Using a Systematic Approach to Improve Water Quality Management Effectiveness and Efficiency

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Maryland Environmental Service (MES) on assignment to The Maryland Transit Administration (MTA)
Agenda

- Brief History
- How TMDL is linked to permits
- Description of permit requirements
  - 12-SW
  - NPDES
- Applying management principals to improve outcomes
- Discussion of costs in terms of life cycle
- Conclusion
History

- Federal Water Pollution Control Act of 1948
- Clean Water Act 1972
- MS4 Permits
  - Phase I issued 1990
  - Phase II issued 1999
  - MTA Phase II Permit issued 09/08/2005
- 12-SW Permits
  - EPA regulation published 1990 requires permit for Stormwater discharge associated with industrial activity
  - 1997 Maryland issues 02-SW/MTA NOI Submitted 2007
  - 2014 Maryland issues 12-SW to replace 02-SW/MTA NOI Submitted 2014
- December 29, 2010 EPA Established TMDL for Chesapeake Bay and its tributaries for sediment, nitrogen and phosphorus
How TMDL is linked to permits

**MS4**
- Opportunity for specific requirements to permit holders
- Easier small scale enforcement

**12-SW**
- Targets industrial users
- Opportunity for specific requirements to permit holders
- Easier small scale enforcement
Permit Requirements

**MS4**
- Specific pollution reduction goals
  - 20% in first cycle
  - Anticipates 20-40% more in second cycle
- Specific pollution targets in terms of pounds

**12-SW**
- Increased oversight of permits
- Requires same pollution reduction if owner/operator is not covered by MS4
- Storm water monitoring requirements
- Increased inspection frequency
Management Principles

- Plan
- Implement
- Monitor/Analyze
- Review/Report
- Improve
Plan

MTA
- 110 + Facilities in 12 counties
- 12 Industrial Permits
- 1 MS4 Permit
- 5 Modals – Bus, Metro subway, Light rail, MARC train, Mobility Services
- Nearly 600 acres of property
- 305 acres impervious
- 51 impervious acres currently treated
- 51 acres needed to meet 20% Goal

Planning Goals
- 2017 target - Schedule
- Least impact to users
- Intercept high pollution potential (industrial)
- Meet treatment goals
- Budget
- All together – Work Plan
Implement

Work Plan
• More detailed study of priority sites (24 sites)
• Proceed with sites that have current projects (3)
  • Design
  • Construct

<table>
<thead>
<tr>
<th>OUTFALL NUMBER</th>
<th>WQs REQUIRED (P = 1-inch) (CF)</th>
<th>WQs PROVIDED (P = 1-inch) (CF)</th>
<th>NEW DEVELOPMENT (ACRES)</th>
<th>REDEVELOPMENT (E)</th>
<th>AREA TO BE TREATED [E- (A)+(B)] (ACRES)</th>
<th>EXISTING IMPERVIOUS AREA REMOVED (ACRES)</th>
<th>WATER QUALITY CREDITS/EXC (ACRES)</th>
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<tbody>
<tr>
<td>POL-1</td>
<td>190</td>
<td>353</td>
<td>0.00</td>
<td>0.160</td>
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</table>

*Does not account for offsite impervious area.
**Credit to be applied to M&As TMDL Goals at Approval.
Monitor/Analyze

Monitor Plan
- Schedule
- Budget
- Progress towards goals
Monitor Practices
- Visual inspection
- Visual Stormwater monitoring
- Maintenance needs
- Maintenance costs
- Effectiveness
- Acceptance (public and agency)
Review/Report

- Progress towards goals
- Budgets
- Schedules
- Issues encountered

Reporting
- MS4
  - Progress
  - Remaining budget
  - Schedule
  - Issues encountered
- 12-SW
  - Monitoring Results
  - Training
  - Issues encountered

Changes
Work Plan
• Accelerate the schedule?
• Adjust the budget?
• Add in more sites?

Practices
• Adjust design standards?
• New innovations available?
• Change maintenance schedule or requirements?
## Costs

- Design
- Initial Construction
- Maintenance
- Practice cost/lb

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### Integrating Unit SWBMP Costs with MAST Output

**Planning Level Unit Cost Development for Stormwater Best Management Practices (BMPs)**

**Part 4: Integrating Unit Stormwater BMP Costs with MAST Output**

<table>
<thead>
<tr>
<th>Stormwater BMP</th>
<th>Reduction in Emissions per acre treated by each Stormwater BMP</th>
<th>(5) % of Available Acres Treated (County Decision Variable)</th>
<th>(6) Number of Acres Treated</th>
<th>(7) Initial Cost</th>
<th>(8) Average Annual Maintenance Cost</th>
<th>(9) Total Cost (Over 20 Years)</th>
<th>(10) Annual Costs (Over 20 Years)</th>
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<tbody>
<tr>
<td>Impermeable Urban Surface Reduction</td>
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<td>Urban Forest Buffers</td>
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<td>$146,250</td>
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*Table by Dennis King and Patrick Hagan 2011 and included in MAST/BayFAST*
Conclusion

- Start out with a plan that relies on real data
- Carefully follow and implement the plan
- Monitor performance of plan
- Monitor performance of practices
- Evaluate and report on progress
- Improve the plan and practices
Conclusion

All of the above leads to “an approach that includes “adaptive implementation,” “a cyclical process in which TMDL plans are periodically assessed for their achievement of water quality standards”


... and adjustments made as necessary

Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs (EPA Memorandum, 11/22/2002)
Questions