CESR into actions. **Wardrop** [chat]: While it is certainly in conversations, there is a lot of work to be done in making sure that the conversations are substantive, and the questions remain active. Erin **Letavic** (HRG) [chat]: Seems that we're getting close to the "now what?" stage as the dust settles over the release of the report.
- Scott Knoche (Morgan State, PEARL): Can we articulate what the "sandbox" approach is for the benefit of new STAC members and the group at large?
 - Wardrop: "Sandboxing" refers to a space for innovation where accountability is still present. And the way the sandbox is set up is a mutual conversation; it is different from a pilot in that it is not a release from accountability, and it is mutually designed right between two parties: the those that want to innovate and the institution or organization that would scale the project upon success. **Yusuke Kuwayama** (UMBC) [chat]: From CESR report: "Sandboxing is a formalized way to test and evaluate the efficacy of new rules and programmatic approaches to nonpoint source or water quality management without disrupting the operation of existing implementation efforts. Sandboxing also requires a commitment from management agencies to make larger programmatic changes if the sandboxed change demonstratively improves outcomes." (p. vii)
 - Kathy Boomer (FFAR) [chat]: My concern about sandboxing is that most don't know what that term means until we (STAC) define the term - that is, it's jargon. Further, with our commitment to DEI, we should realize that sandboxing can conjure negative ideas (e.g., including only those in the sandbox while excluding others). In our June meeting, we had a great discussion about alternative, more intuitive terms such as research management experiment - which I still advocate for. **Knoche** [chat]: Agree.
 - Wood: A separate concern with the term "sandboxing" is that it equates to relaxation of regulation and accountability (which I don't believe is at all the intent).
 - Wardrop [chat]: I would also ask that you consider that sandboxing is a recognized term in the literature.
 - KC Filippino (HRPDC) [chat]: A definition that applies to the various sectors in which it could be implemented would be helpful. **Letavic**

[chat]: Perhaps this could be a topic for the next quarterly meeting if we can identify some scientific peers who can provide examples.

- Jeni Keisman (USGS): As someone who works across disciplinary boundaries and with different types of people, I've seen miscommunication of a term cause many problems. If we are going to introduce and promote this "sandboxing" term, make sure that we are communicating it appropriately, so that it doesn't alienate anyone accidentally. Dennison's group has done a lot of work on science communication and maybe the CBP Communications Office has been learning about and addressing these types of things, too, and can help us. STAC should be thoughtful as we move forward with this new type of term and practice.
 - Sanford: I agree that "sandboxing" is an informal term that's loosely defined but it has taken on a life of its own. It might be difficult for us to replace it with a scientifically more accurate phrase at this point and still have the same buy in. Critical that we come up with a solid definition of what it means and how it might be implemented.

Strategy Review System (SRS) 4th Cycle: Progress Update – STAC Staff

The fourth cycle of the Strategy Review System (SRS) process has revised the timing of when both STAC and Scientific, Technical Assessment and Reporting team (STAR) interface with the cohorts and Goal Implementation Teams (GITs) to earlier in the SRS process. STAC membership was assigned into the four various cohorts (Watersheds, Living Resources, People, and Clean Water) based on individual expertise and interest; members will meet with the cohorts before their quarterly progress meetings and before they present to the MB. This will help the groups define and shape their science needs and provide feedback for the learning portion of adaptive management.

This is the first time STAC members are strategically linked a specific cohort; each group communicates and coordinates differently. STAC members are encouraged to share positive, negative, and neutral insights of the process to ensure effective and efficient integration. This will be an ongoing discussion for subsequent STAC quarterly meetings.

Discussion:

- Sanford: This process seems more effective in interfacing with the Bay Program. Questions that still need to be considered are: How do we address the overall structure of the SRS process? Do we have the right cohorts? Are we asking the right big picture questions? Perhaps this is for a different committee or level to address. **Sullivan** [chat]: This is a great time to ask those questions. On a level below is the question whether the right outcomes are being addressed; this might be best for the Beyond 2025 effort to consider. Outcome meetings are a good time to ask questions like are we measuring the right metric to show progress, are we targeting the right areas/resources to make the biggest impact, are we monitoring the right information, etc.

- Greg Noe (USGS) [chat]: From the USGS representative, I've been working on SRS updates for years. It is illuminating to see how decisions are made, what the priorities and considerations of the workgroups are, and to suggest and learn what the science needs are.
- Boomer: The expert panels are a great way to understand the decisions that are being made and where science can inform those decisions, as well as strengthen our experience with using structured decision making. STAC's impact on the Bay Program will be strengthened with a better understanding of what decisions are made and how we can improve synthesizing and organizing the science to inform those decisions – practicing structured decision making.
 - Noe: An observation with the various workgroups is that sometimes their identified needs are not related to science or research. They are looking for different ways to improve their outcome and do not always need new knowledge. Even so, with scientists such as STAC to work with them through what they want to do and how to get there is still useful for both the groups and STAC. Another benefit of STAC is in helping an individual outcome see connections beyond their workgroup and moving the Bay Program towards being more holistically effective.
- Palm-Forster: Are we at the point where STAC is actively able to engage with the cohorts? STAC Staff sent out cohort assignments and I have been waiting for a coordinator to reach out with a question or request. **Boomer**: I would encourage STAC members take a proactive role to better influence the conversation and outcomes of these efforts. At the same time, there is a need to listen, as STAC is joining these established groups. Start attending the meetings and be ready to engage as opportunities come up. **Saunders** [chat]: Internally do more to make the connection between the coordinator and STAC member. Now that the assignments have been made, we can do that more clearly. Also, some of them may be waiting until they are closer to their cohort going through review in the calendar.

ACTION: STAC Staff will contact Cohort leaders and request they follow up with identified STAC member experts regarding dates and invites to their respective Cohort and Outcome group meetings; STAC member engagement with the Cohorts is based on individual member capacity.

