Conowingo Dam and Lower Susquehanna River Sediment

Mt. Airy Water and Sewer Board
December 12, 2013

MARYLAND
Smart, Green & Growing

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Maryland Department of Natural Resources

Presentation Outline

- Susquehanna River facts
- Impacts from high flow events – USGS Report
- Conowingo Dam Relicensing Process
- Lower Susquehanna River Watershed Assessment study

Susquehanna River As a % of Chesapeake Bay inputs

47% of freshwater

41% of nitrogen

25% of phosphorus

27% of sediment

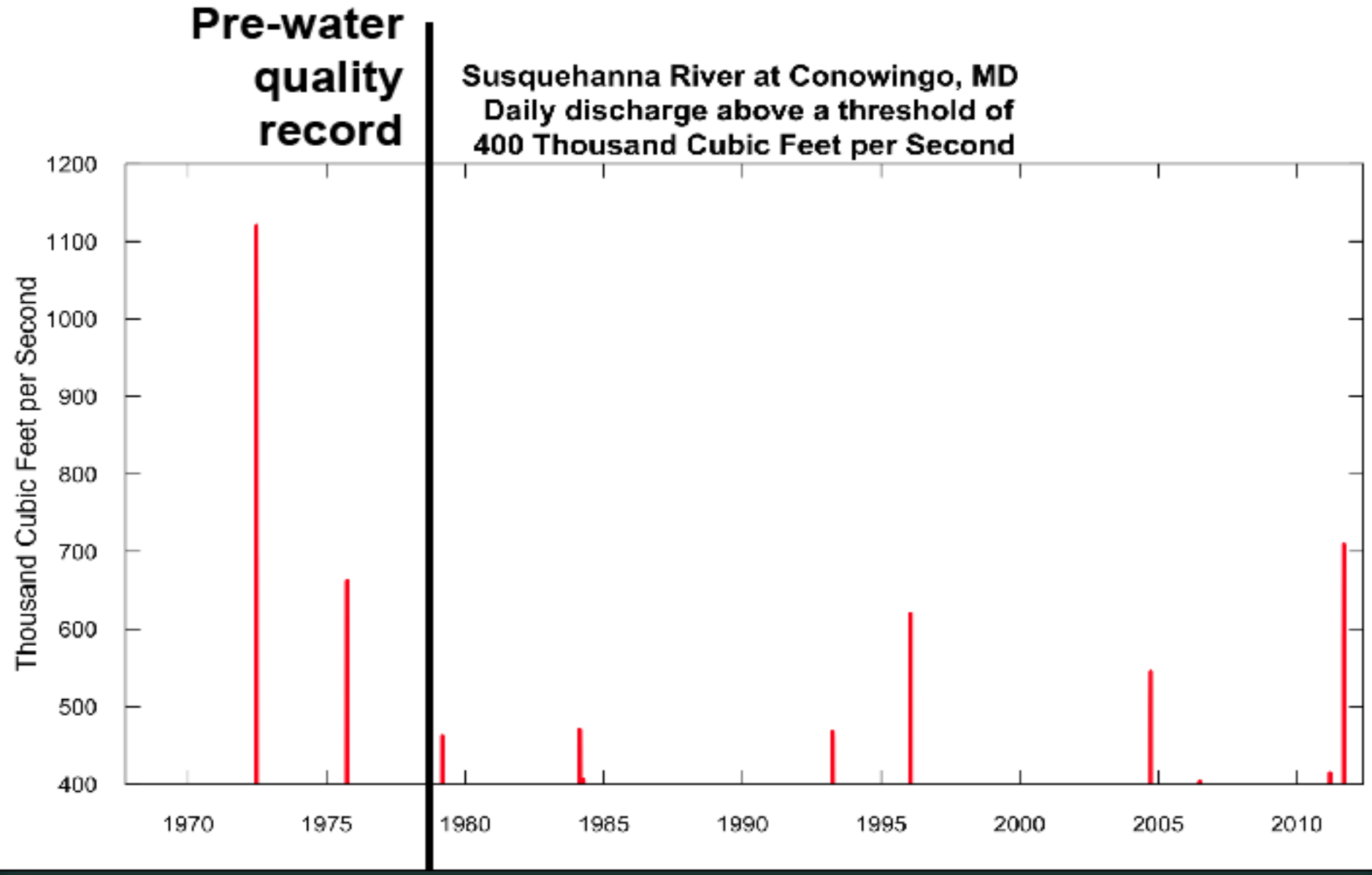
What Does this mean to the Bay?

- 59% (more than half) of the nitrogen comes from outside the Susquehanna River Watershed
- 75% (3 quarters) of the phosphorus comes from outside the SR Watershed
- 73% (almost 3 quarters) of the sediment comes from outside the SR Watershed
- Jurisdictions outside the SR Watershed must continue to meet their nutrient and sediment reductions if we expect Bay and our tributaries to be restored

