VI. Accounting for Growth

Background

For consistency with the 2010 TMDL, EPA expects jurisdictions to describe how they will offset increased nutrient and sediment loads resulting from growth. Further, EPA asks jurisdictions to consider using NPDES regulations to offset or adjust source sector goals for new loads. Jurisdictions should also describe the programs and regulations that they intend to implement to maintain existing beneficial land covers. EPA allows jurisdictions to factor growth projections into their milestone commitments.

Maryland established an Accounting for Growth (AfG) Workgroup in 2013, after completing the Phase II WIP, to find common ground, clarify areas of disagreement, and make recommendations for an AfG policy in advance of formally proposing regulations. The 2013 AfG workgroup achieved consensus on all but two key policy issues: (1) calculating the allocation of loads for new development and determining associated offset requirements and; (2) establishing geographical boundaries for pollution trading. While Maryland has nutrient trading regulations to address trading geographies, the State has not yet determined the specific nitrogen offset requirements for growth. The State's ultimate goal is to have a balanced AfG program that is succinct, cost-effective, and easy to explain.

Because Maryland does not have regulations in place to offset increased loads from new sector growth, the State currently offsets loads through accelerated pollution reductions in the wastewater and agricultural sectors. Additionally, Maryland has land conservation, preservation, and growth management programs that limit growth impacts to the natural environment. To sustain Chesapeake Bay restoration and accommodate projected growth, Maryland needs to implement an adaptive growth policy through the accountability and adaptive management framework. This framework must regularly revisit sector-loading trends and provide sufficient offsets to stay under the State's pollution reduction targets.

Trends

Maryland is expected to grow by approximately 15,000 households per year through 2045, resulting in increased nutrient pollution[13]. Overall, Maryland projects that expected load reductions under the Phase III WIP will overcompensate for new loads from development and increased agricultural animal populations beyond 2045. This section details pollution reduction and growth trends by each sector and programs in place to curtail new pollution.

Agriculture:
According to SDAT, which tracks acres subject to the agricultural transfer tax, Maryland lost about 5,103 acres of farmland in 2018. The annual loss of farmland has been historically low in Maryland since the Great Recession in 2008. During the housing boom of the early 2000s, annual loss was much higher. For example, in 2004, according to SDAT, the State lost 22,451 acres of farmland. The Bay Program has projected a continued loss of farmland through 2025.

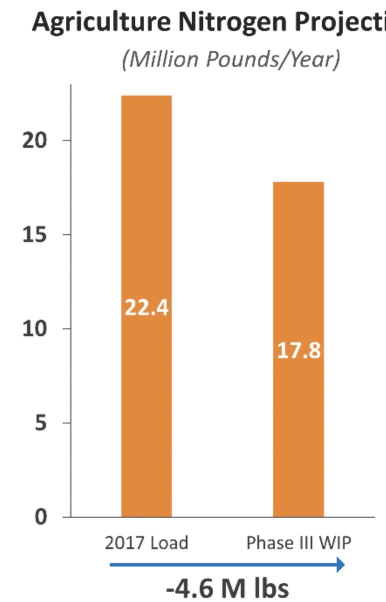

Figure 6: *Current and projected nitrogen loads to Chesapeake Bay from agriculture.*

Forest Loss:
Current projections (CAST "current zoning" scenario for Maryland) estimate 3,000-acres of forest loss annually. Forest is vital to Bay health because it produces the lowest nutrients and provides many co-benefits, including carbon sequestration, the shading, and cooling of streams, and wildlife habitat. Slowing, and ideally reversing forest loss, is imperative to sustaining the health of Maryland's local waters and the Chesapeake Bay.

