Scientific, Technical Assessment and Reporting (STAR) Meeting
Theme: Targeting Co-Benefits

Thursday, February 24, 2022
10:00 AM – 12:00 PM

Meeting Materials:
https://www.chesapeakebay.net/what/event/star_february_2022_meeting
This meeting was recorded for internal use to assure the accuracy of meeting notes.

Action Items

- Scott Phillips, Ken Hyer, and John Wolf have been working on a discussion paper about how to enhance targeting within the Chesapeake Bay Watershed. Anyone interested in contributing should email Scott (swphilli@usgs.gov) to get involved.
- Bring in the users of co-benefit targeting tools to STAR meetings and related meetings, like Watershed Implementation Plan (WIP) implementers, to understand how to best encourage the embracing of additional layers or aspects of these tools.

AGENDA

10:00 AM   **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 (CRC)
STAC March Quarterly Meeting: Adaptive Management - Breck Sullivan
Update on Monitoring Review - Peter Tango and **Breck Sullivan**

Summary
Marisa announced that the Communications Team plans on reaching out to some STAR members about developing content for Chesapeake Bay Awareness week in June.

Breck Sullivan shared that the second day of the Scientific and Technical Advisory Committee (STAC) March Quarterly meeting, March 9, will focus on adaptive management. Discussions will include the different varieties of adaptive management and what they might mean for the Chesapeake Bay Program, current adaptive management in the Chesapeake Bay Program, and opportunities to advance Chesapeake Bay Program adaptive management. Breck asked for STAR members to attend and provide their insights on how adaptive

management could improve. The first day of the STAC Quarterly, March 8, will involve discussions on the science needs of the Healthy Watersheds and Aquatic Life cohorts. Kathy Boomer emphasized three other goals of the adaptive management discussions: better integrating the social and physical sciences, introducing the concept of performance-based incentives, and connecting modeling and monitoring. Bill Dennison commented these topics are very relevant for STAR and encouraged members to attend. Meg Cole linked the registration for the STAC Meeting on March 8 & 9 and the updated draft agenda for the upcoming STAC meeting.

Peter Tango provided the most recent update on the Monitoring Report for the PSC, sharing the team gathered feedback from the Management Board on February 17th and will incorporate that into the presentation to the PSC on March 2, 2022. The report itself will be released later in March.

Upcoming Conferences, Meetings, Workshops and Webinars
- Ocean Sciences Meeting - February 27-March 4, 2022, Virtual.
- Joint Aquatic Sciences Meeting - May 14-22, 2022, Grand Rapids, MI.
- Chesapeake Community Research Symposium - June 6-8, 2022, Annapolis, MD. (Hybrid: virtual and in-person. Subscribe here for updates.)
- World Seagrass Conference and International Seagrass Biology Workshop - August 7-12, 2022, Annapolis, MD. **Abstract submissions due February 15th, 2022**
- Global HAB symposium on automated in situ observations of plankton - August 22-26, 2022. Kristineberg, Sweden. Deadline for registration March 15, 2022.

10:10 AM   **Tools and approaches to target resources for achieving multiple CBP outcomes.** Better targeting resources, especially new funding from the Infrastructure Law, is needed for multiple Chesapeake Bay Program (CBP) outcomes. Several inter-related topics were introduced, and STAR provided feedback to plan for more in-depth discussions at future meetings.

Overview of the need and potential tools and approaches to address multiple CBP outcomes – Scott Phillips (USGS)
Scott Phillips provided an overview of targeting and addressing multiple CBP outcomes.

Summary
Scott emphasized the need to prioritize co-benefits given the directives on climate and equality. Scott made the point that now is the time for targeting co-

benefits due to the need to accelerate progress on achieving outcomes and the opportunities from increases in funding from federal, state, and non-governmental partners. Scott suggested a strategic approach for targeting all 31 outcomes by organizing around four main themes: target and accelerate water quality improvements, coordinate habitat restoration, expand land conservation, and increase benefits to people. For each of these approaches, Scott underlined the need to use the lens of climate resiliency to view these themes. Scott then highlighted some approaches, existing tools, and stakeholders that are involved in each of these four themes. Scott's suggested next steps include forming a working group with science providers to develop a strategic approach to target outcomes, organize existing tools, interact with stakeholders to apply tools, and enhance tools with upcoming results and data.

Kristin Saunders commented this is an amazing the way to lay it out, and it is a great way to set the stage.

Scott commented that he has been working with Ken Hyer and John Wolf on a discussion paper about how to enhance targeting within the Chesapeake Bay Watershed. Scott asked anyone interested in contributing to please email him (swphilli@usgs.gov) to get involved.

