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Results of Quantification of BMP Impacts on CBP Management Strategies

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WQGIT Meeting
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Outline

- Overview of Project
- Management Strategies and Additional Goals
- Impact Scoring Guidelines
- Impact Scoring
  - Sources
  - Processing
- Preliminary Example Scores
- Application of Scores

Goal

- Tetra Tech awarded contract from Chesapeake Bay Trust.
- To quantify the effect the Bay Model's best management practices (BMPs) have on each management strategy to better enable jurisdictions, localities, and others to assess the impact of their watershed implementation plans ***above and beyond*** **nutrient and sediment reductions** on all management strategies or additional goals.

Goal - Results

- A matrix that assigns each BMP (or BMP group) an impact score (-5 to 5) for each management strategy or goal
- Matrix evaluates a wide range of BMP impacts, and can show where co-benefits can be achieved depending on priorities

BMP/BMP Group	Management Strategy A	Management Strategy B	Management Strategy C	Etc.
BMP 1	-X to +X	-X to +X	-X to +X	-X to +X
BMP 2	-X to +X	-X to +X	-X to +X	-X to +X
BMP 3	-X to +X	-X to +X	-X to +X	-X to +X
Etc.	-X to +X	-X to +X	-X to +X	-X to +X

Management Strategies & Additional Goals

Management Strategy
Blue Crab Abundance
Oysters
Fish Habitat
Forage Fish
Wetlands
Black Ducks
Stream Health
Brook Trout
Fish Passage
Submerged Aquatic Vegetation

Management Strategy
Forest Buffers
Tree Canopy
Toxic Contaminants Policy and Prevention
Healthy Watersheds
Citizen Stewardship
Protected Lands
Land Use Methods and Metric Development
Public Access Site Development
Climate Adaptation

Additional Goals
Community Development/Jobs
Flood Control/Mitigation
Bacteria Loads
Property Values
Groundwater Recharge/Infiltration
Drinking Water Protection/Security
Biodiversity and Habitat
Air Quality
Recreation
Energy Efficiency

http://www.chesapeakebay.net/managementstrategies

Additional Goals – Descriptions

Appendix A: Descriptions of Additional Goals

Air Quality

Air quality is the degree to which the ambient air is pollution-free, assessed by measuring a number of indicators of pollution.

Goal

Protect or enhance local air quality.

Factors Influencing Success

- Available information on air quality impacts of BMPs will affect both the selection and expected air quality effects. Planning for air quality improvements will require reliable information on BMP performance.
- The Chesapeake Bay airshed is significantly larger than its watershed, with air pollution coming from as far away as Cincinnati, Ohio. Impacts of local BMPs can be shrouded by this contribution.
- Many sources of air pollution will not be addressed by nutrient and sediment BMPs, so the potential overall impact of these BMPs on air quality may be severely limited.

Bacteria Loads

The load of bacteria that passes a particular point of a river (such as a monitoring station on a watershed outlet) in a specified amount of time (e.g., daily, annually). Mathematically, load is essentially the product of water discharge and the concentration of a substance in the water. Implementation of BMPs to meet TMDL requirements will also reduce bacteria loads to local waterbodies. In some cases, additional BMPs directed at bacteria will be implemented alongside nutrient and sediment practices. Some practices may have unintended consequence of increasing bacteria loads, such as riparian buffers increasing wildlife presence in stream corridors.

Goal

Implement BMPs that will reduce bacteria loads to local waterbodies while at the same time reducing nutrient and sediment loads.

Factors Influencing Success

Impact Score Guideline Process

- Develop narrative guidelines for assigning impact scores
  - Review each management strategy, focusing on the *Factors Influencing Success* section, to help identify and assess the factors for which BMP impacts are of greatest concern
  - CBP Review

