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WWTWG

E3 and Scenario Base Year Discussion

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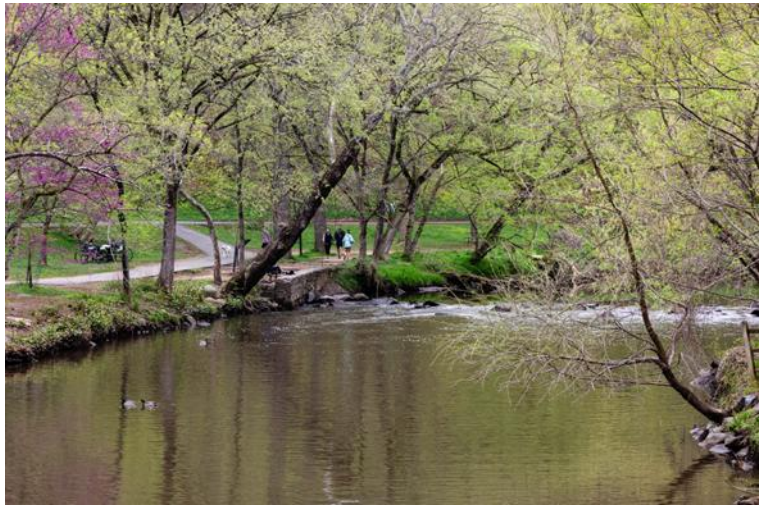
CWGT Request to Sector Workgroups

Sector Workgroups are to provide insight on preferences on the following to the CWGT by August 2026:

- Scenario Base Year –what base year should be utilized for the scenarios.

- Scenario (E3) Inputs- WWTP and relative effectiveness governed effort for point source vs non-point source, exfiltration, CSOs, and Septic system considerations



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Reason for CWGT Request

The Chesapeake Bay Program partnership uses a methodology to derive the basin-jurisdiction allocations that leans upon model parameters related to N, P, and overall performance:

- Hydrologic period
- Critical period
- Relative Effectiveness
- Defined controllable loads

Completion of this work leads to 2027 Year of review

Scarlet oak during fall. (Photo courtesy of Ashley M Bradford/iNaturalist CC BY-NC, cropped)

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Scenario Base Year Summary

What is a Scenario Base Year?

- The year that trend analyses are based on for use to produce base conditions for other years.
- When data is not available, program must backcast and forecast by use of trend analysis to apportion where things are on the landscape in other years.
- Forecast is automatically through 2075 – for changing environmental conditions work, but when should that begin?

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Some Scenario Base Year Options

2022

- Crop Acres, Yields, and Animal Populations (Ag Census)
- Current land use
- Septic Systems
- Organic and Inorganic Nutrients (Fertilizer, Biosolids, and Manure)
- Population

2010

- Land use and septic systems here are confirmed in backcast. Everything else leans upon the past data submissions that were received during that year.
- For example, the 2022 land use would be referenced to produce a more accurate picture of what the land use was in 2010, using the past categories (2007).

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E3 and No-Action:
TMDL Appendix J

This appendix to the Chesapeake Bay TMDL offers definitions for the different modeling scenarios initially used for the development of controllable loads and partner allocations.

Examples of scenarios used in the past to help produce planning targets:

- 2010 No-Action
- 2010 E3

American avocets can be found living in open areas with little vegetation and shallow waters. (Photo by Marielle Scott/Chesapeake Bay Program)

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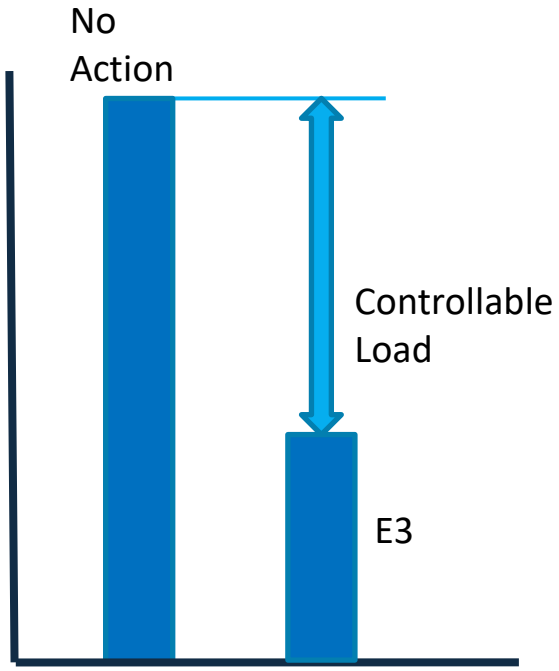
E3 and No-Action: Controllable Loads

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** represents everything by everyone everywhere—represents a theoretical best-case possible 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.