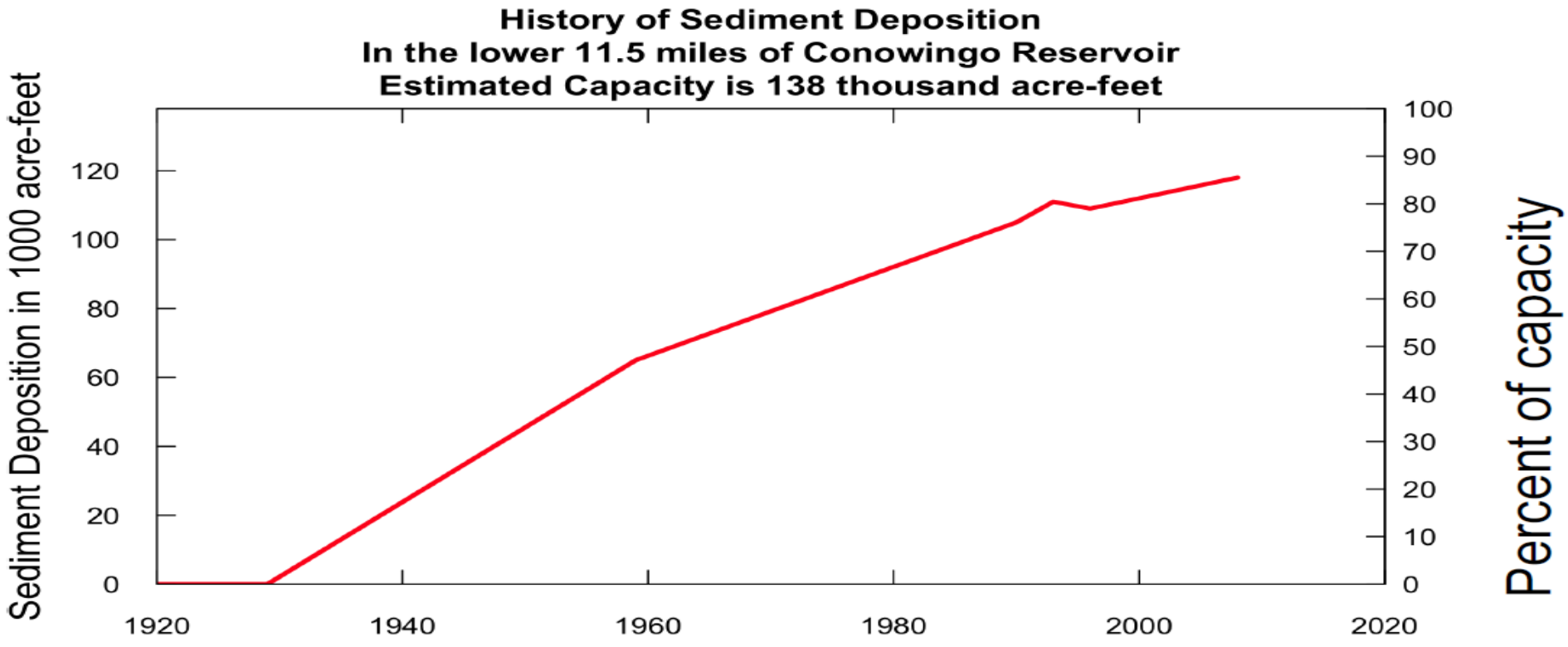
Susquehanna River Sediment

- 3 million tons/year loading with 2 million tons/year captured
- Conowingo Dam Traps about 2% N, 40% P and 50-70% of suspended sediments
- Ability to store sediment is near or at capacity
- Tropical Storm Lee (2011) scoured ≈ 4 million tons of sediment / added about 2 yrs sediment capacity at 728,000 cfs
- Hurricane Agnes (1972) – largest single event at 1,100,000 cfs

How unusual was the Tropical Storm Lee event?



