

Role of BMPs in the Chesapeake Bay Program

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11/14/17

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Chesapeake Bay and its Streams



Economy, heritage, quality of life.

Photos: Chesapeake Bay Program



Photos: Chesapeake Bay Program





- The Chesapeake Bay Program is a partnership
 - Federal agencies
 - State agencies
 - Local governments
 - Non-profit organizations
 - Academic institutions





**CHESAPEAKE BAY
FOUNDATION**

Saving a National Treasure



CHESAPEAKE
WATERSHED
AGREEMENT

1983



CHESAPEAKE
WATERSHED
AGREEMENT

1987



CHESAPEAKE
WATERSHED
AGREEMENT

2000



CHESAPEAKE

**TMDL
2010**



CHESAPEAKE
WATERSHED
AGREEMENT

2014



Chesapeake Bay Program
A Watershed Partnership

40% goal

TMDL
WQ goals

Accountability
And outcomes

1960s

1980s

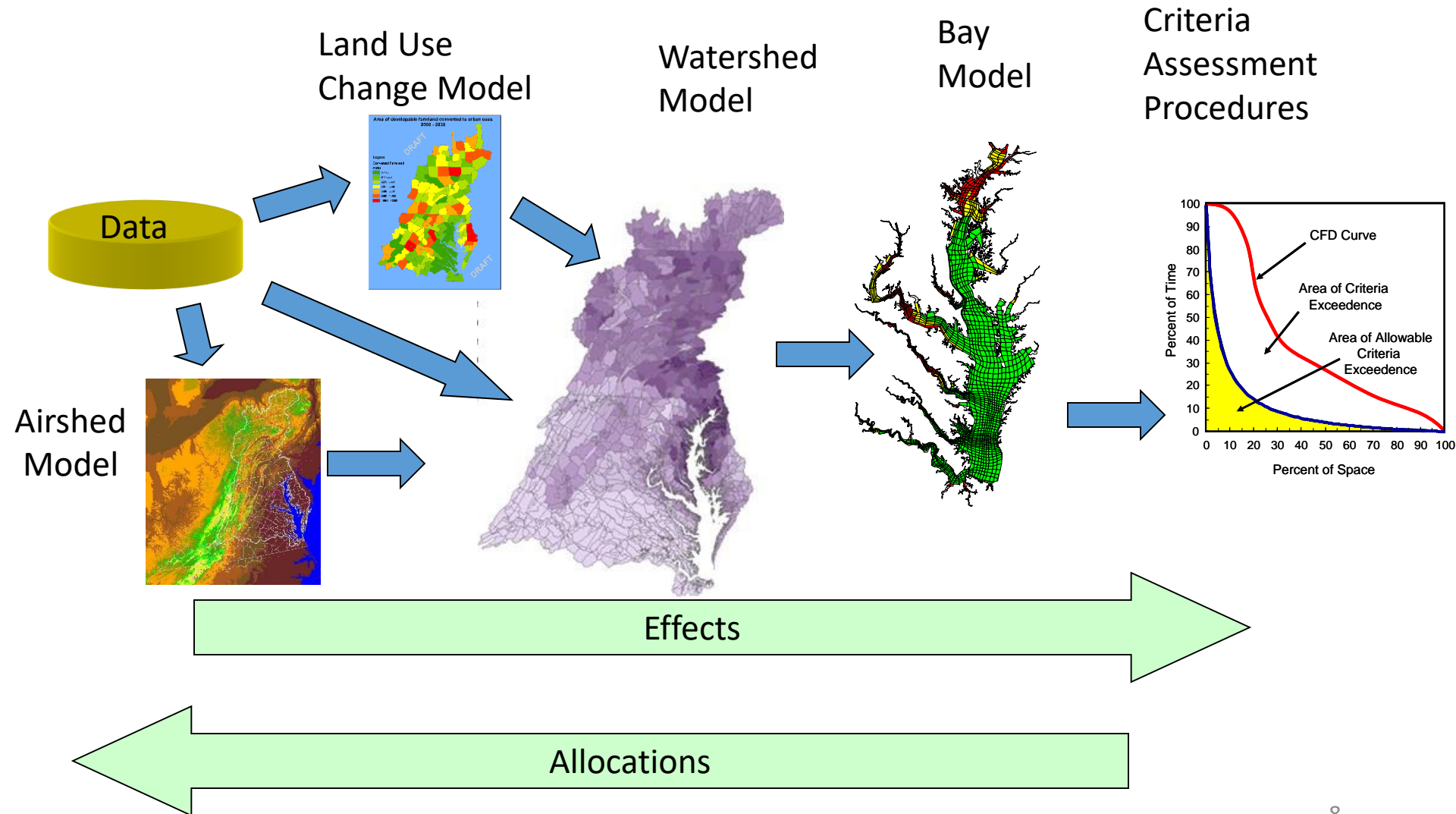
2000s

1970s

1990s

2010s

Decision Support System



Continual Updates to Models

Year	Model Phase	Goal
• 1987	0	40% reduction
• 1992	2	40% of controllable loads
• 1997	4.1	Confirm 1992 loads
• 2003	4.3	Reallocation
• 2010	5.3.0	TMDL
• 2011	5.3.2	Phase 2 WIP targets
• 2017	6.0	Phase 3 WIP targets

