Chesapeake Bay Program
Science. Restoration. Partnership.

May 18, 2026

Leveraging Monitoring Data and Modeling Insights Across the Partnership

Dr. Kaylyn S. Gootman, EPA CBPO

Purpose of Today's Discussion

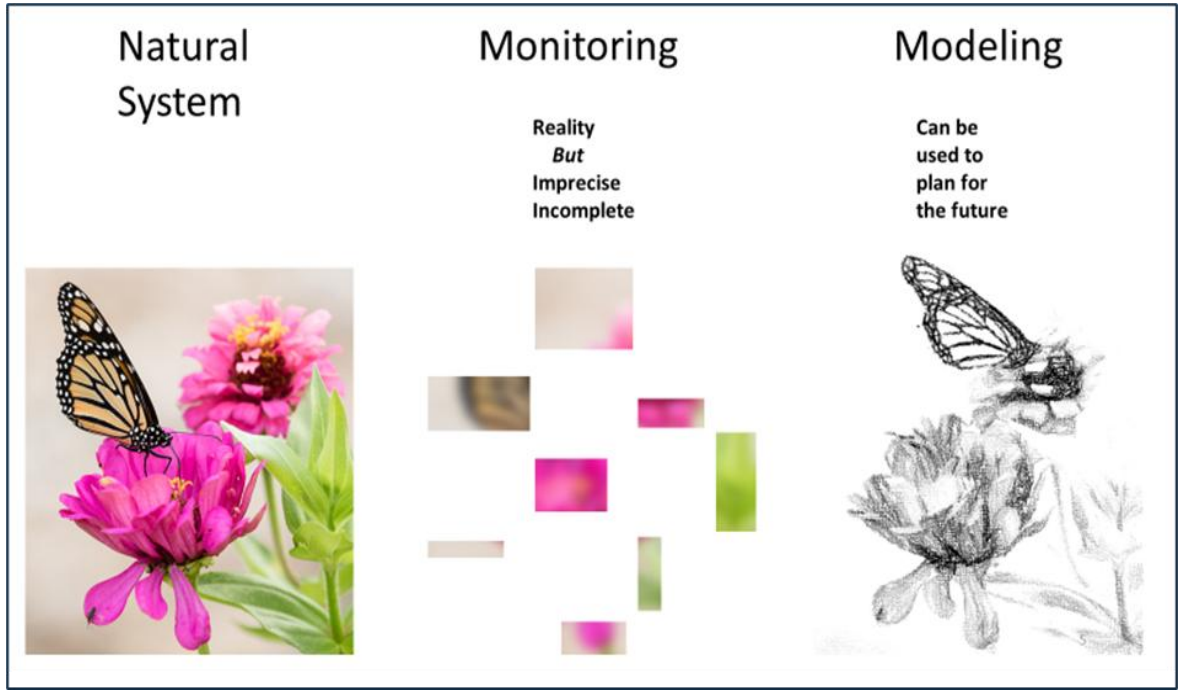
- Connect back to Jimmy Webber's talk in April on nontidal loads and trends
- Learn how we use monitoring data and modeling information in the partnership
- Start to discuss how to further utilize monitoring data in partnership modeling
- We want to hear from you!

Photo by Will Parson/Chesapeake Bay Program

Potential Long-Term Goals

- Enhance partner understanding of differences between modeled and monitored results
- Review the partnership-approved cycle for more frequent monitoring data updates
- Improve the completeness, quality, and representativeness of monitoring data used in the CBP partnership modeling suite
- Increase accuracy between modeled nitrogen, phosphorus, and sediment loads and observed monitoring data
- Better utilize monitoring information with Watershed Implementation Plans (WIPs), two-year milestone reviews, and the Accountability Framework

Why Modeling & Monitoring?



