



Chesapeake Bay Program
Science. Restoration. Partnership.

E3 Source Sector Input Recommendations

Clean Water Goal Team

September 28, 2026

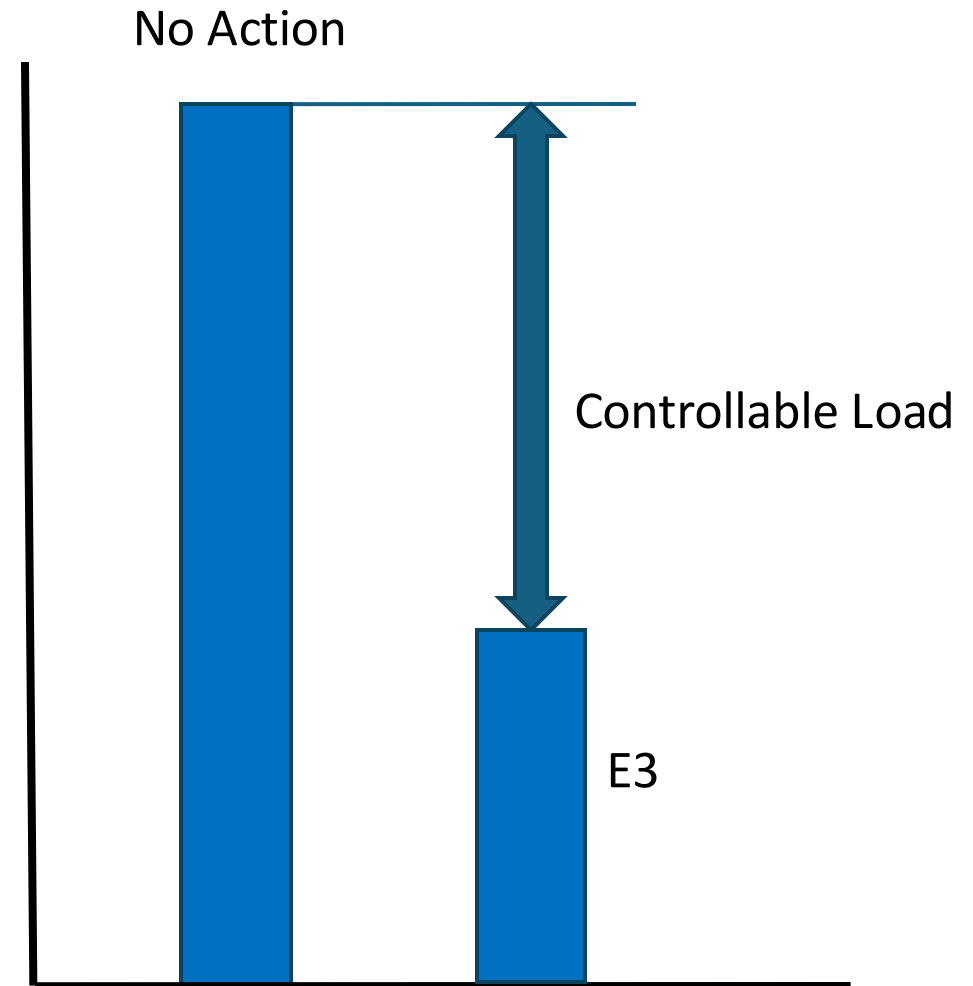


E3 and No-Action: Controllable Loads

Bay TMDL Section 6.3.2: Determining Controllable Loads

Two theoretical scenarios are created to determine the appropriate context for controllable loads (the difference between these two scenarios' loads).

1. **The No-Action scenario** is indicative of a theoretical worst case loading situation in which no controls exist to mitigate nitrogen, phosphorus, and sediment loads from any sources.
 2. **The E3 scenario:** The theoretical everything by everyone everywhere scenario—a best-case situation, where a certain set of possible BMPs and available control technologies are applied to land, given the human and animal populations, and wastewater treatment facilities are represented at highest technologically achievable levels of treatment regardless of costs.
- [TMDL Appendix J](#): modeling scenario definitions initially used for the development of controllable loads and allocations.





Sector Workgroup Request from CWGT:

Develop and present your E3 inputs and relevant justifications for keeping E3 BMP inputs the same or changing them for Phase 7 compared to Phase 6.

Each sector workgroup presented their desired inputs for the E3 scenario in this manner to the CWGT in August for discussion and feedback.

Their specific E3 inputs have been agreed to by their respective source sector workgroup, but the CWGT must provide their ultimate decision, which is requested today at the Sept CWGT meeting.



Outline for Today

1. Overview of updates on Urban Stormwater, Wastewater and Oyster Workgroup recommendations.
2. **Decision Requested:** After discussion and formulation of a specific proposal, CWGT will be asked to support using either the Agriculture Workgroup or Forestry Workgroup's recommended assumptions for certain Land Use Change BMPs for the Everything, by Everyone, Everywhere (E3) Scenario for Phase 7. These include forest buffers, grass buffers, tree planting, and agroforestry.
3. Overview of updates on additional Agriculture and Forestry Workgroup recommendations.
4. **Decision Requested:** CWGT will be asked to approve the full package of assumptions from source sector workgroups for the E3 Scenario for Phase 7, including recommendations from Urban Stormwater, Wastewater Treatment, Oyster, Agriculture and Forestry Workgroups.