Phase 6 Model Structure

Average Load + Δ Inputs * Sensitivity

*

Land Use Acres

*

BMPs

*

Land to Water

*

Stream Delivery

*

River Delivery

Direct Loads

Phase 6

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Keep It Simple

Include Everything

Average Load + Δ Inputs * Sensitivity

*
Land Use Acres

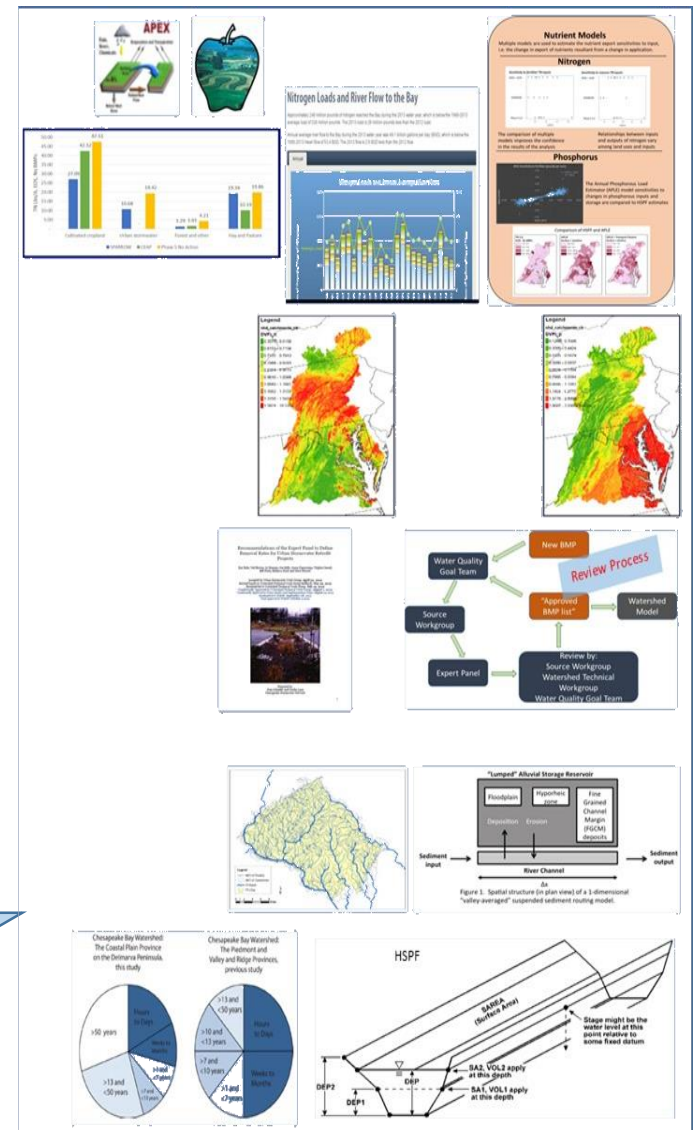
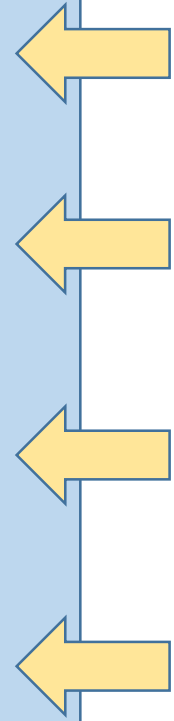
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BMPs

*
Land to Water

*
Stream Delivery

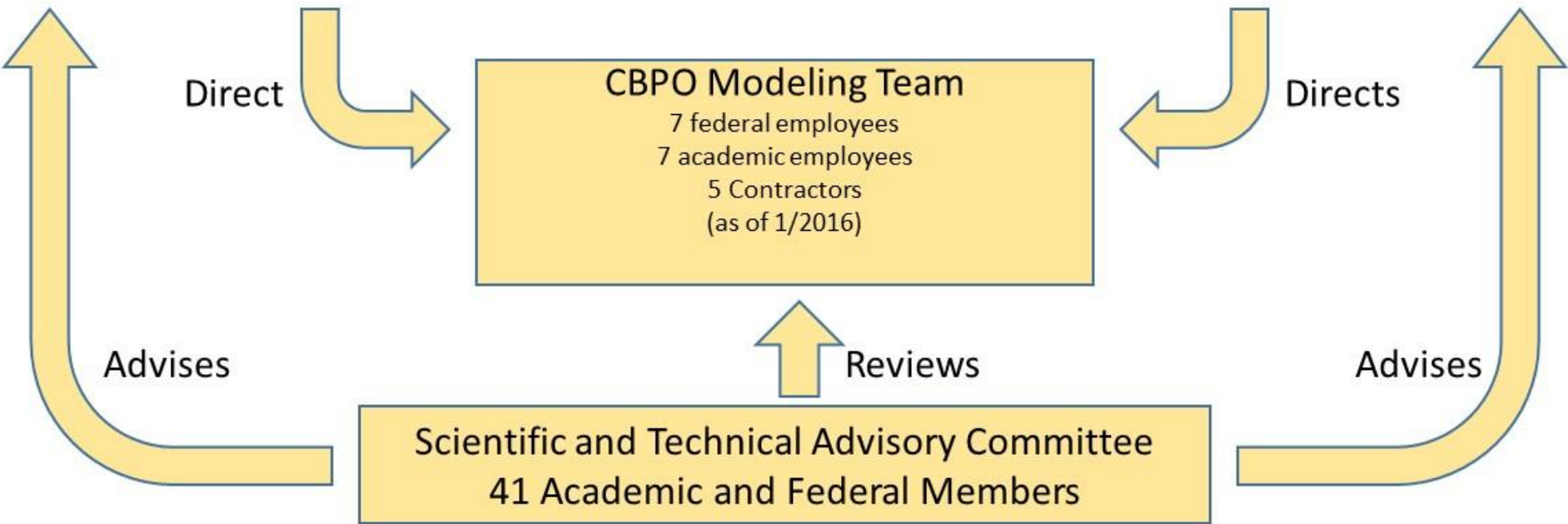
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River Delivery

Direct Loads

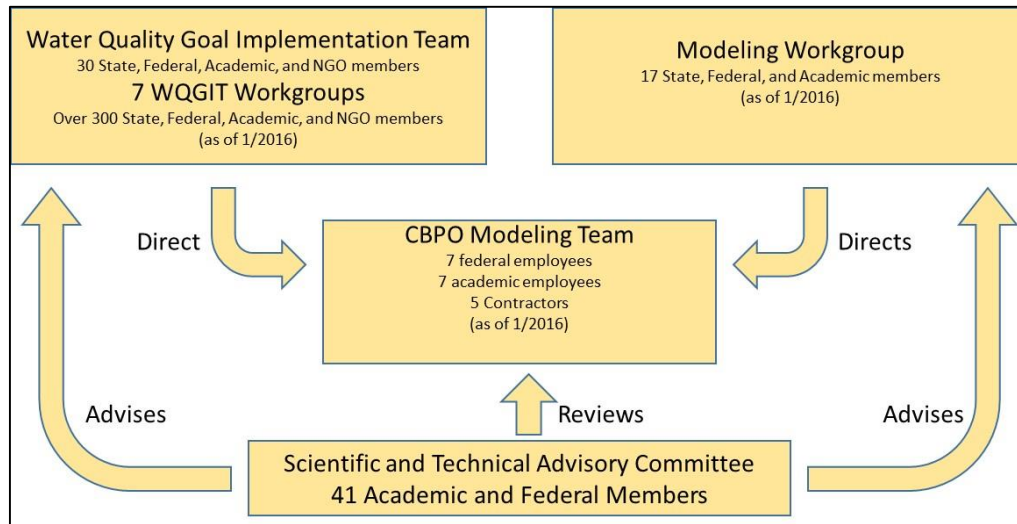


Water Quality Goal Implementation Team
30 State, Federal, Academic, and NGO members
7 WQGIT Workgroups
Over 300 State, Federal, Academic, and NGO members
(as of 1/2016)