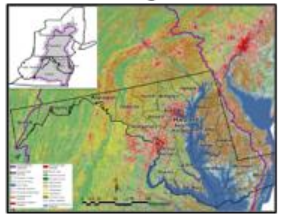
- The Chesapeake Bay Program (CBP) partnership uses a suite of state-of-the art modeling tools to replicate conditions of the Bay watershed
- The CBP partnership uses monitoring data, at various scales, to truth-check the modeling tools
- Combining advanced modeling tools and real-world monitoring data gives us a comprehensive view of the Chesapeake ecosystem
- Information can be used by decision-makers to determine how best to restore and protect local waterways, and ultimately, the Chesapeake Bay
- Many other uses outside of the CBP partnership, and related-communications products

Plan with Models…

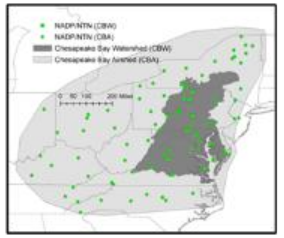
Models help us understand the "Why" of nitrogen, phosphorus, and suspended sediment loads *and* Chesapeake Bay water quality standards attainment

Data and Model Inputs

Pollution Control Data
Land Use Data
Point Sources Data
Septic Data
U.S. Census Data
Agricultural Data