Sediment



Source: Langland, 2009
http://pubs.usgs.gov/sir/2009/5110/

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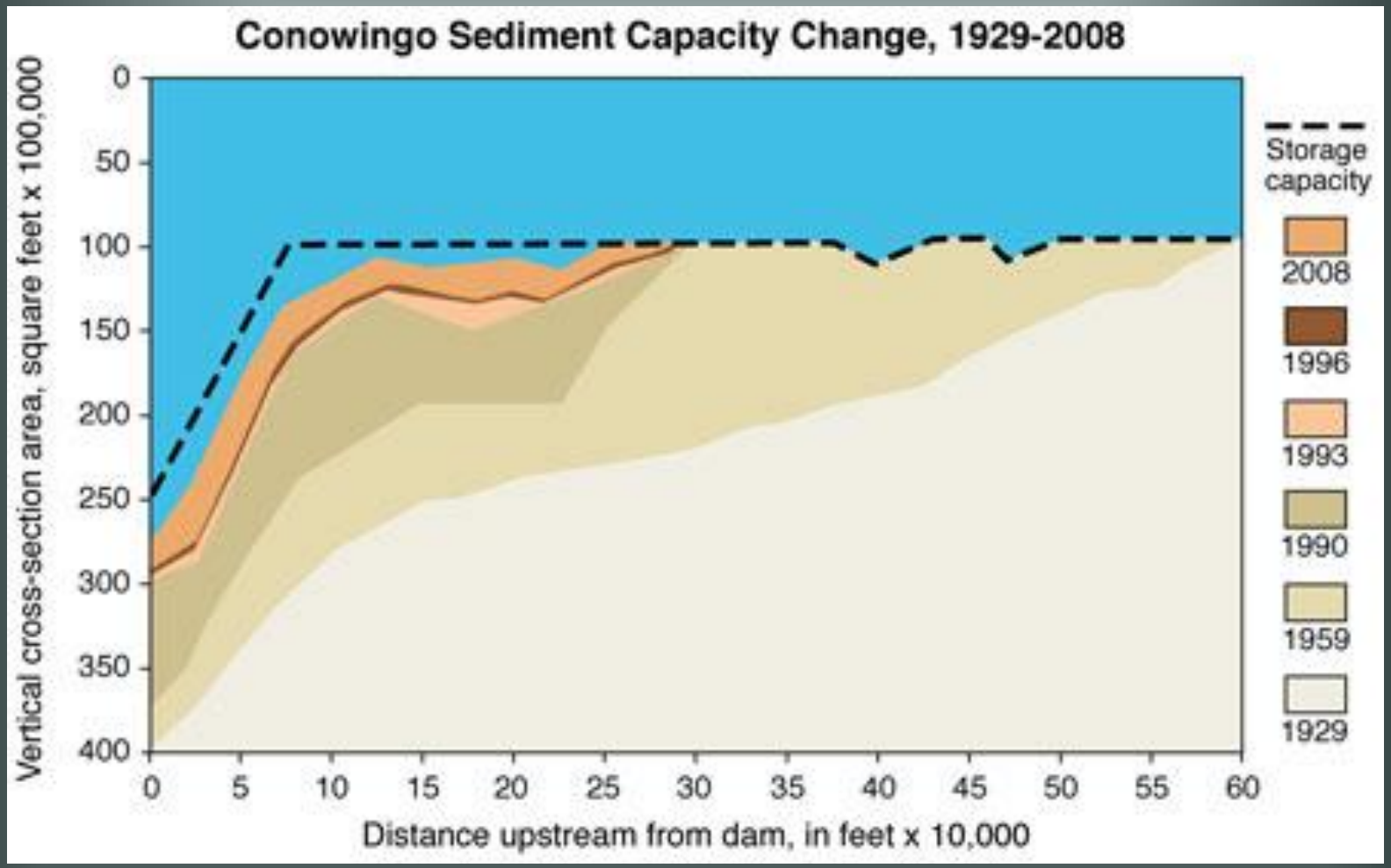
Sediment