E3 Scenario Inputs: Urban Stormwater

BMP/Input	Draft Phase 7
Retrofits	RR Retrofits sized to treat 1.5 in IA for all urban land uses
New Development	All new development has RR BMPs sized for 2.0 inch IA
Street Sweeping	100% Roads swept using SCP-1
UNM Plans	100% of turf, TC over turf, and solar pervious have UNM Plans BMP; For Turf and TC over Turf - 50% Implement UNM W/ a Soil Test (BMP #1), and 50% Implement Non-Fertilized Turf (BMP#3). For Solar Pervious, 100% covered by BMP #3.
Gray Infrastructure and Storm Drain Cleanouts	5% of Urban N and P load removed due to both credits
Stream Restoration	Bed and Bank loads from the following stream miles within each jurisdiction will be reduced by 50%: • DE: 11.677 miles • DC: 3.500 miles • MD: 211.1623 miles • NY: 84.733 miles • PA: 400.754 miles • VA: 583.425 miles • WV: 70.871 miles

BMP/Input	Draft Phase 7
Erosion and Sediment Control	100% of all construction sites are treated to ESC Level 3 and have UNM plan (BMP #1)
Riparian Buffers on Urban	30% of turf grass acres (MS4, CSS, Non-Regulated) within the 35 ft riparian area are buffered as forest for each modeled hydrologic segment in the Chesapeake Bay watershed
Tree Canopy Expansion and Forest Planting on Urban	20% of turf grass and compacted pervious acres (MS4, CSS, Non-Regulated) will be converted to Tree Canopy over Turfgrass (TCTG) using the Urban Tree Canopy Expansion BMP, and an additional 20% of turf grass and compacted pervious acres will be converted to Forest using the Urban Forest Planting BMP.
Impervious Cover Removal	1% of total impervious cover (Roads, Buildings and Other, and TC over Impervious) will be converted to Turfgrass per the ICR BMP.
Shoreline Management	70% of unprotected shoreline linear feet will be managed by the Living Shoreline BMP and receive the default rate for non-conforming practices
Abandoned Mine Reclamation	AMR will be applied to 2% of compacted pervious acres

Any questions, stops or holds on Urban Stormwater recommendations?

***Highlight indicates potential change, to be updated ASAP.**

E3 Scenario Inputs: Wastewater Treatment

BMP/Input	Draft Phase 7
Definition	LOT Everywhere
Concentration Sig Municipal Plants	TN=3 mg/l and TP=0.1 mg/l; BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l
Concentration Sig Industrial Plants	WIP loads adjusted by the percentage of equivalent sig municipal average load reduction from WIP to E3 level by state; BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l
Concentration Non-sig Municipal Plants	TN=8 and TP=2 or the same level as sig plants if ENR is required; BOD =5 mg/l, DO=5 mg/l and TSS= 8 mg/l
Concentration Non-sig Industrial Plants	State estimated non-sig industrial data adjusted by the percentage of equivalent reduction from No-Action (18 mg/l TN, 3mg/l TP) to E3 (3 mg/l TN, 0.1 mg/l TP); BOD =5 mg/l, DO=5 mg/l and TSS= 8 mg/l

BMP/Input	Draft Phase 7
Flow	WIP flows for sig plants; 2006 data or newly submitted non-sig data for non-sig plants
CSO	100% CSO overflow reduction
Septic Systems	10% of septic systems connected to WWTP; Remaining septic system applied 75% TN reduction for the most efficient combined ex situ and in situ BMPs
Exfiltration	Not recommending to include for Phase 7

Any questions, stops or holds on Wastewater Treatment recommendations?

E3 Scenario Inputs: Oysters

BMP/Input	Draft Phase 7
Oyster Restoration - Assimilation	33,095 acres
Oyster Restoration - Denitrification	35,000 acres
Licensed Oyster Harvest	Maintain replenishment of 330M oysters/year and maximum allowable harvest (9.9 M oysters/year)
Private Oyster Aquaculture	143.2 M oysters harvested/year

Any questions, stops or holds on Oyster recommendations?

Comparison between Ag & Forestry E3 Assumptions

- Differences between AgWG and FWG assumptions for forest and grass buffers (including amount and buffer width), tree planting, agroforestry
- Differences affect the acreages of ag forestry BMPs and the watershed-wide ag land use conversion associated with E3 (including other land use change ag BMPs), which AgWG agreed to cap at 15%.

Comparison of Agriculture & Forestry E3 Proposals

BMP	E3 Scenario Acres Credited (Watershed-Wide)	
	FWG Proposal	AgWG Proposal
Forest Buffers	80% of cropland within 30m of all unbuffered streams/rivers	70% of cropland within 20m of all unbuffered streams/rivers
	300,498 acres	175,299 acres
Forest Buffers (w fence)	80% of pasture within 30m of unbuffered streams/rivers	85% of pasture within 20m of all unbuffered streams/rivers
	114,128	80,845
Grass Buffers	20% of cropland within 30m of all unbuffered streams/rivers	30% of cropland within 20m of all unbuffered streams/rivers
	75,124	75,128
Grass Buffers (w fence)	20% of pasture within 30m of all unbuffered streams/rivers	15% of cropland within 20m of all unbuffered streams/rivers
	28,532	14,267
Tree Planting	3% of available ag land (excluding ag open space)	1% of available ag land (excluding ag open space)
	195,076	66,600
Agroforestry	10% of cropland/pasture	0%
	627,841	0
Total (excluding Agroforestry)	713,358 acres (9.3% of ag land)	412,139 acres (5.4% of ag land)

