Chesapeake Bay Program
Science. Restoration. Partnership.

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Selecting BMPs for Evaluation under Changing Climatic Conditions

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Speakers

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Project Overview

- **Project Title:** RAND Climate Resilient Stormwater Support
- **Purpose:** This cooperative agreement provides RAND Corporation with funds to create an integrated toolkit of easy-to-use guidance materials, web-based tools, and references for integrating climate considerations into stormwater planning, management, and/or design as well as enhancements to Chesapeake Bay modeling.
- **Timeline:** 03/01/2024 – 02/08/2029

Award Activities and Desiered Outcomes

Major Activities:

1. Developing a vulnerability assessment tool for local communities in the Chesapeake Bay watershed
2. Developing guidance to accompany the existing intensity-duration-frequency (IDF) curve tool, including a tool that supports decision-making
3. Developing a guidance manual that includes resilient design adaptations and implementation options for stormwater infrastructure and restoration practices
4. Providing analysis on the impact of future hydrology on a range of widely used best management practices (BMPs) in the Chesapeake Bay watershed

Desired Outcome:

This agreement supports the Chesapeake Bay Watershed Agreement's Climate Resiliency goal and advances efforts of the Chesapeake Bay Program (CBP) partnership to maintain the resilience of current stormwater BMPs and to advance stormwater management, design, and implementation practices that consider future climate and IDF curves. The expected outcomes are increased understanding of the impact of future hydrology on stormwater BMPs and improved decision-making and leadership by the CBP partnership in responding to climate change conditions and other future water quality challenges

BMPs Selected from the Bay TMDL WIPs

- The WIPs are the best estimate of the BMPs that the jurisdictions intend to use to meet the Bay TMDL
- MD, PA, VA, WV, DE, DC, and NY independently develop their WIPs
- Nonpoint source BMPs were prioritized among those in the Bay TMDL Watershed Implementation Plans (WIPs)
  - Wastewater treatment plant upgrades and other controls on point sources not considered
- The WIPs do not include all the methods or BMPs available to control runoff of TN, TP, and TSS
  - Other methods include land use planning
  - Natural lands preservation
  - New technologies
- As with all CAST data, the expected loads are the amount generated in an average hydrologic year
- The nitrogen, phosphorus, or sediment load reduced is the expected pounds per year delivered to the edge-of-tide (EOT) in the Chesapeake Bay watershed portion of the jurisdictions

Priority BMP Assessment

- Used the most up-to-date WIPs developed in CAST-2023 to accommodate the expected load in 2025 and the increased load due to climate change
- A series of BMP “subtraction” model scenarios are used to calculate the pounds of N, P, and S reduced for each BMP
- Ran a series of scenarios – each with one BMP removed at a time
- Computed the difference in load between the scenario with all the BMPs and the one without the target BMP
  - There are more than 300 BMPs, so that was a lot of scenarios!
- Benefits of this method:
  - Isolates the load reduced from each BMP
  - Includes the interaction effects of other BMPs
  - Assesses the relative differences among BMPs

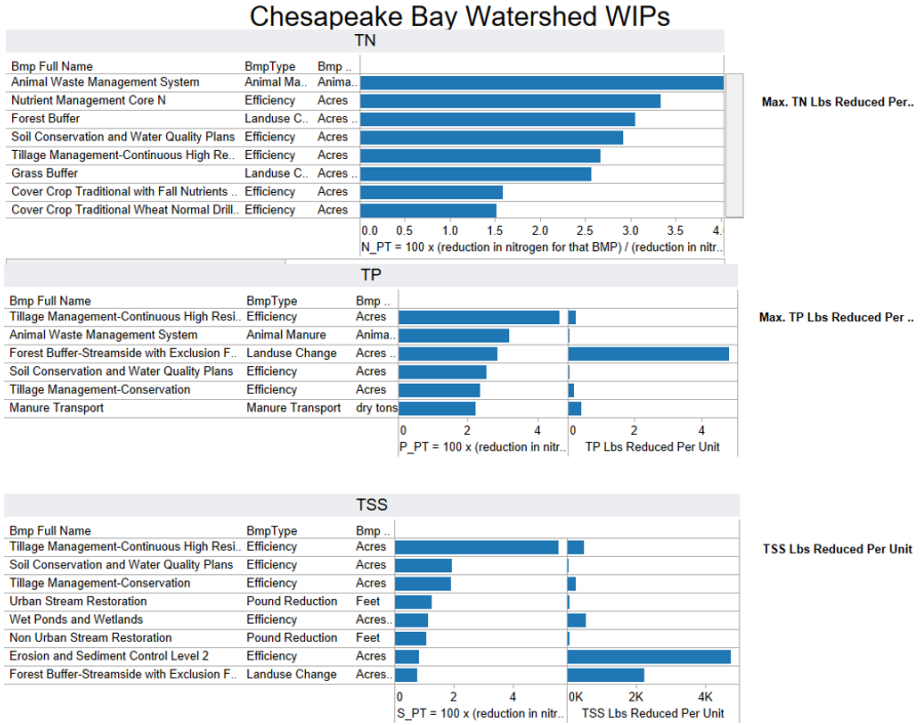
BMP Isolation Scenario Example

- Developed Impervious Surface Reduction
- Agriculture Biofilters
- Agriculture Lagoon Covers
- Agriculture Tillage Management-Conservation
- Developed Erosion and Sediment Control Level 2
- Developed Tree Planting
- Developed Nutrient Management Plan Core Nitrogen
- Agriculture Grass Buffers

Plus, all other BMPs approved by CBP for planning

Percentages Based on Total Implementation

- Total implementation percentages are the reduction in a nutrient for a specific BMP divided by the total reduction across all BMPs
  For each BMP, the formula for percentage is:
  PT = 100 x (reduction in nitrogen for that BMP) / (reduction in nitrogen for all BMPs)
- Accounts for the extent of planned implementation as well as the amount of the individual BMP's effectiveness



Open Link to Access:

https://public.tableau.com/views/WIPPriorityBMPs/ChesapeakeBayWatershedWIPs?:language=en-US&publish=yes&:sid=&:display_count=n&:origin=viz_share_link

Caveats

- All geographic areas need to be managed differently
- BMPs only represent one way to manage excessive nutrient and sediment loads
- Only the BMPs in the WIPs are considered
- The load reduced per BMP varies geographically. The data can be provided at multiple scales for any area within the Chesapeake Bay watershed
- These results may not be generalized to other scenarios. The actual load reductions depend on the specific BMPs in a scenario, the base conditions for land use, and year

Thank you!

Any questions?
You can contact us at olivia@devereuxconsulting.com or smith.auston@epa.gov

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