Modeling Workgroup
17 State, Federal, and Academic members
(as of 1/2016)

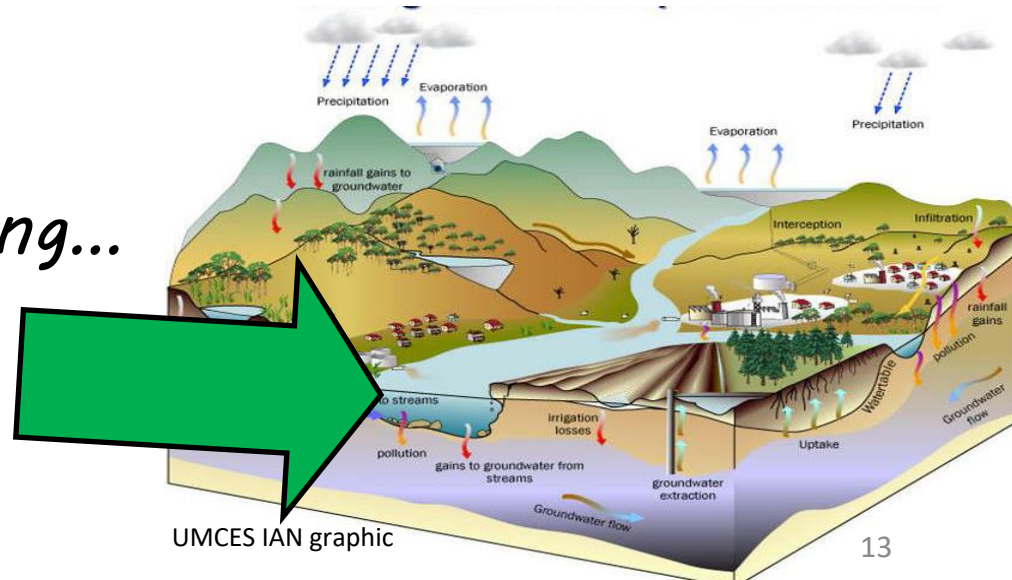
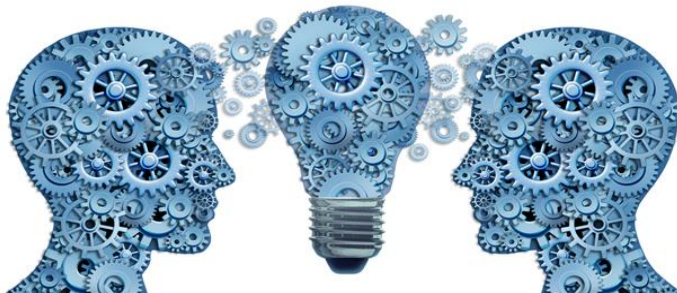


Extensive partnership involvement...



...Which Leads to a robust and accepted model of the watershed

...Leads to collaborative thinking...



UMCES IAN graphic

On Line Version -- CAST

File Edit View History Bookmarks Tools Help

New Tab x CAST - Edit Scenario x +

https://cast.chesapeakebay.net/Scenario/EditScenario?scenarioId=2843

Chesapeake Assessment Scenario Tool

gshenk@chesapeakebay.net
Manage Profile
Log Off

HOME SCENARIOS RESULTS COST PROFILES HOW TO ABOUT CONTACT US

Download Load Source

BMP Data Submitted

+ Add BMP Clear Filters Delete Selected

Drag a column header and drop it here to group by that column

Agency	BMP	Geographic Area	Load Source	Amount	Unit	Total Annualized Cost Per Unit	Edit	Delete
Non-Federal	Nutrient Management Maryland Commercial Applicators	Maryland (CBWS Portion Only)	Developed		acres	\$1.51		
Non-Federal	Stormwater Performance Standard-Stormwater Treatment	Anne Arundel, MD (CBWS Portion Only)	Developed	2,364.17	acres treated	\$832.77		
Non-Federal	Stormwater Performance Standard-Stormwater Treatment	Anne Arundel, MD (CBWS Portion Only)	Developed	1,036.43	acres treated	\$832.77		
	Dry Detention Ponds	Anne Arundel, MD						

Developed - All Developed land including MS4, CSS and non-regulated Tree Canopy, Roads, Buildings, and Turfgrass

