Scientific and Technical Advisory Committee (STAC)
to the Chesapeake Bay Program (CBP)
April 2026 Meeting | Topical Meeting
April 30, 2026 | virtual
Meeting Minutes

Attendance:

STAC Members: Charles Bott (HRSD), Chris Brosch (DE DA), Tony Buda (USDA-ARS), Elliott Campbell (MD DNR), Shirley Clark (Penn State), John Dawes (The Commons), Bill Dennison (UMCES), KC Filippino (HRPDC), Carl Friedrichs (VIMS), Kathy Gee (OptiRTC, Inc.), John Jacobs (NOAA), Christine Kirchhoff (Penn State), Scott Knoche (Morgan State, PEARL), Ellen Kohl (UMBC), Erin Letavic (HRG), Molly Mitchell (VIMS), Efeturi Oghenekaro (DC DOEE), Kevin Orner (WVU), Leah Palm-Forster (UD), Joey Reustle (Hampton University), Kenny Rose (UMCES), Mike Runge (USGS), Robert Sabo (EPA), Larry Sanford (UMCES), Val Were (CIRA), Joe Wood (CBF)

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

Guests: Gopal Bhatt (Penn State), Karl Blankenship (Bay Journal), Dylan Burgevin (MDE), Chris Clark (Prince George's County Dept. of the Environment), Victoria Coles (UMCES), Dan Coogan (EPA), Cassandra Davis (NY DEC), Joseph Delesantro (Koniag GS; EPA), Gabriel Duran (CRC), Alex Echols (Campbell Foundation), Brian Erickson (Oregon State), Mike Foreman (University of Virginia), Lara Fowler (PSU), Marjy Friedrichs (VIMS), Kathleen Gagnon (CBF), Kaylyn Gootman (EPA CBPO), Galen Gorski (USGS), Normand Goulet (NVRC), Sushanth Gupta (MWCOG)Caroline Harper (Campbell Foundation), Dante Horemans (VIMS), Ashley Hullinger (PA DEP), Admin Husic (VIMS), Arianna Johns (VA DEQ), Marel King (CBC), Andrea Krug (DC DOEE), Cecilia Lane (DC DOEE), Lew Linker (EPA), Gussie Maguire (CBF), Andy McAliley (USGS), Sarah McDonald (USGS CBPO), Kevin McLean (VA DEQ), Kendalynn Morris (Joint Global Change Research Institute), Margie Mulholland (ODU), George Onyullo (DC DOEE), Rachel Owrutsky (DNREC), Shannay Rawal (WVU), Sheronda Rose (CBF), Matt Royer (Penn State), Sheila Saia (Tetra Tech), Jillian Seagraves (MD DNR), Rachel Stahlman (York County Planning Commission), Kathy Stecker (MDE), John Stephens (UNC-Chapel Hill), Christopher Streb (Biohabitats), Breck Sullivan (USGS), Peter Tango (USGS CBPO), Sean Taylor (Prince George's County), Uchi Dominic Terhile (Federal University Dutse), Patrick Thompson (EnergyWorks), Megan Thynge (EPA CBPO), Jimmy Webber (USGS), Angie Wei (UMCES), Maggie Woodward (CBC), Qian Zhang (UMCES CBPO)

Meeting Overview

The STAC April 2026 Topical Meeting was organized in response to recommendations from the 2025 STAC workshop, "Leveraging Artificial Intelligence and Machine Learning to Advance Chesapeake Bay Research and Management," which identified opportunities, challenges, and future applications for AI/ML across Chesapeake Bay restoration activities. Presentations were given across two panels: speakers in the first panel highlighted where AI/ML is already being applied, where it appears most promising, and where its value for Chesapeake Bay work is still uncertain; and speakers in the second panel looked how AI may be used in real-world settings, alongside the risks, limits, and conditions that should shape its use. STAC members and meeting participants discussed where AI/ML can be meaningfully and responsibly implemented to support

Chesapeake Bay decision-making, management, monitoring, and communication, and what conditions need to be in place for that implementation to be useful and credible.