[13] Maryland Department of Planning, Projections and State Data Center, August 2017

To minimize the loss of State forest resources during land development, Maryland enacted the Forest Conservation Act (FCA) in 1991. Any activity requiring an application for a subdivision, grading permit, or sediment control permit on areas 40,000 square feet (approximately 1 acre) or larger is subject to the FCA and requires a Forest Conservation Plan. During the first fifteen years of implementation, FCA was responsible for the review of 199,925 acres of forest. Of those nearly two hundred thousand acres, Maryland saw 120,638 acres of forest retained, 71,885 acres cleared, and 21,461 acres planted with new forest. Thus, at least twice as many acres were protected or planted as were cleared.

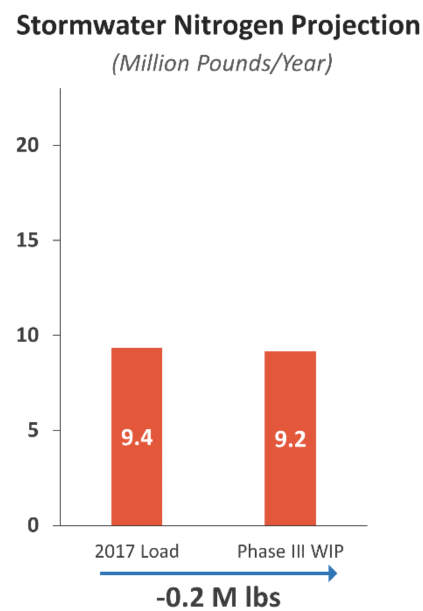

Figure 7: *Current and projected nitrogen loads to Chesapeake Bay from stormwater.*

Forest restoration and a 2025 conservation goal are part of the Vital Habitats goals in the 2014 Chesapeake Bay Watershed Agreement. This conservation goal sets to "protect an additional two million acres of lands throughout the watershed—currently identified as high conservation priorities at the federal, state, or local level—including 225,000 acres of wetlands and 695,000 acres of forest land of highest value for maintaining water quality." Appendix D provides information on Maryland's land conservation programs. Appendix B identifies tree planting and riparian buffers goals to help meet Bay agreement goals.

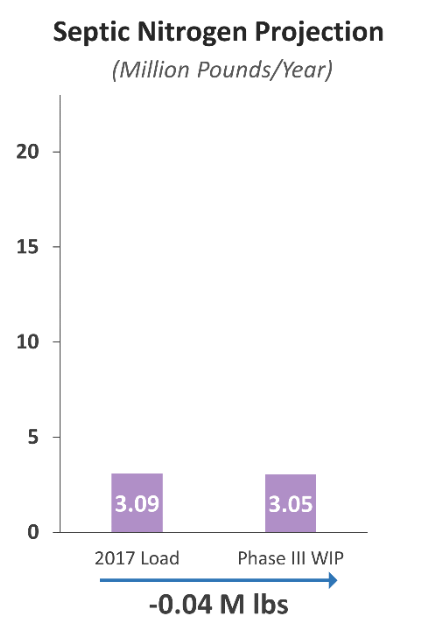

Figure 8: *Current and projected nitrogen loads to Chesapeake Bay from septic.*

Stormwater:
Current projections from 2018 -2025 (CAST "current zoning" scenario for Maryland) estimate new development creates 900-acres of impervious per year. Unabated, new growth would result in an approximately 2 percent increase in stormwater nitrogen loads by 2025. However, due to stormwater pollution reduction practices, the stormwater sector is expected to offset this growth and decrease nitrogen loads by about 190,000 pounds from current loads (Figure 5). After agriculture and wastewater, stormwater is Maryland's third highest nutrient loading sector to the Bay at approximately 17 percent of the total nitrogen load. By 2025, stormwater nitrogen pollution is estimated to comprise 20 percent of Maryland's nitrogen loads to the Chesapeake Bay. To address stormwater impacts from new development, Maryland implemented the "Stormwater Management Act of 2007" (Act). Before this Act, Maryland's Stormwater Design Manual encouraged environmental site design (ESD) through a series of credits. The Act requires that ESD, through the use of nonstructural best management practices and other better site design techniques, be implemented to the

maximum extent practicable. ESD practices infiltrate stormwater into vegetation and soils, reducing nitrogen loads from new development.