Comparison of Agriculture & Forestry E3 Proposals

BMP	E3 Scenario Acres Credited (Watershed-Wide)	
	FWG Proposal*	AgWG Proposal
Wetland Restoration	[matches AgWG proposal]	1% of available ag land uses, excluding ag open space
	143,606 acres	147,043 acres
Land Retirement to Open Space	[matches AgWG proposal]	Land retirement: combined 7% of available ag land uses
	495,094	506,945
Land Retirement to Pasture	[matches AgWG proposal]	Land retirement: combined 7% of available ag land uses
	255,686	261,165
Alternative Crops	[matches AgWG proposal]	1% of available row crop acres
	29,062	30,305
Sum (LUC BMPs excl. LRP, AF)	1,381,119	1,096,433
% LUC (excl. LRP, AF)	18.0%	14.3%

Additional Land Use Change BMPs that affect Ag land conversion rate

*Note the FWG did not make a specific proposal for these BMPs. These assumptions match the AgWG proposal

Decision Requested:

After discussion and formulation of a specific proposal, CWGT will be asked to support using either the Agriculture Workgroup or Forestry Workgroup's recommended assumptions for certain Land Use Change BMPs for the Everything, by Everyone, Everywhere (E3) Scenario for Phase 7. These include forest buffers, grass buffers, tree planting, and agroforestry.

E3 Scenario Inputs: Agriculture (cont.)

BMP/Input	Draft Phase 7	BMP/Input	Draft Phase 7	BMP/Input	Draft Phase 7
Nutrient Application Management Core N and P	100% of all available land uses	Off Stream Watering Without Fencing	100% of all available livestock pasture	Barnyard Runoff Control	100% of available feed space acres
Nutrient Application Management Supplemental (N and P Placement, Rate, Timing)	80% of all available land uses	Prescribed Grazing/Precision Intensive Rotational Grazing	100% of all available livestock pasture	Loafing Lot Management	100% of available feed space acres
Tillage Management-Continuous High Residue	99% of row crops (excluding corn silage and soybeans), and low input specialty crops	Soil Conservation and Water Quality Plans	100% of animal units	Agricultural Stormwater Management	100% of available permitted feed space acres
Tillage Management-Conservation Tillage	99% of soybeans and high input specialty crops	Animal Waste Management Systems	100% of animal units	Manure Transport	Up to 100% of excess organic nutrients applied will be transported out of the watershed, using only poultry litter/manure; Includes benefits of MTT1-19
Tillage Management-Low Residue Tillage	99% of corn silage	Animal Mortality Management	100% of dead animal units (disposal by composting)	Dairy Precision Feeding and/or Forage Management N	100% of dairy manure @ TN = 24% reduction
Cover Crop	100% of available cropland, excluding small grains and double cropped land, receives early aerial-seeded rye efficiency [NY and PA Growth Region 1] 75% of available cropland, excluding small grains and double cropped land, receives early drilled rye efficiency, and 25% of available cropland, excluding small grains and double cropped land, receives early aerial-seeded rye efficiency [DE, MD, PA Growth Regions 2 and 3, VA, and WV]	Manure Injection	99% of row crops (excluding corn silage and soybeans), and low input specialty crops	Dairy Precision Feeding and/or Forage Management P	100% of dairy manure @ TP = 28% reduction
Commodity Cover Crop	100% of available small grain and double cropped land receives standard commodity cover crop efficiency	Manure Incorporation; Low Disturbance	99% of soybeans, high input specialty crops, and corn silage	Biofilters and Lagoon Covers	100% of Dairy and Swine; excludes manure storage for dry manure/stackable manure
		Non-Urban Stream Restoration	Loads from the following stream miles within each jurisdiction will be reduced at twice the default stream restoration value: DE: 37.299 mi MD: 250.722 mi NY: 238.749 mi PA: 793.672 mi VA: 632.944 mi WV: 131.881 mi	Poultry Litter Amendments (including alum)	100%
		Shoreline Management	70% of unprotected shoreline linear feet will be managed by the Living Shoreline BMP and receive the default rate for non-conforming practices (same as USWG)		

Any questions, stops or holds on the rest of the Agriculture recommendations?

*Ag Sector Forestry BMPs and additional Land Use Change BMPs that affect Ag land conversion rate are not listed here as they were discussed with comparison to FWG proposal and will be reconciled based on the CWGT decision.

E3 Scenario Inputs: Forestry (cont.)

- Developed Sector Forestry BMPs: Included in USWG's E3 assumptions
- Ag Sector Forestry BMPs: To be reconciled with AgWG proposal by CWGT
- Natural Sector Forestry BMPs (forest harvesting BMPs): 100% Timber harvest BMP implementation on harvested forest lands

Any questions, stops or holds on Natural Sector Forestry recommendations?

Decision Requested:

CWGT will be asked to approve the full package of assumptions from source sector workgroups for the E3 Scenario for Phase 7, including recommendations from Urban Stormwater, Wastewater Treatment, Oyster, Agriculture and Forestry Workgroups.