Meeting Introduction

STAC Chair Bill Dennison (UMCES) called the meeting to start at 9:00am. Dennison provided a brief overview of STAC and reflected on recent topical meetings, noting that the November 2025 Meeting focused on governance and decision making while the February 2026 Meeting explored the integration of social science into restoration programs. He noted that each topical meeting is intended to generate recommendations and discussion that can inform future STAC activities and Chesapeake Bay Program decision making.

Lara Fowler (Penn State) facilitated the meeting.

Panels and Presentations

Panel – Current and Emerging AI Applications in Chesapeake Bay Science and Management

The first panel explored current and emerging applications of artificial intelligence and machine learning in Chesapeake Bay science and management. Speakers discussed recent advances in environmental monitoring, land cover mapping, restoration planning, and predictive modeling while highlighting both opportunities and limitations associated with AI driven approaches. Several presentations emphasized the importance of data quality, transparency, and maintaining human expertise throughout the development and application of AI tools.

Recap of STAC Leveraging AI/ML Workshop Recommendations – Qian Zhang (UMCES-CBPO)

The STAC workshop titled "Leveraging Artificial Intelligence and Machine Learning to Advance Chesapeake Bay Research and Management: A review of status, challenges, and opportunities" convened February 2025; key objectives of the workshop were to assess the current status of the application of AI and ML tools for the watershed and the estuary, identify challenges and gaps in applying AI and ML tools, and develop recommendations to leverage opportunities for AI and ML tools to address Chesapeake Bay questions. The workshop report was published October 2025.

Prior to the workshop, Zhang and the Steering Committee completed a literature review that revealed a variety of applications of AI/ML within Chesapeake Bay watershed conservation and restoration efforts, such as prediction and forecasting, gap filling and data reconstruction, pattern recognition and classification, process inference and driver attribution, and scenario analysis and decision support. The literature review also showed AI/ML use across a variety of environmental domains: coastal and estuarine water quality; physical and hydrodynamic processes; ecological and biological systems; microbial, biogeochemical and contaminant processes; and watershed and riverine inputs.

Recommendations from the workshop supported four categories: 1) strengthen data infrastructure and integration for AI/ML applications; 2) leverage AI/ML for Chesapeake Bay tidal and non-tidal regions restoration and decision support; 3) promote transparency and engage managers and stakeholders; and 4) build collaboration and capacity. When adopting AI/ML for management, implementers must consider the readiness of data, the stability and robustness of methods built, the interpretability and transparency of outputs, the defensibility of results, and how to integrate these approaches with existing models and align the development of AI/ML within the existing workflow. Attributes of the Weighted Regressions on Time, Discharge, and Season (WRTDS) method may be able to provide guidance on using AI/ML.

Land Cover and Land Use Monitoring with AI – Sarah McDonald (USGS-CBPO)

Land cover and land use data is used to monitor nutrient loads through the Chesapeake Assessment Scenario Tool (CAST), for reporting progress towards Bay Program outcomes, and as a starting point for planning conservation and restoration activities. From aerial and satellite imagery, AI is mapping land cover and best management practices (BMPs), producing land cover datasets, identifying land cover change, and deriving and scaling land use footprints.

A promising application of AI is to differentiate vegetation types in order to better discern land uses. Current projects are using AI to scale the detection of BMPs from pilot projects to the watershed. The biggest challenge in using AI to monitor land cover and land use is in mapping land cover change; when using AI/ML to difference high accuracy land cover maps, the resulting map is filled with noise that is difficult to filter out. Manual quality assurance, an abundance of high-quality training data, and continued investment in field data are needed for pursuing the use of AI in monitoring land cover.