10:20 AM   **Examples of existing tools to address multiple CBP outcomes** – **John Wolf** (USGS), CBP GIS lead
John Wolf presented tools organized around these topics: accelerating water-quality practices, restoring habitats, conserving lands, and providing benefits to people.

Summary
John began with an explanation of Cross-Goal Implementation Team (GIT) mapping and the historical context of how this effort started. John then moved to the Cross-GIT User Research effort in the winter of 2020-2021 led by the Chesapeake Conservancy, RTI, and CBP GIS team. John identified the categories of key results from the Cross-GIT User Research, like the needs (more timely data, higher resolution data, new formats of data, new types of data) and solutions (central location for tools, case studies on use of tools, training on how to use tools, and tools for cross-GIT analysis) of the GITs. John next previewed some short-term solutions for targeting and assessment tools from the CBP (Watershed Data Dashboard, CAST, DEIJ Dashboard), Chesapeake Conservancy, GIT-Funded projects, and other partner organizations (The Nature Conservancy, Army Corps of Engineers). John then showcased the webpage being used to house the many different tools under the approaches Scott laid out in the previous presentation.

John asked for STAR and GIT input on the following questions:

- Targeting tools – what is missing?
- Outcome-specific tools – options and opportunities for cross-outcome data access/ integration?
- Tools you would like to hear more about at future STAR meetings?
- Suggested edits to tool descriptions?

Attendees responded that the following tools should be included:

- Julie Reichert-Nguyen suggested AdaptVA, a tool that has a lot of great climate resilience information.
- Greg Allen suggested including the USGS geomap tool on contaminants in the Susquehanna and Shenandoah if it is not already included under water quality.
- Megan Ossmann suggested adding the Black Duck Decision Support Tool to the habitat section.
- Megan Ossmann suggested adding the USGS Habitat Vulnerability Assessment for Wintering American Black Ducks to the habitat section.
- Katie Brownson suggested adding the USFS Forests 2 Faucets tool.
- Breck Sullivan suggested adding a section for Chesapeake Bay Tidal Monitoring to the water quality section, similar to one on there for Nontidal Monitoring. Links could include the tributary summaries, Potomac story map, and link to water quality change results available on data dashboard.
- Stephen Faulkner suggested the Landscape Conservation Cooperatives toolbox of Decision Support Tools.
- Matt Robinson suggested the Storymap from a recent DC project to map buried urban streams.

Many participants expressed their support and approval for this webpage. They agreed that having these tools in one place is a good step for supporting the most efficient use of resources in the partnership. Scott Phillips commented the site John is showing is a strong initial draft by John Wolf to get tools in one place.

Gina Hunt asked who the intended audience is and if it was local government. Scott responded that they envision stakeholders on multiple levels of government, such as federal, state, and local, as well as Goal Teams and workgroups for their associated outcomes. Kristin Saunders expressed the first user group is hopefully the CBP before it is exported to other audiences.

Jeremy Hanson suggested that if it's possible to include state level tools like what Julie shared, maybe those should be distinguished since it seems what is on the site now are all at the regional (multi-state, Chesapeake Bay Watershed) or national scale. Gina Hunt agreed local data crossed with larger data sets would be useful to local government.

Katie Brownson observed that it seems like many of these tools are oriented towards identify places to target that can help achieve multiple outcomes. It may also be helpful to think explicitly about where there may be trade-offs and opportunities to minimize those tradeoffs.

Kristin Saunders said she believes Rachel Felver and Olivia Devereux are discussing how to integrate the Beyond Environmental Benefits database into either CAST or the dashboard, or both. John Wolf responded that this tool is in the dashboard and can be found here.

10:40 AM **Applying upcoming results from ecosystem services studies** – **Bo Williams** (EPA) **and Ryann Rossi** (EPA)
Bo provided a listing of existing ecosystem services projects and Ryann discussed the application of her project results.

Summary
Bo began by reviewing some of the current ecosystem services projects underway in the Chesapeake Bay region. Some of the projects he reviewed included USGS Science and Decisions Center's Chesapeake Bay Watershed Local Stream Ecosystem Services project, EPA's High-Resolution Metrics for Ecosystem Services in Enviroatlas, and a Best Management Practices (BMP) impact scoring project by Tetra Tech. Ryann presented on an ecosystem services project on agricultural BMPs that she had been a part of through EPA's Office of Research and Development. She did a quick overview of the goal (describe how ecosystem services may change as BMPs to restore ecosystem condition are implemented) and approach (Ecosystem Services Gradient (ESG)) of the project. Ryann concluded with the different mediums in which the results of the study will be shared, such as an EPA style report, integration with CAST, and integration with the Watershed Data Dashboard.