7:18 AM 11/5/2017

Phase 6 Model Structure

Average Load + Δ Inputs * Sensitivity

*

Land Use Acres

*

BMPs

*

Land to Water

*

Stream Delivery

*

River Delivery

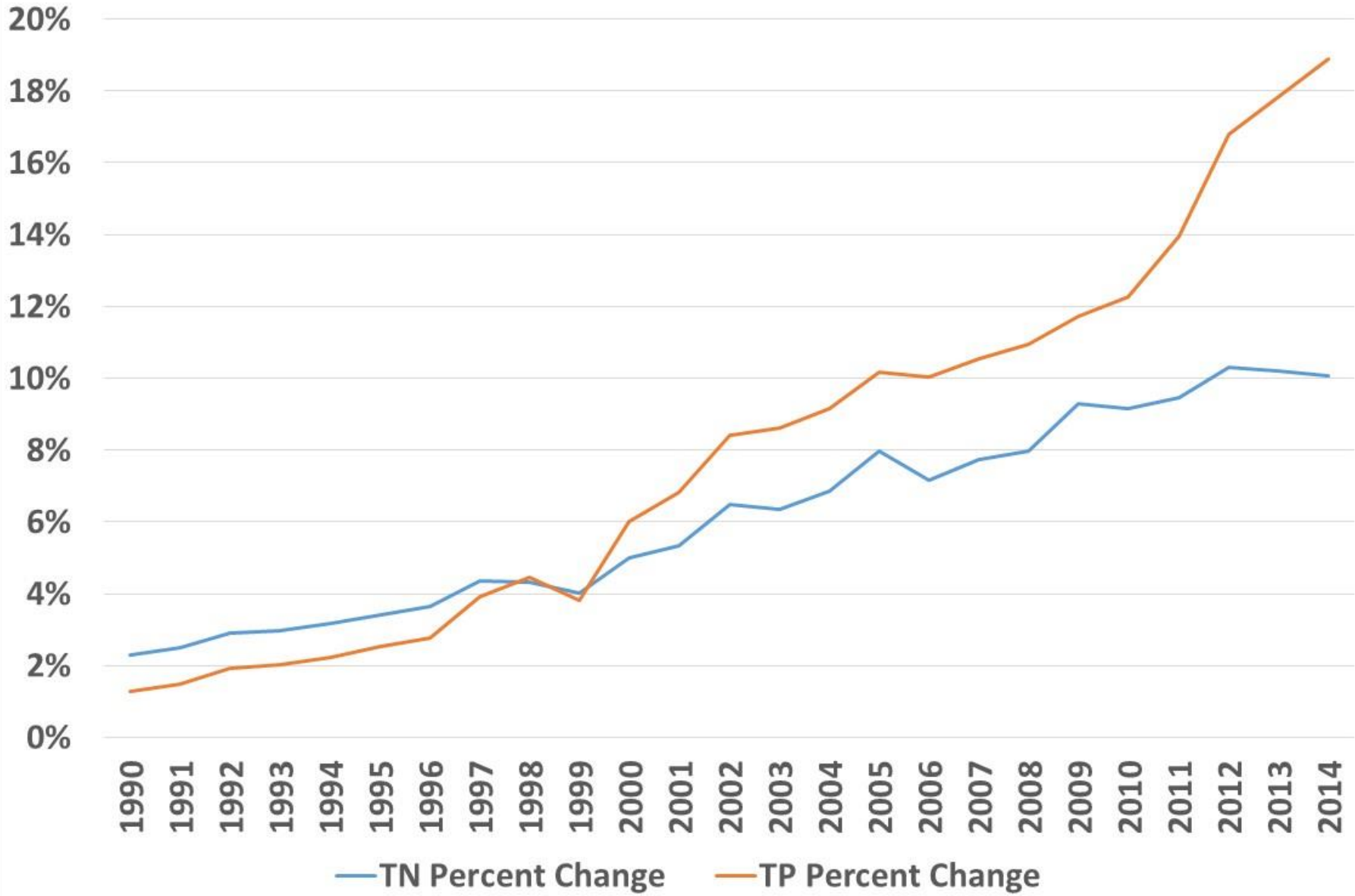
Direct Loads

Phase 6

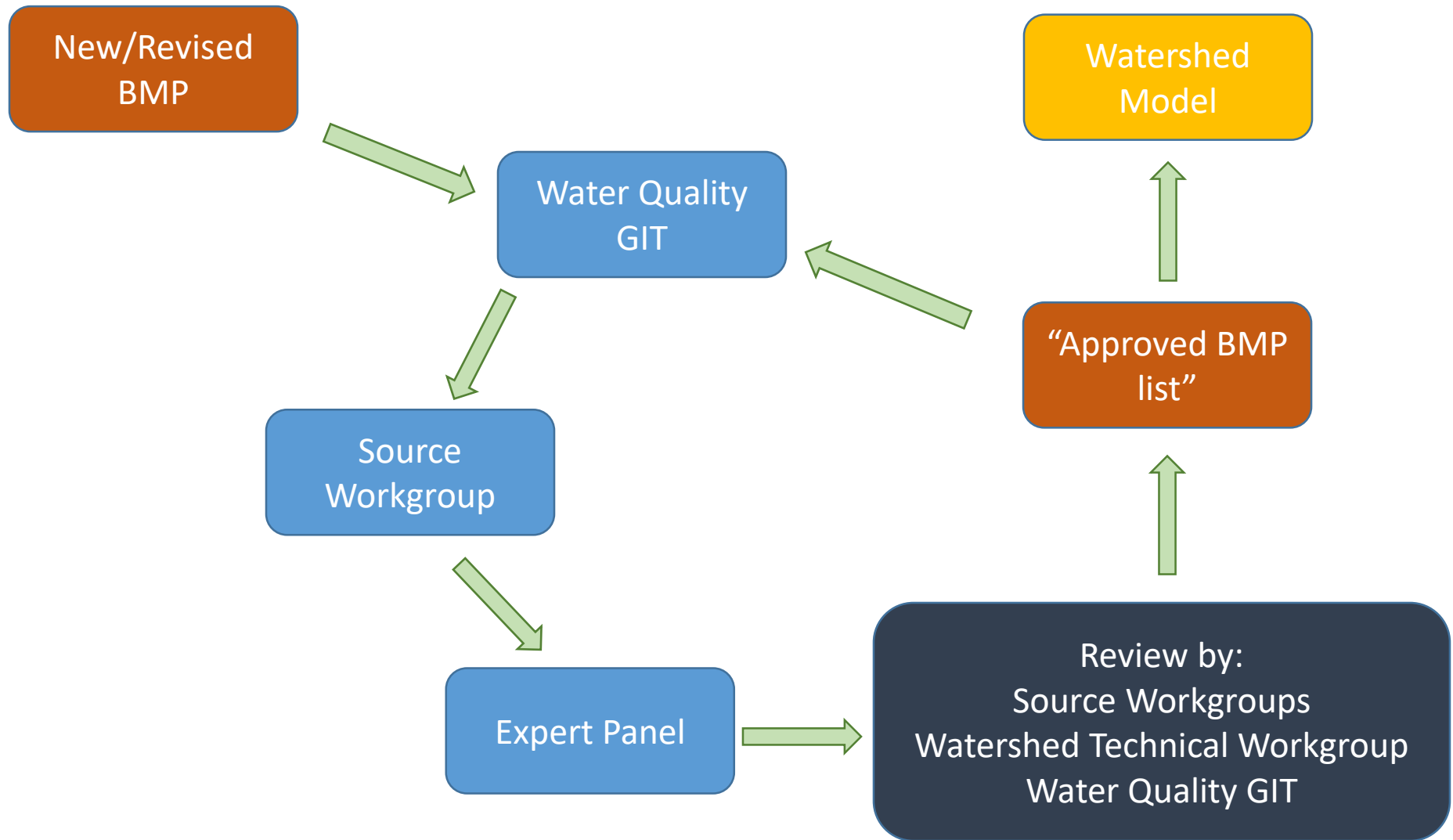
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Overall effect of nonpoint source BMPs



Protocol to Add/Modify BMPs



BMP Panels

October 11, 2017

Status of Current and Upcoming BMP Expert Panels of the Chesapeake Bay Program Partnership

The Chesapeake Bay jurisdictions implement Best Management Practices (BMPs) to achieve the goals set forth in the [2010 Chesapeake Bay TMDL](#). Through the [Protocol for Development, Review and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls](#), newer practices and technologies are considered and evaluated for inclusion in the Chesapeake Bay Program partnership modeling tools by expert panels. Existing practices are re-evaluated to ensure they reflect the best available scientific data and information. This table does not list BMP panels completed prior to May 2016.