FY24 Request for Workshop Proposals (RFP) Overview – STAC Staff

STAC has funding for workshops available each year, with an allocated \$40,000 for the upcoming grant cycle beginning June 1, 2024 and ending May 31, 2025. Workshops can be programmatic, with actionable recommendations, or state of the science (SOS), with an interdisciplinary perspective to examine a topic. With STAC member approval, the FY24 RFP will be distributed to the partnership on December 11th, 2023. Proposing steering committees will submit their preliminary proposals to STAC Staff by February 5th, 2024.

The maximum request for funds is \$15,000 per activity. By the March 2024 Quarterly Meeting, STAC members will have received all workshop proposals for this first round of activities and provided STAC Staff with scores per proposal based on the STAC FY24 Proposal Scoring Rubric. The STAC member identified on each proposing steering committee will answer any comments or questions remaining from the committee at the March 2024 Quarterly Meeting. Using feedback from this discussion, the EB will make the final decision on which activities to fund for the first round of FY24 STAC workshops.

Discussion:

- Wardrop: Proposals do not always have to come to STAC; a group of STAC members can propose a workshop for a topic of interest.
- Sullivan [chat]: In a quick look through the CBP Science Needs Database here are some ideas that I could share with GITs for a STAC Workshop. If there is one a STAC member would be interested in, this might help encourage GITs to submit a proposal: SAV Need, [Assessing tradeoffs of shallow water uses](#); Climate Resiliency Need, [Thresholds and quantifying resilience effectiveness of nature-based adaptation strategies](#); Synthesis of Science, [Conserving 50% of land by 2050](#)
- Wardrop: Sullivan and Saunders, do you have suggestions on the best way to generate interest in accessing these funds as a vehicle? The workshop vehicle is effective, and I would like to see the funds used. **Sullivan**: I know that there is interest in STAC workshops because they are very helpful. As Saunders suggested, we can poll for ideas and people who are interested or find a STAC champion to promote a workshop opportunity.
- Wardrop: Beyond 2025 recommendations will be discussed in spring, some of which might be ideal for a STAC workshop. There are no administrative restrictions to STAC having two calls for workshop proposals. This could be a rolling call or a second call.
 - Saunders: I encourage STAC to consider two calls. The teams that have appropriate issues for STAC workshops are also heavily invested in drafting recommendations and Small Group coordination for the Beyond 2025 effort and the additional workload of composing a proposal might discourage applications. Parsing the RFP out over the year will make the most effective use of those minds and ideas. **STAC Staff**: When workshops were always two in-person consecutive days and the event space might have needed to be booked months in advance. If STAC is more open to virtual or hybrid events, a rolling basis would make more sense as these events wouldn't need so much logistical planning.
 - Sanford: Do the funds have to be spent in the June 2024 – May 2025 timeframe, or can they roll over? Given the constraints with timing, having two phases of calls makes sense. **Wardrop**: We can't use the money ahead of time, but the funds are able to be rolled over into consecutive years.

- Shenk: My concern with announcing two calls for proposals is the limitation of funding. I believe last year was an outlier rather than a trend. A second call would be a good contingency plan.
- Letavic: I'd like to see what proposals STAC receives; if STAC does not find value in them and decides not to fund, then we have a Plan B. I worry funding expiring, so as long as we're certain delaying any awards will not decrease funding available, I'm in favor of having this rolling approach as a Plan B, should we not have many good proposals this first quarter.
- Kuwayama: CESR is a priority for STAC but it is not mentioned in the RFP. How do these two activities relate to each other? To what extent should an RFP – this one or a future one – specify in its evaluation criteria relating proposed activities to CESR activity, proposed CESR directions and outcomes. **Wardrop:** There are additional CESR Outreach funds, which we will discuss tomorrow, that could provide a buffer for workshop proposals or actions from the Beyond 2025 effort that are related to CESR. STAC's workshop RFP schedule has been in place for 20 years so the Bay Program and partnership are used to it; STAC can put out the regular call and make the decision whether to have a second call later. We can also add language to the RFP about a potential second call or rolling call depending on the outcome of the first call, so people have an indication that there might be some flexibility.
- Theo Lim (VT): There doesn't seem to be many previous workshops on social and behavioral or policy sciences. If that is something of interest, we should spell that out explicitly, so that people know that the call also includes social, behavioral and policy sciences as well
 - Sullivan [chat]: The CBP Strategic Engagement Committee have been compiling needs from the outcomes related to social behavior and may be able to help.
 - Wardrop: The workshop "[Overcoming the Hurdle: Addressing Implementation of Agricultural Best Management Practices \(BMPs\) Through a Social Science Lens](#)" focused on behavioral change. I agree the range of topics should be clearly signaled in the RFP.

DECISION: The STAC FY24 Workshop Request for Proposals (RFP) language will be adjusted to explicitly call for social, behavioral, and policy sciences, and for DEI/mixed-gender steering committees.

Discussion of FY23 STAC Synthesis Effort Funds – STAC Staff

The EPA Cooperative Grant awarded to the Chesapeake Research Consortium (CRC) provides funding for small synthesis projects beginning on June 1st, 2023. STAC will identify topics requiring further exploration to determine the risk and/or opportunity they pose to the trajectory of the partnership's efforts. A set amount of funding is available each year and rolls over into subsequent years. STAC can utilize funds for several smaller synthesis projects or 1-2

larger synthesis projects. The overall focus areas are “the continued effort to effectively manage in the face of climate change” and “the addressal of issues arising from traditionally under-served stakeholder groups” and STAC can determine the topic(s) to explore within these focuses.

Following the model from the previous synthesis, a six-member Science Synthesis (SS) Subcommittee of interested STAC members, led by Keisman, will begin meeting in February 2024. Keisman was an integral member to the previous STAC synthesis effort led by previous STAC member, Jeremy Testa (UMCES). Gary Shenk (USGS) has agreed to sit on the SS Subcommittee as a link to the Bay Program and Denice Wardrop, STAC Executive Secretary, will join as the sixth non-voting member. The SS Subcommittee will determine the synthesis topics, number and timing of awards, preparation of appropriate RFP, and design of the review process.

