Chesapeake Bay Program
Science. Restoration. Partnership.

Integrated Trends Analysis Team (ITAT)

Workgroup Meeting

Wednesday, May 20th, 2025
10:00 – 12:00 PM

Join the meeting via Microsoft Teams
Meeting ID: 221 406 840 669 16 | **Passcode:** 6Ar9jQ6W

Call: +1 469-208-1525 | **Conference ID:** 327 101 737#

Visit the meeting webpage for meeting materials and additional information.

This meeting may be recorded for internal use only to assure the accuracy of meeting notes. To turn on closed captioning, click on the three ellipses (More actions), then click on "Turn on live captions" (preview). To request accommodations, please contact Gabriel Duran at gduran@chesapeakebay.net.

Please read the following information carefully, as our meeting policies have changed:

- All meeting attendees' cameras and microphones will be muted at the start of the meeting.
- To request access to the microphone and camera, all meeting participants will be required to use the raised hand feature on Teams. Once access has been granted by the meeting organizer, you will then be allowed to unmute your mic and turn on your camera. Unless instructed otherwise, once a participant has microphone or camera access, they will have this permission for the remainder of the meeting.
- Access to chat will be provided as well. Should it be necessary, the Q&A feature on Teams will be utilized to field participant questions.

Compromised Meeting Plan: If the meeting's privacy is compromised, the meeting staffer and coordinator will send an email to all Members, alternates, staffers, coordinators, and interested parties. Within the email, you will find a new meeting link, instructions on sharing this information with external partners, and any necessary adjustments to the meeting schedule. Please do NOT share this information publicly or post it to the Chesapeakebay.net webpage.

Purpose: This meeting aims to explores how artificial intelligence (AI) and machine learning (ML) are being applied across the Chesapeake Bay watershed to better understand long-term patterns in water quality, ecosystem health, nutrient pollution, and hydrodynamic processes. Presentations will highlight emerging AI/ML tools and findings, and we will discuss key challenges such as model transparency, explainability, stakeholder trust, and translating scientific insights into practical decision-making tools.

Agenda

I. Welcome, Introductions & Announcements (10:00 - 10:05 AM)

Lead: ***Breck Sullivan*** *(U.S. Geological Survey, USGS) ITAT Co-coordinator, and* ***Kaylyn Gootman*** *(U.S. Environmental Protection Agency, EPA) ITAT Co-coordinator.*

- The DataHub will be updated on June 8th. Email eyoung@chesapeakebay.net to receive a summary of the updates, and/or to be added to a DataHub users mailing list.

Upcoming Conferences, Meetings, Workshops and Webinars

- Chesapeake Community Research Symposium – June 1-3, 2026. Annapolis, Maryland. ***Registration is now open here!***
- Restore America's Estuaries' 2026 Coastal & Estuarine Summit – September 22-25, 2026. San Francisco, California.

II. AI-Driven Insights into Shifting Water, Sediment, Nutrient, and Salt Dynamics in the Chesapeake Bay and Beyond (10:05 – 10:25 AM)

Description: This presentation demonstrates how deep learning and explainable AI frameworks can be used to reconstruct decades of water, sediment, nutrient, and salinity, from local to continental scales. I will highlight specific findings for the Chesapeake Bay Watershed, including how climatic and land use forces are shifting the source and timing of water quality impairment and the implications for management.

Request Action: Informational, for discussion.

Lead: **Admin Husic** (Virginia Tech, VT).

Material: Meeting webpage here.

III. Using machine learning to examine long-term trends in stream biological condition (10:25 – 10:45 AM)

Description: Stream ecosystems worldwide face ongoing degradation, underscoring the urgent need for conservation and restoration. This study demonstrates the utility of long-term data and machine learning for predicting stream condition, identifying key stressors, and guiding restoration and conservation site selection in the Chesapeake Bay watershed.

Request Action: Informational, for discussion.

Lead: **Kelly Maloney** (USGS).

Material: None.

IV. Net declines in nonpoint source pollution into one of the world's largest estuaries (10:45 – 11:05 AM)

Description: AI/ML and the CAST-based Chesapeake Bay Nutrient Inventory were leveraged to identify long-term drivers of nitrogen export for 121 NTN/RIM monitoring stations throughout the Chesapeake Bay watershed. Modeling results indicate that farm-level nutrient management, as well as reductions in air pollution and wastewater loads, have significantly improved water quality, while urbanization has partially offset these gains.

Request Action: Informational, for discussion.
Lead: **Robert Sabo** (EPA, Office of Water)
Material: Meeting webpage here.

V. Applications of ML for Hydrodynamics and (11:05 – 11:25 AM)

Water quality simulations in Chesapeake Bay

Description: VIMS estuarine and coastal modeling group have focused on applications of Machine Learning (ML) for predictions and management for both hydrodynamics and water quality.

Request Action: Information, for discussion.
Lead: **Jian Shen** (Virginia Institute of Marine Science, VIMS).
Material: Meeting webpage here.

VI. Discussion (11:25 AM – 12:00 PM)

- What are some of the main challenges in your AI/ML model development?
- How do we ensure transparency, trust, and interpretability in ML-driven insights?
- What level of explainability is sufficient for stakeholders and decision-makers?
- How do we move from AI/ML insights to decision-ready tools?
- How do we build a community of practice and collaboration network around AI/ML?

VII. Adjourn (12:00 PM)

Next meeting: June 24th from 10 AM – 12 PM.