Using Local Monitoring Results to Inform the Chesapeake Bay Program's Watershed Model

Presentation to STAC

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Local Monitoring Workshop Objectives

- Identify current monitoring data that can be used to inform watershed model processes under Phase 7 of the model
- Determine how representative the monitoring data is of watershed-wide conditions
- Determine if any additional analyses of existing data would make it useful for informing the watershed model
- Identify potential changes to current local monitoring programs that would make their data more useful for informing watershed model updates in the future

Workshop Structure

I. Provide overview of model structure
II. Hear from case studies
    - Urban and Agriculture monitoring networks in and outside of the Bay watershed
III. Discuss provided questions in urban and agriculture break-out groups, plus one online group
    - What current monitoring data can be used to inform watershed model processes?
    - How representative of watershed-wide conditions is this data?
    - What additional analyses of existing monitoring data would allow it to be generalized across the Chesapeake watershed?
    - What changes to existing monitoring programs would make their data more useful for informing watershed model processes in the future?
IV. Reconvene to discuss and establish recommendations

The Role of Monitoring Data

In Phase 6, Monitoring Data Used for:

- Calibration
- Comparison with trends
- Knowledge generation

Potential input into Phase 7:

- New load sources
- New relative loads
- Stormflow/baseflow split
- Lag effects
- Generalizable knowledge

Monitoring Networks

Examples from Urban Watersheds inside the Bay:

- Fairfax County, VA
- Hampton Roads, VA
- Gwynns Falls, MD

And outside the Bay:

- Atlanta, GA

Monitoring Networks

Examples from Agricultural/Rural Watersheds in the Bay:

- Mahantango Creek, PA
- Showcase watersheds
  - Upper Chester River, MD
  - Smith Creek, VA
  - Conewago Creek, PA

And outside the Bay:

- NC Piedmont

Overall Findings

Monitoring networks vary…

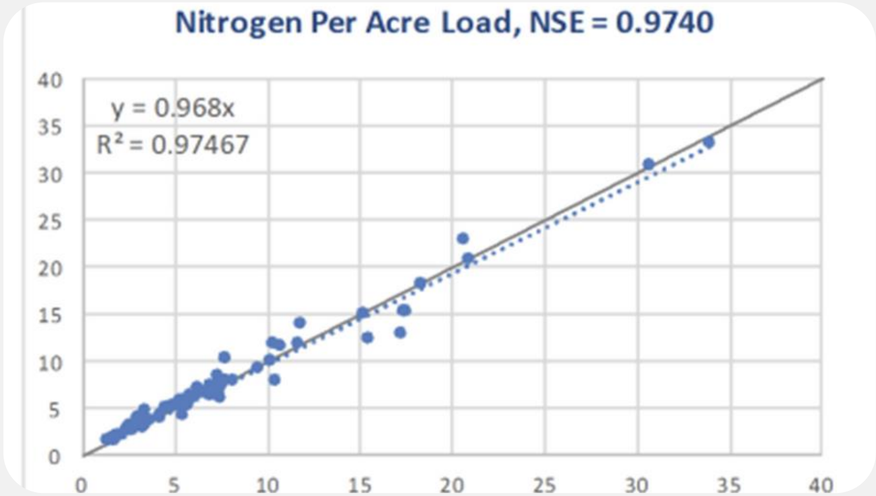
- Unique Hypotheses
  - Some with and without BMPs
- Watershed Size
- Duration

…But are very similar

- The power of partnership is key
- Unexpected results are common
- Statistical analyses are needed
- All provide generalizable knowledge

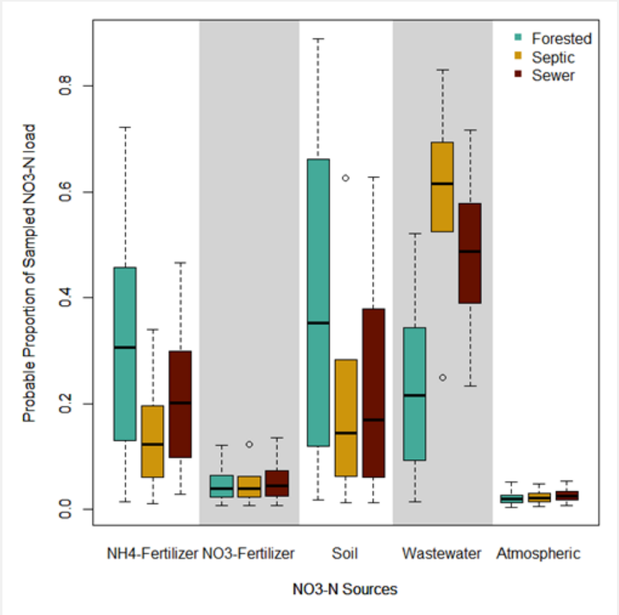
There is potential to extend, expand, and enhance.