Discussion:

- Dennison: In my experience, a synthesis is best done over two years as it takes time to curate and then construct the desired products.
- Sanford: How is this different from a State of the Science Workshop?
 - Wardrop: Delineation of topic areas. When the CRC wrote the proposal for the award, there were two unfunded mandates from the EC on climate change and DEIJ. The synthesis seeks funds to address those topics specifically from STAC. I’ll also mention that in the language of structured decision making, we had identified critical uncertainties as places where, if resolved, would lead to a change in how the Bay Program goes about business – those critical uncertainties relating to either managing for climate change or associated with underserved stakeholders.
- STAC Staff: The remaining members of the subcommittee will be decided by the EB; members can nominate themselves by contacting STAC Staff or Keisman.

- **ACTION:** A Science Synthesis (SS) Subcommittee, led by Jeni Keisman (USGS), will be formed to aid in determining synthesis topics, number and timing of awards, preparation of appropriate RFP, design of review process, and other STAC Synthesis-related decisions. This subcommittee will begin meeting in early 2024.

[Artificial Intelligence \(AI\) and Physics-informed Differentiable Modeling in Hydrology](#)

– Chaopeng Shen (PSU)

Chaopeng Shen (PSU) introduced STAC to strengths of machine learning (ML) models compared to process-based models and the benefits of using of differentiable modeling (DM) in geosciences. Challenges emerged with process-based models in the difficulty to evolve with more and more data and the influences of human intuition and biases; an alternative is deep

learning (DL), which is a rebranding of neural networks featuring large capacity, hidden layers that automatically extract features, improved architecture and regularization, and working directly with data. More information can be found in Shen's publication [here](#).

Shen's team calibrated a hydrologic model over the entire continental U.S., with high resolution data and six parameters. DL was able to process the amount and complexity of data where traditional algorithms were not and comes with advantages of better results for altering variables and better spatial generalization. Within Shen's paradigm is the process of DM, which is a free and fundamental intermingling between neural networks and process-based equations. DM differs from a direct paradigm in cutting the process into steps and defining equations, allowing for adaptability to the data and better training for the machine. This model has the same performance as process-based models with the added outputs of physical variables including base flow, groundwater flow, and evapotranspiration.

Discussion:

- Wardrop: What is the CBP going to do with this modeling?
 - Shen: This modeling will help track the triplets and the shallows as CESR has recommended. It is more accurate in estimating concentrations and flows. These predictions of changes can be integrated into CAST.
- Sanford: In many traditional engineering models, people use power laws to come up with parameter relationships. With this method, those power laws are replaced with these deep learning derived parameters, which is an advantage to the dynamic models that use those parameters. **Shen**: That is conditionally correct.
- Boomer: What are your thoughts about the prospects of using or integrating AI and process models to tackle structural uncertainty?
 - Shen: If you have a missing process, you can replace it with a neural network and the machine will learn from the data. The human aspect will have to interpret what is learned but the potential is huge. DMs narrow the scope of the neural network to a very small scope so that the outcome of the learning is interpretable.
- Hayes: What is the ability of ML to provide insight on subsurface networks that we can't pick up on Light Detection and Ranging (LiDAR) modeling?
 - Shen: A neural network cannot be directly trained from what cannot be observed. DM will allow observations to be used to inform parameters.
- Lew Linker (EPA): That is a revolutionary tool that can make a real difference in application of technology and science in the Chesapeake Bay.

[Briefing on Findings from the FY21 STAC Workshop "Evaluating an Improved Systems Approach to Crediting: Consideration of Wetland Ecosystem Services"](#) – Pam Mason (VIMS)

Pam Mason (VIMS) summarized the FY21 STAC Workshop “[Evaluating an Improved Systems Approach to Crediting: Consideration of Wetland Ecosystem Services](#)” that was held virtually on March 22-23rd, 2022. The objective of the workshop was to explore specific management actions for improvements to the current National Environmental Information Exchange Network (NEIEN) system to better account for habitat-based data and co-benefits, and for incorporation of landscape consideration and application of a systems approach to maximizing benefits from multi-habitat projects to improve restoration outcomes.

Discussion:

- Wardrop: How would you like to see the results of this workshop move forward?
 - Mason: Some of what our recommendations have started moving into implementation. The report proposed tools to help systems acknowledge the co-benefits of wetlands practices, such as a checklist or report card-adjacent template that could gain projects crediting. These tools can be used by NFWF and the Bay Trust to award grants.
 - Noe: Like idea of changing funding proposal review formats to include multiple ecosystem services of a mode reduction. There is a larger structural issue relevant to STAC, particularly given CESR and the discussion of sandboxing: the primary incentivization for conservation practices in the Bay is the TMDL which is driving most behavior. This is a bigger structural issue for the partnership that perhaps can be tackled with help with CESR and Beyond 2025. **Wardrop**: I was at a Bay Commission meeting presenting CESR and most of the commission members were shocked to learn that we were not going to meet the Wetland Restoration Goal and are overall losing wetland acreage. Our messaging and how we incentivize things around wetlands has to shift.
 - Mason: The Division of Wildlife Resources in Virginia had to advertise three times to hire a wetlands person. In a previous STAC discussion, I talked about needing partnerships in academia; wetland projects are complicated, and part of the issue is not having enough people.
- Sanford: There have been discussions in the Shallow Water focus group about defining wetlands and whether they're considered to be part of the part of the shallow water, the land water interface, or whether they're considered just to be a BMP? From this report, it sounds like the habitat value of wetlands is an integral part and they should be considered valuable for that reason in addition to being a nutrient treatment facility.
 - Noe: Right, and in certain parts of the landscape, they have really important functions other than water quality functions. In the context of the workshop, wetlands meant both marshes and nontidal wetlands. As a wetland scientist, it's certainly both but they have different functions and ecosystem services based upon landscape position. Noe: There's a big science need to be able to both measure and model these other ecosystem services. Because of the incentivization, we've gotten better at predicting water quality functions at

wetlands but to correctly incentivize other things such as flood reduction, habitat provision, and recreational benefits, we need to be able to understand what controls them and how to predict them based upon management actions. The science isn't there to be able to guide the partnership. **Boomer** [chat]: Emphasizing Noe's point: We don't often mention importance of headwater, riparian, and floodplain wetlands to climate resiliency (flood and micro drought mitigation); especially in non-tidal catchments - relevant to LCAG's concerns. There is a critical need for cumulative assessment tools.