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Reference Slides

Full Source Sector Recommendations
with Phase 6 Comparisons and
Justifications

E3 Scenario Inputs: Urban Stormwater

BMP/Input	Phase 6	Draft Phase 7	Justification
Retrofits	RR Retrofits sized to treat 1.5 in IA for all urban land uses	RR Retrofits sized to treat 1.5 in IA for all urban land uses	No justification to change.
New Development	All new development has RR BMPs sized for 2.0 inch IA	All new development has RR BMPs sized for 2.0 inch IA	No justification to change.
Street Sweeping	100% TIC swept using SCP-1	100% Roads swept using SCP-1	No justification to change.
UNM Plans	100% of PC has UNM Plans; 20% High risk/80% Low risk	100% of turf, TC over turf, and solar pervious have UNM Plans BMP; For Turf and TC over Turf - 50% Implement UNM W/ a Soil Test (BMP #1), and 50% Implement Non-Fertilized Turf (BMP#3). For Solar Pervious, 100% covered by BMP #3.	Change due to updated UNM Expert Panel. For UNM, 75% of residents from surveys cited in UNM report say they fertilize at least once a year. This scenario assumes there is an uptick in residents who chose not to fertilize, and the remainder use a soil test to develop a targeted UNM plan.
Gray Infrastructure and Storm Drain Cleanouts	5% of Urban N and P load removed due to both credits	5% of Urban N and P load removed due to both credits	No justification to change.
Stream Restoration	15% of stream network restored at twice the default SR value	Bed and Bank loads from the following stream miles within each jurisdiction will be reduced by 50%: DE: 11.677 miles DC: 3.500 miles MD: 211.1623 miles NY: 84.733 miles PA: 400.754 miles VA: 583.425 miles WV: 70.871 miles	The AGWG was not comfortable with setting a percentage assumption for the stream restoration E3 without a final Phase 7 CAST stream scale to reference. The USWG's original proposal was to reduce stream bed and bank loads by 50% for 15% of stream network, dispersed evenly across each modeled hydrologic segment in the CB watershed. To maintain consistency across sectors, this approach was adjusted to match the AGWG decision. SR - Protocol 1 is based on measured bank erosion rates, which are then reduced by 50% post-restoration in the absence of post-restoration monitoring. If we assume the same magnitude of implementation as Phase 6 (15%), this approach should square the Protocol 1 approach within the model parameters of E3.

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Urban Stormwater

BMP/Input	Phase 6	Draft Phase 7	Justification
Erosion and Sediment Control	100% of all construction sites are treated to ESC Level 3 and have high risk UNM plan	100% of all construction sites are treated to ESC Level 3 and have UNM plan (BMP #1)	No change except to align with updated UNM Expert Panel.
Riparian Buffers on Urban	10% of pervious riparian areas without natural vegetation (forest and wetland) associated with urban lands are buffered as forest for each modeled hydrologic segment in the CB watershed	30% of turf grass acres (MS4, CSS, Non-Regulated) within the 35 ft riparian area are buffered as forest for each modeled hydrologic segment in the Chesapeake Bay watershed	There was 53,948 acres of turf in the 35 ft buffer zone for 21/22, so 30% would represent a conversion of 16,184 acres to forest. Buffer width language added for clarity. Implementation percentage updated based on feedback from the Forestry Workgroup.
Tree Canopy Expansion and Forest Planting on Urban	Addressed by Forest Conservation and urban riparian buffers	20% of turf grass and compacted pervious acres (MS4, CSS, Non-Regulated) will be converted to Tree Canopy over Turfgrass (TCTG) using the Urban Tree Canopy Expansion BMP, and an additional 20% of turf grass and compacted pervious acres will be converted to Forest using the Urban Forest Planting BMP.	Tree Canopy Outcome is 45,000 acres of canopy by 2040 across all sectors, and 202,000 acres of new forests across all sectors. There was ~1.7 million acres of turf grass in 21/22, so under this E3, 347,908 acres of turf would go to TCTG and 347,908 acres would go to Forest for a total conversion of nearly 695,815 acres. These BMPs were approved after the P6 E3 was developed. Values based on FWG recommendations.
Impervious Cover Removal	Not included in P6 E3	1% of total impervious cover (Roads, Buildings and Other, and TC over Impervious) will be converted to Turfgrass per the ICR BMP.	Significant physical constraints prevent the removal of Impervious Cover. 1% represents best professional judgment based on an extremely conservative assumption of viable vacant lot retrofits and parking reductions.

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Urban Stormwater

BMP/Input	Phase 6	Draft Phase 7	Justification
Shoreline Management	Not included in P6 E3	70% of unprotected shoreline linear feet will be managed by the Living Shoreline BMP and receive the default rate for non-conforming practices	The VIMS shoreline management model was used, which estimates that 82.5% of shoreline ft would be suitable for living shoreline. This was adjusted downward to 70% following USWG member feedback and based on data from VIMS on shoreline erosion rates in Virginia which found that 80% of shorelines measured were eroding at a rate of >0 ft per year, but only 30% were eroding at a rate of >1ft per year.
Abandoned Mine Reclamation	Previously considered under Controls on Extractive.	AMR will be applied to 2% of compacted pervious acres	This is based on comparing P7 LU data with active permits in WV, which found approximately 10% of extractive lands were abandoned mine lands (AML). Because only 15% of compacted pervious acres are extractive, that leads to a conservative estimate of 2% AMR.

*Changes from Phase 6 highlighted in red

*Highlight indicates potential change, to be updated ASAP.

