

Chesapeake Bay Program Modeling Developments

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Metropolitan Washington
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Presentation Overview

- Conowingo Dam developments
- STAC workshop on modeling urban lands
- Creation of Ag Modeling Subcommittee
- Recommendation to create Bay modeling laboratory



Conowingo Dam Issue

- Problem posed by sediment accumulation within 3 lower dams on Susquehanna River
- A certain amount of deposition is built into Bay models and TMDL analysis
- New data emerging from monitoring and modeling shows that this older deposition pattern is changing -- resulting in more sediment and nutrients entering the Bay
- A priority for addressing during mid-point evaluation
- Also will be an issue during dam re-licensing

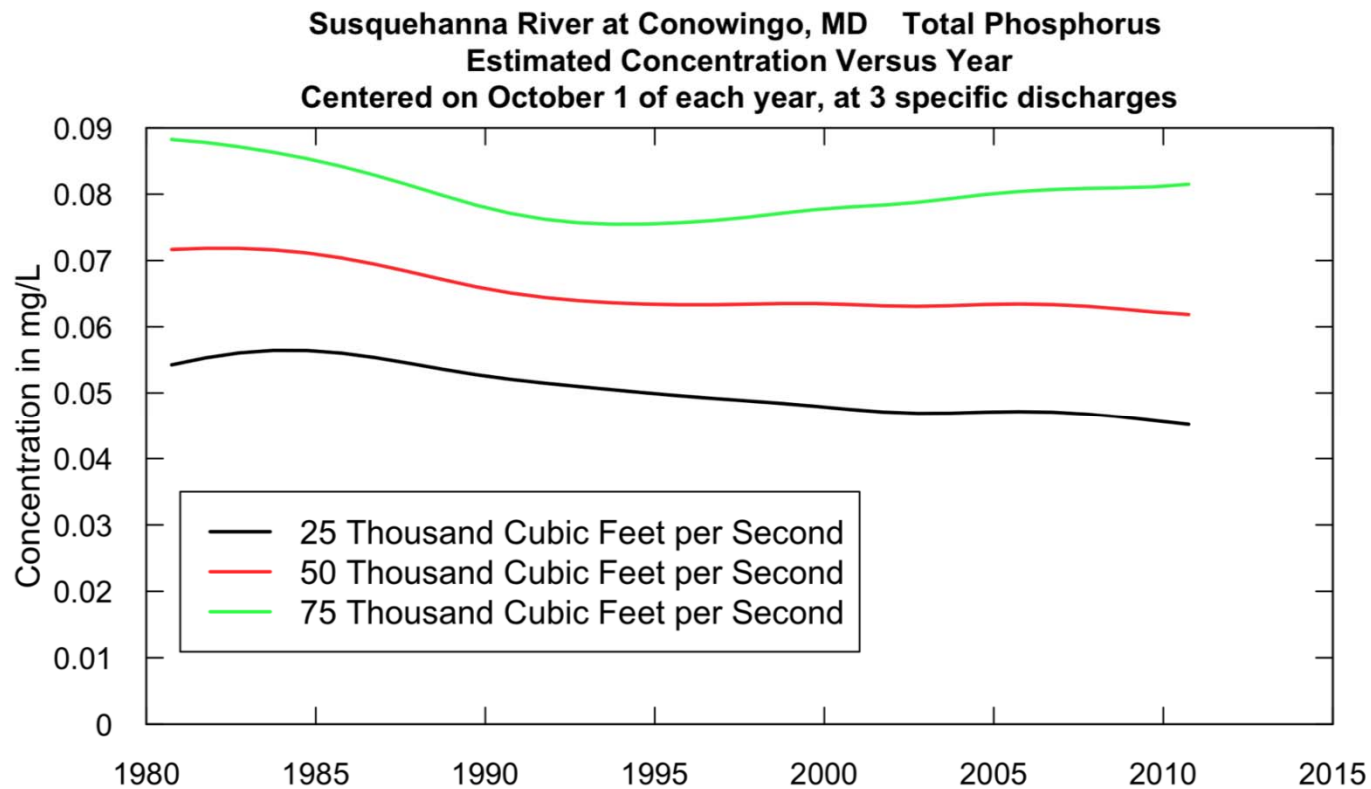


Conowingo Dam (cont)

