Where are we now and
Where do we need to be?

The Maryland Perspective
2014 Maryland Sources of Nitrogen and Phosphorus

**Nitrogen**
- Agriculture: 38%
- Wastewater: 25%
- Urban Runoff: 20%
- Forest - Atm Dep: 11%
- Septic: 6%

**Phosphorus**
- Agriculture: 50%
- Urban Runoff: 23%
- Wastewater: 21%
- Forest - Atm Dep: 6%
Nitrogen reductions required under the Bay TMDL are about 20% of what we have achieved when compared to 1985
2014 EPA Evaluation shows Maryland is on Track

<table>
<thead>
<tr>
<th>2014 Oversight Status</th>
<th>Agriculture:</th>
<th>Urban/Suburban:</th>
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Steeper Nitrogen Reductions for 2009 to 2017 .... then leveling off from 2018 to 2025

On track for 60% by 2017

2025 is within reach, but consumes WWTP capacity to grow

Implementation pace projected to level off
Similar Progress for Phosphorus

…. Estimations Likely Optimistic

Million Lbs/Yr


Progress Target Projection
SPECIFIC SOURCE SECTOR ACTIONS
In agriculture, current reduction drivers are...

- Forest and grass buffers
- Manure management
- Nutrient management
- Cover Crops
- Conservation tillage
- Drainage management
- Precision conservation
Implementation of the Phosphorus Management Tool

- On farm soil samples
- Phosphorus restrictions on highest risk fields
- Full implementation by 2022
- Optimize relocation manure to other farms or alternative uses
- Motivate new technologies
  - BMPs to mitigate existing high phosphorus soils
  - Technologies to repurpose manure
Finalizing Upgrades to Major WWTPs by 2017

- Majors are more than 90% of the WWTP nitrogen load
- Two of largest completed in next 2 years
- Water quality and financing success story
- Dedicated funding
- Building capacity for population growth
- Continue to upgrade minor WWTPs
The challenge ahead...

...prioritize minors

- WWTP Flow (MGD)
  - Minors
  - Major WWTPs

- Cost* $/Lb
  - <0.05
  - 0.1 - 0.5
  - 0.5 - 1
  - 1 - 5
  - 5 - 30
  - >30

* Annualize Cost over 20-years
Septic systems: A focus in the critical area and on connections

- Critical area
- Within 1,000’ of stream
- Outside 1,000’ of stream

TN Cost Range
- High
- Low

$ per pound of delivered nitrogen removed

Septic connection, Septic upgrade, Septic pumping, Septic connection, Septic upgrade, Septic pumping, Septic connection, Septic upgrade, Septic pumping
Urban stormwater from older areas is perhaps the most significant financing challenge.
More than 80% of Urban Nutrients are from Regulated Areas

- **MS4 Restoration requirement**

- **Solutions**
  - Increase efficiency in restoration permit review process
  - Financial assurance
  - Expanded funding opportunities, BRF & Trust
  - Trading to accelerate restoration and create affordability
  - Build Public Private Partnerships
LOOKING AHEAD
Ensuring Financial Capacity for Restoration

- Restoration success is achievable
- The revenue likely exists to solve the problem
- There must be a renewed focus on cost efficiency and effectiveness
- The State must mitigate the future impact of growth in pollution loads
- Success doesn’t end in 2025
Maximize investment performance within and across sectors

$ per pound of delivered nitrogen removed

AFO, CAFO & nursery
Cropland & Pasture
Forest
Septic & Wastewater
Urban Stormwater

TN Cost Efficiency Range
high
low

more cost effective
less cost effective
Greener options result in broader value

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<th></th>
<th>Public Health</th>
<th>Recreation</th>
<th>Esthetics</th>
<th>Urban Heat Island</th>
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source: Center for Watershed Protection, Cost-Effectiveness Study of Urban Stormwater BMPs in the James River Basin, Ellicott City, MD 2013
Implement a cross sector trading program to close 2025 sector gaps and reduce cost

$14 Billion

Wastewater
$400/lb

Agriculture
$200/lb

Funding $$

Stormwater
$3,800/lb

Credits

Septic Systems
$3,200/lb
Verify that Investments continue to provide a return

- Full approval by EPA
- 2-year ramp up period
Accounting for Changes on the Landscape.

By 2025, Expect about

- 184,000 acres of farmland converted
- 162,000 acres of forest converted

- 415,000 New Households
- 75% on sewer and 25% on septic systems

Manure Treatment Technologies
Accounting for Changes on the Landscape.

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Figure 9. Trend in sediment storage capacity change (percent full) in the Conowingo Reservoir; Lower Susquehanna River Basin, Pennsylvania and Maryland, since construction, 1929–2012. Values are estimated from a combination of methods and assume a gradual reduction in long-term trapping efficiency from 75 to 55 percent.
Summary

Where are we now?
• A long history of progress
• Restoration success is achievable

Where do we need to be?
• Optimize implementation
• Foster partnerships
• Develop and incorporate new technologies
• Expand market opportunities
• Ensure verification
• Account for changes
Thank You!

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