- Wardrop: Did the workshop come up with any ideas about how you would express either that connectivity with different habitats or different projects? Or how you would kind of score that?
 - Noe: The predictive tools to understand and predicted it aren't there. I don't think we really made enough progress on useful guidance going forward other than just the recognition that landscape ecology matters.
- Letavic [chat]: Wetland protection might be a thing PA gets right with our state regulations (especially with respect to WOTUS ruling). Here they're protected from being developed without expensive mitigation, so avoiding wetland disturbance is usually the goal for a development project. This is prompting me to check out PA's acres to see if our portion is also decreasing. Building new ones is just as challenging in PA due to the reasons PA mentioned, but I agree that engineers and wetland scientists need to get together on this to make it happen. **Filippino** [chat]: VA is currently more stringent than the feds.

[Briefing on Findings from the FY22 STAC Workshop “Best Management Practices to Minimize Impacts of Solar Farms on Landscape Hydrology and Water Quality” and Request to Approve Workshop Report](#) – *Lauren McPhillips (PSU)*

Lauren McPhillips (PSU) summarized the FY22 STAC Workshop “[Best Management Practices to Minimize Impacts of Solar Farms on Landscape Hydrology and Water Quality](#)” that was held April 6-7th, 2023 at George Mason University in Manassas, Virginia. The objective of the workshop was to explore the potential impact of land use transition renewable energy within the Chesapeake Bay watershed, and the partnership's ability to meet Total Maximum Daily Load (TMDL) goals. Since current best management practice (BMP) recommendations are varied across the watershed with only some states providing solar-specific stormwater management guidance, there was a need to ascertain the state of the science on solar farms and environmental quality that will inform field research and modeling in the Chesapeake Bay region.

Discussion:

- Sanford: What percentage of the of the land you know of the available land is currently covered by solar panels, or what are the projections? **McPhillips**: There is a summary in

the report about some of the historic and future projections. A lot of large sites are hundreds of acres and some of the newer are thousands of acres.

- Sanford: Does the height or angles of the solar panels affect the way the farms are set up? **McPhillips:** Study has started to look at how they affect how the water redistribute or vegetation. Newer technology can allow for tracking panels that can optimize the capture of solar energy by tilting the panels, as well as not having as much of the ground is covered and affecting how much rain is intercepted. Exploration of how panels are mounted has not been focused on as much as optimizing the solar energy capture from these sites.
- Letavic: Herbert, Rowland, & Grubic, Inc is a consulting firm that works with local government in Pennsylvania reviewing land development plans and writing ordinances to help local government decide how they want to regulate solar farms. Most communities that we work in or adjacent to are unprepared for the development. I'm glad that these are very noticeable on our updated land use cover data sets because that means retrofit opportunities should be relatively easy to locate on the landscape.
- Matthew Baker (UMBC): Is there a pattern in the geography of these installations? I'm wondering about the utility incentives to have these solar farms in remote places, and the impacts of having those out of sight and out of mind, like coal mines or other or fracking operations, and how that could play a role in thinking about their potential impacts, such as fragmentation effects.
 - McPhillips: One of the first workshop talks was from Michael Evans (Chesapeake Conservancy), who has done an analysis of where solar farms are in the Bay region. He showed that many of our existing solar farms are on former agricultural land because it's flat. Those are the sorts of sites we're seeing in terms of rural versus urban. Land is more expensive near cities so you may have some smaller sites, but these larger arrays tend to be in the rural parts of the states. The industry folks continued to bring up the locations of these interconnects, the electricity grid, and the proximity to that is important. There are many layers that come together in terms of optimizing potential sites to consider minimizing water quality impacts, clashing with agricultural land, and feasibly accessing the electricity grid.
- Kuwayama: From the regulator perspective portion of the of the workshop, did you get a sense that there was a common pattern across states in our region for managing this type of development?
 - McPhillips: For the three States on the panel, there were some similarities as well as differences. Across the US, only twelve states have storm water management regulations for solar farms or solar specific stormwater guidance. This is an area that is rapidly evolving but there has not been a lot of consideration of this specific land use type in our region. Virginia released new guidance; Pennsylvania has had state level recommendations for a while as does

Maryland. There are some differences in how the states classify the surface type and calculate runoff and recommend management.

- Knoche: Was there a common thread in the opportunity costs associated with this land use? If the best use of this land was for a solar farm, what was the second-best use of the land?
 - McPhillips: We certainly had those discussions but no clear answers. My colleagues in the Midwest have talked about seeing net water quality benefits because so much highly fertilized conventional agricultural land is being transitioned to solar farms. For other types of land, the right management practices need to be used to keep the site from having net negative impacts in a variety of ways. It is an area to study trade-offs more and how to optimize. Part of the challenge is that there are many incentives to build solar farms for meeting renewable energy goals and researchers is trying to catch up in informing large scale planning.
- Hayes [chat]: What is the average life span of a solar farm in the humid temperate mid-Atlantic? **McPhillips**: Roughly 30 years. There have not been many farms that have reached that point yet and usually end for other reasons.
- Filippino [chat]: There has been work in VA towards identifying mitigation strategies for solar placed on prime ag and forest land that should be reflected in draft regulations soon. The new guidance in VA for stormwater includes calculating runoff based on whether or not installed solar panels will rotate vertically during storm events.
- McPhillips: There was [an article](#) about the workshop as well featuring some pictures right from the field trip to Dominion Energy Remington Solar Facility. Think positively about how fast we can update management practices and minimizing degrading; getting the right recommendations will make a big difference.
- Boomer [chat]: Payment rates to producers for converting from croplands to solar fields is a key conversion driver. This is concerning because of need to increase food production by 50% to meet population growth demands. Are there enough marginal lands to accommodate both renewable energy and food production goals? How did this group define marginal lands?
 - McPhillips: I've heard conflicting discussion about the clash between agricultural land and solar. We have a growing population but we're always improving our ability to produce more food with less space, and I think there is more work that could be done in optimizing site selection and planning. The workshop did not define marginal lands or try to quantify that. Pennsylvania will be doing some spatial analysis of where our marginal lands are that could be used more for solar development. I would broadly define marginal in terms of poorly draining soils or steep slopes, as well as lands like reclaimed Mine Lands; there are policy challenges with repurposing reclaimed Mine Lands which can make it difficult for the solar transition.

