

Maryland Assessment Scenario Tool

MAST

Developed by:

Interstate Commission on the Potomac River Basin

and

J7 LLC

MAST – A PLANNING TOOL

MAST CAN ANSWER:

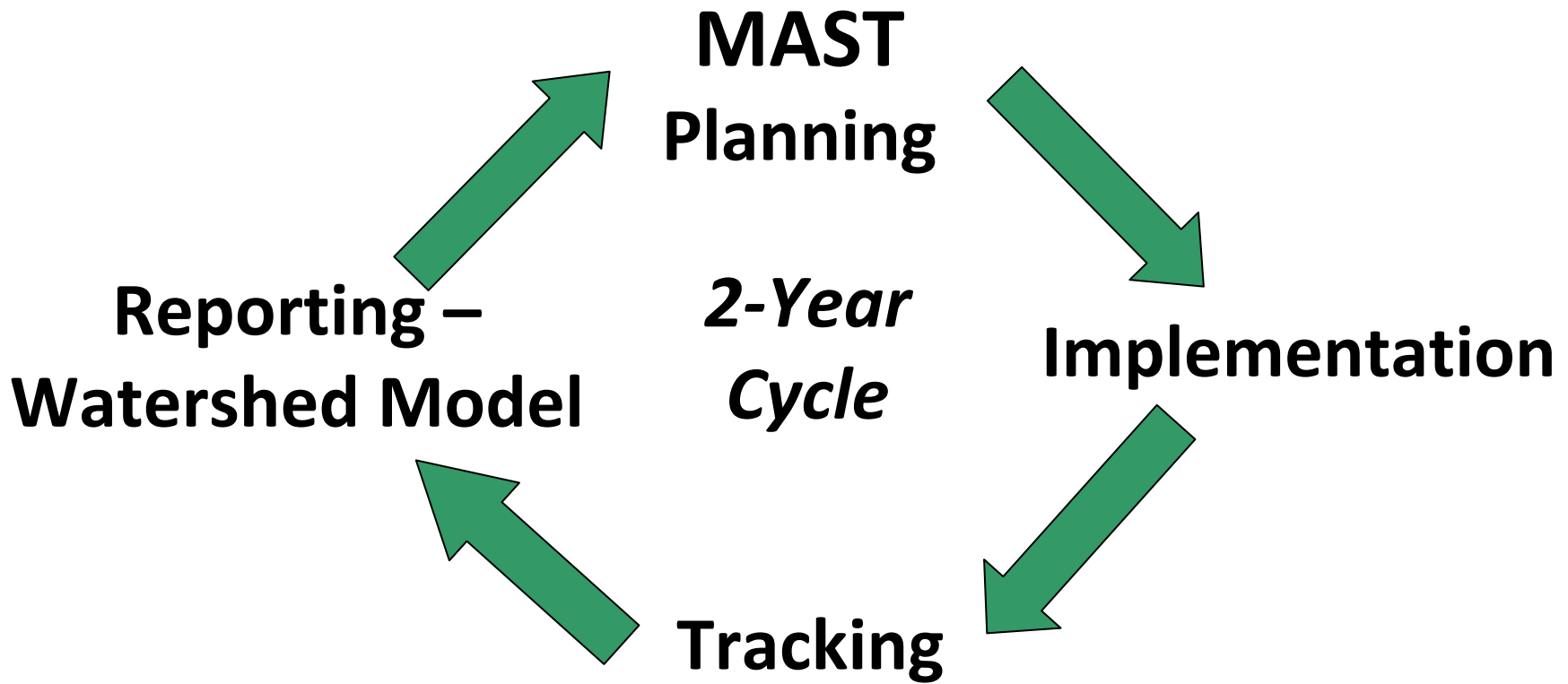
- Did I meet the allocations?
- Am I hitting the targeted load?
- Which BMPs or combination of BMPs give the greatest load reductions?