Land Use Change Model

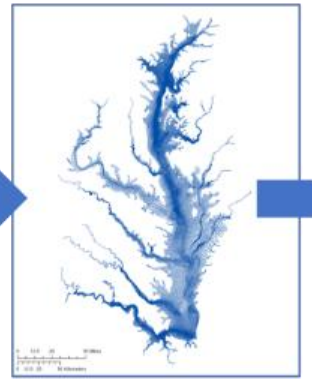


Airshed Model

Precipitation Data
Meteorological Data
Elevation Data
Soil Data

Phase 7 Watershed Model/CAST

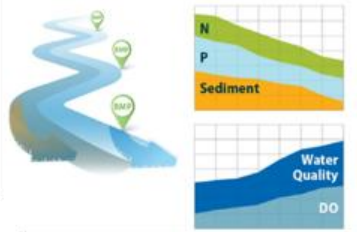
Estuary Model



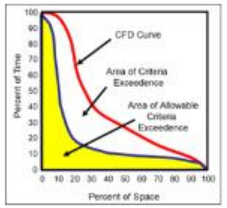
Model Outputs

Prediction of Impacts

BMP Implementation Results



Criteria Assessment Procedures

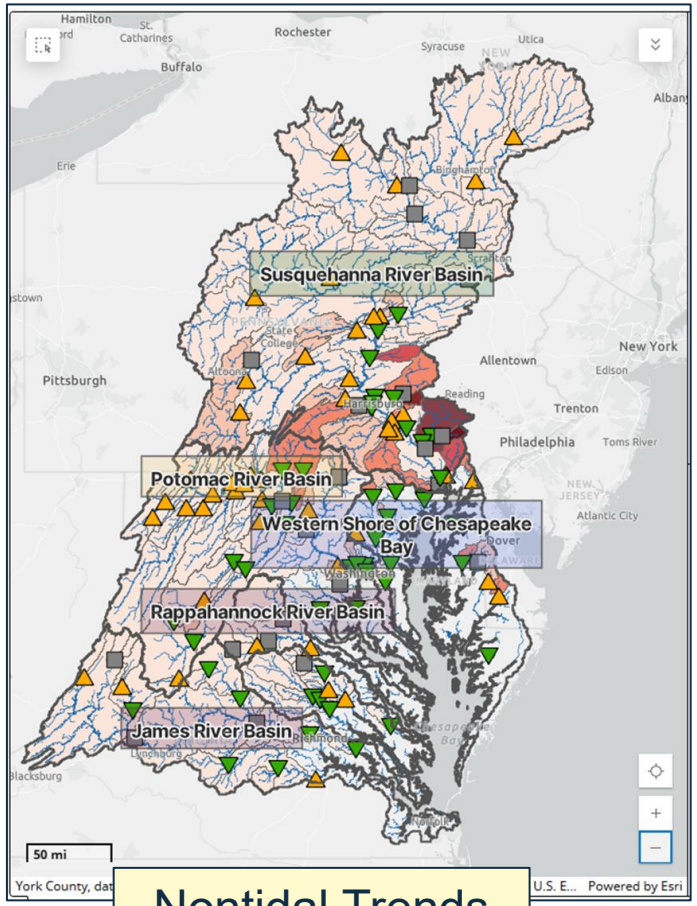


Nutrient and sediment targets for CBP state and Federal partnership

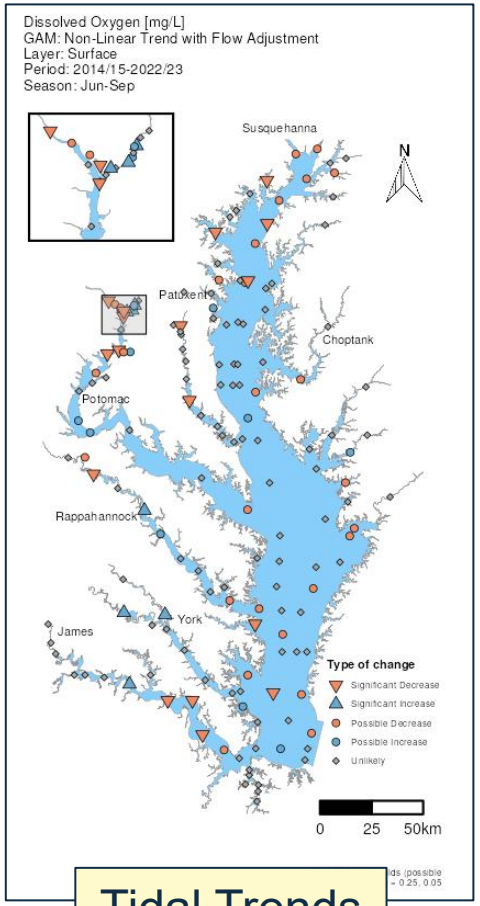
Effects

Allocations

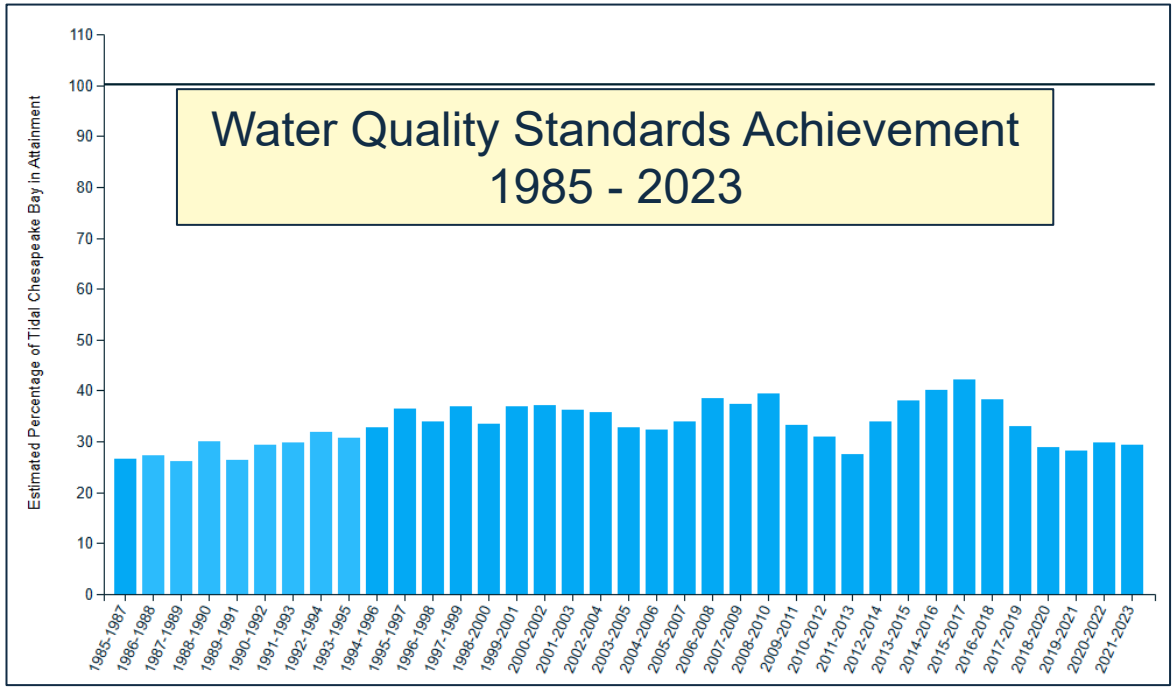
… And Assess with Monitoring Data…



Nontidal Trends
2014 - 2023

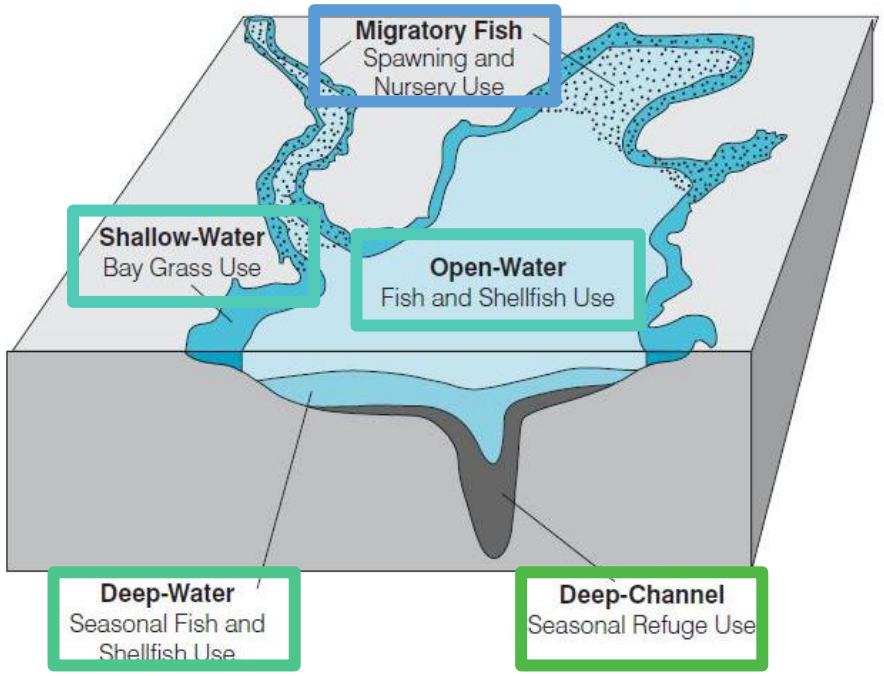


Tidal Trends
2015 - 2023

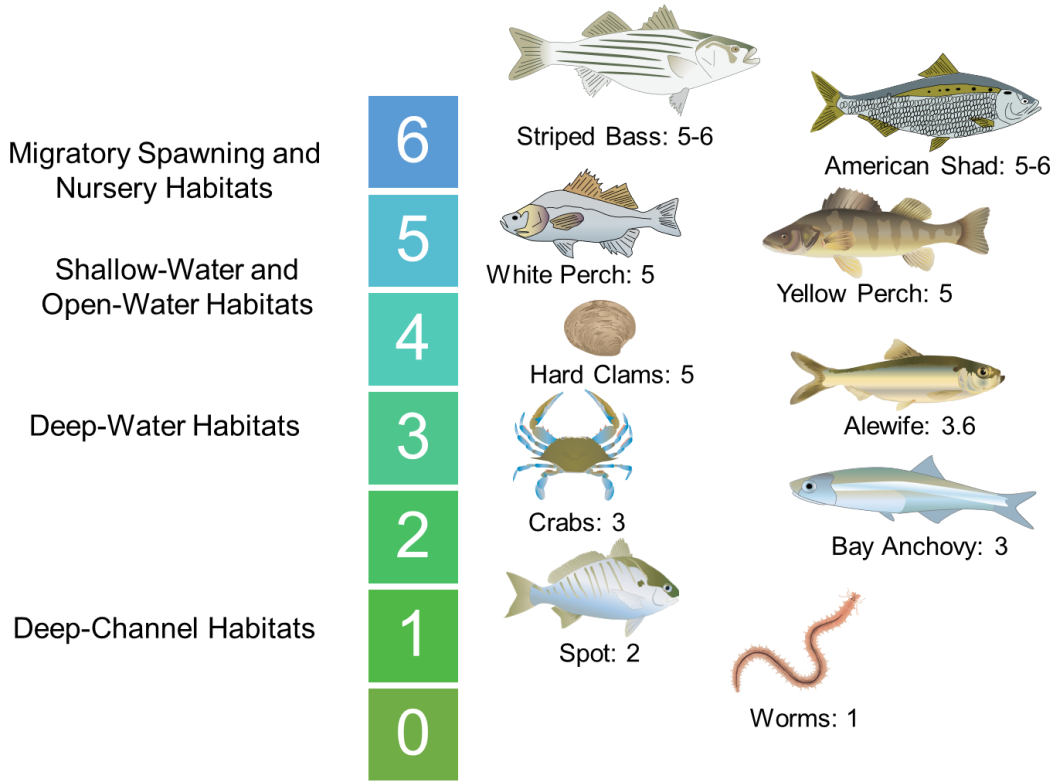