Key Findings - Urban



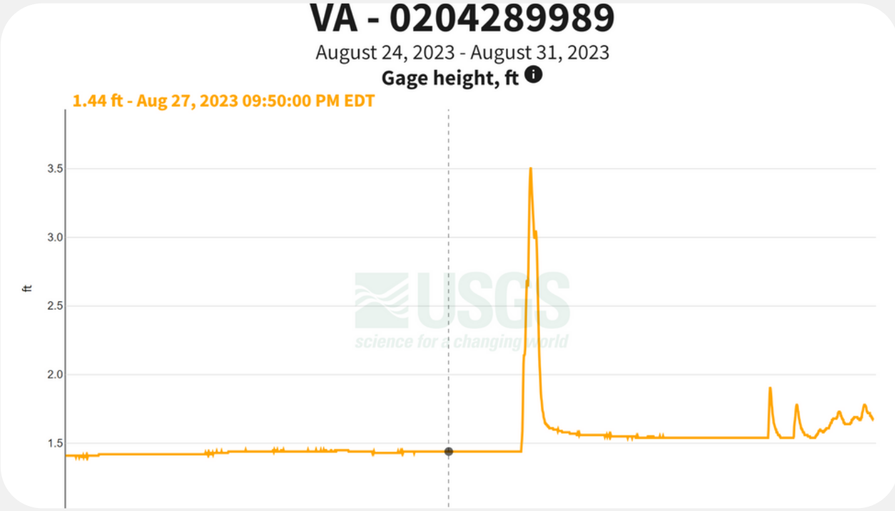
Include local monitoring stations in watershed model calibration

- Urban loads are underrepresented
- Expand geographic extent



New load sources

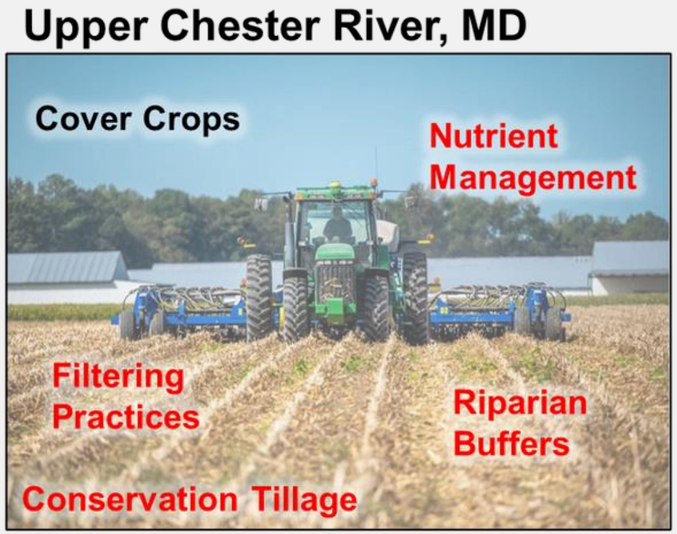
- Provide generalize knowledge to inform the model
- Urban ‘karst’, residential groundwater pumping, illicit discharges, exfiltrated wastewater, new look at septic



Local monitoring guidance

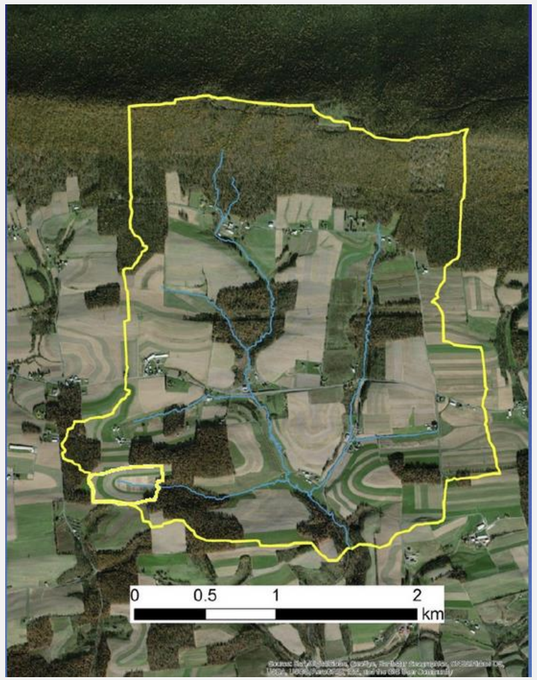
- Establish a process to develop a network
- Consider other data sources
- Provide statistical tools