DECISION: STAC conditionally approved report for the workshop “Best Management Practices to Minimize Impacts of Solar Farms on Landscape Hydrology and Water Quality,” following Steering Committee addressment of STAC comments and completion of a USDA agency review.

[Briefing on Findings from the FY22 STAC Workshop “Using Ecosystem Services to Increase Progress Toward, and Quantify the Benefits of, Multiple CBP Outcomes”](#) – *Jeremy Hanson (CRC)*

Jeremy Hanson (CRC) summarized the FY22 STAC Workshop “[Using Ecosystem Services to Increase Progress Toward, and Quantify the Benefits of, Multiple CBP Outcomes](#)” that was held across three hybrid sessions, on March 16th, April 18th, and June 6th, 2023. The objectives of the workshop were to: 1) have investigators engage with stakeholders on effective application of new ecosystem service (ES) results into tools and decision making at multiple levels, and 2) develop recommendations for an actionable workplan of how ecosystem services can be used to address multiple CBP outcomes, with both short-term applications of ecosystem services into tools (between 2023-2025), as well as longer-term improvements based on research needs identified at the workshop.

This workshop focused on the following aspects of ecosystem services for decision making: refining stakeholder needs and knowledge gaps and evaluating how ecosystems services data being produced from several studies related to water-quality practices can be applied by decision makers and conservation and restoration practice implementers to help advance other CBP outcomes and support local restoration and community goals; and emphasizing riparian forest buffers, stream health, wetlands, climate resiliency, and healthy watersheds outcomes.

Discussion:

- Monaco [chat]: [NOAA Ecosystem Service](#) activities include tools and ecosystem services framework for planning.
- Knoche: Talking about ecosystem services is precise, such as food and water provision and climate regulation. With benefits or multiple benefits, we are missing an opportunity to be clear on how relates to ecosystem services. As STAC social science capabilities grow with more expertise, should try to do precise social science.
 - Hanson: The workshop struggled with the terminology. Ecosystem services is very clearly defined with a large amount of literature, but the Bay Program has other terms that it has created over the years; ecosystem services are often used as shorthand for other terms and concepts. This was definitely a point of struggle, and we may have to clean that up in the report as well.
 - Hayes: I want to reinforce Knoche’s statement. STAC faces a similar challenge in discussions around “sandboxing” and getting caught up in one definition. We need to be more careful in our use of the term ecosystem services because it's

undermining the importance of the messaging. It's incumbent upon us, if we're going to be scientific and technical and provide that advice, that we're very careful in the language.

- Hanson: Agree. Part of the difficulty is “ecosystem services” is the most recognizable term and it is so specifically defined. Other terms that have more direct meaning in the partnership context aren't used as much, like benefits where the term implies that something else is primary.
- Palm-Forster: What were the biggest roadblocks and what can STAC do to help overcome these challenges?
 - Saunders: Stakeholders drive their decision-making based numbers from the Chesapeake Assessment Scenario Tool (CAST), which measures and predicts nutrient and sediment removal. The accountability system does not provide extra incentive to consider outcomes. STAC and CESR can help the Bay Program consider outcomes-based accountability. **Palm-Forster**: The outcomes you're talking are the ones that we are kind of accountable for broadly in the Chesapeake Bay?
 - Saunders: In this context, the outcomes that are structured or tethered to our agreement, from land conservation to habitat, etc.
 - Letavic: Did the workshop discuss who the right people are for quantifying ecosystem services? **Hanson**: No, it will be a case-by-case basis as to whether a monetary number or value attached to it. **Knoche**: As I understand, ecosystems have a structure, and a change in structure will change the function, and a change in function will change human's care and monetization of benefits.
 - Boomer [chat]: Ecosystem services reflect values that may vary among stakeholders. There is also a tendency to avoid evaluating priorities. Both related challenges seem like critical opportunities to engage social-economic experts in building consensus.
- Sanford: A report card approach similar to the Chesapeake Bay Report card (UMCES-IAN), is another way to quantify value and health and satisfaction without monetizing ecosystem services through a series of indices that are averaged together in a particular category to grade. **Dennison**: Possibly a color coding visual; quantitative ranking rather than monetary. **Hanson**: There have been projects with quantitative information, but they are not transferable to a CAST scenario where cost per unit is associated with all the BMPs, and the benefits are not explicitly tied on a per unit basis in the same way.
- Hayes: I had a student who used the Stanford invest model to look at carbon sequestration from the forests in seven counties in the West Branch to the Susquehanna River. She compared it with the revenue generated by the hunting and fishing licenses in the adjacent forests and their streams. What was surprising was how much they valued the hunting and the fishing just using a carbon trading on the Stock Exchange. Carbon has a high value. There was more money spent on the hotels and

fishing licenses and those trips than there was generated by the carbon in the forests. It shows that humans place a tremendous value on having healthy waters.

