Chesapeake Bay Phase III WIP

Wastewater Workgroup

DRAFT Scenario Recommendations
Workgroup Recommendations

- Maintain Existing Nutrient Reduction (NR) Strategy for Dischargers
- Encourage NR Optimization
- Incentivize Plant Optimization
- Required Nonsignificant Sewage Facilities to consider cost effectiveness of NR technology
- Sewage Management for onlot (septic) systems
## Chesapeake Bay TMDL

<table>
<thead>
<tr>
<th>Sector</th>
<th>WLA Type</th>
<th>Total of TN WLAs (lbs/yr)</th>
<th>Total of TP WLAs (lbs/yr)</th>
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<td>Significant Sewage</td>
<td>Individual</td>
<td>10,001,276</td>
<td>1,314,603</td>
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<td>Significant Industrial</td>
<td>Individual</td>
<td>1,820,139</td>
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<td>CSOs</td>
<td>Individual</td>
<td>212,920</td>
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<td>Non-Significant</td>
<td>Aggregate</td>
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<td><strong>Totals:</strong></td>
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<td><strong>15,041,002</strong></td>
<td><strong>2,256,100</strong></td>
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• Point Source Allocation Strategy
  – Goal: Meet WLA for the wastewater sector
• Nutrient CAP Load established in NPDES
• Significant Reductions from Wastewater
  – Typical Pre-Bay TN at Sig Sew Fac – 20 to 25 mg/L
  – Bay TN Concentration CAP Load basis – 6 mg/L
• Sig Sew Dischargers – 95% of TN WW Load
Historical Perspective

• Sig Sew Discharges - CAP Load for 190 facilities
  – Flows > 0.4 MGD
  – NPDES Permit Annual Load Limits
    • TN Load = Design Flow @ 6.0 mg/L Total Nitrogen
    • TP Load = Design Flow @ 0.8 mg/L Total Phosphorus

• Sig IW Dischargers – CAP Loads for 23 facilities

• Non-Sig Dischargers- 2300 facilities
Current Status

• Successfully operating under the WLA established in the TMDL
• On track to continue to be under WLA in 2025
• Limited way to get reductions from Sector
  – Upgrading the treatment technologies
  – Optimization of existing facilities
Scenario No. 1 - Significant Sewage Dischargers to ENR
Reduction Scenarios
Sig Sew to ENR

- Levels of Nutrient Removal
  - Biological Nutrient Removal
    - TN – 8.0 mg/L and TP – 1.0 mg/L
  - PA Biological Nutrient Removal
    - TN – 6.0 mg/L and TP – 0.8 mg/L
  - Enhanced Nutrient Removal
    - TN - 4 mg/L and TP - 0.3 mg/L

- PA Requirements more restrictive than BNR but less than ENR.
Reduction Scenarios
Sig Sew to ENR

• Reductions at discharge design flow
  – 3,270,771 lbs/yr TN & 807,815 lbs/yr TP

• Reductions at 2025 flow
  – 2,835,176 lbs/yr TN & 567,737 lbs/yr TP

• Nutrient Reduction Cost Estimates
  – 11 Facilities with 4 or 5 more in the works
## Reduction Scenario

Sig Sew to ENR

<table>
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<tr>
<th>Facility Name</th>
<th>Bay Design Flow MGD</th>
<th>Current Annual Avg Flow MGD</th>
<th>TN Cap Load lbs/yr</th>
<th>ENR Capital Costs TN</th>
<th>ENR Annual Operation Cost TN</th>
<th>TN Reduction Cost over 20 yrs</th>
<th>Annual Cost per lb of TN reduction</th>
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<td>Scranton WWTP</td>
<td>20</td>
<td>12</td>
<td>365,292</td>
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<td>New Cumberland WWTP</td>
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<td>Fairview North WWTP</td>
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<td>$218,900</td>
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<td>Quarryville Borough Authority WWTP</td>
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**AVG:** $30
Sig Sew Discharger upgrade to ENR Scenario Not Recommended by Wastewater Workgroup due to cost per lb of TN reduction.
Scenario No. 2 - Significant Sewage Dischargers Optimization
• Sig Sew Discharger – Limit = Lbs/yr not mg/L

• 2017 water year data
  – 98 dischargers > 6.0 mg/L TN based on annual avg
  – 89 dischargers > 0.8 mg/L TP based on annual avg

• Reductions at discharge design flow
  – 1,648,587 lbs/yr TN, 208,885 lbs/yr TP

• Reductions at 2025 flow
  – 628,519 lbs/yr TN, 37,227 lbs/yr TP
• Existing DEP Plant Optimization Program
  – Outreach for facilities with compliance issues
  – DEP Deploys instrumentation that measure real-time performance
  – Program could be expanded to facilitate nutrient optimization.
Workgroup recommends establishing a nutrient removal optimization program and encouraging discharger participation.

Considering 2 Alternatives

– Program run fully by DEP
– Program relying on DEP data collection and consultant to help discharger optimize
• Workgroup recommends establishing an operation and maintenance reimbursement program similar to Maryland’s.
  – Incentivize plant optimization
  – Costs for optimization have not been developed since they are plant specific.
  – Cost could be developed as part of the optimization program
Scenario No. 3 – Non-Significant Sewage Dischargers to BNR
Reduction Scenario
Non-Sig Sew to BNR

• Limitation to successful BNR implementation
  – Design Flow cut-off of 0.075 mgd left 181 of the Non-sig Sew Dischargers
  – 72 of 181 have actual flow greater than 0.075 mgd

• Reductions at 2017 annual average flow
  – 401,699 lbs/yr TN
  – Reductions at 2025 flow
  – 327,303 lbs/yr TN
Wastewater Workgroup recommends the Non-Sig Sewage Dischargers perform a nutrient reduction alternative evaluation prior to any upgrade or major capital improvement that includes the biological treatment component of their facility.
Scenario No. 4 – Onlot (Septic)
• Estimated Onlot TN Load – 2,897,000 lbs/yr
  – Reduction through treatment technology
    • Only One PA approved system, 50% Reduction
    • Cost of technology ≈ $10K
  – Sewage Management Program for Onlot Systems
    • Inspection of system, ensures O&M being performed and septic tank is pumped
    • Reduction for Implementation of Sewage Management
      – 5% reduction or 144,000 lbs TN/yr.
Wastewater Workgroup recommends implementation of sewage management. DEP should develop a GIS based online monitoring and reporting system that municipalities could use to manage program and report data to DEP for reporting.
Develop a program to better facilitate trading between sectors. Sectors that fall short of their load reductions could be offset through reductions in the wastewater sector. These reductions could be funded through a dedicated fund to offset cost for facility optimization or capital improvements.
Questions???

Wastewater Workgroup
Co-Chairs
Jay E. Patel, P.E., PADEP
John Brosious, PMAA