YOU NEED TO KNOW:

- Which BMPs to use
- Target load

BMP COST

- Not currently implemented in MAST
- Output of MAST allows calculation of a unit load (lb/A)
- With the cost of each BMP in your local area, you can calculate costs of your scenario



- Serve as a data management system
- Facilitate stakeholder involvement, teach stakeholders implications of decisions
- Is Replicable , Consistent, and Transparent
- Facilitate an adaptive process, scenario development is iterative

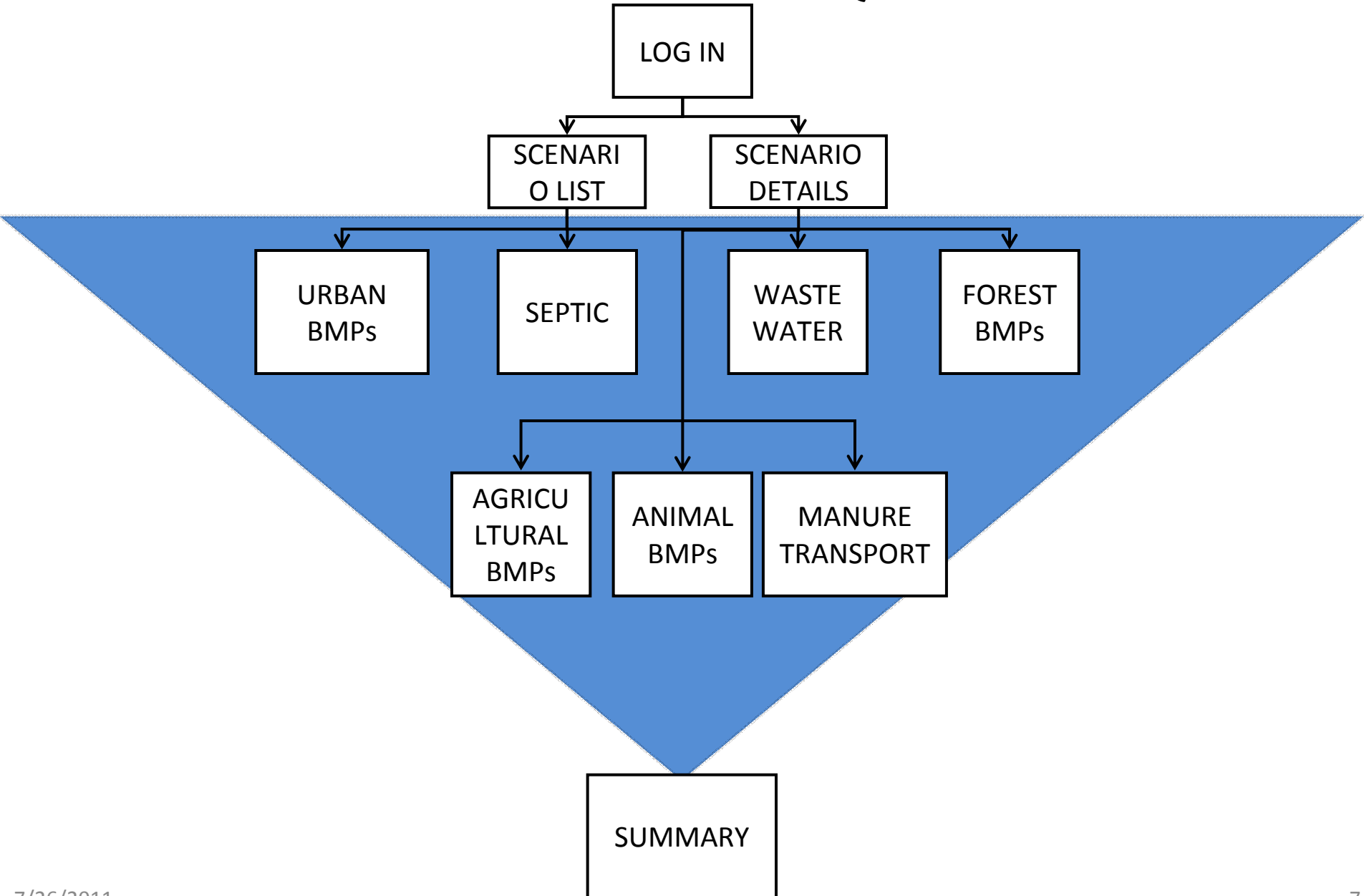
MAST OUTPUTS

- Land use acres available
- Changes in the acres of each land use
- BMPs submitted
 - Lists the BMPs in your scenario
 - Shows your notes for each BMP. The notes field is your justification.
 - Shows which BMPs it was not possible to credit
- Loads for each land use
 - Edge of stream (EOS)
 - Delivered to the Chesapeake Bay (DEL)
- Inputs to the Chesapeake Bay Program's Scenario Builder

