Planning Target Methodology

Base Year and Wastewater Curve Definition

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11/14/16
Base Year, Land Use and Wastewater Flow Assumptions for the Chesapeake Bay TMDL

September 29th and 30th, 2009

Presentation D

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Relative Effect of a Pound of Pollution on Bay Water Quality
1. Plot effectiveness vs percent effort
2. Use 2010 as the base year
3. Set upper half of WWTP line at 4.5 mg/l equivalent; intercept at 8 mg/l
4. Most effective basin is 20 percentage points higher than least effective
5. Special Cases
WWTP and ‘all other’ loads are combined

- Western Shore Maryland
  - Allocation from WWTP = 6.12 Mlbs N
  - Allocation from All Other = 3.63 Mlbs N
  - Total = 9.74 Mlbs N

A planning target is a total number, not broken out by source.
Issue #1
How to Draw the Wastewater Curve
The curve goes from 67% to 90%
These values are equivalent to 8 mg/l and 4.5 mg/l N for significant facilities
TMDL documentation

• For nitrogen
  • The maximum percent controllable load was 90 percent, corresponding to an effluent concentration of 4.5 mg/L.
  • The minimum percent controllable load was 67 percent, corresponding to an effluent concentration of 8 mg/L.

• For phosphorus
  • The maximum percent controllable load was 96 percent, corresponding to an effluent concentration of 0.22 mg/L.
  • The minimum percent controllable load was 85 percent, corresponding to an effluent concentration of 0.54 mg/L.
WQGIT 2009

• 9/21 decision
  • **WWTP**: WQGIT overall preferred a line with a maximum of 90% for N and 96% for P

• 9/29 decision: WQGIT approval to present options 1 and 3 to the PSC.
  • Option 1
    • TN WWTP 4.5-8 & other straight w/ 20% slope
    • TP WWTP .22-.53 & other straight w/ 20% slope
  • Option 3
    • TN: WWTP 4.5-8 hockey stick, other straight 20% slope
    • TP: WWTP .22-.53 hockey stick, other straight 20% slope
TN, p5.2, goal=200, WWTP = 4.5 - 8 mg/l, other: max=min+20%,

Percent reduction from 2010 noBMPs to E3

All Other

WWTP

4.5 mg/l

8 mg/l

20 percent slope

Option A

Relative Effectiveness

Percent reduction from 2010 noBMPs to E3
TN, p5.2, goal=200, WWTP = 4.5 - 8 mg/l, other: max=min+20%

Relative Effectiveness
Percent reduction from 2010 noBMPs to E3 All Other

- WWTP
- 4.5 mg/l
- 8 mg/l
- 20 percent slope

Option B

All Other
WWTP
PSC decision 10/23/2009

• The PSC acknowledges the good work of the Water Quality Goal Implementation Team to develop options for allocating target loads for the Chesapeake Bay to the seven jurisdictions. The PSC agrees to adopt Option B and its associated, non-binding, working target loads for nitrogen and phosphorus. Adoption of Option B today allows for the separate jurisdictions to move forward and engage local partners in development of their Watershed Implementation Plans.

• ...
35% of flow below 3 mg/l
47% of flow below 4.5 mg/l

...but plants are operating below capacity
E3 Has Different Definitions for Significant and NS facilities

- 90% of E3 is 4.5 mg/l for significant facilities
- 90% of E3 is 9 mg/l for non-significant facilities

Table 6-4. Pollutant sources as defined for the No Action and E3 model scenarios

<table>
<thead>
<tr>
<th>Model source</th>
<th>No Action</th>
<th>E3 = Everyone Everything Everywhere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land uses</td>
<td>No BMPs applied to the land</td>
<td>All possible BMPs applied to land given current human and animal population and land use</td>
</tr>
</tbody>
</table>
| Wastewater Dischargers            | Significant municipal WWTPs Flow = design flows  
  TN = 18 mg/L  
  TP = 3 mg/L  
  BOD = 30 mg/L  
  DO = 4.5 mg/L  
  TSS = 15 mg/L  
|                                  | Significant municipal WWTPs Flow = design flows  
  TN = 3 mg/L  
  TP = 0.1 mg/L  
  BOD = 3 mg/L  
  DO = 6 mg/L  
  TSS = 5 mg/L  |                                         |
|                                  | Non-significant municipal WWTPs Flow = existing flows  
  TN = 18 mg/L  
  TP = 3 mg/L  
  BOD = 30 mg/L  
  DO = 4.5 mg/L  
  TSS = 15 mg/L  | Non-significant municipal WWTPs Flow = existing flows  
  TN = 8 mg/L  
  TP = 2 mg TP/I  
  BOD = 5 mg/L  
  DO = 5 mg/L  
  TSS = 8 mg/L  |
Summary of Issues

• WWTP must be specified as a percent of E3
• ... but, clearly the decision was based on the concentration of the significant facilities

• 35% of the sector is below E3 in 2015
• ... but, loads may climb as capacity is reached
Options – WWTP Line

1. Keep the intent of the definitions. Draw the lines from 4.5 to 8 mg/l. Potential changes in E3 would have no effect.
   • 1a. Modify those concentrations in some way

2. Keep the 90% definition. Reductions in E3 would mean reductions in allocations for areas with WWTPs
   • 2a. Modify the definition in some way
1. Plot effectiveness vs percent effort
2. Use 2010 as the base year
3. Set upper half of WWTP line at 4.5 mg/l equivalent; intercept at 8 mg/l
4. Most effective basin is 20 percentage points higher than least effective
5. Special Cases
Changing Base Year - Theoretical

Allocation = 140
Both basins are the same percent of the difference between NA and E3
Changing Base Year - Theoretical

Allocation = 140
Both basins are the same percent of the difference between NA and E3
Changing Base Year - Theoretical

Allocation = 140
Both basins are the same percent of the difference between NA and E3
Options

• 2010
  • Consistent with TMDL
  • Does not grandfather additional growth past the TMDL date

• 2012
  • Best land use data set
  • Grandfathers growth from 2010-2012

• 2017
  • Close to current year
  • Grandfathers growth from 2010-2017