Justin shared a link in the chat to NOAA's oyster restoration ecosystem services technical paper (https://spo.nmfs.noaa.gov/sites/default/files/TMOHC8.pdf).

Scott Phillips commented that Bo Williams and Jeremy Hansen also submitted a proposal for a STAC workshop for better incorporating ecosystem services into CBP decision making. Ecosystem services are an important part of the targeting efforts.

10:50 AM **Input from STAR on which items they want to hear more about at future meetings** (interactive survey via mentimeter)

Summary

Participants responded via mentimeter to the following questions about themes and topics of future STAR meetings:

1.) What topic do you want a more in depth presentation on tools to address multiple outcomes at future meetings? (accelerating water quality practices, restoring habitat, conserving lands, benefits to people, other)

The top two categories based on responses were benefits to people and restoring habitat. Katie Brownson said all of the options are good ideas for future topics. Kristin Saunders suggested bringing in the users of these tools, like Watershed Implementation Plan (WIP) implementers, to understand how to best get them to embrace additional layers or aspects of these tools. Julie Reichert-Nguyen supported this idea and shared she knows some people using The Nature Conservancy's climate resilience data. Gina Hunt also agreed and said one should start with the need of the users to guide tool development. Kristin commented it would be fun and educational if time was spent time working with these tools, either at STAR or GIT chairs or both. Using them together might highlight additional opportunities.

Stephen Faulkner suggested having some conversations around how specific production functions are being calculated, uncertainty, decision analysis based on uncertainty.

Katie Brownson suggested focusing on tradeoffs. Jeremy Hanson agreed. Julie agreed as well and suggested having a meeting where to discuss tradeoffs of marsh migration versus forest conservation (allowing marshes to migrate could also mean losing forests).

Breck said that based on these results, meeting topics will begin with benefits to people and restoring habitat, but all of the topics will be covered.

2.) Do you have projects or know of people who could present on the topics in question 1 above?

Some of the responses to the question include:
- Work with Chesapeake Conservancy on land conservation.
- The Nature Conservancy's Agriculture Restoration team (contact - Amy Jacobs) and the connected efforts to Envision the Choptank River.
- The Nature Conservancy's Resilience and Landscape Data.
- The Nature Conservancy's Living Shoreline Permitting app built for North Carolina.

- The USDA's Agricultural Conservation Planning Framework (ACPF) toolbox.
- The work of the Plastic Pollution Action Team.
- Ryann Rossi and Susan Yee for more discussion of ecosystem services, gradients, and production functions.

Jeremy Hanson said in response to Julie's comment about trade-offs and land transitions, Keryn Gedan (George Washington University) would be a good contact or presenter based on her publications, especially for forest/marsh transitions and dynamics. Katie Brownson agreed with this suggestion.

Kathy Boomer suggested mapping variability in ecosystem services across regional scales depending on landscape location and condition as it is essential to developing performance-based incentives.

Breck Sullivan commented that in terms of hearing about how stakeholders are using the tools, the Local Leadership Workgroup is hosting a series of webinars to planners and showcasing a lot of these tools. We could have them come to present on input they got during those webinars once the GIT Funding project is done. Laura Cattell Noll replied she is happy to do that and suggested inviting some of our new partners from the MidAtlantic Planner's Collaboration (made up of the American Planning Association chapters from each of the states). Scott Phillips and Jeremy Hanson agreed it is a great idea to get this in front of local government partners.

11:00 AM   [**An introduction to the latest 1-meter land use/cover and change data for the Chesapeake Bay watershed**](#) – **Peter Claggett** (USGS) **and Katie Walker** (Chesapeake Conservancy)
The U.S. Geological Survey, Chesapeake Conservancy and University of Vermont are releasing very-high resolution land cover and land use data products based on 2013/14 and 2017/2018 National Agriculture Imagery Program (NAIP) data. The datasets will inform multiple outcomes in the 2014 Chesapeake Bay Watershed Agreement and inform the next generation of Bay models (e.g., watershed, estuary, and land change). The presentation highlighted the benefits and limitations of the data and announced related data products to be released in 2024.