Further Conversation on Implementing ITEK in STAC Efforts – Marla Emery (NINA)

Marla Emery (NINA) is a member of the [National Academies' Committee on Independent Scientific Review of the Everglades Restoration Project](#) (CISRERP) which is currently in the process of the with the [tenth biennial review](#), and is tasked with ensuring inclusion of the experiences and perspectives from the two federally recognized tribes, the Miccosukee and Seminole, whose lands are within the Everglades Restoration area. The 2022 [Federal Guidance](#) for working with Indigenous peoples and indigenous knowledge is specifically directed at heads of Federal departments and agencies and the people that who work for them. The three focal points of that guidance were: the necessity to understand indigenous knowledge, to grow and maintain mutually beneficial relationships, and to think about ways to include and apply indigenous knowledge in research and management.

For CISRERP, understanding indigenous knowledge has been important for the entire committee, not just the subgroup which is working on tribal experiences and perspectives. It is important for the entire committee to understand is that indigenous knowledge is grounded in social, spiritual, and cultural systems, which are reflected and incorporated into the biophysical aspects of the Everglades system. In engaging with indigenous knowledge, it is extremely important to be sure that we honor and practice the principle of [free, prior and informed consent](#).

In growing and maintaining mutually beneficial relationships, CISRERP sought early and sustained engagement. The involvement of tribes cannot be an extractive or one-way process; the committee will need to be intellectually and emotionally prepared to acknowledge past injustices and the context of seeking indigenous knowledge. A part of earning and maintaining trust has been to invite both tribes to every meeting and guarantee dedicated time on the agenda for the tribes and tribal issues. It's also important to recognize the challenges and to be transparent with tribes and with yourself about the challenges that you're facing in engaging with indigenous peoples and indigenous knowledge.

Wednesday, December 6th

Attendance:

Members: Matt Baker (UMBC), Kathy Boomer (FFAR), Charles Bott (HRSD), Tony Buda (USDA-ARS), Kathy Bunting-Howarth (NY Sea Grant), Bill Dennison (UMCES), KC Filippino (HRPDC), Kathy Gee (Longwood University), Ellen Gilinsky (Gilinsky, LLC), Kirk Havens (VIMS), Ben Hayes (Bucknell University), Jason Hubbart (WVU), Jeni Keisman (USGS), Christine Kirchhoff (PSU), Scott Knoche (Morgan State, PEARL), Ellen Kohl (UMBC), Yusuke Kuwayama (UMBC), Erin Letavic (Herbert, Rowland, & Grubic, Inc. [HRG]), Theo Lim (VT), Mark Monaco (NOAA), Greg Noe (USGS), Efeturi Oghenekaro (DOEE), Leah Palm-Forster (UD), Joe Reustle (Hampton

University), Kenny Rose (UMCES), Larry Sanford (UMCES), Tess Thompson (VT), Valerie Were (CIRA), Joe Wood (CBF), Weixing Zhu (Binghamton)

Guests: Greg Berranco (EPA), John Karl Bohlke (USGS), Douglas DeFlitch (Douglas DeFlitch Consulting, LLC), Joseph Delesantro (PSU), Lisa Dewey (VA DEQ), Alyssa Duh (PA DEP), Melissa Fagan (CRC), Carl Friedrichs (VIMS), David Goshorn (MD DNR), Melissa Harrison (PA DEP), Scott Heidel (PA DEP), Elizabeth Hoffman (), Amy Hruska (Underwood & Associates), Ashley Hullinger (PA DEP), Anna Killius (CBC), Lew Linker (EPA), Scott Macomber (Linesider Consulting, LLC), Lee McDonnell (EPA), Kathleen Michels (Sligo Headwaters Civic Association), Alisha Mulkey (MD DA), Allison Prost (CBF), Kristin Reilly (NWF), Kristin Saunders (UMCES), Gary Shenk (USGS), Kurt Stephenson (VT), Breck Sullivan (USGS), Jill Whitcomb (PA DEP), John Wolf (USGS)

Administration: Meg Cole (CRC), Tou Matthews (CRC), Denice Wardrop (CRC)

Closed Session Discussion: Comments/Feedback Received since CESR Publication – *Denice Wardrop (CRC), Kurt Stephenson (VT)*

Day 2 began as a closed-door session for STAC members only. Wardrop and Kurt Stephenson (VT) shared their recent CESR outreach and communication efforts, and feedback received from various stakeholders during their presentation sessions. STAC members were able to ask questions to further understand responses to the report and next steps that the CESR Outreach Committee is considering.

Introduction to Meeting Theme: Implementing CESR – *Larry Sanford (UMCES)*

Larry Sanford (UMCES) opened Day 2 with an introduction to the meeting theme: *implementing CESR*. Response to the CESR report has been overall positive and STAC must now consider how to implement recommendations and the impacts of decisions on the Bay Program.

Based on public feedback, the CESR Outreach Committee has identified four areas to target:

1. Tiered Approach to TMDL – CESR suggests a tiered TMDL with different pollutant targets for different segments over different timelines.
2. Focus on Nonpoint Source Reduction Outcomes Rather than BMP Implementation – CESR noted that exclusive reliance on CAST to document and credit NPS activities for the entire watershed may stifle innovation and limit effectiveness.
3. Identify and Address Nutrient Mass Imbalances – CESR noted the importance of identifying and addressing regional nutrient mass imbalances to reducing NPS loads from affected areas.
4. Adaptive Management – CESR did not offer specific recommendations for how adaptive management and decision science can help the CBP, but STAC believes these tools could offer significant benefits moving beyond 2025.
5. Transition to New Approaches and Priorities – CESR recommends new approaches and priorities that will likely require rebalancing of both personnel and resources. How can STAC help with this transition?