E3 Scenario Inputs: Urban Stormwater

- Practices implemented prior to 2016 will be applied as the Retrofit standard for E3 and practices implemented after 2016 will be applied as the New Development standard. This is consistent with the P6 split.
- No proposed Conservation Landscaping implementation, because efficiency removal (39% TN and 25% TP) is lower than proposed E3 conditions for Retrofits and New Development and would apply to the same acres.
- Continuous Monitoring and Adaptive Control (CMAC), Coagulant Enhanced Treatment (CET) and Floating Treatment Wetlands (FTWs) are all retrofits to ponds, which are ST practices. As such, none of these strategies represent an increase in pollutant removal over the proposed E3 scenario which is based on RR implementation on 100% of urban lands. CET comes close for TP removal, but at a significant expense to TN.
- No workgroup consensus recommendation on scenario base year.

E3 Scenario Inputs: WWTWG

BMP/Input	Phase 6	Draft Phase 7	Justification
Definition	LOT Everywhere	LOT Everywhere	
Concentration Sig Municipal Plants	TN=3 mg/l and TP=0.1 mg/l; BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l	TN=3 mg/l and TP=0.1 mg/l; BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l	No change in reliable, widely achievable performance for major facilities. 3 mg/L TN remains the low end of the working definition of limit of technology (LOT) used by permitting agencies in multiple states and EPA regions - Higher performing facilities often have site-specific characteristics not broadly applicable to all wastewater facilities (e.g., consistently higher influent temps, low concentrations of poorly degradable organic-N, operational capacities less than full design capacity, and other process components and configurations not practical at all wastewater facilities). - Some concentration buffer is needed to ensure regulatory compliance. Facility operators must target below their limit in order to ensure compliance. - Consistently achieving 0.1 mg/L TP is similarly challenged. Significantly lower concentrations have not been shown to be broadly achievable.
Concentration Sig Industrial Plants	WIP loads adjusted by the percentage of equivalent sig municipal average load reduction from WIP to E3 level by state; BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l	WIP loads adjusted by the percentage of equivalent sig municipal average load reduction from WIP to E3 level by state; BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l	No justification to change.

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: WWTWG

BMP/Input	Phase 6	Draft Phase 7	Justification
Concentration Non-sig Municipal Plants	TN=8 and TP=2 or the same level as sig plants if ENR is required; BOD =5 mg/l, DO=5 mg/l and TSS= 8 mg/l	TN=8 and TP=2 or the same level as sig plants if ENR is required; BOD =5 mg/l, DO=5 mg/l and TSS= 8 mg/l	No change in reliable, widely achievable performance for minor facilities. - Minor facilities are disproportionately vulnerable to collection-system and weather-related perturbations. Limited buffering capacity due to small size. Biological nutrient removal is particularly sensitive to swings in load, temperature, and carbon-to-nutrient ratios. - Achieving very low nutrient concentrations requires advanced biological nutrient removal that demands careful process control. Less redundancy in process control and laboratory capacity than large plants. Smaller facilities typically operate with limited staff and shared resources.
Concentration Non-sig Industrial Plants	State estimated non-sig industrial data adjusted by the percentage of equivalent reduction from No-Action (18 mg/l TN, 3mg/l TP) to E3 (3 mg/l TN, 0.1 mg/l TP); BOD =5 mg/l, DO=5 mg/l and TSS= 8 mg/l	State estimated non-sig industrial data adjusted by the percentage of equivalent reduction from No-Action (18 mg/l TN, 3mg/l TP) to E3 (3 mg/l TN, 0.1 mg/l TP); BOD =5 mg/l, DO=5 mg/l and TSS= 8 mg/l	No justification to change.
Flow	WIP flows for sig plants; 2006 data or newly submitted non-sig data for non-sig plants	WIP flows for sig plants; 2006 data or newly submitted non-sig data for non-sig plants	Current approach preserves the use of the best available information on design/permitting capacity for significant plants, and consistent with the WIP. WIP flows varied by jurisdiction - some did cap loads and some did expected/predicted flows – and are documented in their individual WIPs.

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: WWTWG

BMP/Input	Phase 6	Draft Phase 7	Justification
CSO	100% CSO overflow reduction	100% CSO overflow reduction	No need to modify (already 100%)
Septic Systems	10% of septic systems connected to WWTP; Remaining septic system applied 69% TN reduction for the most efficient combined ex situ and in situ BMPs	10% of septic systems connected to WWTP; Remaining septic system applied 75% TN reduction for the most efficient combined ex situ and in situ BMPs	75% reduction reflected in 2018 OWTS Expert Panel Report which considered additional BMPs.
Exfiltration	NA	Not recommending to include for Phase 7	New load source for Phase 7 model. - Insufficient literature and case studies to quantify the range of what is practical for exfiltration reduction. - WWTWG-approved method of assigning load includes a theoretical upper limit to the exfiltration-reduction credit (70%) given for sewer replacement and rehabilitation. However: * The upper limit is not tied to a demonstration of practical feasibility, and * The small number of case studies available would indicate much lower rehab/replacement rates. - At this time, there is no effective manner to report on exfiltration reduction watershed-wide.

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: WWTWG

- We did not reach consensus on base year.

Those that prefer to maintain the existing baseline expressed these considerations:

- Concern that it violates one of the principles of assigning planning targets: that those who contribute more should have to do more. How do we address growth fairly and abide by this principle.
- No strong reason to change the base year.
- Appreciation for desire to use new data but concerns that use of the new data could cause problems without ready solutions
- Shifting baseline forward risks losing the historical calibration and benchmark data established in previous model iterations.

Those that prefer to update the scenario base expressed the following consideration:

- Use of the most recent data to best reflects current conditions.

