Chesapeake Bay Program
A Watershed Partnership

Tidal Monitoring and Analysis Workgroup
and Nontidal Water Quality Workgroup Joint Meeting Minutes

Wednesday, March 27, 2013
USGS Baltimore Science Center
For meeting materials visit:
http://www.chesapeakebay.net/calendar/event/19252/

MINUTES

PURPOSE: To develop an integrated workplan and technical approach for explaining water quality trends.

Action Items:

- Work with L. Hernandez and R. Batiuk to change the language of chlorophyll a trends published on the CBP website (C. Buchanan)
- Continue the discussion of reporting trends in the Factors Affecting Trends (FAT) adhoc team meetings at the CBP

Welcome and Introductions – W. Boynton (TMAW Chair) and S. Phillips (NTWG Chair)

- Joint meetings between TMAW and NTWG occur biannually.

Overview of the Midpoint Assessment Priority Work Plan and Meeting Objectives – S. Phillips (USGS) and R. Batiuk (EPA)
STAR Enhanced Water Monitoring Workplan

The Chesapeake Bay Program (CBP) will enhance the assessment and explanation of monitoring information as part of the Mid-Point Assessment for the *Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment* (Bay TMDL). The three primary pieces of information to assess progress toward water-quality standards include:

- Reporting of water-quality practices.
- Trends of nitrogen, phosphorus and sediment in the watershed.
- Attainment of dissolved oxygen, chlorophyll-a, and water clarity/SAV standards.

The integrated approach to assess and explain water-quality trends in the Bay and its watershed relies on monitoring information, enhanced BMP implementation data, and use of several models. The following activities will be coordinated through the CBP STAR team and interaction with the WQGIT with a deadline of **October 2017**:

- Analysis of trends of nitrogen, phosphorus and sediment in the watershed
- Enhance approaches to use tidal monitoring data to assess attainment of water-quality standards
- Explain water-quality trends in Bay and its watershed
- Enhance CBP Models
- Synthesize and Communicate Results and Implications for the TMDL
- Using BMP information being reported for progress toward the Bay TMDL
- Maintaining monitoring, and enhancing data management, in the watershed

The goal for this group is to develop a suite of products to explain trends to engage the varied audiences as an adaptive management approach. Communicate milestones reached and a midpoint assessment to track our progress towards the 2025 target.

Initial Technical Approach to Explaining WQ Trends in the Watershed – J. Blomquist (USGS)
J. Blomquist – Technical Approach to Explaining Trends

J. Blomquist discussed the technical approaches employed by the nontidal group to explain watershed trends and how ways in which they could contribute to the mid-point assessment. He expressed the importance of incorporating data from multiple avenues to develop a variety of products. He also pointed out the need to work better together to ensure projects that workgroups (i.e., Nontidal, Tidal, and Modeling) are working on independently are relevant to our long-term goals. J. Blomquist touched base on the multitude of components necessary to complete watershed analysis and suggested they be used for topical products. The presentation includes many useful graphics for reporting trends and loads.

Discussion, Comments, and Questions

- By providing a non-linear trend line, WRTDS helps the viewer make a connection between BMP's and water quality trends.

Explaining WQ Trends in the Watershed: Eastern Shore Synthesis Report – S. Ator (USGS) presented by Joel Blomquist (USGS)

J. Blomquist presented S. Ator's synthesis of nutrient (nitrogen and phosphorus) trends on the Eastern Shore. S. Ator's work will be published as a USGS circular by the end of the calendar year. This product serves as an example of how we can educate a non-technical audience about nutrient loads, trends in water quality and the implications for restoration and best management practices.

Ideas for explaining WQ trends from a previous integrated workshop included:
- Describing conditions in sub-watersheds to explain the response in various estuaries
- Comparing conditions on the eastern shore to other locations nationally

- Changes in trends over time, tying major changes to changes in stream water quality and groundwater conditions
- Identify a clear definition of success

Discussion, Comments, and Questions

- Develop products that look at a broader scale (i.e. baywide) to identify what BMP's are doing regionally and watershed wide.
- Use CBP tools (e.g., watershed model) to create synthesis reports that may provide information on what to expect from future BMP implementation; this may be useful for the public and jurisdictions' understanding of what to expect from management practices.
- Need to include agricultural colleagues to better understand discussions on crop management plans.
- Quantifying the regional or watershed influence of specific BMP's on the water quality observations to help tell a story can be very challenging.

Linking Land Inputs to Estuarine WQ Responses – W. Boynton (UMCES-CBL)
W. Boynton – Linking Land Inputs to WQ

W. Boynton's work uses conceptual models to understand the relationship(s) between land inputs and estuarine response(s). Recent work suggests that the Chesapeake Bay appears to have become a source of DIN rather than a sink; this is a newly observes trend. W. Boynton also presented a summary of his work on Mattawoman Creek that evaluated the Creek's response to major reductions in nitrogen and phosphorus loading.

Discussion, Comments, and Questions

- Bob Orth published a paper on SAV conditions in the Bay; why they are where they are, and causation. The next step would be to translate the information for a product for the public.
- The suite of indicators CBP is reporting allows for studies like W. Boynton's. There is a clear need for all variables to be monitored to understand Bay patterns and future projections.

Re-evaluating the Chlorophyll *a* Trend Explanation – C. Buchanan (ICPRB)
C. Buchanan – Chlorophyll a Trends

C. Buchanan suggested changes to the language used in the chlorophyll a trends documentation published on the CBP website to better represent current and correct science. She also expressed her concern of how chlorophyll a trends do not agree with overall phytoplankton trends. She aslo expressed the need to be very careful in interpretting chlorophyll a trend results.