Key Findings - Agriculture



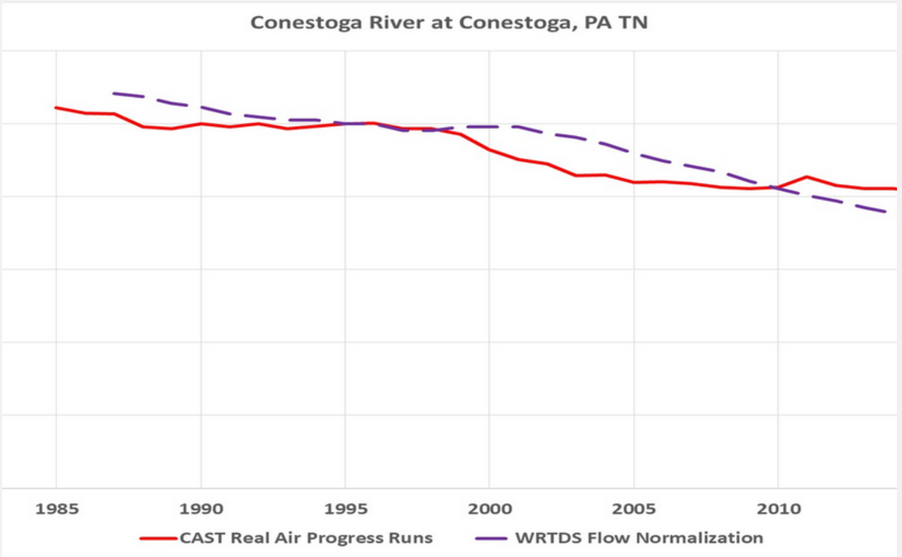
Develop monitoring for BMP effectiveness studies

- Need for hypothesis-driven study design
- Need more complete BMP implementation data
- May help explain gaps and allow for adaptive management



Improve model confidence

- Using local data can bolster local buy-in
- Consider counties as public laboratories



Consider the trends

- Compare to the TMDL
- Evaluate effectiveness of policies

Response to Comments

Committee members:

- *Define local monitoring better*
- *Clarification on sources*
- *Combine ag & urban recommendations vs keep separate*
- *Editorial*

Response to Comments

STAC:

- *Literature synthesis*
- *Not hypothesis driven*
- *Data is being collected to feed the model not explore*
- *Interest in uncertainties that can be uncovered (model and process related)*
- *More detail on monitoring methods*
- *Editorial*

RECOMMENDATIONS

For the Bay Program to consider

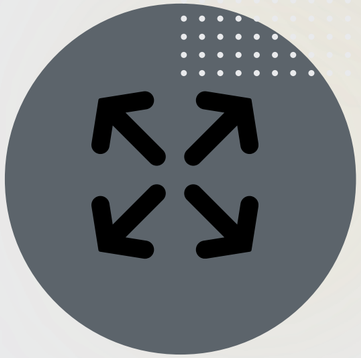
- Include local data in model calibration
- Include as generalized knowledge
- Discuss policy changes to incorporate monitoring
- Look for other established data sets
- Compare with TMDL expectations

RECOMMENDATIONS

For local networks to consider

Design for BMP effectiveness

Identify new statistical tools



Expand existing programs

Consider climate change

Conclusions

- Phase 7 offers an opportunity to influence model decisions
- Significant local funds have been invested in these programs
- Local monitoring can inform calibration and/or provide generalized knowledge
- Local monitoring can provide buy-in towards modeled results
- Future efforts can
  - Build off existing networks
  - Be hypothesis driven to better inform BMP effectiveness

Thank you

Workshop Steering Committee:

Karl Berger, Metropolitan Washington Council of Governments (Chair)
K. C. Filippino, Hampton Roads Planning District Commission
Normand Goulet, Northern Virginia Regional Commission
John Jastram, U.S. Geological Survey
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