- Various parties sponsoring studies by Corps, USGS, Bay Program into what's happening with dams, impact on water quality in Bay
 - USGS – new monitoring trend data using WRTDS (flow-adjusted load trends – from Bob Hirsch)
 - Corps – impact on water quality, attainment of TMDL criteria – from Carl Cerco)

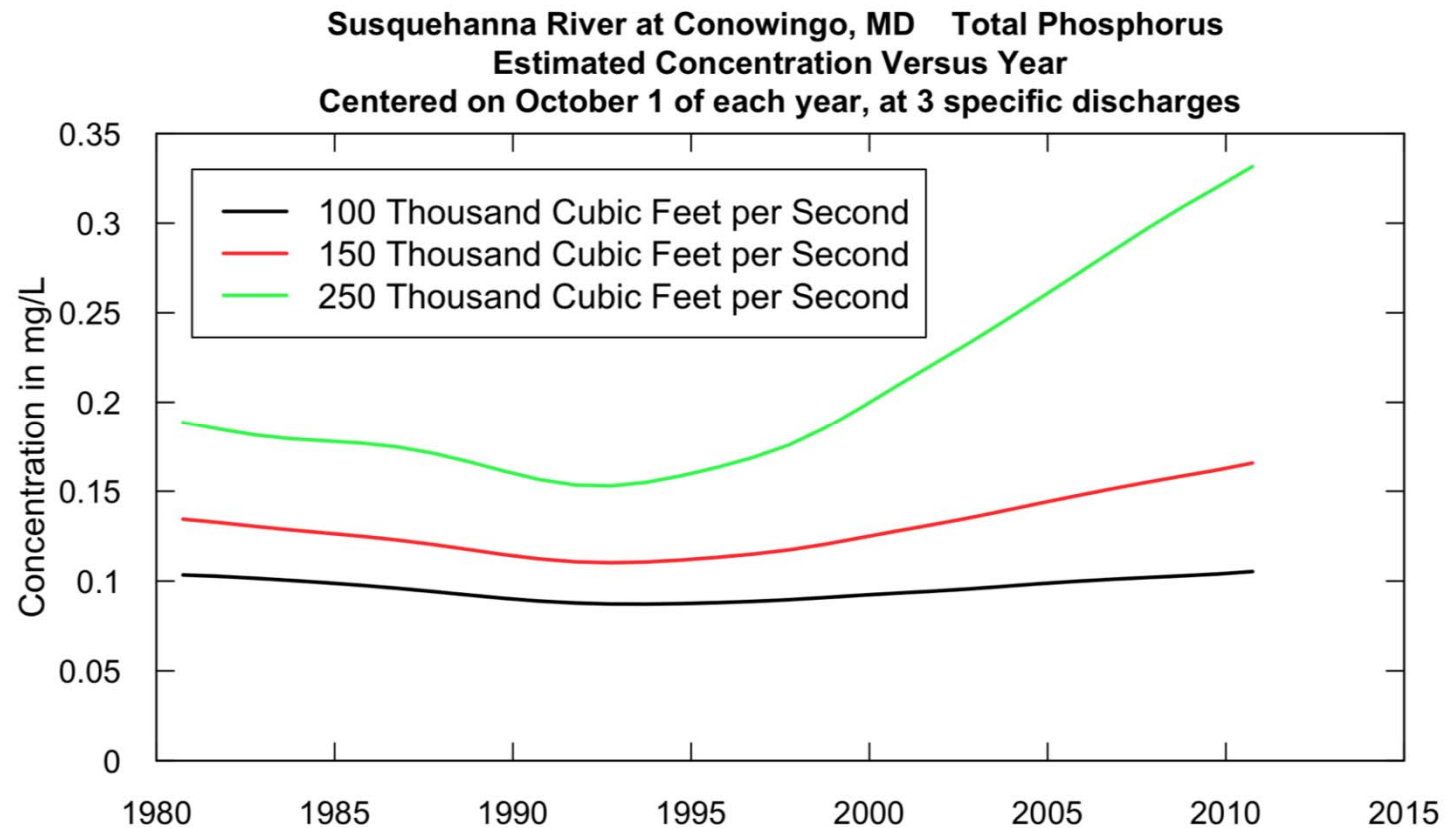


Some preliminary findings - monitoring



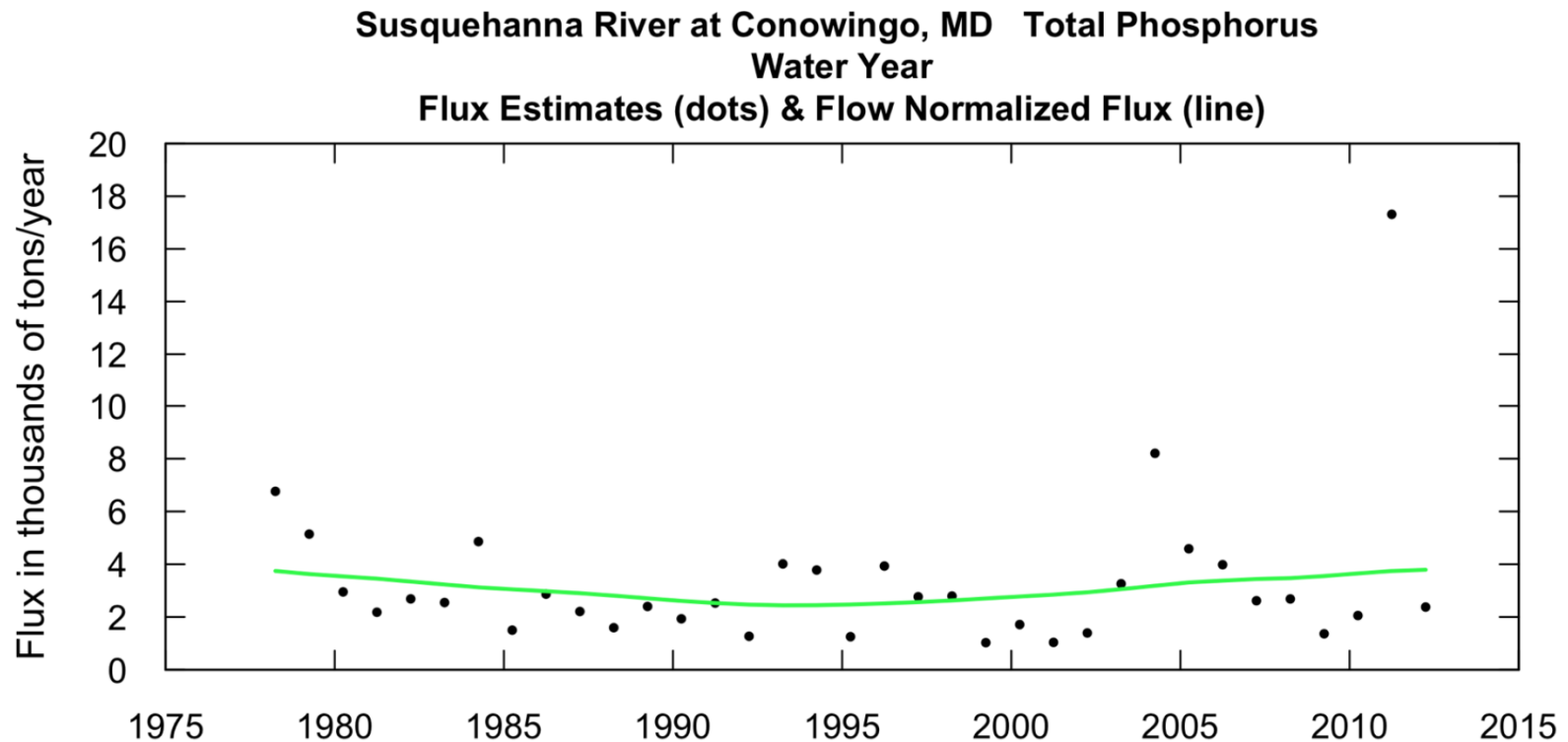


Some preliminary findings - monitoring





Some preliminary findings - monitoring



Although concentration only increased 8% from 1996 to 2012, flux increased by 51%