Source: USGS

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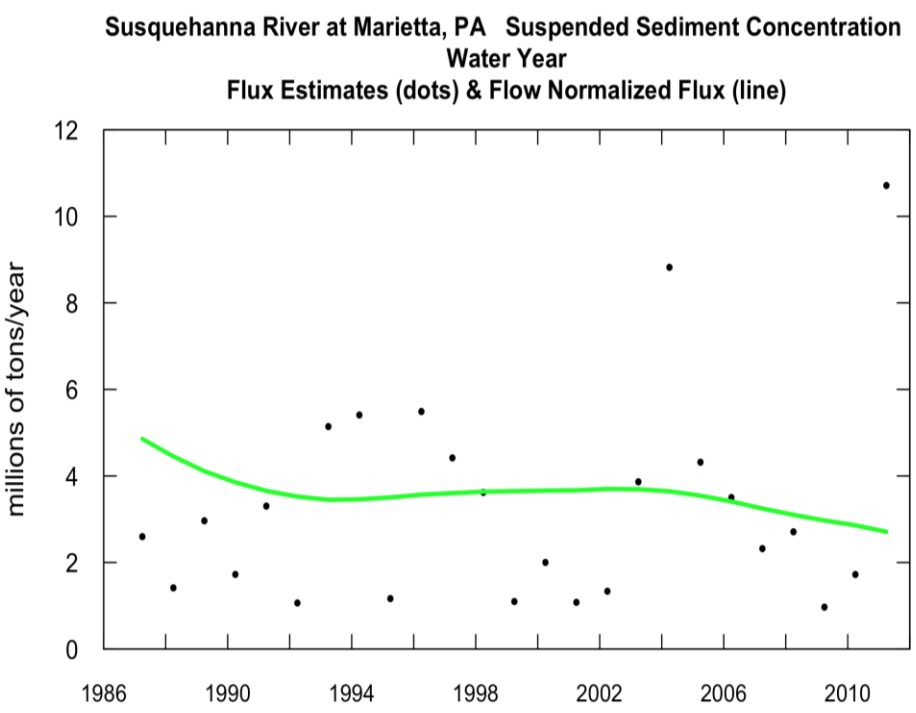
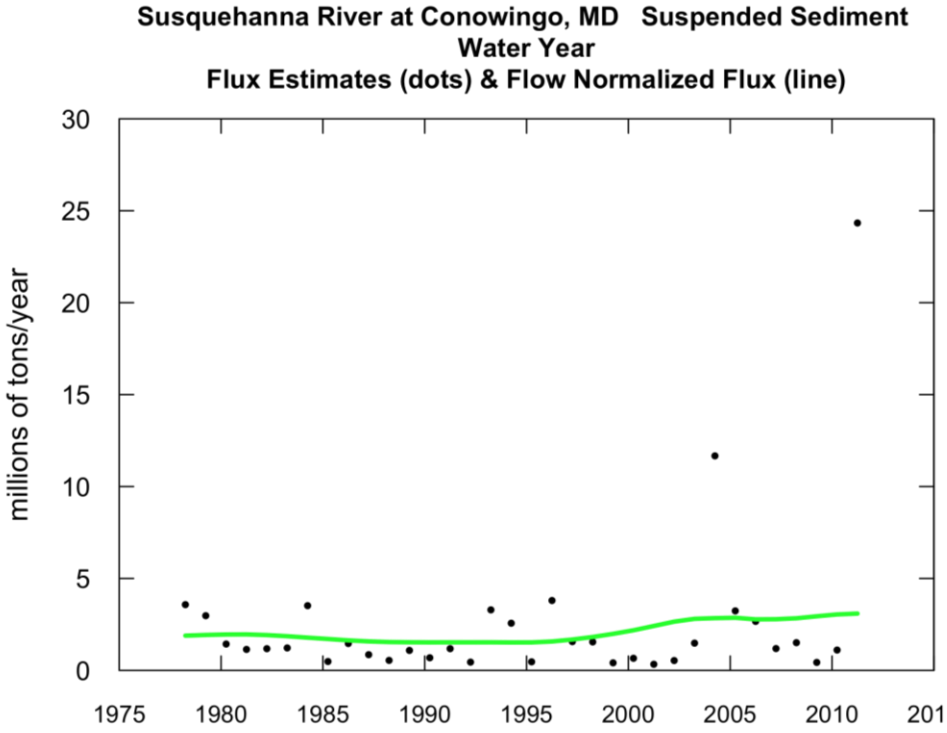
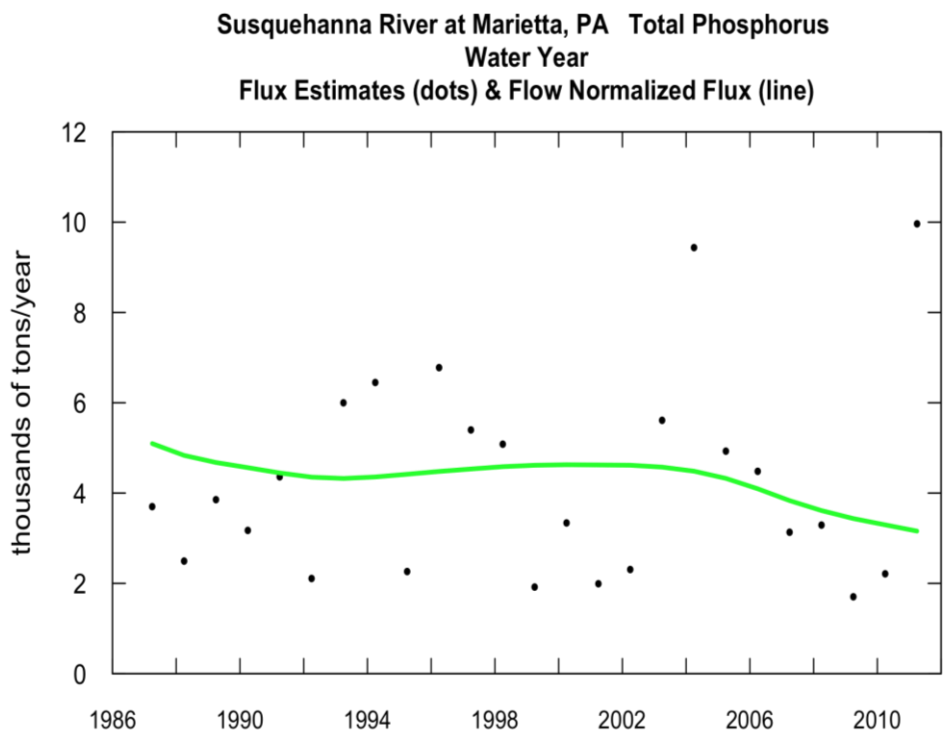
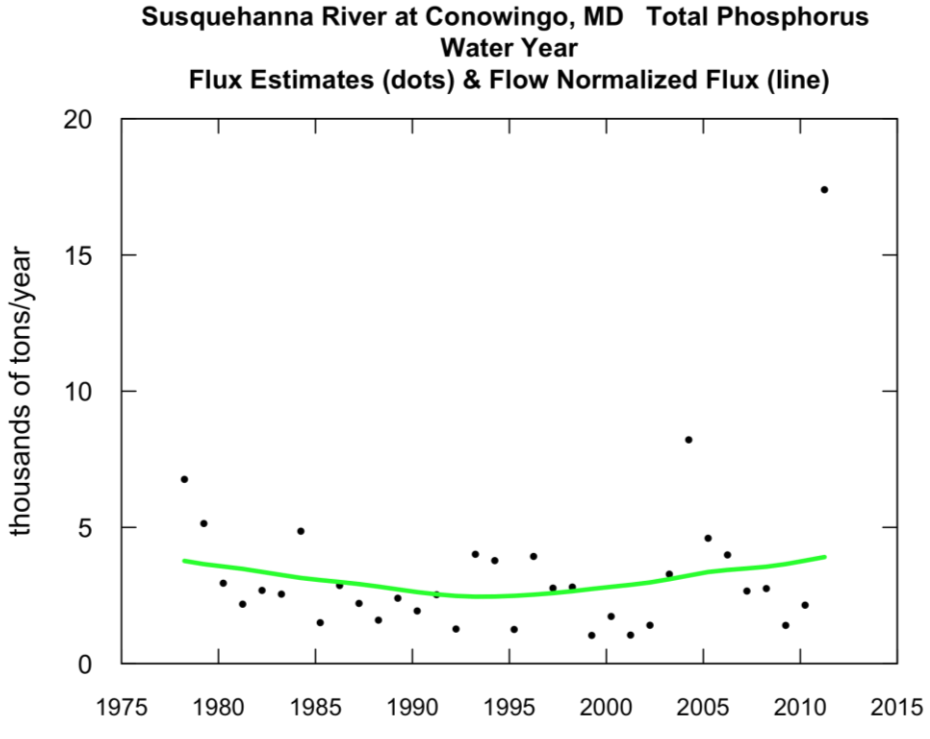
Suspended Sediment: Marietta and Conowingo