Example Impact Score Guidelines

Value	Score	Score Narrative for Black Duck Habitat	Score Narrative for Tree Canopy
5	Substantial Improvement	Practice directly creates or restores wetlands or increases habitat connectivity.	Directly restores or conserves tree canopy, or leads directly to establishment of policies, regulations, ordinances, or program priorities that will result in increased tree canopy.
4	Moderate to Substantial Improvement	Somewhere between 3 and 5 → BPJ	Somewhere between 3 and 5 → BPJ
3	Moderate Improvement	Practice protects against or reverses shoreline disturbance adjacent to wetlands, or increases cover or food sources in areas adjacent to wetlands.	Likely to directly or indirectly restore or conserve tree canopy, or leads to establishment of policies, regulations, ordinances, or program priorities that will likely result in increased tree canopy.
2	Slight to Moderate Improvement	Somewhere between 1 and 3 → BPJ	Somewhere between 1 and 3 → BPJ
1	Slight Improvement	Practice improves runoff water quality to, or reduces impact of high runoff events on, adjacent wetlands.	May indirectly result in more tree canopy.
0	No Effect	Practice has no impact on wetlands.	Practice has no impact on tree canopy
-1	Slight Worsening	Practice worsens runoff water quality to, or increases impacts of high runoff events on, adjacent wetlands.	May indirectly result in less tree canopy.
-2	Slight to Moderate Worsening	Somewhere between -1 and -3 → BPJ	Somewhere between -1 and -3 → BPJ
-3	Moderate Worsening	Practice increases shoreline disturbance adjacent to wetlands, or decreases cover or food sources in areas adjacent to wetlands.	Likely to directly or indirectly impact tree canopy (restoration or conservation), or leads to establishment of policies, regulations, ordinances, or program priorities that will likely result in decreased tree canopy.
-4	Moderate to Substantial Worsening	Somewhere between -3 and -5 → BPJ	Somewhere between -3 and -5 → BPJ
-5	Substantial Worsening	Practice directly removes wetlands or increases habitat fragmentation.	Directly removes trees or hampers restoration or conservation of tree canopy.

**** Do not consider location or scale of BMP, unless noted.****

Scoring - Sources

- Tt reviewed expert panel reports and performed additional literature search
- GITs and workgroups contributed to scoring
  - Some GITs scored their management strategies
  - Some WQGIT workgroups scored their BMP type
- Special Cases
  - Agriculture: Tt scores derived largely from USDA-NRCS conservation practice physical effects (CPPE) data
  - Toxic Workgroup scored all BMPs for toxics
    - Identified the toxics of concern for each sector
      - For example: For septics, considered pharmaceuticals, household and personal care products, flame retardants, biogenic hormones

Scoring – Processing

- Goal was at least one score for each BMP/management strategy combination
- Tt-scored practices were quality checked
- Averaged multiple scores for final relative score
  - Weighted scores based on source of scores
  - Rounded to nearest 0.5
  - Final impact scores are *relative* within goals/sectors

Example Results

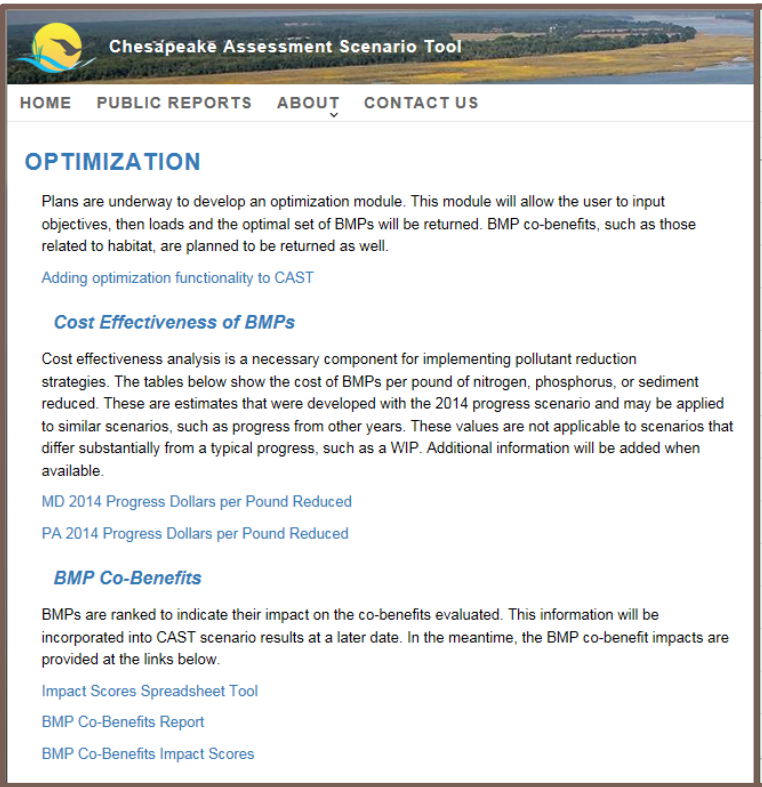
Sector	BMP Group	Air Quality	Bacteria Loads	Biodiversity and Habitat	Black Ducks	Blue Crab Abundance
Urban	Abandoned Mine Reclamation	2.0	1.0	5.0	2.0	1.5
Urban	Advanced Grey Infrastructure Nutrient Discovery Program	0.0	3.5	0.0	0.0	2.5
Urban	Bioretention	1.5	3.5	2.0	1.0	3.0
Urban	Dry Ponds	1.0	0.0	1.0	1.0	1.0
Urban	Erosion and Sediment	2.0	1.0	0.0	0.5	2.0
Urban	Filtering Practices	2.0	3.0	1.0	1.0	2.0
Urban	Grass Buffers	2.0	2.5	3.0	1.0	2.5
Urban	Impervious Surface Reduction	2.0	2.0	1.0	0.5	2.5
Urban	Infiltration Practices	2.0	2.0	1.5	0.0	2.5
Urban	Nutrient Management Plan	0.0	2.0	1.5	0.0	3.0
Urban	Permeable Pavement	2.0	2.0	0.0	0.0	3.0
Urban	Runoff Reduction	2.0	3.5	1.0	1.0	3.0
Urban	Street Sweeping	2.0	1.0	0.0	0.0	1.0
Urban	Urban Forest Buffers	4.5	4.0	5.0	3.0	2.5
Urban	Urban Growth Reduction	2.0	3.0	4.5	2.5	3.0
Urban	Urban Shoreline Management	0.5	1.5	4.0	3.5	5.0
Urban	Urban Stream Restoration	1.0	2.0	3.5	3.0	3.0
Urban	Urban Tree Planting	3.5	2.0	2.5	1.5	1.5
Urban	Wet Ponds	2.0	2.5	3.5	2.5	2.5