Summary
Katie began by explaining the differences between land use and land cover. Land cover describes the physical land surface, such as tree canopy or open water, and is classified using satellite/aerial imagery and digital elevation before being grouped into objects. Land use describes how people make use of the land, such

as cropland or solar, and is derived from land cover data and supporting, ancillary data that allows for more nuanced classes. Katie then showed an example 2017/2018 NAIP image, followed by classifications of land cover and land use. Katie provided listings of the classes used for the 2017/2018 data, as well as the proposed classes for the 2021/2022 data. Next, Katie provided examples of the change products for land cover and land use from 2013/2014 to 2017/2018 using a NAIP image. This was complemented by a land use change matrix by county, state, and watershed.

Katie emphasized the unique qualities of this land use data are: the 1-meter spatial resolution of the cells, which revealed 53% more impervious surfaces in the Chesapeake Bay watershed compared to the 30-meter resolution land cover/land use data; categorical resolution of 50+ classes; high accuracy anticipated to be 90-95% for most classes; and the change product, which will accurately monitor changes in land use every 3-5 years.

Scott Phillips asked if the change characterization every 3-5 years would be the same as potential monitoring via snapshots in time of land change. Katie confirmed this was the goal and explained that as soon as they finish this data, they will move forward with a data production with imagery that reflects 2021/2022. She added the years can fluctuate based on the availability of the NAIP imagery, so it can vary within the 3-5 years. Scott followed up asking if the resource capacity to do this analysis spans those years and is not just during a brief snapshot in time. Katie confirmed the process to produce the data products is roughly two years to get the datasets, revise the methodology, allow the time for the data to process, and evaluate accuracy.

Jeremy Hanson asked about the 53% increase in impervious surfaces compared to the 30-meter LULC data, specifically what is being seen and what is driving that discrepancy. Katie responded that the biggest driver is the differences in spatial resolution, as the higher resolution NAIP imagery can identify smaller objects like driveways, sidewalks, edges of structures, and docks that were not identified before with the lower spatial resolution data. Peter Claggett added that based on the analysis he has done, this is mostly a difference in exurban, suburban fringe, and rural areas. In these areas, the higher resolution data can identify smaller and more dispersed structures and country roads that were completely omitted due to the older, lower spatial resolution data. Peter emphasized that these new discoveries in the higher resolution data is important as some of the most significant environmental impacts result from changes like 1 or 2% impervious to 5 or 10% impervious.

Katie shared there will be an upcoming data release in March 2022. This data release will include land cover, land use, and change product data available for download at the county scale in a raster format. This will be supplemented by tabular summaries, change matrices, documentation on methodology, interpretation guides, and high-level interpretations.

Peter Claggett overviewed some of the applications of this data, such as identifying BMP opportunities and locating BMPs where they may be most effective, targeting land conservation, informing land use planning decisions, and assessing the extent of different outcomes, among others. Peter walked through some examples, like the Chesapeake Healthy Watersheds Assessment and the Land Use Methods and Metrics Outcome. Peter then outlined the caveats for this data, such as the data will be retrospectively revised with future data releases, a longer temporal record is needed to interpret certain types of land cover/land use change, there is potential to confuse transitional and temporary change with permanent change, and periods of change may vary by state depending on data availability. The next future release is set for spring 2024.

Kristin Saunders asked if there is a sense of whether local governments will use this data for decisions on development or comprehensive plans? Peter Claggett replied that is the hope and that few local governments monitor change in land use consistently over time. Kristin commented that based on what she learned in behavior change training, we need more than public awareness to affect change and that we are going to need to lean into that portion of the outcome and get decision makers to adopt and use this data. Jeremy Hanson replied that Anne Arundel County, Maryland relied on 1m data to inform a lot of their work in recent years, including their comprehensive plan he believes. Kristin replied that Matt was well-trained to use this data.

Kristin commented on the need to standardize language and definitions for what entails high resolution data. Scott suggested using the term 1-meter resolution.

Alexander Gunnerson asked if there is a way to distinguish the temporary forest loss change due to timber harvests and if different stages of forest succession and age lead to different ecosystem services. Peter Claggett replied that at a four-year interval, mapping successional stages is key to understanding the dynamics of land cover/land use change. For the 2021/2022 mapping effort, they are adding a digital surface model derived from the imagery which will identify height from the same date, instead of relying on outdated LiDAR data. This height data can be helpful in delineating between low vegetation/early stages of succession and areas of cropland. Height information can help link the age or

stage of succession, and thus different levels of carbon sequestration or other ecosystem services. Katie Brownson added that being able to distinguish between different stages of succession will help identify heterogeneity across the landscape, which is relevant understanding the habitat benefits from a diversity of stands. Katie Brownson emphasized how this information can be useful from multiple angles.