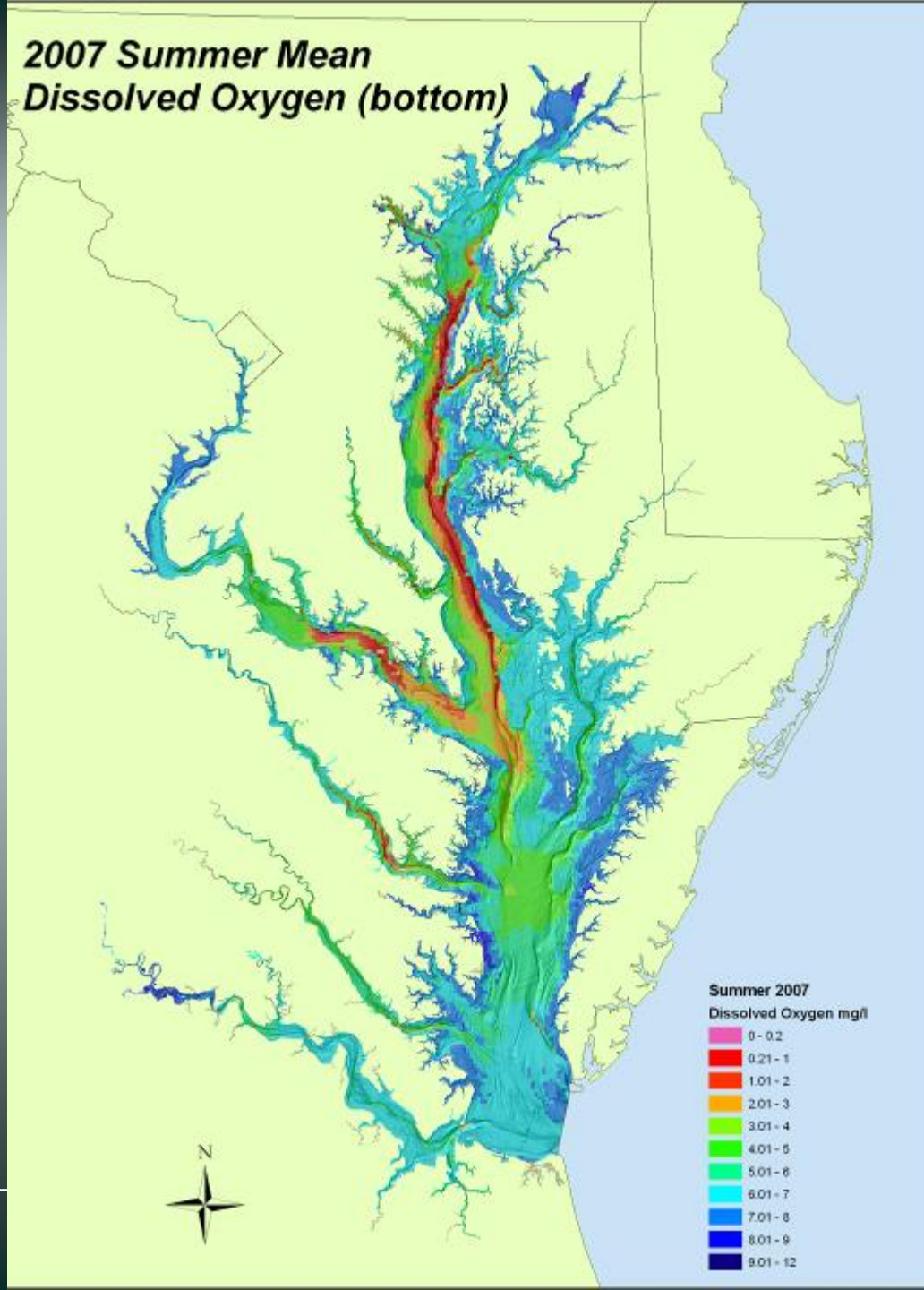
Total Phosphorus: Marietta and Conowingo





Water Quality Impairment

Extensive low to no summer dissolved oxygen conditions persist throughout the Chesapeake Bay and its Tidal Tributaries