BMP Expert Panel	Sponsoring Workgroup	Status
Panels completed since May 2016		
Manure Treatment Technologies	Agriculture Workgroup	Approved by WQGIT, September 2016
Phase 6 Nutrient Management	Agriculture Workgroup	Approved by WQGIT, December 2016
Phase 6 Cover Crops	Agriculture Workgroup	Approved by WQGIT, December 2016
Phase 6 Conservation Tillage	Agriculture Workgroup	Approved by WQGIT, December 2016
Animal Waste Management Systems (Animal Waste Storage Facilities)	Agriculture Workgroup	Approved by WQGIT, December 2016
Manure Injection/Manure Incorporation	Agriculture Workgroup	Approved by WQGIT, December 2016
Urban Tree Canopy Expansion/Urban Forest Planting	Forestry Workgroup	Approved by WQGIT, September 2016
Wetland Panel	Habitat GIT and Wetland Workgroup	Recommendations for Phase 6 nontidal Wetland Restoration (Re-Establishment) approved by WQGIT, December 2016
Floating Wetlands	Urban Stormwater Workgroup	Approved by WQGIT, December 2016
Street Sweeping	Urban Stormwater Workgroup	Approved by Management Board, May 2016
Advanced Onsite Systems, Part 2 (Attenuation)	Wastewater Treatment Workgroup	Not a BMP; Approved by Modeling Workgroup, September 2016
Impervious Disconnection	Urban Stormwater Workgroup	Approved by WQGIT, December 2016

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October 11, 2017

Oyster Restoration/Aquaculture	Fisheries GIT	First set of recommendations approved by WQGIT in coordination with Habitat and Fisheries GITs, December 2017; panel is still active and reviewing additional oyster practices
Current Panels		
Agricultural Ditch BMPs	Agriculture Workgroup	The panel is working on their literature review.
Cropland Irrigation Management	Agriculture Workgroup	The panel is working on their literature review.
Nontidal Wetland Rehabilitation, Enhancement and Creation	Wetland Workgroup	The panel is preparing for its first two conference calls and will hold its open stakeholder forum in early 2018.
Onsite Treatment Systems III	Wastewater Treatment Workgroup	Panel discussions ongoing. Draft panel report is currently under development.
Boat Pump-Out	Wastewater Treatment Workgroup	Panel discussions ongoing. Draft panel report is currently under development.
Upcoming Panels		
Agricultural Stormwater Structures	Agriculture Workgroup	An Expert Panel Establishment Group (EPEG) has been convened to discuss and draft the scope, charge, and suggested membership of the BMP expert panel.
Nursery Runoff Capture and Reuse	Agriculture Workgroup	An Expert Panel Establishment Group (EPEG) will be convened to discuss and draft the scope, charge, and suggested membership of the BMP expert panel.
Mortality Composting and Mortality Management	Agriculture Workgroup	An Expert Panel Establishment Group (EPEG) has been convened to discuss and draft the scope, charge, and suggested membership of the BMP expert panel.
Other BMPs, yet to be determined panel status		
Roadside ditch management	Urban Stormwater Workgroup	This was not a formally convened BMP Expert Panel, but rather an ad-hoc group that considered crediting options that could be applied for roadside ditches, and determine if current understanding warrants a new BMP expert panel. A technical memo was distributed to the Partnership in May 2017.

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- Working on a series of 3-5 page descriptions for each BMP type

A-2. Nutrient Management

General Information

Nutrient management planning has been a common practice for decades, as it helps the farmer maximize profits by balancing crop yields and nutrient inputs. Nutrient management has four basic components: nutrient source, rate, placement and timing. Under a Nutrient Management Plan, each of these four components is managed at the field or sub-field scale in a manner that supports crop productivity, achieves high nutrient use efficiency by the crop and minimizes nutrient loss.

CBP Definition(s)

Nutrient Management (NM): The implementation of a site-specific combination of nutrient source, rate, timing, and placement into a strategy that seeks to optimize agronomic and environmentally efficient utilization of nitrogen (N) and phosphorus (P). Improvement in nutrient-use efficiency necessitates documentation of nutrient management implementation strategies that are suitable for independent verification.

The BMPs for Nutrient Management are categorized into *Core Nutrient Management* and *Supplemental Nutrient Management* for both N and P. *Supplemental NM* is further divided by *Rate*, *Placement*, and *Timing*.

Nitrogen Core Nutrient Management: Applications of nitrogen are made in accordance to all of the following elements as applicable:

- Land-grant university recommendations for nitrogen applications at field level.
- Manure analysis and volume, using either test or book values to determine nitrogen content.
- Calibration of spreader/applicator.
- Yield estimates and cropping plan at the field level.
- Cropping and manure application history at the field level.

Phosphorus Core Nutrient Management: Applications of phosphorus are made in accordance to all of the following elements as applicable:

- Land-grant university recommendations for phosphorus at the field level. This may include recommendations resulting from advanced assessment (i.e. P Index, etc.) that recommend higher P application rates where the risk of P loss is low.
- Soil test for phosphorus levels at the field level. This requirement may be waived if restrictions on manure



Figure A-2-1. A tractor spreads liquid manure on a field. All crops need nutrients such as nitrogen and phosphorus to grow, and farmers can get those nutrients from animal manure, commercial inorganic fertilizers or both. Source: Chesapeake Bay Program






Figure A-2-2. A crop consultant collects a soil sample to test nitrogen availability in the soil. A test like this helps decide how much nitrogen the growing crop needs for optimum production. Source: NRCS Photo Gallery