…To Achieve WQ Standards and Restore Living Resources

Five Chesapeake Bay tidal water designated use zones.



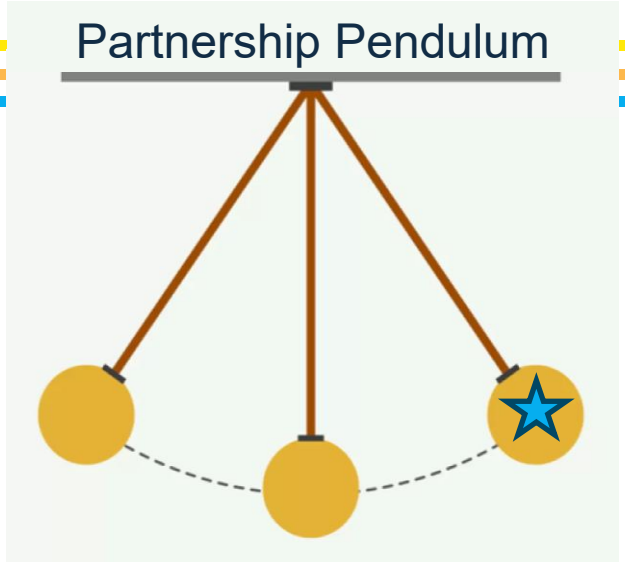
Dissolved oxygen (mg liter^{-1}) concentrations required by different species and communities.

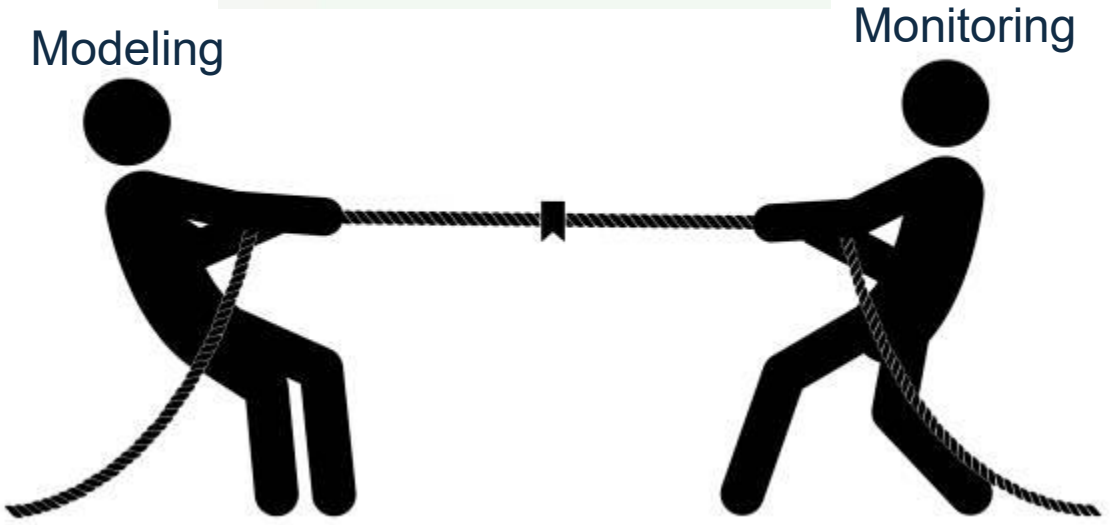


Water quality criteria were derived to protect species *and* communities during specific time periods