Discussion, Comments, and Questions

- Meeting participants reaffirmed the importance of expressing clear and concise science to the public coming from the CBP Partnership.
- C. Buchanan questioned the value of using DOC to explain chlorophyll a trends
- **ACTION:** Work with L. Hernandez and R. Batiuk to change the language of chlorophyll a trends published on the CBP website. (C. Buchanan)

Linking WQ to Fish with a Biogeochemical Model that Integrates Physical Forcing, Biogeochemical Cycling, Trophic Interactions, and Human Influences – T. Ihde (NOAA) and Howard Townsend (NOAA)
T. Ihde – Biogeochemical Model for WQ Trends

T. Ihde emphasized that the Bay community should be examining the effects of higher trophic levels on water quality. He presented the Chesapeake Atlantis Model (CAM), which is a biogeophysical model using output from the CBP Estuarine Model. This model may be used as a tool for the integration of many parameters monitored within the Bay. When trying to determine factors controlling hypoxia, the most realistic picture can be achieved when simultaneously overlaying multiple factors, such as chlorophyll a and wind. This model can overlay multiple factors at once to produce non-linear results.

Discussion, Comments, and Questions

- Does the model have the capability to vary components, such as fishing pressure, depending on annual difference?
    - Yes, this model is dynamic and allows for those changes.
- Can this model be used to 1) examine the eventual impacts and outcomes of Harris Creek oyster restoration project, assuming it is successful, and 2) could we do this for all 19 tributaries and make a generalization about the effects on a baywide scale?
    - Yes, adjustments can be plugged into the model. A graduate student at Johns Hopkins is exploring an oyster reef restoration model, to determine how much fish biomass a restored oyster reef can support per acre.
- What/how are the stories being told with this model?
    - The inputs to the model tell the story of nutrient loads and sediment loads, simulated by year and certain biomasses representative of the year.
- **SUGGESTION:** Form an ecological cross-agency workgroup

Using Models and Associated BMP and Source Information to help Explain WQ Trends – G. Shenk (EPA)
G. Shenk – Using Models to explain Water Quality Trends

G. Shenk presented the WRTDS model, which is a tool for estimating loads. He compared the WRTDS model and the CBP Watershed Model results for similarities and contradictions. He also spoke about Sparrow and innovative uses of this tool currently in development.

Discussion and Questions:

- Is the CBP watershed model based on RIM data for nitrogen and phosphorus trends?
    - Yes, the model is based on RIM data, and most of the phosphorus reductions are point sources below the RIM
- Is the same data used to calibrate the CPB watershed model and WRTDS?
    - Yes, same data

Discussion and Example of how Jurisdictions work to Explain WQ Trends – B. Michael (MDDNR)
B. Michael – Jurisdictions Explain Water Quality Trends

B. Michael provided examples of how MD has attempted to explain water quality trends in the tidal and nontidal regions with graphs, maps, and Eyes on the Bay. The impacts of individual management practices are difficult to detect with state monitoring data, but it does allow for telling timeline stories, where improvements are needed, and the impacts on concentrations and loads. It also allows for linkages between concentrations/loads and habitats such as SAV or fisheries.

Discussion and Questions

- Changes in the SAV communities have an impact on the nitrogen cycle, but there isn't enough data for a report.
- A current study involves speaking with fisherman to inform stories of changes over time.
- Adaptive start-up monitoring efforts could give a more complete picture.

Developing an Integrated Technical Approach to Explaining WQ Trends – All, facilitated by S. Phillips (USGS) and W. Boynton (UMCES-CBL)

S. Phillips and W. Boynton led a discussion on how to develop an integrated approach to better explain Chesapeake Bay water quality trends both in the watershed and tidal waters.

Summary of Discussion

How are jurisdictions and partners explaining/reporting trends?

Virginia

- Reporting trends similar to MD including:
    - Relationships between parameters
    - Multiple trend analysis

- Relationships overtime between living resources and water quality, mostly in tidal waters

Pennsylvania

- Susquehanna watershed is a priority point of study because of the sediment behind the Conowingo Dam.
- Other work in development: Small Mouth Bass study, pesticide sampling, sampling for endocrine receptors, intensive collaboration with fisheries
- WRTDS sampling in planned for the Susquehanna River after the Potomac work is well underway.

Susquehanna River Basin Commission (SRBC)

- Reporting of unique situations/findings in data, with a story of a shift or change and why.
- Exploring inorganic phosphorus to see how it affects the system.
- With the recent large storms, exploring BMP's functionality, what are the capacities of the BMP's in place?

Interstate Commission on the Potomac River Basin (ICPRB)

- Survey filamentous algae in WV; MD is doing a comparable study.

Council of Governments (COG)

- Collaborating with USGS to use data in trend analysis and evaluate seasonal trends.
- A network of small watershed sites in the Occoquan area are good candidates for a trends in small watersheds study; COG is not currently involved, but expressed interest in future involvement.

Next Steps to Develop Draft Work Plan (Technical and Operational) – All, facilitated by S. Phillips (USGS), W. Boynton (UMCES-CBL) and R. Batiuk (EPA)

Summary of Discussion

- **RECOMMENDATIONS/SUGGESTIONS:**
  - Partner with the USGS small watershed study; the small scale enables the scientific community to analyze trends and linkages at the process level and answer the "why?" question that can't be seen using the larger scale systems.
  - Report data on systems that have received significant BMP implementation, large scale or small scale, to show change.
  - In *Estuaries and Coasts* W. Boynton's publication may be a helpful resource
  - **ACTION:** Continue the discussion of reporting trends in the Factors Affecting Trends (FAT) adhoc team meetings at the CBP

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