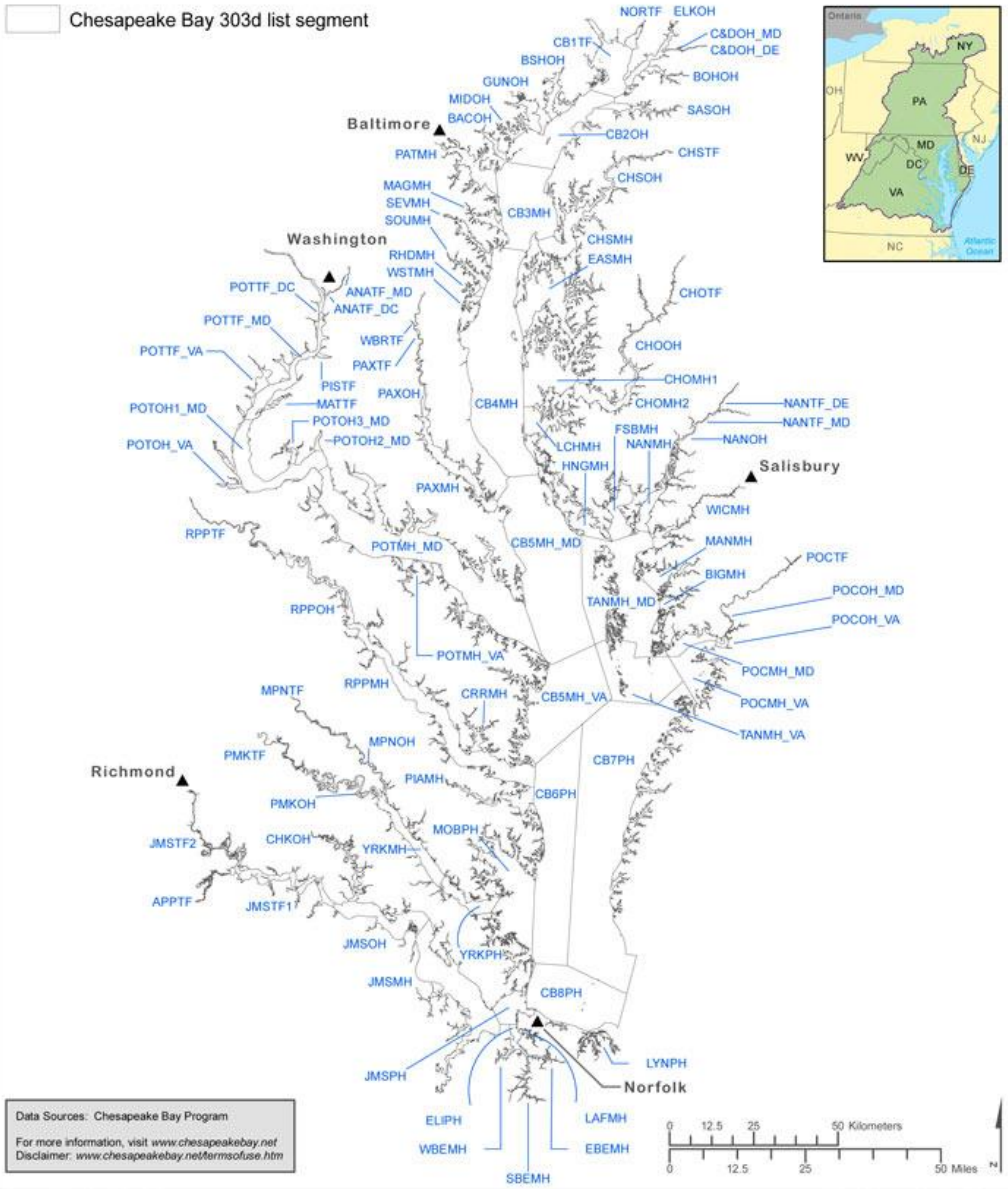


Source: www.chesapeakebay.net/data

Chesapeake Bay Segmentation Scheme

(For 303d listing - 92 segments)

Chesapeake Bay Program
A Watershed Partnership



Created by HW, 6/4/08

UTM Zone 18N, NAD 83

Water Quality Criteria Attainment

- Timing of storms is important. The “best” time for a storm is late fall or early winter. The worst time is early summer.
- A winter storm
  - depresses summer-average DO by ≈ 0.3 mg/L.
  - increases SAV growing season average Chl by ≈ 1 µg/L.
  - increases SAV growing season average KE by ≈ 0.1 /m.
  - decrease in Deep Channel DO attainment of 1% or less for the 3 years following the storm (using the 1996-1998 hydrology).
- An early summer storm
  - depresses summer average DO by ≈ 0.6 mg/L
  - increases SAV growing season average Chl by ≈ 2 µg/L.
  - increases SAV growing season average Chl by ≈ 0.25 /m.
  - decrease in Deep Channel DO attainment of about 2% for the 3 years following the storm (using the 1996-1998 hydrology).

Implications if We Do Not Mitigate for Sediment Behind the Dam

- If full implementation of the WIPs by 2025
  - Will not meet Dissolved Oxygen criteria in 3 Chesapeake Bay segments – CB4; Chester River mesohaline; and Eastern Bay
  - There are some negative short-term water quality impacts to tributaries down to the Potomac River
  - No water quality criteria impact to tributaries except the Chester River and Eastern Bay

Susquehanna River Dams Relicensing

- Conowingo Dam
-- expires 2014
- Muddy Run (Pump/Storage)
  – expires 2014
- Holtwood Dam
  – amended to 2030
- Safe Harbor Dam
  – expires 2030
- York Haven Dam
  – expires 2014

Relicensing Participants (Conowingo)

- Federal Energy Regulatory Commission (FERC)
- Exelon – Applicant / Owner
- Maryland – DNR & MDE
- Pennsylvania – PADEP, PAFBC
- USFWS / NOAA / NMFS
- National Park Service (NPS)
- Susquehanna River Basin Commission (SRBC)
- The Nature Conservancy (TNC)
- Lower Susquehanna Riverkeeper

FERC Relicensing Activities
(to date)

2009

- Exelon Filed Pre-Application Document
  - Maryland participated in the development of all study plans
  - FERC approved a total of 32 studies
  - Exelon conducted studies between 2010 and 2012