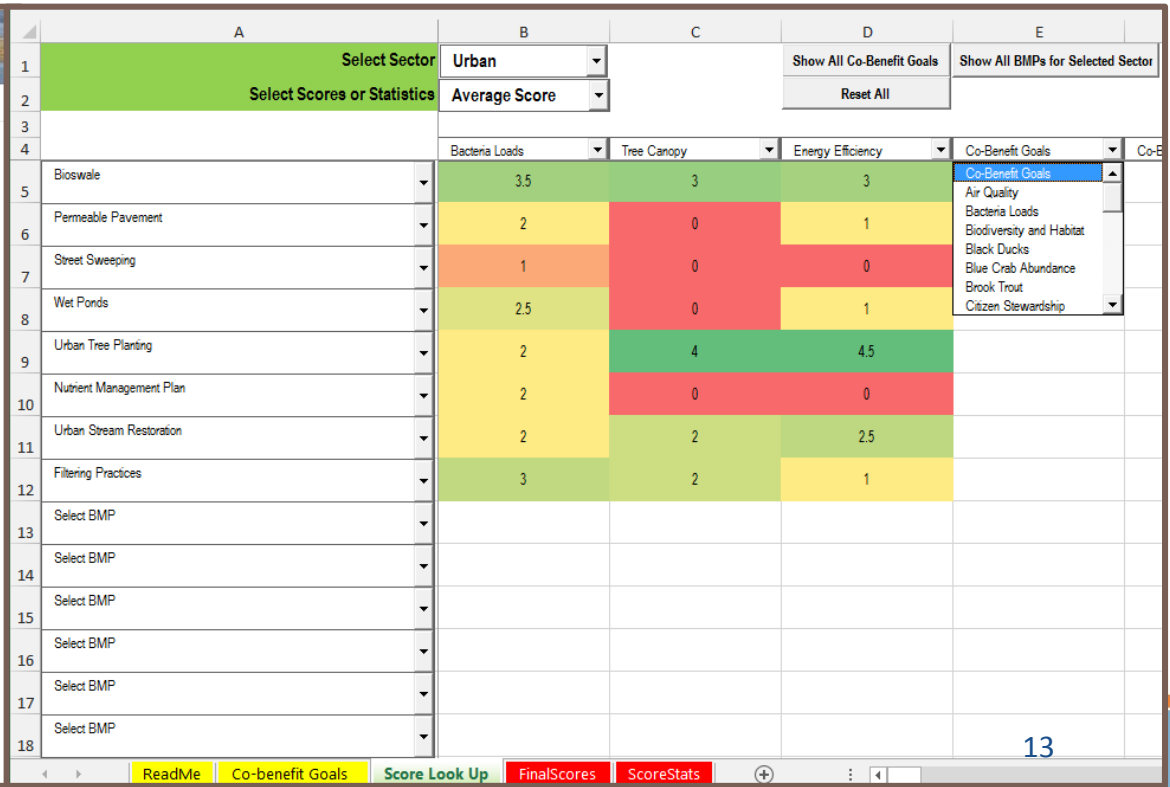
Applications

- To characterize the additional impacts (+/-) of BMP strategy *beyond* nutrient and sediment reductions to inform
  - Selection of BMPs using management strategy priorities
  - Assessment of overall benefits of a BMP strategy
  - Convey co-benefits to public or jurisdiction governing body
- Not intended as part of overall evaluation or effectiveness. Main use is for planning.
- Considerations
  - Scores provide a general or qualitative indication of the relative impacts of BMPs. They should not be considered additive.
  - Scores should not be compared across sectors or across management strategies.
  - Scores should be considered within the context of the placement and scale of the BMP.

Using the Results

- CAST
  - Documentation available, but not incorporated
- Impact Scores Excel Tool
  - Available on CAST





Questions?

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