AI/ML for Chesapeake Bay Science and Management: Promise, Gaps, and Cost – Victoria Coles (UMCES)

Recent studies and projects have used AI/ML for mapping habitat and wetland, forecasting hypoxia and dissolved oxygen, estimating streamflow, and monitoring oyster restoration and aquaculture. Opportunities for integrating AI/ML lie in identifying nutrient trend attribution, verifying BMP impact, and predicting coastal flooding and sea level rise. Challenging areas for AI/ML implementation are living resources and scenario planning as models struggle with extrapolating data or quantifying uncertainty. As adoption of AI tools increases, a systemic consideration should be whether the incremental improvement in modeling capacity justifies the energetic cost.

For a good model to be developed and effectively applied, environmental scientists need to understand why and how the models are operating. The Chesapeake Global Collaboratory (CGC) SCIPE Program at UMCES pairs environmental and data scientists for bidirectional training; environmental scientists receive training in AI tools and how to interrogate them while data scientists gain ecological and management context needed to build relevant and useful tools.

Panel Q&A:

- How much time does it take to develop an application? Imagine it depends on a lot of things, but can helpful tools be developed and deployed in a few months or even days?
    - Zhang: The most time-consuming part is data cleaning, or harmonization – getting it ready for AI. Once the data is ready, building an algorithm is quick. This can vary depending on the model you want to use and what the research purposes are. Generally speaking, if the data is ready, I could build a model in a day's time; including the data processing, perhaps a few months.
    - Coles: Computing resources are broadly available through the National Artificial Intelligence Research Resource (NAIRR) pilot program, which has an easy application process.
- Published research that demonstrates the use of AI for stormwater management practices:
    - The Potential of Green Infrastructure and Artificial Intelligence in Urban Stormwater Management
    - Incorporating artificial intelligence into the future of stormwater management
    - The Potential of Stormwater Management Strategies and Artificial Intelligence Modeling Tools to Improve Water Quality: A Review

- Since building, testing, operating, and maintaining AI models typically comes with greater computing needs, how can the potentially transformative products be weighed against the increased need for institutional/infrastructural support to work on these models?
    - Coles: That is difficult to assess right now and depends on whether a model is trained on a Long Short Term Memory (LSTM) or using an underlying generative AI model. The true cost of a generative AI prompt is unknown. There is the institutional cost of training people but we are in the business of always evolving our learning in environmental science, we are all trying to change and grow and reinforce ourselves.
    - Zhang: Resources need to be leveraged across universities and beyond.
- AI is only as good as the input data quality. Same for models. Are there data being used to train AI that are not used for our models? How can we improve access to useful data in general?
    - Zhang: I agree, AI is only as good as the input data. Compared to our traditional models, AI can be advantageous. It can leverage additional data sets in a fashion that is more effective than our existing models, and it provides the opportunity to mine the large variety of data we have. On the other hand, using AI to build a model is easy, but using AI to build a trustworthy model – particularly one that is useful in management – is challenging.
    - McDonald: The Chesapeake Bay watershed is very data-rich and the Chesapeake Bay Data Catalog aims to collect and make accessible all the region's data and resources. When talking about AI, there is a lot overlooked in terms of the amount of time, budget, and manpower it takes to generate the quality information needed to train a model.
    - Coles: Crowdsourcing and citizen science data could potentially be leveraged to annotate data sets which is an opportunity for training and teaching people about how this works.

Presentation – AI for Identifying BMP Opportunities on Farms

Alex Echols (Campbell Foundation) and John Dawes (The Commons) presented Conservation Concierge, an AI-assisted conservation planning tool designed to improve the efficiency of conservation delivery and identify opportunities for implementation of best management practices on agricultural lands. The presentation provided a practical example of how AI and machine learning tools are beginning to move from research and development into operational conservation settings. Built through a partnership between The Campbell Foundation and The Commons, it is currently being operated on a small scale and will be live broadly later in the year. The tool is intended to greatly reduce drudgery and inefficiency in the conservation process, benefitting both farmers and conservation professionals. The application is a series of ML pipelines for a variety of workflows that the integrated large language model (LLM) routes users; it does not utilize AI to do any of the spatial assessments.