2012

- Exelon Filed Final License Application (FLA)
  August 31, 2012

2013

- FERC Issued Ready for Environmental Assessment (REA)
  April 29, 2013
  - FERC granted extension until December 15, 2013
    - MD can file comments on the FLA and preliminary fish and wildlife measures for protection, mitigation and enhancement (10j licensing recommendations)
    - FWS must issue fish passage prescriptions (US Fish and Wildlife mandatory fish passage conditions)
    - Maryland 401 WQC Application Due (1 year review period) State has to certify that the project will meet water quality standards

Significant Relicensing Issues Identified for Protection, Mitigation and Enhancement

High Priority

- Sediment Management
- Fish Passage
- Flow Management
  - fish stranding
  - downstream habitat
- Water Quality
  - freshwater mussels

Moderate Priority

- Debris Management
- RTE Species
- Land Conservation
- Recreation

What We Want To Accomplish Through Relicensing

- Proper Management of Sediment
- Improved Fish Passage
  - American Shad; Goal of 2M above York Haven
  - American Eel; Goal of 8.2M within 10 years
- Restore Freshwater Mussels
  - Water quality / filtration capabilities
- Enhance Flow Conditions
  - Improve downstream habitat
  - Reduce fish stranding
- Expand and Improve Recreational Opportunities
- BMP for Debris Management
- Land Preservation
- Protection of RTE Species

MDE's 401 Water Quality Certification Process

- Exelon must file its 401 WQC Application within 60 days of REA.
- State must act within 1 year of receipt of the WQC application or it waives its rights (there are ways to extend).
- State's WQC authority has been interpreted broadly by courts.
- Includes authority to condition as necessary to ensure compliance with State water quality standards.
- Courts have upheld WQC conditions related to fish passage, habitat, minimum flows, and recreation.
- FERC cannot grant license without WQC from Maryland (although 1 year licenses are possible).
- FERC has little to no authority to reject or modify our WQC conditions.
- WQC determination is appealable to State court.

Upcoming Opportunities for Public Comment

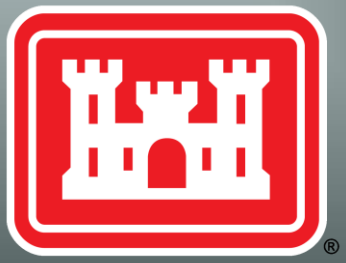
- Comments to FERC (Final License Application)
  - Currently December 15, 2013

- Comments to MDE (401 Water Quality Certification)
  - Comment period will be announced by the MDE after a complete application is submitted by Exelon

Lower Susquehanna River Watershed Assessment Study

- Watershed assessment (Authorized by Section 729 of Water Resources Development Act of 1986)
- Cost: $1.376 million
- Cost-sharing sponsor = Maryland Department of the Environment with contributions from MD DNR, Susquehanna River Basin Commission and The Nature Conservancy
- Cost sharing = 75% Federal, 25% non-Federal
- Agreement executed September 2011
- Study duration expected to be 3-years

LSRWA Partners



- Each agency will be providing funding and/or conducting specific tasks for the assessment.

Goals and Objectives

1. Evaluate strategies to manage sediment and associated nutrient delivery to the Chesapeake Bay.
   - Strategies will incorporate input from Maryland, New York, and Pennsylvania Total Maximum Daily Load (TMDL) Watershed Implementation Plans.
   - Strategies will incorporate evaluations of sediment storage capacity at the three hydroelectric dams on the Lower Susquehanna River.
   - Strategies will evaluate types of sediment delivered and associated effects on the Chesapeake Bay.

2. Evaluate strategies to manage sediment and associated nutrients available for transport during high flow storm events to reduce impacts to the Chesapeake Bay.

3. Determine the effects to the Chesapeake Bay due to the loss of sediment and nutrient storage behind the hydroelectric dams on the Lower Susquehanna River.

Activities Completed to Date

- ✓ Sediment Data Collection (sediment cores, suspended sediment water quality, grain size analysis)
- ✓ Bathymetric Surveys
- ✓ Sediment Characterization
- ✓ Outreach Activities (project website, quarterly email updates, ...)
- ✓ Literature Search for Potential Strategies – Watershed and Reservoir-Specific
- ✓ Development of Hydraulic, Transport and Bay Models
- ✓ Evaluated Available Alternatives
- ✓ Modeling of Existing and Projected Conditions
- ✓ Assessed Feasibility of Sediment Management Alternatives
- ✓ Developed Rough Cost Estimates of Viable Alternatives
- ✓ Assessing conclusions and recommendations

Sediment Management Options Being Investigated

- Reducing sediment yield from the upstream watershed
  - Expansion of BMPs above and beyond current WIPs
- Minimize sediment deposition impacts – allow sediments to bypass the dam during times with least impacts to the Bay
  - Reservoir operations
  - Pipeline to downstream areas
- Increase or recover sediment-trapping volume
  - Dredging with innovative reuse of materials – e.g., construction aggregate, island restoration
  - Dredging with placement on land – e.g., quarries, agricultural lands, abandoned mines