Additional Context

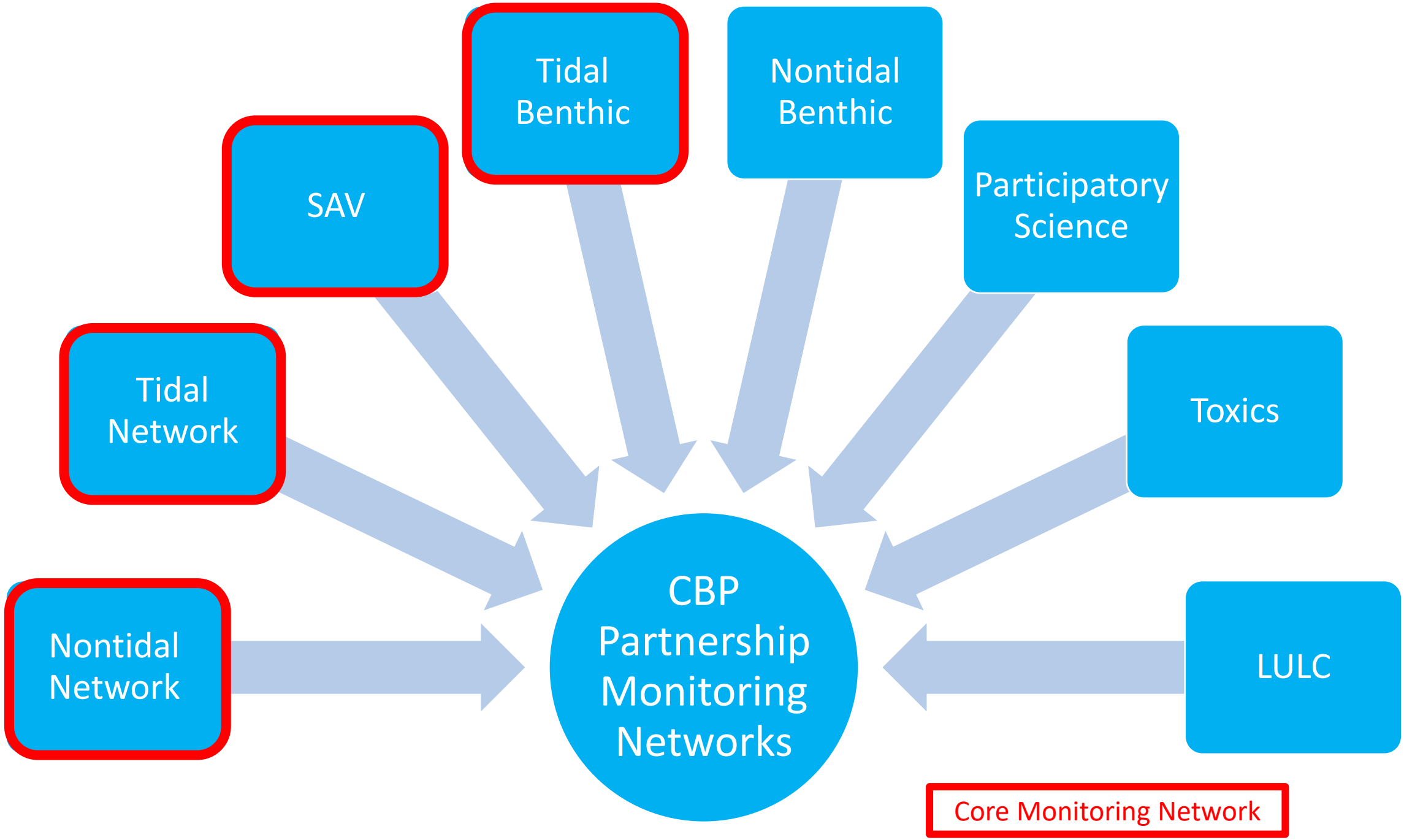
- CBP partnership uses models to plan and monitoring to assess