PLANNING YOUR SCENARIO

- What do I need to know to use it?
- Chesapeake Bay Program vocabulary
 - Land Use names
 - BMP names
 - Geographic areas
- Initial idea of which BMPs you want to implement and where you want to put them.
 - MAST will help you refine BMP choice and location

DATA INPUT SEQUENCE



MAST EXERCISE 1

- Creating a Baseline
 - No BMPs
 - 2009 Progress
 - Additional Reductions

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TIPS FOR MAXIMIZING REDUCTIONS

BMP TYPES

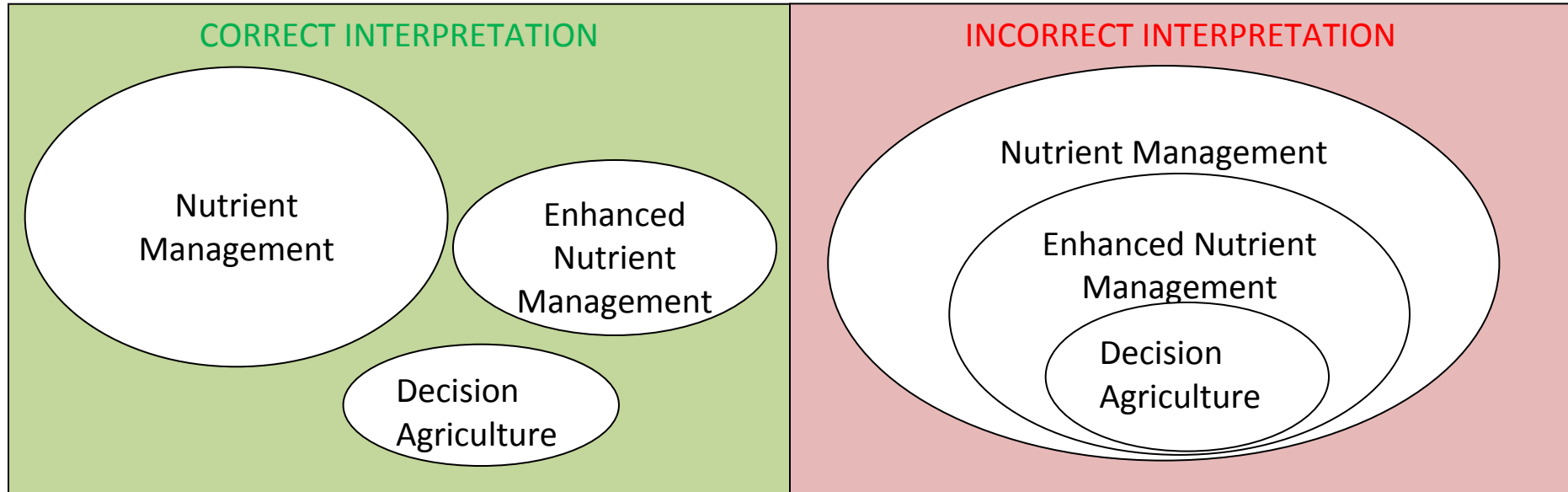
- ***Effectiveness values***: a percentage of a pollutant that is removed when the BMP is applied.
 - Dry Extended Detention Ponds remove 20% of nitrogen that would have been delivered without the Detention Ponds.
 - When a pass through value for a BMP is referred to, it is simply 100% minus the effectiveness value. In this case, the pass through value for Dry Extended Detention Ponds is 80%.
- ***Land use change***: change one land use to another.
 - Urban Growth Reduction changes an urban land use to agricultural land.
 - Forest Buffers that converts agricultural land uses to a forest land use.
- ***Land use change with effectiveness values***: Some BMPs work as both land use change and effectiveness value BMPs.
 - The land use change is calculated first, and then an effectiveness value is applied to an additional number of acres of the original land use.
 - Grass buffers, forest buffers, enhanced nutrient management, decision agriculture, and wetland restoration.
- ***Load reduction***: A few special BMPs do not fit among the above categories.
 - Stream restoration, dirt and gravel roads, street sweeping, shoreline erosion control
 - Animal BMPs (e.g., Precision Feeding)
 - Manure transport