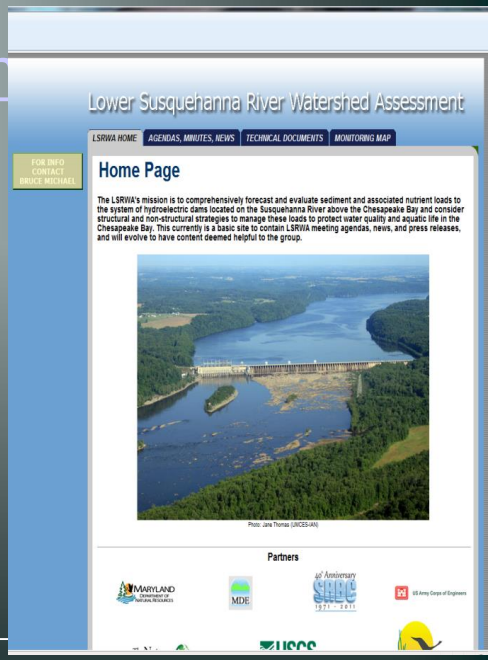
Stakeholder Outreach

- Study Initiation Notice February 2012
- Agency Coordination Letters February 2012
- Facebook Page:

http://www.facebook.com/pages/Lower-Susquehanna-River-Watershed-Assessment/359608094092593

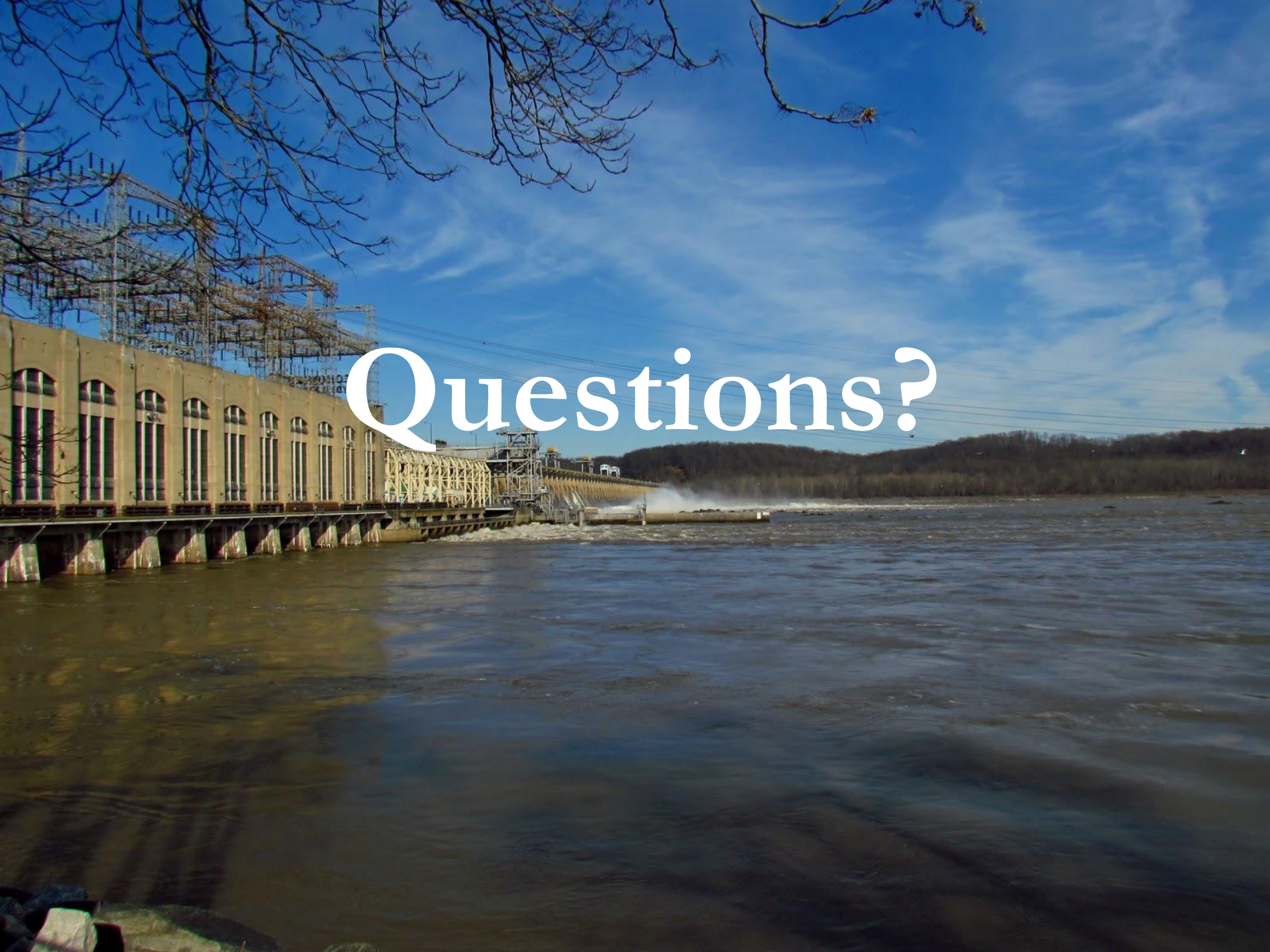
- LSRWA Website: http://bit.ly/LowerSusquehan
- Stakeholder Involvement Plan
- Email updates: to be added email

bmichael@dnr.state.md.us



Next Steps

- Finalize Cost Estimates for Alternatives
- Finalize Potential Funding Options and Conclusions
- Develop Recommendations – will include additional data on nutrients and impacts to water quality criteria


Questions?