Additional Context

- CBP partnership uses models to plan and monitoring to assess
- Combination of both gives us a comprehensive view of the Chesapeake ecosystem
- Both are needed to by decision-makers to determine how best to restore and protect our waters


Tidal Benthic
Nontidal Benthic
SAV
Participatory Science
Tidal Network
Toxics
Nontidal Network
CBP Partnership Monitoring Networks
LULC
Core Monitoring Network

Monitoring Data Uses

Loads and Trends

- Tidal
- Nontidal

Bioreference Curve as a Part of WQS Attainment

- Tidal Benthic

Community Science

- Additional information from the Chesapeake Monitoring Cooperative

Partnership Suite of Models

- Input data (Phase Change)
- Calibration (Phase Change)
- Validation

Modeling Information Uses

Planning

- Planning Targets for WIP Development to meet WQS in the Chesapeake Bay

Annual Progress (CAST)

- Part of the Accountability Framework

Monitoring & Modeling Uses

Monitored and Expected Total Reduction Indicator for the Chesapeake (METRIC)

- However, note that METRIC is not a monitoring-based Indicator
- METRIC helps us understand if the model is performing the way we expect it to
- METRIC is for comparison modeled progress towards load reductions and observed monitored loads

Current Clean Water Indicators (2014 Agreement)

- Water Quality Standards Attainment (Monitoring)
- Monitored Nutrient and Sediment Trends in the Watershed (Monitoring)
- Modeled Load Reduction Indicator (Modeling)
- Progress Toward the Chesapeake Bay Total Maximum Daily Load/TMDL Indicator (Monitoring & Modeling)
- Annual Nutrient and Sediment Loads to the Chesapeake Bay (Monitoring & Modeling)

Revised Outcomes & Potential Targets to Tie Into Indicators

- Reducing Excess Nitrogen, Phosphorous & Sediment (1/3)
  - Demonstrate net reductions in nitrogen, phosphorus and sediment through multiple lines of evidence, including modeling and monitoring data (Modeling & Monitoring)

- Toxic & Emerging Contaminants (0/1)

- Water Quality, Standards Attainment & Monitoring (2/4)
  - Maintain or exceed the rate of improvement in the water quality standards attainment indicator relative to the 1985-2022 baseline (Monitoring)
  - Analyze and report status/loads, trends and factors affecting those trends for nontidal and tidal water quality (Monitoring)

Discussion Questions

- Are these Indicators sufficient for tracking revised Watershed Agreement Targets?
- Any changes?
- Is there interest in better connecting the loads/trends to Clean Water outcomes?
- Do we need a new Indicator(s)?

Discussion Questions

- Is there any appetite in the partnership for a monitoring-based indicator of progress?
    - For example, could connecting monitoring trends to planning targets submitted in Phase IV WIPs
    - Decision could influence future load and trends communication

Discussion Questions

- Is there a path to update monitoring data more frequently in the partnership modeling suite without trigger a Phase change?

    - Answering this question will rely on the Modeling Team to evaluate feasibility and path forward, if this is possible

Discussion Questions

- How to make monitoring data more aligned with goals jurisdictions are trying to reach?

- How would we answer the following:
  - Have you reached your goal based purely on the monitoring data?
    - Still missing the why and effects of BMPs

Discussion Questions

- Do jurisdictional partners want to be evaluated based monitoring information?
- How might this work within the Accountability Framework?
- How would we measure progress through the monitoring lens?
- How might this connect to/influence Annual Progress? Two-Year Milestones? WIPS
- How would monitoring data work as another line of evidence in practice?

Next Steps

- Continue sharing feedback and ideas
  - gootman.kaylyn@epa.gov

- Continue the discussion
  - Agenda item during the June CWGT meeting

- Potential Path Forward
  - CWGT task workgroups to evaluate the discussion questions for their area of expertise
  - Workgroups explore ideas (e.g., new Indicator)
  - Bring ideas back to Workgroups and CWGT for discussion and debate


Will Parson/Chesapeake Bay Program with aerial support by Southwings

Thank You!

Dr. Kaylyn S. Gootman
gootman.kaylyn@epa.gov

Chesapeake Bay Program
Science. Restoration. Partnership.