BMPs – 266 types

BMPType	BMPGroup	BMPFullName	BMPShortName	BMPDescription
Landuse Change	Carbon Sequestration/Alternative Crops	Alternative Crops	CarSeqAltCrop	Accounts for those crops that are planted and managed as permanent, such as warm season grasses, to sequester carbon in the soil. Carbon sequestration refers to the conversion of crop to hay land. Enter units of acres or percent.
Animal Manure	Animal Waste Mangement Systems	Animal Waste Management System	AWMS	Any structure designed for collection, transfer and storage of manures and associated wastes generated from the confined portion of animal operations and complies with NRCS 313 (Waste Storage Facility) or NRCS 359 (Waste Treatment Lagoon) practice standards. Enter units of percent, number of animals or number of animal units.
Efficiency	Feeding Space Management	Barnyard Runoff Control	BarnRunoffCont	Includes the installation of practices to control runoff from barnyard areas. This includes practices such as roof runoff control, diversion of clean water from entering the barnyard and control of runoff from barnyard areas. Enter units of acres, percent, number of systems or animal units.
Animal Manure	Ammonia Emissions Reductions	Biofilters	Biofilters	Ammonia emission reduction includes housing ventilation systems that pass air through a biofilter media with a layer of organic material, typically a mixture of compost and wood chips or shreds, that supports a microbial population. The ammonia emissions are reduced by oxidizing volatile organic compounds into carbon dioxide, water and inorganic salts. Enter units of percent, number of animals or number of animal units.
Efficiency	Cover Crops	Cover Crop Commodity Early	CoverCropComEarly	A winter cereal crop planted for harvest in the spring that does not receive any fall nutrient applications. The crop is planted at least 2 weeks prior to the average frost date. Enter units of acres or percent.
Efficiency	Cover Crops	Cover Crop Commodity Late	CoverCropComLate	A winter cereal crop planted for harvest in the spring that does not receive any fall nutrient applications. The crop is planted at least 2 weeks after the average frost date. Enter units of acres or percent.
Efficiency	Cover Crops	Cover Crop Commodity Normal	CoverCropComNormal	A winter cereal crop planted for harvest in the spring that does not receive any fall nutrient applications. The crop is planted 2 weeks prior to the average frost date. Use this BMP where plant date is unknown. Enter units of acres or percent.

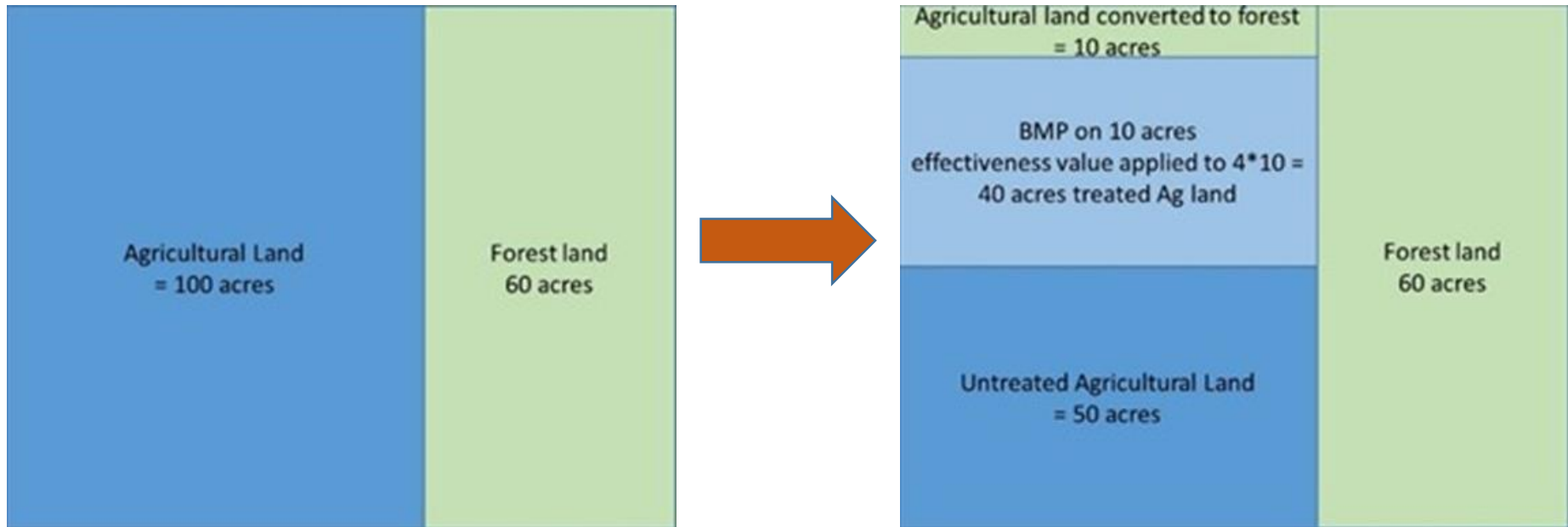
BMP specifications ~19,000

Sector	Agriculture
BMPFullName	Barnyard Runoff Control
BMPShortName	barnrunoffcont
LoadSource	Non-Permitted Feeding Space
HydroGeomorphicRegion	Coastal Plain Lowlands
AvgNitrogenEfficiencyPct	 20.00
AvgPhosphorusEfficiencyPct	 20.00
AvgSedimentEfficiencyPct	 40.00