Panel: Chesapeake Bay ‘Thought Leaders’ – *Alison Prost (CBF), David Goshorn (MD DNR), Anna Killius (CBC), Kristin Reilly (NWF), Lee McDonnell (EPA)*

A panel of four Chesapeake Bay ‘Thought Leaders’ were invited to speak with STAC on the implementation of the report: Alison Prost (CBF) is the Vice President of Environmental Protection Restoration at the Chesapeake Bay Foundation and works with state offices watershed-wide on policy, advocacy and restoration; Dave Goshorn (MD DNR) is the Deputy Secretary of Maryland Department of Natural Resources and works on implementing nonpoint source funding projects in Maryland; Anna Killius (CBC) is the Executive Director of the Chesapeake Bay Commission, which works to find policy solutions to issues of common concern in Chesapeake Bay health; Kristin Reilly (NWF) is the Director of the Choose Clean Water Coalition, which consists of almost 300 nonprofit organizations across the watershed and are focused on water quality with intersectional focus on land conservation, equality and justice; and Lee McDonnell (EPA) works in the Chesapeake Bay Program Office overseeing the modeling, monitoring, and GIS teams.

Killius chairs the [Beyond 2025 Steering Committee](#) alongside Martha Shimkin (EPA, CBP Director). Shimkin is a nonvoting member of the People Small Group, and Reilly is a member of the Clean Water Small Group.

STAC Staff shared pre-meeting material, the internally circulated CESR Outreach summary document, for the panelists to reflect on considering the four target areas outlined by Sanford in the session introduction. Prost said the document highlights the items that most resonated with the CBF, though further consideration is needed for how to encourage model adjustments to align with the lens shift. STAC could help in collecting information for a parallel system that would be more accurate, by identifying measurements that can be monitored and identifying criteria for a tiered approach to TMDL, Prost noted. Goshorn said that Maryland has fully embraced the CESR report but is struggling with how to implement recommendations and urgently needs help. There are a variety of funding sources allocated for projects that align with identified CESR targets, Goshorn added. He suggested STAC help advise on the direction to invest these resources in.

Killius supported the creation of a short and cohesive document and underscored the difficulty in trusting decision-makers will read larger reports such as CESR, making it a challenge for full understanding. The Chesapeake Bay Commission is exploring how to focus more on outcomes than implementation including pay-for-performance opportunities, and Killius recommended STAC support increasing confidence in the measurement of outcomes. Reilly mentioned it would be helpful to draft either a list of policies to address these concerns and/or keep a record of successful efforts from other watersheds when advocating to policymakers and elected officials. Social scientists on STAC can help provide direction for incentivizing and measuring behavior change, as this is critical to understand how to frame and present the work.

McDonnell stated there are many outstanding questions remaining including how best to shift program focus from strict water quality criteria to living resources as well as general uncertainty regarding the feedback mechanism of pay-for-performance. McDonnell requested that STAC help expand community science and community monitoring within the partnership to surpass these issues.

Discussion:

- Keisman [chat]: It is important to keep in mind that as we come forward and say, "there is a better way," we must keep in mind that there are valid reasons why this developed framework that exists, through decades of iterative learning. If we are going to help move the ball towards more effective solutions, we must listen, understand, and learn from their experiences and institutional knowledge. **Wardrop** [chat]: Agreed. CESR's message is to point out the learning opportunities that have occurred. STAC's purpose is to be the body that has the luxury of looking beyond the day-to-day work to see the horizon. It is a partnership in the best sense of the word. The CBP's superpower is the exact things you point out; STAC's superpower is its vantage point and independence to say things that might not be able to be said by those in the day to day effort.
- Kirk Havens (VT) [chat]: Implementation and subsequent monitoring need to be equal partners in management actions.
- Letavic [chat]: Can we be reminded about the schedule of Phase 7 model finalization?
 - Sullivan [chat]: There are timelines for each project [here](#).
 - Linker [chat]: The fully operational Phase 7 models will be delivered to the CBP partnership by December 2025. Then the CBP has 2026 to fully review the Phase 7 suite of models. In 2027 the CBP applies the Phase 7 models to assess the influence of 2035 climate change on Chesapeake water quality and living resources.

Breakout Group Discussions

STAC members and meeting attendees met in virtual breakouts for 30 minutes to consider how to address the major implications of CESR, then reported out to the larger group. The groups were split by the following topics: 1) Tiered Approach to TMDL; 2) Focus on Nonpoint Source Outcomes; 3) Nutrient Mass Imbalance; 4) Adaptive Management; and 5) Transition into Action. Groups recorded notes using Jamboard and all aside from the Transition into Action group discussed the following questions:

- What can STAC uniquely do?
- Where should we focus our efforts?

The Transition into Action group was the only group to answer questions unique to the other breakouts, answering instead the following:

- How do we transition CESR into action?

- How do we transition into implementation?

Report-outs from the half-hour breakout discussions are summarized below.

1. Tiered Approach to TMDL – *Kenny Rose (UMCES)*

Kenny Rose (UMCES) reported out on the tiered approach to the TMDL. He acknowledged it can be difficult to support people and goals with difficult and contrary knowledge, and that the outcomes from CESR may be seen as disruptive, causing implementation to encounter resistance and risks. It is important to present the material in an acceptable way that allows for the partnership to embrace change, lest our CESR efforts will not be effective. A theme of the breakout discussion was the value of STAC in being able to step back and consider longer-term and broader-scale issues within the partnership efforts. Creating an intermediate step, such as an implementation plan or strategic tactical, might cover the gap between CESR implications and feasible action; STAC has knowledge and the ability to identify possible “low-hanging fruits” and the ways to effectively address them. Allison Prost (CBF) suggested a series of conversations to develop individual options about what a tiered TMDL, either spatially or temporally, might look like; nothing urgency of action, Prost stated that one “perfect approach” is not the goal but instead a mindset of developing different options to work through. Monaco added that STAC can be a great convener and communicator for these kinds of conversations. Lim remarked that coproducing a tiered approach could be a collaborative opportunity to incorporate new forms of knowledge and values, particularly Traditional Ecological Knowledge.