E3 Scenario Inputs: Oysters

BMP/Input	Phase 6	Draft Phase 7	Justification
Oyster Restoration - Assimilation	N/A	33,095 acres	New acres/biomass can only be credited one time
Oyster Restoration - Denitrification	N/A	35,000 acres	Cumulative acres/biomass is credited on an annual basis
Licensed Oyster Harvest	N/A	Maintain replenishment of 330M oysters/year and maximum allowable harvest (9.9 M oysters/year)	Practice in Maryland only. Reduction from assimilation in tissue only, diploid oysters only. Assume 3 in (2.5-3.49 in) midpoint BMP
Private Oyster Aquaculture	N/A	143.2 M oysters harvested/year	Reduction from assimilation in tissue only. Assume diploid oysters, 3.0 in (3.0-3.49 in) midpoint BMP

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Nutrient Application Management Core N and P	100% of all available agricultural land uses	100% of all available land uses	No need to change assumption identified
Nutrient Application Management Supplemental (N and P Placement, Rate, Timing)	100% of all available agricultural land uses	80% of all available land uses	These practices are supplemental to the 100% of agricultural land implementing core nutrient management in P7 E3; 80% represents the average across all practices included in this composite category (N & P rate, timing, placement). The continually diversified landscape of operations and limited access to technology needed to adopt these practices are very real barriers to 100% adoption.

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Tillage Management-Continuous High Residue	100% of row crops (excluding corn silage and soybeans), and low input specialty crops	99% of row crops (excluding corn silage and soybeans), and low input specialty crops	The AgWG determined that 100% implementation of tillage - across all categories - would never be achieved as tillage is required in the production of certain crops. 99% was deemed an acceptable reduction from the 100% assumed in Phase 6 for these practices.
Tillage Management-Conservation Tillage	100% of select row crops including corn silage and soybeans, and high input specialty crops; excludes mushrooms, greenhouse and container nursery	99% of soybeans and high input specialty crops	
Tillage Management-Low Residue Tillage	100% of select high input specialty crops including potatoes, peanuts, tobacco; excludes mushrooms, greenhouse and container nursery	99% of corn silage	

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Cover Crop	61% of row crops; not associated with small-grain production and high input specialty (excludes mushroom, greenhouse and container nursery); early, drilled, rye 20% of row crops; early, aerial-seeded, rye Exception for NY and PA Growth Region 1 = 81% traditional Cover Crop early, aerial-seeded, rye + 19% Commodity normal = planted 2 weeks prior to average frost date	100% of available cropland, excluding small grains and double cropped land, receives early aerial-seeded rye efficiency [NY and PA Growth Region 1] 75% of available cropland, excluding small grains and double cropped land, receives early drilled rye efficiency, and 25% of available cropland, excluding small grains and double cropped land, receives early aerial-seeded rye efficiency [DE, MD, PA Growth Regions 2 and 3, VA, and WV]	In Phase 6, two assumptions were established for the traditional cover crop BMP: one for NY and PA Growth Region 1, and one for all other areas. The assumption for NY and PA GR1 included both traditional and commodity cover crops; Phase 7 assumptions attempt to capture the essence of Phase 6 assumptions while applying traditional and commodity cover crops to the appropriate load sources (commodity is only applicable to small grain and double cropped land). Elsewhere (DE, MD, PA GR2 and GR3, VA, and WV), the Phase 7 assumption maintains the ratio of early drilled rye to early aerial-seeded rye established in Phase 6 (61:20 then; 75:25 now) with load sources eligible for commodity cover crops excluded from the assumption for traditional cover crops. Collectively, these assumptions result in 100% implementation of cover crops across the appropriate eligible load sources.

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Commodity Cover Crop	19% of row crops; associated with small-grain production; normal = planted 2 weeks prior to average frost date	100% of available small grain and double cropped land receives standard commodity cover crop efficiency	Phase 6 recommendation was adjusted to reflect appropriate domain; because commodity cover crop is only eligible on small grains and double cropped land, the Phase 7 assumption was set at 100% for those two land uses.
Off Stream Watering Without Fencing	100% of all available livestock pasture	100% of all available livestock pasture	No need to change assumption identified
Prescribed Grazing/Precision Intensive Rotational Grazing	100%; includes PIRG acres	100% of all available livestock pasture	No need to change assumption identified

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Forest Buffers	Crop land within 30m of all streams and rivers that's unbuffered - from high-resolution land cover (originally 6% of cropland for Phase6, 15% for Phase5)	70% of cropland within 20m of all streams and rivers that are unbuffered (originally 6% of cropland for Phase6, 15% for Phase5)	The AgWG determined that while 100% buffering of streams was, for the purposes of E3, acceptable, 100% implementation of forest buffers is beyond the realm of theoretical possibility. Some split between forest and grass buffers was necessary, and the group ultimately settled on 70% forest/30% grass for buffers on cropland. The width of those these buffers was reduced from 30m to 20m as the group believes that the 30m assumption would make production unviable across many small farms.
Forest Buffers on Fenced Pasture Corridor	Pasture land within 30m of all streams and rivers that's unbuffered - from high-resolution land cover (originally 5% of pasture for Phase6, 10% for Phase5)	85% of pasture within 20m of all streams and rivers that are unbuffered	
Grass Buffers	0%	30% of cropland within 20m of all streams and rivers that are unbuffered	
Grass Buffers on Fenced Pasture Corridor	0%	15% of pasture within 20m of all streams and rivers that are unbuffered	