Dawes provided a visual walkthrough. Conservation Concierge ran a watershed assessment (using data from the GWLFE model developed by Stroud Water Research Center) to return information of drainage area, soil composition, hydrology, and nutrient sediment loadings within the field boundaries. The tool generated results in under two minutes, whereas old-fashioned methods might have taken several months. Conservation Concierge can also recommend best-fit conservation practices, which trained from USDA-based federal and state documentation, and research state- and federal-level funding opportunities.

Panel – Using AI Responsibly in Practice: Opportunities, Tradeoffs, and Guardrails

The second panel shifted from technical applications to questions surrounding implementation, workforce development, governance, and responsible use of AI. Speakers discussed how AI tools are currently being applied within conservation, environmental management, and public engagement processes, while highlighting concerns related to transparency, trust, accountability, and maintaining human expertise.

Bay in the Balance Reflections: AI, Technology, and Data Management – Matt Royer (Penn State)

The Bay in the Balance conference focuses on implementing conservation in the agricultural sector. Big applications – and associated challenges – of AI/ML that the practitioner community is excited about were shared in a session on exploring advances in data management and technology to meet Chesapeake Bay goals. 1) Geospatial AI can be used in agricultural and urban settings to identify and prioritize where to focus conservation efforts, as well as help identify BMP opportunities in those areas. Challenges in this use include ground truthing of the data and ensuring that the visualization tools are continuously accurate. There were also concerns that the use of this technology might diminish a conservation professional's understanding that they still need to be physically present to learn the lay of the land and build relationships and trust with producers and farmers. 2) The use of AI/ML in verification of conservation practices, particularly in terms of reporting requirements to the Bay Program, could save a lot of time. Many in the professional conservation community are being asked to do the job of verification, taking away from their ability to implement new conservation on the ground. There will be practices where using AI/ML will not work well, such as non-visual practices like nutrient management or practices requiring an engineering certification for verification. 3) AI/ML might be able to streamline the conservation funding delivery system. Funding a project often requires a support from multiple programs and AI/ML tools could help project teams identify potential funding sources, advance application processes, and manage the different requirements. However, the funding landscape changes quickly – and often dramatically – and can be hyper-specific to place, practice, and other parameters that an AI/ML program may not be equipped to navigate.

Hopes, Concerns, and Current Uses of AI for Public Comments – Brian Erickson (Oregon State)

The process of environmental rulemaking requires allowance of public comments, and for the thousands of rules written every year, millions of comments are received. Erickson interviewed 26 state (Oregon and Washington) and federal agency staff who review public comments for proposed environmental rules. There is hope that using AI/ML can save time on mundane tasks, reduce errors and bias, and help them better consider public perspectives. Staff hesitate to apply AI/ML due to ethical concerns with environmental impacts and protecting personally identifiable information, technical concerns about loss of nuance and context and lack of transparency, implementation concerns for the process change and lack of agency guidance on AI use, and professional concerns such as legal liability and fear of job loss. Only four of the interviewees reported using AI, and they primarily used chatbots to pull summaries or themes from comments. Erickson highlighted how the most avid user of AI/ML viewed their usage with a quote: "I don't use AI to read the letters and tell me what's in them. I use it as kind of link an indexing tool, if you will, that tells me if you're looking for this, this is where to go find it."

Implementation of Digital Water at HRSD – Charles Bott (HRSD)

The Digital Water department at Hampton Roads Sanitation Department (HRSD) are working on applying ML to optimize the control of nitrogen removal processes at their wastewater treatment plants. Continuous feedback controllers are an integral piece in these processes and are reliant on a proportional-integral-derivative algorithm. The proportional and integral values of the controllers are very important but the

standard method of tuning controllers is through trial and error. Digital Water is combining ML into existing models to solve the complexity of tuning feedback controllers and in some projects, is running a digital twin to the mechanical process. HRSD is also building a staff assisting AI agent which has access to operation and management manuals, real time and historical data, lab data, operator data, and more. Addressing employee concerns about job loss, HRSD has undertaken an initiative to eliminate operator shift work.