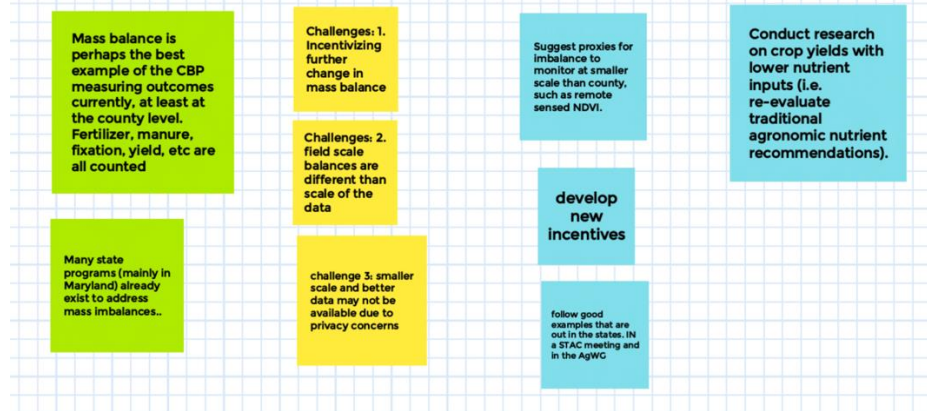
2. Focus on Nonpoint Source Outcomes – *Joe Wood (CBF)*

Wood reported on the group’s initial reactions to the panel and interest in achieving outcomes by focusing on nonpoint sources. Breakout participants expressed concern on the lack of clarity regarding redirecting without incentives; STAC can advise action and provide examples but is unable to create an incentive. The group discussed how social decisions from the local governments and/or soil and water districts may differ from the current incentive framework, though STAC is able to explore and detail these social sciences. Jill Whitcomb (PA DEP) mentioned that each state has opportunities through nonpoint source management programs through the Clean Water Act and often organizations at a local level are disconnected and unaware. CBP and STAC could help facilitate these connections and work toward an incentive process across the partnership. Kuwayama added that STAC would benefit from learning about ongoing individual efforts and consider frameworks that do not apply to specific programs or incentives, but instead to the general issue of tying point source loads to outcomes.

3. Nutrient Mass Imbalance – *Gary Shenk (USGS)*

Shenk reported out for the Nutrient Mass Imbalance breakout group. The group’s Jamboard (image below), organized by color into the state of nutrient mass balances or imbalances (green), the challenges faced (yellow), and what STAC could do (blue).

What can STAC uniquely do?



There is a lot of available data on mass imbalance as well as state programs addressing these imbalances; challenges are in incentivization, particularly in agriculture, and the scale of data being county-level, Shenk stated. Members in the group suggested using [normalized difference vegetation index \(NDVI\)](#) as one of the tools to indicate areas of mass imbalance, developing new incentives, following good examples from state jurisdictions, and conducting research on crop yields with lower nutrient inputs. Thompson suggested further discussion of existing agriculture, nonpoint source pollution, and nutrient application programs in a future STAC meeting. Whitcomb proposed STAC bring together agronomists to discuss the [4R Alliance](#) network and learn more about what is happening on the parcel-level.

4. Adaptive Management – Larry Sanford (UMCES)

For the Adaptive Management breakout, Sanford discussed the group's responses to the central question of whether focusing on measuring outcomes or pay-for-performance would contribute most in the near-term. Participants suggested designing a series of programs that allow local jurisdictions propose their own ideas, and then experimenting and measuring program outcomes rather than full implementation as it is still important to realize projects and practices that are unsuccessful. The method of measuring and rewarding outcomes as opposed to implementation is one in which adaptive management processes could be effective. Lim added that in adaptive management, learning must be a part of the process and multiple types of learning may be happening at the same time. Lim wondered whether STAC could encourage protocols for practitioners to engage in reflection or if there is a way to systemically measure different types of learning within the Bay Program. In response, Havens noted that part of the process should be the implementation of learnings and Stephenson emphasized the importance of spreading this knowledge across the partnership. Tess Thompson (VT) pointed out that when thinking about sandboxing, groups should be prepared to commit to long-term monitoring to see a response or contemplate other ways to evaluate outcomes. Christine Kirchhoff (PSU) added that STAC needs to consider other capacities required to enable improvements the Bay Program wants to see and to further understand the process of information to action to change.

5. Transition into Action – Tony Buda (USDA)

Tony Buda (USDA) presented on comments made in the final group, Transition into Action. Participants began with discussion of unclear definitions (e.g., shallow waters) which make it difficult to translate the findings of CESR into action. In general, STAC should be clearer in defining terms so that implementers know where to focus their efforts. CBP GITs and the Beyond 2025 Steering Committee are key groups for STAC to engage with. A suggestion made was to draft short one-pagers with plain language on the larger CESR report to distribute to policymakers and implementers. Wardrop agreed that terms need to be better defined; shallow water was not defined in CESR but emerged from the difference in progress across habitats, its delineation as to a place with stakeholder engagement, and a hotspot of living resources response.

Discussion:

- Sanford: Is it feasible for the CESR Outreach Committee to work with the STAC staff on suggestion outcomes from these breakout discussions? **Stephenson:** Yes
 - Wardrop: We will be taking some of these specific ideas back to the CESR Outreach Committee to discuss. Committee members and CESR Writers Rose and Monaco have volunteered to identify a criteria strategy that may be used to tier the TMDL and focus on living resource response. A CESR 'Report in Brief' on policy opportunities is currently being drafted.
 - Dennison: The report cards are quick snapshots that summarize a lot of information and open conversation by being short and colorful. This could be a potential avenue for disseminating the CESR efforts.
- Wardrop: The Bay Program has gone through a transition in leadership and STAC can play an important role in a successful transition with repetition in CESR presentation and conversations.

The [STAC March 2024 Quarterly Meeting](#) will take place virtually on Tuesday and Wednesday, March 5th and 6th, 2024. Day 2 will focus on debriefing from the February 2024 [Beyond 2025 Symposium, inviting Beyond 2025 leaders to speak with the committee on](#) STAC's role in 2025 and beyond.

*Minutes Conditionally Approved by STAC at the March 2024 Quarterly Meeting
Finalized after STAC Staff addressed clarifying comments submitted by STAC Members*