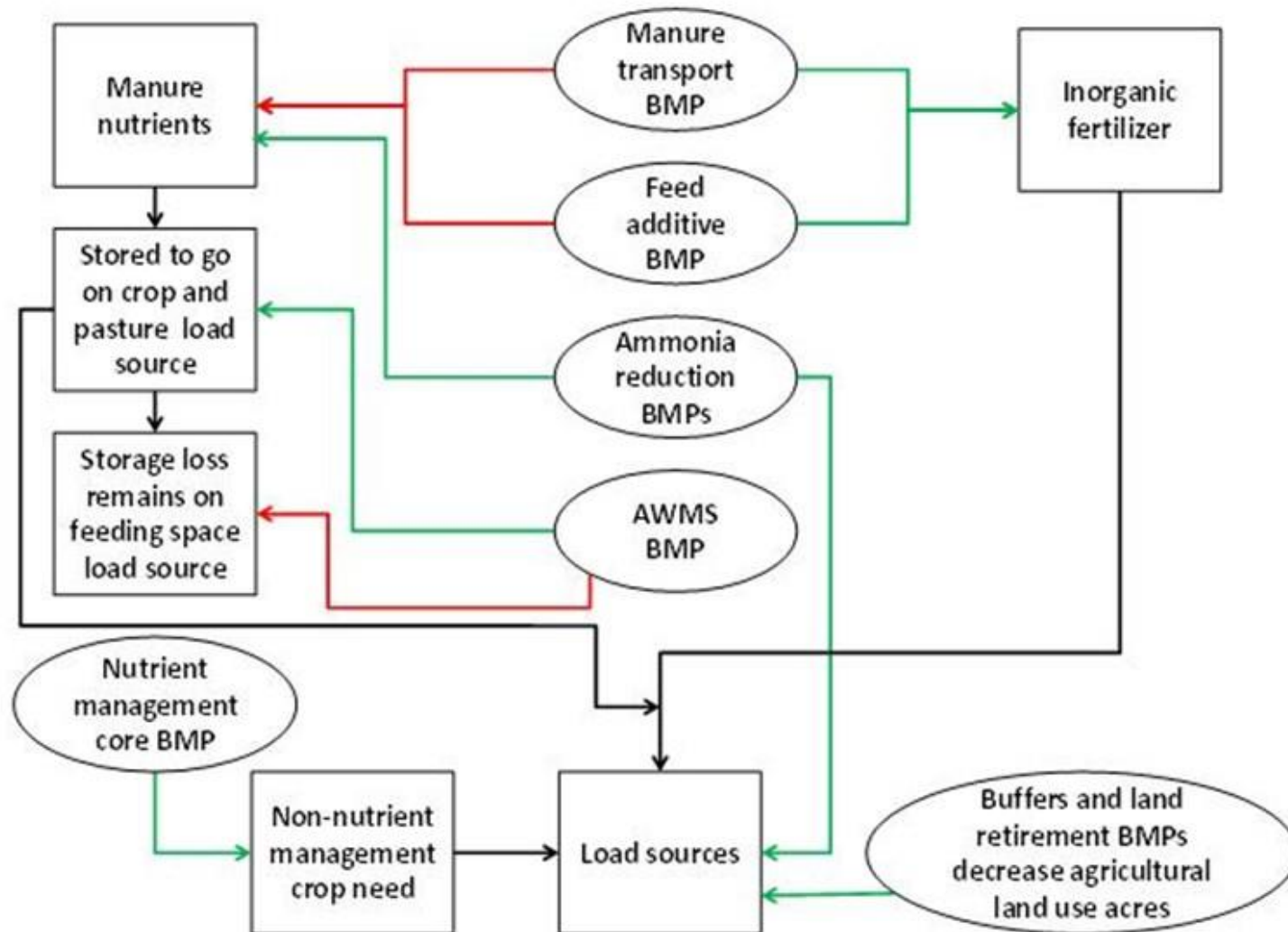
Land use change BMPs – 2 effects

Land change

Treated Area



Effect of manure and fertilizer BMPs on Loads

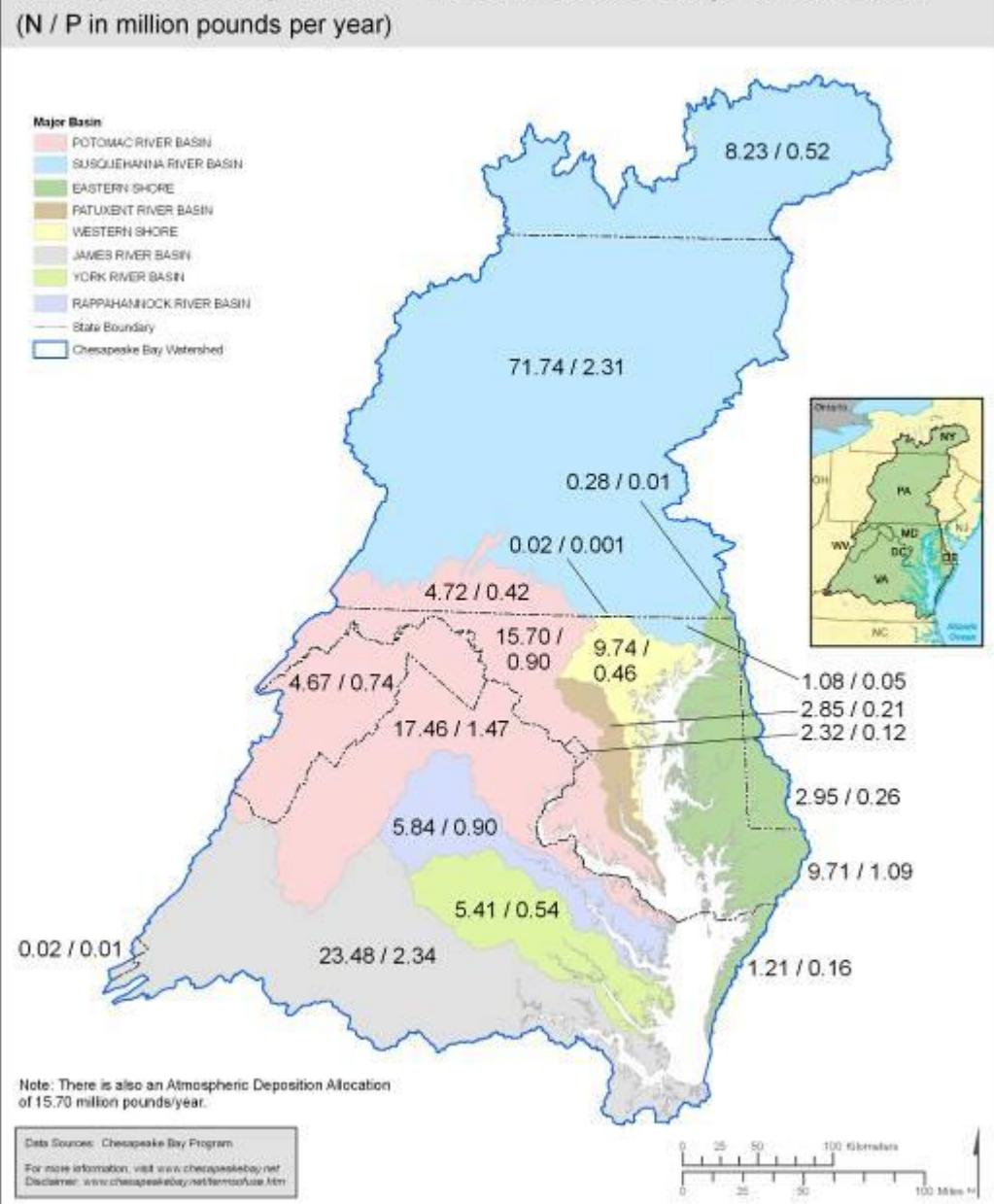


TMDL Timeline

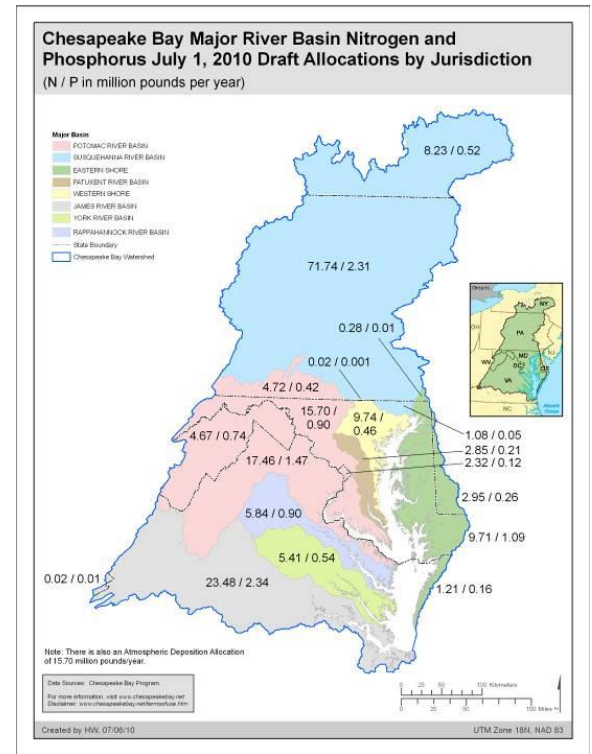
- 1999 – Lawsuit by American Canoe Association and American Littoral Society
- 2010 – TMDL put in place
- 2017 MidPoint Assessment
 - 60% of the management practices implemented
 - Improved models
 - Mid-Course Correction?
- 2025 TMDL Goal Date
 - 100% of the management practices implemented
 - Improved models?
 - Other new information ????

State/basin allocations (N/P (MPY))

Chesapeake Bay Major River Basin Nitrogen and Phosphorus July 1, 2010 Draft Allocations by Jurisdiction (N / P in million pounds per year)

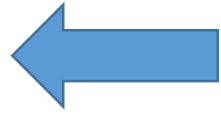
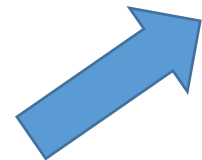
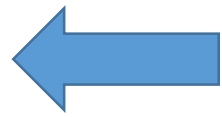
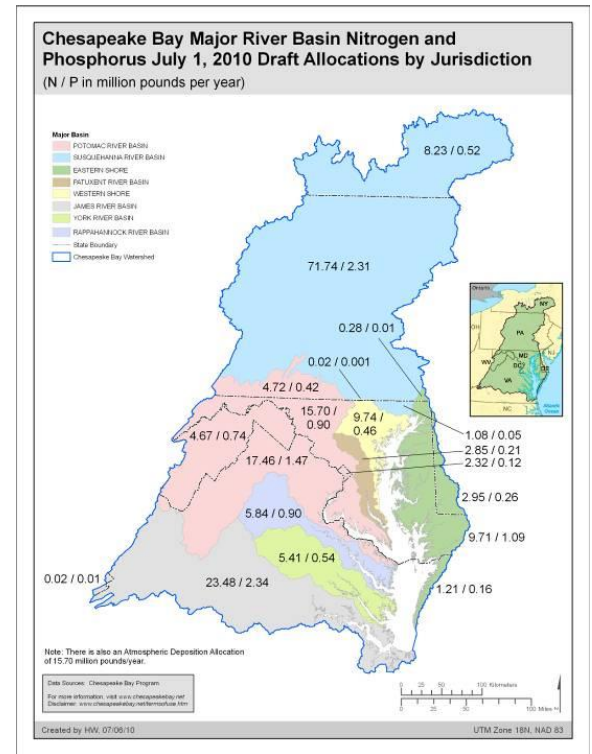


Target Process



Preliminary Information-Subject to Revision.