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Wetland Restoration (floodplain/headwater)	1% of available crops and pasture	1% of available agricultural land uses, excluding ag open space	The AgWG deemed it was not appropriate to assign wetland restoration to ag open space acres; the Phase 7 and Phase 6 assumptions for this practice are otherwise the same.
Land Retirement to Ag Open Space and to Pasture	7% of available crops and pasture	7% of available agricultural land uses	No need to change assumption identified
Tree Planting	1% of available crops and pasture	1% of available agricultural land uses, excluding ag open space	The AgWG deemed it was not appropriate to assign tree planting to ag open space acres; the Phase 7 and Phase 6 assumptions for this practice are otherwise the same.
Alternative Crops	1% of row crop	1% of available row crop acres	No need to change assumption identified

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
[Land Use Change Composite]	Total land use change not to exceed 15%	Total land use change not to exceed 15%	No need to change assumption identified
Soil Conservation and Water Quality Plans	100% over all available agricultural land uses	100% of all available agricultural land uses	No need to change assumption identified
Animal Waste Management Systems	100% of all animal production areas	100% of animal units	No need to change assumption identified
Animal Mortality Management	100%	100% of dead animal units (disposal by composting)	No need to change assumption identified

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Manure Injection	All liquid manure from dairy & swine on crops that receive manure, excluding crops w/ manure incorporation Split between acres with injection vs incorporation is the proportion of liquid-to-dry manure nutrients applied to crops, e.g., dairy+swine vs poultry+beef+horses+etc Combined with high-residue tillage management	99% of row crops (excluding corn silage and soybeans), and low input specialty crops	Phase 6 assumption domain set by manure lbs; however, this practice is reported in acres. Because in Phase 6 (and reaffirmed in Phase 7 discussions) this practice was associated with high residue tillage, the assumption for high residue tillage was used here.
Manure Incorporation; Low Disturbance	All dry manure from poultry, beef, horses, sheep, and goats on crops that receive manure, excluding crops w/ manure injection Split between acres with injection vs incorporation is the proportion of liquid-to-dry manure nutrients applied to crops, e.g., dairy+swine vs poultry+beef+horses+etc Combined with low-residue tillage and conservation-tillage, not high-residue tillage	99% of soybeans, high input specialty crops, and corn silage	Phase 6 assumption domain set by manure lbs; however, this practice is reported in acres. Because in Phase 6 (and reaffirmed in Phase 7 discussions) this practice was associated with conservation and low residue tillage, the assumptions for those practices were combined and used here.

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Non-Urban Stream Restoration	15% of low-order agriculture stream miles are restored @ twice the default Stream Restoration value; Stream miles from Chesapeake Conservancy synthetic data layer at lower order than National Hydrography Dataset (NHD)	Loads from the following stream miles within each jurisdiction will be reduced at twice the default stream restoration value: DE: 37.299 mi MD: 250.722 mi NY: 238.749 mi PA: 793.672 mi VA: 632.944 mi WV: 131.881 mi	Unable to clearly define domain for Phase 7 without a final Phase 7 CAST stream scale to reference, the AgWG was not comfortable with setting a percentage assumption. For Phase 6 E3 scenario, the partnership determined that reducing loads from 15% of low-order ag stream miles at twice the default stream restoration value was an acceptable assumption. The number of stream miles associated with this assumption was identified for each jurisdiction (based on Phase 6 stream layer/CAST stream scale) and will be carried forward to the Phase 7 E3 scenario.
Shoreline Management	Any practice along agriculturally-dominated tidal shorelines that prevents and/or reduces tidal sediments to the Bay; Shoreline practices can include living shorelines, revetments and/or breakwater systems and bulkheads and seawalls; Using new buffer data set of buffered:unbuffered shoreline to define domain	70% of unprotected shoreline linear feet will be managed by the Living Shoreline BMP and receive the default rate for non-conforming practices	Phase 6 assumption could be interpreted as 100% of total ag-dominated shoreline and does not specify a shoreline management BMP; Phase 7 specifies under 100% of currently unprotected shoreline and prescribes the default load reduction value.

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Barnyard Runoff Control	100% of beef and dairy facilities	100% of available feed space acres	No need to change assumption identified
Loafing Lot Management	100% of beef and dairy facilities	100% of available feed space acres	No need to change assumption identified
Agricultural Stormwater Management	<i>Not available for inclusion in Phase 6 E3 scenario</i>	100% of available permitted feed space acres	Assumption established for Phase 7 E3
Manure Transport	Will be added based on excess of crop goal; Includes benefits of Manure Treatment Technologies	Up to 100% of excess organic nutrients applied will be transported out of the watershed, using only poultry litter/manure; Includes benefits of MTT1-19	For Phase 7, the AgWG determined only poultry litter would be transported as hauling liquid manure is economically infeasible and would rarely be done. The P6 and P7 assumptions are functionally the same; however, the wording was updated for Phase 7 to improve clarity. "Benefits of Manure Treatment Technologies" now explicitly references all 19 MTT BMPs.

E3 Scenario Inputs: Agriculture

BMP/Input	Phase 6	Draft Phase 7	Justification
Dairy Precision Feeding and/or Forage Management N	100% of Dairy @ TN = 24% reduction	100% of dairy manure @ TN = 24% reduction	No need to change assumption identified
Dairy Precision Feeding and/or Forage Management P	100% of Dairy @ TP = 28% reduction	100% of dairy manure @ TP = 28% reduction	No need to change assumption identified
Biofilters and Lagoon Covers	100% of Dairy and Swine, excludes manure storage for dry manure/stackable manure	100% of Dairy and Swine; excludes manure storage for dry manure/stackable manure	No need to change assumption identified
Poultry Litter Amendments (including alum)	0%, represented by poultry litter nutrient projected trends	100%	The Phase 6 assumption for PLA was set at 100%; the Phase 7 assumption represents no change from what was included in the P6 E3 scenario, though it does represent a change from P6 E3 <i>documentation</i> .

