Maryland Coastal Bays: TMDL Development Update

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Presentation Outline

• Brief Introduction
• Modeling Approach
• Water Quality Standards and TMDL Modeling Endpoints
• Status, Schedule and Timeline of TMDL Development
• Q/A
Impairments Under Investigation

- 1996: All Coastal Bays listed as impaired by nutrients.
- Some areas have nutrient TMDLs in place (Newport Bay and areas of Isle of Wight Bay).
- Areas needing TMDLs include:
  - Assawoman Bay (02130102)
    - Greys Creek
    - Open water
  - Isle of Wight Bay (02130103)
    - Manklin Creek
    - Open water
  - Sinepuxent Bay (02130104)
  - Newport Bay (02130105)
    - Marshall Creek
  - Chincoteague Bay (02130106)
MDE’s Modeling Approach

• MDE is currently developing a linked modeling system to address Coastal Bays impairments.

  – Watershed Model (HSPF)
    • University of Maryland

  – Hydrodynamic Model/Water Quality Model (UnTRIM/CE-QUAL-ICM)
    • Virginia Institute of Marine Science
      – Includes sediment process component
Schematic of the Modeling Framework for TMDL Development

- Hydrodynamic Model
- Transport
- Freshwater Discharge
- Watershed Model
- Nutrient Loads
- Water Quality Model (Including both water column and sediment processes)
Watershed Segmentation Procedure

- Delaware Inland Bays model
- MD-8 digit watersheds (Includes State boundary)
  - Delineation to USGS calibration stations
  - Automated based on DEMs
- Delineated to match hydrodynamic model grid
Watershed Model Segmentation
Land Use

- Delaware (Inland Bays model)
  - Delaware Department of Planning Land Use Database.

- Maryland
  - Worcester County Land Use database (2009)
  - CBPO land use classification for agricultural categories

- Virginia
  - National Land Cover Data (USGS, 1999)
  - CBPO land use classification for agricultural categories
TMDL/Modeling Endpoints

• Must be protective of Designated Uses per Code of Maryland Regulations
  – Seek to protect SAV grow zones
Mean Chla= 8.3µg/L Mean TSS=25.2mg/L

Chincoteague Bay-West Part (A5,7,9,10,14) grow season (apr-oct) average

Mean Chla= 5.9µg/L Mean TSS=20.8mg/L

Chincoteague Bay-East Part-major SAV area(A6,8,11-13,15) grow season(apr-oct) average
Sediment

- Re-suspension is wind driven
- Composition varies spatially
- TSS is a significant factor in water clarity
Current designated uses and criteria

• Designated Uses in Coastal Bays are:
  – Water Contact Recreation (Use I)
  – Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting (Use II)

• Dissolved Oxygen Criteria (Numeric)
  – MD: 5 mg/l DO at any time
  – VA: 5mg/L min/ 6mg/L daily average DO
  – DE: 5mg/L daily average DO

• Narrative Nutrient Criteria for Chlorophyll a in MD
  – Not to exceed levels that result in ecologically undesirable consequences
Prior and Existing Efforts:

- **Maryland TMDLs:**
  - 50-100µg/L – Estuarine systems (based on Thomann and Mueller, 1987)
  - 10µg/L mean; 30µg/L 90\(^{th}\) percentile – Reservoirs and Lakes (drinking water supply)

- **DE Inland Bays TMDLs:** 20µg/L

- **NC TMDLs:** 40µg/L

- **Chesapeake Bay SAV goals:** 15µg/L
  - Also MD-Coastal Bays Program SAV habitat goals
Options Examined

• **Option 1**: Use 50µg/L (as used in previous TMDLs)

• **Option 2**: Develop regional chlorophyll a targets using an optical model

• **Option 3**: Use values from other systems or literature

• **Option 4**: Use 15µg/L in SAV grow zones
Recommended Endpoint(s):

- **Combined Approach:**
  - 15μg/L in SAV grow zones
  - 50μg/L in non–SAV grow zones

- Defensible

- Practical
  - Compatible with sampling
  - Recognizes variability throughout the Coastal Bays system

- Protective of SAV

- Protective against DO/Nuisance Issues
TMDL Development Status and Timelines
TMDL Development Schedule and Status

- Watershed model development and calibration virtually complete; technology transfer to MDE underway.

- January – March:
  - Calibration of Water Quality Model (VIMS)
  - Scenario Runs Setup (MDE)
  - Post Processing Setup (MDE)

- March:
  - Technical Workgroup Meeting; comprehensive update

- March – April:
  - VIMS TMDL Scenario Development
TMDL Development Schedule (cont’d)

- **June:**
  - MDE Internal Review

- **July:**
  - Interagency Review
    - Opportunity for STAC and others to review

- **August:**
  - Public Comment Period

- **September 30:** Submittal to U.S. EPA
Questions?
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