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WIP Process



Preliminary Information-Subject to Revision.
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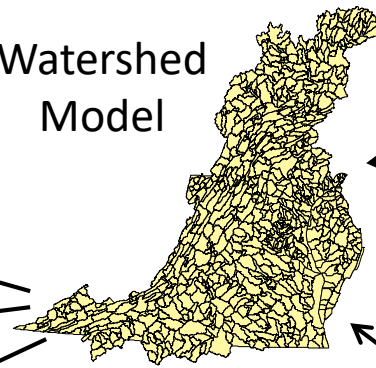
TMDL Accountability Framework

CAST

1. Watershed Implementation Plans identify nutrient and sediment targets that meet water quality standards.



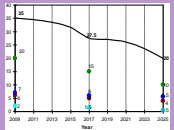
Watershed Model



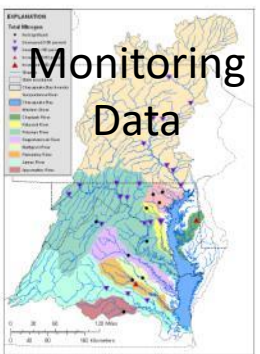
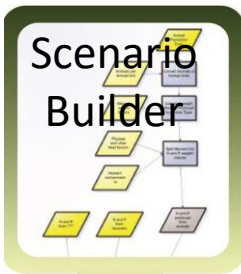
Land Change Model



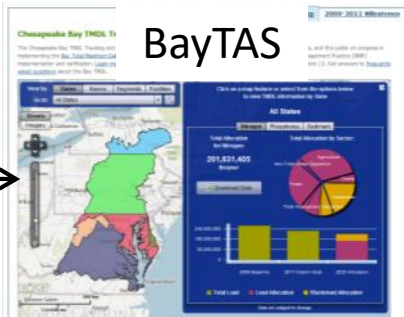
2. 2-Year Milestones with programmatic and pollutant reduction commitments



3. Track and Assess Progress implementing WIPs and milestones



NEIEN
Environmental Information
exchange
Network



4. Federal Actions if insufficient Watershed Implementation Plans or 2-year milestones



“heaven and earth never agreed better to frame a place for man’s habitation...”

Captain
John Smith
-1612

Discussion