E3 Scenario Inputs: Agriculture

- Difference between AgWG and FWG assumptions for buffers, tree planting, agroforestry
- No recommendation on base year.

E3 Scenario Inputs: Forestry- Developed Sector

BMP/Input	Draft Phase 7	Justification
<i>Forest conservation and urban growth reduction</i>	<i>All projected loss of forest from development is retained or planted in forest</i>	• Carryover from Phase 6 documentation but may not be needed since the E3 scenario does not project loss
Urban Riparian Forest Buffers BMPs	30% of turf grass acres (MS4, CSS, Non-Regulated) within the 35 ft riparian area are buffered as forest for each modeled hydrologic segment in the Chesapeake Bay watershed	• Only 30% of the 35 ft buffer is being converted due to physical infrastructure constraints present in the urban landscape • 30% would represent a conversion of 16,184 acres to forest
Tree Canopy Expansion and Forest Planting BMPs	20% of turf grass acres (MS4, CSS, Non-Regulated) and 20% of compacted pervious (PDEV) acres will be converted to Tree Canopy over Turfgrass (TCTG) using the Urban Tree Canopy Expansion BMP, and an additional 20% of turf grass acres and 20% of PDEV acres will be converted to Forest using the Urban Forest Planting BMP.	• Only 40% of turf and PDEV is being converted to allow space for implementation of other BMPs and to allow for physical and site/soil suitability constraints in the urban landscape • 347,908 acres of turf would go to TCTG and 347,908 acres would go to Forest for a total conversion of 695,815 acres from Turf • 184,395 acres of PDEV would go to TCTG and 184,395 acres would go to Forest for a total conversion of 368,790 acres from PDEV • Between Turf and PDEV, a total of 1,064,605 acres would be converted to TCTG or Forest • To put this in context, the 2025 Watershed Agreement set a target to restore 45,000 acres of community tree canopy from a 2014 baseline (36,238 acres from 2022), so E3 represents a 29-fold increase in effort from the Watershed Agreement targets

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Forestry- Ag Sector

BMP/Input	Draft Phase 7	Justification
Agricultural Riparian Forest Buffer and Grass Buffers	80% of unbuffered cropland and pastureland within 100 ft of streams/rivers will be converted to forest using the Forest Buffer BMP (crop) and the Forest Buffer with Stream Exclusion Fencing BMP (pasture) and the remaining 20% of unbuffered cropland and pastureland would have Grass Buffers.	- The 100 ft buffer was used to represent the average reported buffer width in the watershed and the recommended width by the expert panel report to ensure water quality benefits (reducing risk of concentrated flow pathways bypassing the buffer). - Buffers should be a minimum of 30 M wide to protect the physical, chemical and biological integrity of small streams (Sweeney and Newbold 2014) - The 100 ft buffer has a total of 517,333 acres of crop and pasture. Converting 80% of crop and pasture within the riparian area would result in the conversion of 413,867 agricultural acres to forest - Adding grass buffers to allow more flexibility for places where it is not physically appropriate to plant trees in the landscape (for example where there are wetlands or likely to be wetlands in the future) - To put this in context, the 2025 Watershed Agreement set a target of 7500 acres a year for a total of 135,00 additional acres between 2040 and 2022, so E3 would represent a 2.2 fold increase over the Watershed Agreement target
Agricultural Tree planting and Agroforestry	3% of crop and pastureland with tree planting, and 10% of crop and pastureland having agroforestry practices applied (Alley Cropping BMP applied to crop, Silvopasture BMP applied to pasture)	- Including both Ag Tree Planting and Agroforestry to allow more land to stay in production while increasing acres being converted to forest with high nutrient load reductions 3% of crop and 3% of pasture would amount to 236,060 acres of agricultural tree planting 10% of crop and 10% of pasture would amount to 786,867 acres of agroforestry practice implementation. However, only 25% of the total land footprint for the agroforestry practices converts to forest (with the remaining acres staying in agricultural production), which would amount to 196,717 acres converting to forest. - Between agricultural tree planting and agroforestry, 432,777 acres would be converted to forest representing a 2.6-fold increase over the Watershed Agreement target
Combined Ag Forestry BMPs	Estimated combined total of 950,110 acres (12% of ag land)	Remains under 15% threshold set by ag workshop while increasing implementation of highly effective BMPs for reducing loads

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Forestry- Natural Sector

BMP/Input	Draft Phase 7	Justification
Timber Harvest	100% Timber harvest BMP implementation on harvested forest lands	Maintain from Phase 6, ensures temporary load increases from harvest are minimized

*Changes from Phase 6 highlighted in red

E3 Scenario Inputs: Forestry

- Recommended scenario inputs are based on a 2022 base year to align with our best understanding of the watershed's Land Use/Land Cover.
- Forest Buffer inputs were developed using the 1:24K hydrography. The % of land being converted into forest was used to calculate the acreages that will be used as inputs for the final E3 scenario (so would not be affected by any changes in the hydrography used for P7).
- Discrepancy between proposed inputs for ag forestry BMPs between the Ag WG and the FWG proposal needs to be reconciled.