Panel Q&A:

- I would expect to see a massive flood of AI-generated public comments. Ultimately, we very likely will have a situation in which the vast majority of public comments are both AI-generated and also reviewed and synthesized by AI. Do you think this is where we are headed, is this entirely a bad thing, and how should the public comment process be modified to deal with this potential future?
    - Erickson [chat]: That's definitely a concern folks have! Folks were mixed about what to think about them and what to do about them. If it is helping an individual submit more clear and useful comments, it is great for increasing public participation. If it is an advocacy group sending a form letter through ChatGPT to make the words different, it is just creating extra work for the agency and seen as an annoyance. If it is a bad actor misrepresenting themselves, that's a major concern. The general accounting office (GAO) is aware of the concern about fraud and spam. There's a tradeoff between restricting format and meeting the intent of the law (e.g., Administrative Procedures Act).
- How do we develop a workforce that incorporates AI while still maintaining specialized knowledge in their field? We still need wastewater engineers, but will they have to have skills in AI/ML too? Will this all be naturally integrated in the future of higher education?
    - Erickson: One of the interviewees spoke about avoiding using AI as a shortcut to comment processing. Making sense of the context of what people are saying and evaluating whether it has any merit is based on expertise and system-level understanding.
    - Bott: Our goal is to give our people the best tools they can have to do their job. On the industrial process control side, most folks have no idea what is going on in the background and in a lot of cases, the majority of people don't need to understand all the details in the system.
    - Royer: No matter the application of AI/ML tools, the agricultural space will still need a conservation professional that can build a relationship with the farmer, understand the landscape, and make recommendations on that particular individualized farm situation.

Breakout Groups

STAC members and meeting participants were split into small breakout groups and discussed the three questions below. Upon returning to the main meeting, each group gave a brief report-out on key points from its discussion.

How do we move from AI/ML insights to decision-making tools for different audiences?

All groups generally agreed that decision making by AI/ML has significant ethical considerations as decision making is steeped in politics, human nature, and societal issues and values. AI/ML tools are best used to summarize and synthesize data to help inform decisions or to improve the performance of systems that are already automated. One group reflected that in many of the panelists' examples of AI/ML application, the use case was already known when the tools were built; integration and decision making should be easier for pulling AI into an existing decision context, rather than pushing it into a novel area.

How do we ensure transparency, trust, and interpretability in AI/ML-driven insights?

Participants highlighted the need for quality assurance, quality control, human validation, and expert feedback for data, processes, and models driven by AI/ML. Several groups noted that a lack of trust from the public stems from stigma surrounding generative AI on top of conflation of vastly distinct techniques. Disclosure of AI/ML usage should be addressed. One group noted that trust is an emergent process and is earned over time.

How do we build a grassroots community of practice and collaboration network around AI/ML?

Breakout groups pushed back on this question. Many disagreed with building a grassroots community and believe the focus should be on incorporating AI/ML tools into existing communities of practice and collaboration networks in appropriate ways. AI/ML should be designed to meaningfully support people and their working conditions and people will need to be encouraged to embrace the unknown.

Plenary Discussion

Fowler opened the discussion for comments, questions, and remarks from participants. A suggested action for the Bay Program was to understand what usage and disclosure policies exist for each partner. A strong theme throughout all presentations and discussions was that the human element is critically important when applying AI/ML.

Post-Meeting

The draft April 2026 Meeting Synthesis will be discussed and revised at the STAC June 2026 Retreat, with plans to finalize the document with STAC, meeting participants, and larger CBP partnership.

The STAC June 2026 Meeting will take place in-person from Monday, June 15th to Wednesday, June 17th at the National Conservation Training Center (NCTC).

Minutes Approved by STAC following the June 2026 Meeting.