Breck Sullivan asked when the data becomes available, who do you recommend use it, should a user reach out to you, and where will the data be available. Katie Walker responded the data will be available on the Chesapeake Conservancy webpage and there will be an announcement on when and where CBP coordinators can access it. Katie Walker added that anyone that has comfort working with these products is welcome to use it and that if they are interested in the data at a different scale or they have questions about the data or its uses, they should reach out to the CBP GIS and Chesapeake Conservancy Team. Peter added that they do want to be consulted because they do not want the data to be misrepresented or misused, such as might happen with a misunderstanding of temporary versus permanent forest loss.

Kathy Boomer commented that based on the data presented, the impacts of development were prominently highlighted yet the collective discussions from the meeting increasingly focused on agriculture as the primary source of excess nutrients. Kathy expressed she felt this is a bit of a mismatch and that maybe not enough focus is being directed towards the impacts of development. Peter Claggett replied this illustrates the differences between land cover and land use, which is why it will receive more focus in the next round of mapping. Peter added the Chesapeake Conservancy is also directing efforts towards mapping animal operations using AI. Kathy Boomer emphasized that conceptually the impacts of development would be very strong. Peter replied that the strengths of the data discussed today lie in detecting development and impervious surfaces. Kathy replied that the weaknesses she sees in mapping development lies in the hydrography of urban areas since so much of it is buried underground. Katie Walker replied that she agrees it is a challenge, but the Chesapeake Conservancy is working with hydrologists to add a separate hydrography component.

11:45 AM   **Utility, limitations, and GIT applications for high-resolution LULC data**
(interactive Round Robin)

Summary
Amy Goldfischer provided questions in the chat for attendee consideration:

- Do you use high resolution land cover and land use data products to support your outcome?
  - Yes
  - No. I need help connecting it to my outcome.
  - No. I need support to utilize it.
  - No. Other reason

Ryann Rossi responded yes, quantifying ecosystem services.

Jeremy Hanson responded for the Water Quality Goal Implementation Team WIP Outcome, yes, they use the data as part of the watershed model. Jeremy believes the answer is also yes for the Water Quality Standards and Attainment Outcome.

Katie Brownson responded how the forestry workgroup is planning on using the data. In addition to the specific metrics Peter mentioned, they will also be doing a more comprehensive bay-wide assessment of forests and total change, how they've changed, and the implications of these changes. Jeremy replied that he hopes other groups can think of analyses they would like to see in this same vein of thinking and a temporal scale of changes in about four years.

- What projects are ongoing that this data might help inform?

Matt Robinson replied that for plastic pollution action team purposes, land cover/land use could serve as a proxy for plastic pollution. Research in the bay shows plastic pollution is highly correlated with increased urban land use.

Breck Sullivan replied the Tributary Summaries are looking to include insights on change to help explain the observed water quality trends from the monitoring data. The change in land use/cover may help support us in writing that section in the summaries.

Julie Reichert-Nguyen replied she sees the 1-meter data being useful to assess land use considerations around marsh migration.

Kathy Boomer replied The Nature Conservancy and Envision the Choptank use land cover/land use data as an input to identify opportunities for edge-of-field and edge-of-stream restoration opportunities (e.g., grass buffers, bioreactors, wetlands, and riparian buffers).

Laura Cattell Noll replied the Local Leadership Workgroup has a budding relationship with the MidAtlantic Planner's Collaboration. This group of mostly local and state planners would surely be very interested in using these data.

12:00 PM   Adjourn

Participants: Alexander Gunnerson, Allison Ng, Amy Goldfischer, Amy Handen, Angie Wei, Breck Sullivan, Bill Jenkins, Bo Williams, Briana Yancy, Caroline Johnson, Chris Moore, Doug Austin, Denice Wardrop, Doreen Vetter, Gary Shenk, Gina Hunt, Greg Barranco, Greg Allen, Jake Leizar, Jeremy Hanson, John Wolf, John Young, Julie Reichert-Nguyen, Justin Shapiro, Katheryn Barnhart, Katie Brownson, Katie Walker, Kathy Boomer, Katlyn Fuentes, Ken Hyer, Kevin Krause, Kristin Saunders, Labeeb Ahmed, Laura Cattell Noll, Lee McDonnell, Liz Chudoba, Marisa Baldine, Mark Nardi, Matt Robinson, Meg Cole, Megan Ossmann, Megan Thynge, Melissa Fagan, Peter Claggett, Peter Tango, Ryann Rossi, Sarah McDonald, Scott Phillips, Shannon Smith, Sophie Waterman, Stephen Faulkner, Susan Yee, Tom Parham, William Dennison.