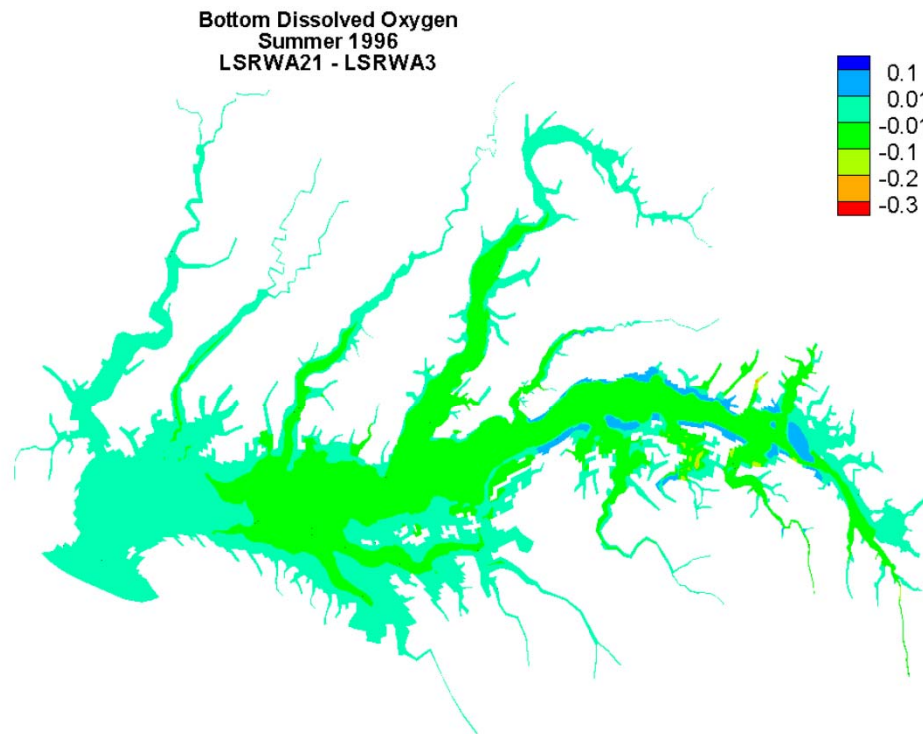


Some preliminary findings - monitoring

Summary points

- Decreased deposition may be more important than increased scour
 - Hirsch estimates 59 % of increased TP flux due to flows between 75,000 and 400,000 cfs (deposition events that occur 45 days/year on average)
 - 41 % of increase due to flows above 400,000 cfs (scour events that occur about 1.5 days/year)
- Unless some management change occurs, outputs will continue to rise until outputs = inputs (steady state) over the long term

Some preliminary findings - modeling



Change in DO as a result of change in bathymetry between what existed in 1996 and what exists today

- Model results using CE-QUAL-ICM (WQSTM)
- Focused on single storm event (Jan. 26, 1996 hydrology)
- Impact on living resources depends on timing (spring and summer worse than fall and winter)
- The major impact on water quality standards is the decline in dissolved oxygen created by increased nutrient loads



Some preliminary findings - modeling

“The computed dissolved oxygen decline during a scour event is small but can be significant to standards which are only marginally met.” –

Carl Cerco personal insight at 1/17/14 CBP modeling team meeting



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STAC Urban Lands Modeling Workshop

Date: Feb. 12-13

**Location: Sheraton Baltimore North in
Towson, MD**

**Invite-only attendance, but available via
webcast**

- Steering Committee includes:
- Norm Goulet, NVRC – Urban Stormwater Workgroup
- Karl Berger, COG; Jenny Tribo, HRPDC – Land Use Workgroup



STAC Workshop (cont)

- Review basis for urban loadings in CBP watershed model
 - Pervious and impervious
- Determine if there is data to support finer-grained land use classification, for example:
 - Residential / commercial
 - Connected / disconnected
- Begin process to make changes in Version 6.x of the model
 - Follow up by various “experts”



STAC Workshop (cont)

Topics:

- Stream Corridors as a Land Use
- Urban Tree Canopy as a Land Use or BMP
- Connected vs. disconnected imperviousness
- Nutrient inputs (urban fertilizer and atmospheric)
- Nutrient enrichment of sediments



Creation of Ag Modeling Subcommittee

- History
 - Ag modeling workshop (spring 2013)
 - Creation of new subcommittee (fall 2013)
- Key Goal – integrate watershed model with USDA #s and models (e.g. CEAP)
- Members represent land grant universities, state agencies
- Staffed by Bay Program

Comparison to CBP urban resources - ?



Modeling Lab Recommendation

“Action Team” recommendations (January 2014)

- Establish a “hybrid” – part physical, part virtual – Chesapeake Bay Modeling Lab
- Focus on research, some operational development, calibration
- Governance – new management board formed from reconstituted Modeling Subcommittee
- Funding – additional \$2 million/year in sustainable funding (current spending = \$2 million/year)

Should COG endorse - ?