Chesapeake Bay TMDL Section 6: Establishing the Allocations For The Basin-Jurisdictions

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E3 Overview

Used alongside the No-Action scenario, this calculation of controllable loads will address all three rules for determining Planning Targets:

1. Planning Targets must meet water quality standards
2. Those that pollute more should do more.
3. Actions already taken count toward the goals.

Planning targets will be within the range of loads between the No-Action and E3 and are for all sources in the watershed.

They did not determine the reductions needed from each sector to reach the planning targets in Phase 6. This was from the WIPs.

Eastern brook trout swim at the Virginia Living Museum in Newport News, Va., on Dec. 30, 2018. (Photo by Will Parson/Chesapeake Bay Program)

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Wastewater Scenario Input Definition

Scenario		2010 No Action	Previous Modified E3	Draft E3
Definition		No management action. Secondary Treatment at the same level everywhere with TS flows	LOT Everywhere Tier 4 Level	LOT Everywhere
Concentration	Sig Municipal Plants	TN=18 mg/l and TP =3 mg/l BOD=30 mg/l, DO=4.5 mg/l and TSS=15 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	TN=3 mg/l and TP=0.1 mg/l BOD=3 mg/l, DO=6 mg/l and TSS=5 mg/l
	Sig Industrial Plants	Highest Loads on record, or TS loads if greater BOD=30 mg/l, DO=4.5 mg/l and TSS=15 mg/l	TS sig industrial loads adjusted by the percentage of equivalent sig municipal average load reduction from TS 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
	Non-sig Municipal Plants	TN=18 mg/l and TP =3 mg/l BOD=30 mg/l, DO=4.5 mg/l and TSS=15 mg/l	TN=8 and TP=2 or TS values if less 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
	Non-sig Industrial Plants	Tetra Tech estimated non-sig industrial data. BOD=30 mg/l, DO=4.5 mg/l and TSS=25 or 45 mg/l	Tetra Tech estimated non-sig industrial data adusted 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 adusted 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
Flow		TS flows for sig plants 2006 data or newly submitted non-sig data for non-sig plants	TS 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
CSO		2003 Estimates	100% CSO overflow reduction	100% CSO overflow reduction
Septic Systems		No any septic BMP	10% of septic systems connected to WWTP Remaining septic system applied 55% TN reduction for denitrification and pumping BMP	10% of septic systems connected to WWTP Remaining septic system applied 69% TN reduction for the most efficent combined ex situ and in situ BMPs.

Note: The proposed changes are highlighted in red. The previous version definitions was modified in June 2010. Both TS (tributary strategy) and WIP used design flow for significant plants. 100% CSO overflow reduction is assumed through 100% storage and treatment.

<<<<Phase 6 E3 Assumptions approved by the WQGIT 8/2017

Current Discussions:

1. **WW facilities expectations may be good for assumptions – Wide range of condition in non-sigs so they had lesser expectation. But update based on no-monetary constraint?**
2. **CSOs cannot go further than 100%**
3. **Septic Adjustments**
4. **Exfiltration Inclusion?**

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Context for Past Decisions:

Septic: onsite treatment systems report at 69% was from first OWTS expert panel (2014) showing the highest efficiency when combining in and ex-situ systems.

2018 OWTS expert panel shows the highest combined in and ex-situ systems to be 75% effective at TN reduction. Like all expert panels, they are deigned to be conservative. Update?

Exfiltration: 70% reduction for new or rehabbed facilities in exfil load.

Difficult work and low load relatively This 70% mark may be more difficult even than E3 would suggest. Limited area reporting so maybe leave that out entirely?

Feedback for Current Decisions:

1. Expectations for WWTP's plants may not need much additional review if at all, expectation sets high bar still.
2. CSO Reduction is already at 100%.
3. Exfiltration – new item, how should this be handled for E3?
4. Septic systems – Additional connection or TN reduction considerations from more recent expert panel report?

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E3 and Scenario Base Year Timeline for Review and Completion

Request Deliverables:

- Sector workgroups perform input review to produce documented list of input decisions table along with justification to be discussed and finalized at CWGT.

Timeline:

- 6-8 month review window (similar to Phase 6 review timeline) to complete scenario and inputs before by September 2026.
- August CWGT – Draft ready for discussion from workgroups
- September CWGT – Finalize E3 Inputs and Scenario Base Year

Thank you!

Questions?

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