BMP	Type	Group Name	Group Order	Sequence within Group	Land Use & Eff. BMP
Urban Growth Reduction	Landuse change	Urban Growth Reduction	1	1	
Impervious Urban Surface Reduction	Landuse change	Impervious Surface Reduction	2	1	
Forest Conservation	Landuse change	Forest Conservation	3	1	
Stream Access Control with Fencing	Landuse change	Off-Stream Watering with Fencing	4	1	
Streamside Forest Buffers	Landuse change	Forest Buffers trp	5	1	Y
Streamside Wetland Restoration	Landuse change	Wetland Restoration on trp	6	1	Y
Land Retirement to hay without nutrients (HEL)	Landuse change	Land Retirement on trp to hyo	7	1	
Streamside Grass Buffers	Landuse change	Grass Buffers on trp	8	1	Y
Tree Planting; Vegetative Environmental Buffers - Poultry	Landuse change	Tree Planting on trp	9	1	
Forest Buffers	Landuse change	Forest Buffers	10	1	Y
Wetland Restoration	Landuse change	Wetland Restoration	11	1	Y
Land Retirement to pasture (HEL)	Landuse change	Land Retirement on pasture (HEL)	12	1	
Land Retirement to hay without nutrients (HEL)	Landuse change	Land Retirement on hyo (HEL)	13	1	
Grass Buffers; Vegetated Open Channel - Agriculture	Landuse change	Grass Buffers	14	1	Y
Tree Planting; Vegetative Environmental Buffers - Poultry	Landuse change	Tree Planting	15	1	
Alternative Crops	Landuse change	Carbon Sequestration/Alternative Crops	16	1	
Urban Forest Buffers	Landuse change	Urban Forest Buffers	17	1	Y
Urban Grass Buffers	Landuse change	Urban Grass Buffers	18	1	Y
Urban Tree Planting; Urban Tree Canopy	Landuse change	Urban Tree Planting	19	1	
Abandoned Mine Reclamation	Landuse change	Abandoned Mine Reclamation	20	1	
Conservation Tillage	Landuse change	Conservation Tillage	21	1	
Nutrient Management	Landuse change	Nutrient Management	22	1	
Enhanced Nutrient Management	Landuse change	Nutrient Management	22	2	Y
Decision Agriculture	Landuse change	Nutrient Management	22	3	Y

NUTRIENT MANAGEMENT GROUP

- Group includes:
 - Nutrient Management
 - Enhanced Nutrient Management
 - Decision Agriculture
- Mutually exclusive because more than one BMP in the group.

NUTRIENT MANAGEMENT GROUP



1. Enhanced Nutrient Management and Decision Agriculture have an effectiveness value as well as a land use change.
2. The nitrogen effectiveness value is 7% for Enhanced Nutrient Management and 3.5% for Decision Agriculture.
3. Enhanced Nutrient Management has the highest effectiveness value in this group, so the greatest load reduction will be credited by selecting only Enhanced Nutrient Management.
4. Should some Nutrient Management be selected, then those are acres that cannot have Enhanced Nutrient Management.
5. The Nutrient Management group is last in the sequence of land use change BMPs. The user could specify so many acres in grass and forest buffers, that there would be no land remaining for nutrient management.

Consideration of the BMP sequence, groups, and effectiveness values will enable users to target those BMPs that generate more pollution reductions.

Land Use Change with Effectiveness Values

Pre-BMP:

Agricultural = 100 acres

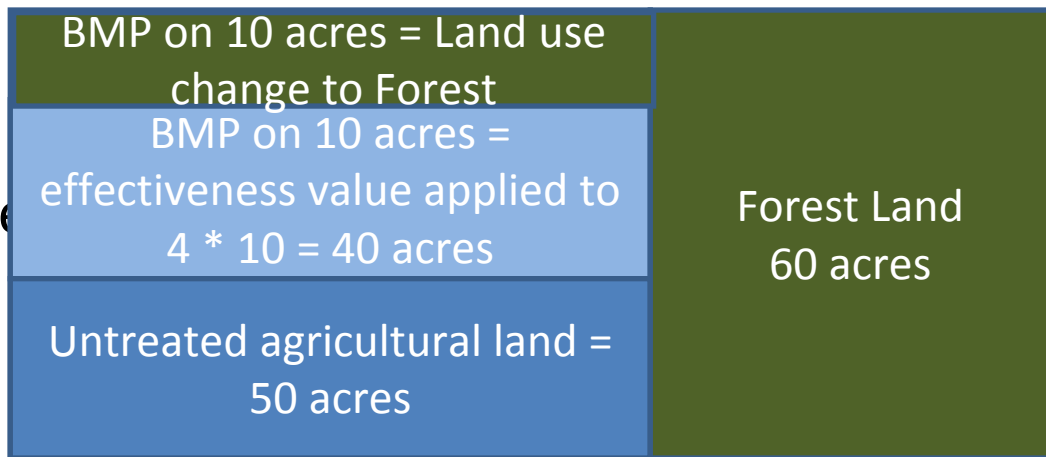
Forest = 60 acres



Post-BMP:

Agricultural = 90 acres,
40 acres are treated
with a BMP

Forest = 70 acres



The BMP illustrated is a buffer that converts 10 acres of agricultural land to forest land, with a nitrogen efficiency that treats $4 *$ the acres converted. If this were illustrating phosphorus or sediment, only $2 *$ acres are treated. When a BMP is put on a specific land use, the benefit of the effectiveness value is applied to all land uses within that group. For example, if put on pasture, then the benefit is to all agricultural

Comparison of BMPs on Pervious Urban Land Use in a Segment - Nitrogen

Scenario	Effectiveness Value (%)	Pre-BMP Acres	Post-BMP Acres	Pre-BMP Load (lb/A)	Post-BMP Load (lb/A)	Pre-BMP (Load per LU per Segment)	Post-BMP (Load per LU per Segment)	Load per Forest LU for acres in Segment
Urban Tree Plant and Urban NM	12%	100	70	8	7	800	492	60
Urban Tree Plant	0%	100	70	8	8	800	560	60
Urban NM	12%	100	100	8	7	800	703	0

Urban Tree Planting—land use change

Urban Nutrient Management—effectiveness value

Note: assumed pre-BMP forest load as 2 lb/A

MAST EXERCISES 2 AND 3

- Exercise 2
 - Urban Nutrient Management (effectiveness value)
 - Urban Tree Planting (land use change)
 - Urban Nutrient Management and Urban Tree Planting
- Exercise 3
 - Comparing BMPs submitted vs. credited

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FINE TUNE TO MAXIMIZE REDUCTIONS

- Calculations and the sequence in which they are done are critical—
And MAST does them for you!
- Target implementation to areas where the pre-BMP load and the delivery to the Bay is highest
- Land use change BMPs provide more of a reduction than effectiveness value BMPs because they are always calculated before effectiveness value BMPs, where the pre-BMP load is similar
 - Effectiveness BMPs are calculated after the land use changes, so prioritize land use change BMPs since they will be applied to the greater portion of land
- Where BMPs are mutually exclusive (in the same group in the table, such as with NM), prioritize the BMP in the group with the higher effectiveness.
 - Nutrient Management
 - Stormwater practices

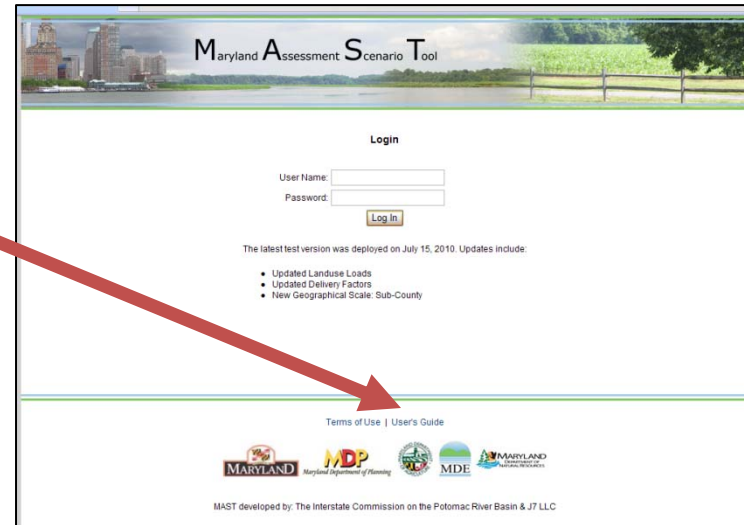
MAST REFINEMENTS UNDERWAY

- Animal BMPs are not yet programmed. BMPs entered are not showing any reductions.
- Refine functionality for point sources listed on the waste water page
- Request a login button will be added to login page
- On-line documentation and help will be added
- Option to compare between scenarios will be added

**This version of MAST is a beta version deployed in a test environment.
Any scenarios created will not be available once the final version is online**

HAND OUTS

- Users Guide and General Features
 - Currently in draft form
 - Will be available via the link on the MAST website
- BMP Definitions
- Chesapeake Bay Program Land Use Definitions
- BMP Calculation Sequence and Groups
- Geographical area maps
- Exercises



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