On-Site Disposal Systems:
Current projections (CAST "current zoning" scenario for Maryland) estimate approximately 1,700 new on-site disposal systems (septic systems) per year between now and 2025. Nitrogen loads from septic systems will decrease by an estimated total of 40,000 pounds from 2018 to 2025 (Figure 8). The State and local governments partially offset this growth by upgrading an average one thousand two-hundred conventional septic systems per year to best available technology (BAT)[14]. By 2025, Maryland's septic loads are expected to comprise approximately 7 percent of the overall nitrogen load to the Chesapeake Bay.

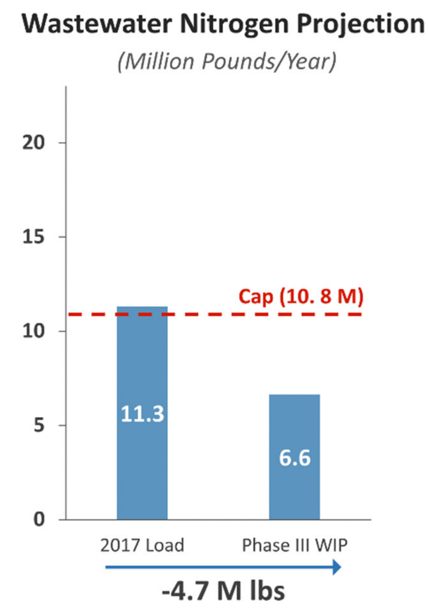

Figure 9: *Current and projected nitrogen loads to Chesapeake Bay from wastewater.*

Centralized Wastewater:
Maryland's 67 major wastewater treatment plants have NPDES total nitrogen, total phosphorus, and suspended solids permit limits to control the effluent concentration and volume of daily flow discharged. Approved design capacities (Table 9) are the basis for loading limits. These major plants are projected to be below their nitrogen pollution cap in 2025 by approximately 4.7 million pounds (Figure 9) because they are not at full design flows and because the State is upgrading them all to "best available technology." This projection also accounts for the assumption that wastewater flows will continue to grow by approximately 0.6 percent each year[15].

In short, over performance in the wastewater sector is more than enough to offset anticipated growth in the urban and agricultural sectors. Wastewater loads will be approximately 4.2 million pounds below its loading cap through a combination of better treatment performance (3.25 mg/L total nitrogen) than required under permit and operating below full design flows (Figure 9).

Table 9: *Design capacity and average daily flows for Maryland's major wastewater treatment plants.*

WWTP	Approved Design Capacity (MGD)	Average Flow (MGD)*
Aberdeen	4.000	1.677
Aberdeen-APG	2.800	0.596

[14] Maryland BAT database
[15] This estimate is based on MDP's population projections published in August 2017. The percent increase assumes a constant percent growth from 2015 to 2025, from 5.99M to 6.34M people. While growth is presented as a statewide number, plant flow increases were based on county-specific projections.

WWTP	Approved Design Capacity (MGD)	Average Flow (MGD)*
Aberdeen-APG Edgewood	3.000	0.592
Annapolis	13.000	7.880
Back River	180.000	135.048
Ballenger Creek	18.000	6.692
Beltsville USDA East	0.620	0.281
Blue Plains	169.600	114.572
Boonsboro	0.530	0.302
Bowie	3.300	1.483
Broadneck	6.000	4.503
Broadwater	2.000	1.004
Brunswick	1.400	0.527
Cambridge	8.100	2.639
Celanese	2.000	1.490
Centreville	0.500	0.095
Chesapeake Beach	1.500	0.775
Chestertown	1.500	0.639
Conococheague	4.100	2.292
Cox Creek	15.000	9.957
Crisfield	1.000	0.557
Cumberland	15.000	7.469
Damascus	1.500	0.749
Delmar	0.850	0.687
Denton	0.800	0.412
Dorsey Run	2.000	1.455
Eastern Correctional Institute	1.140	0.529
Easton	4.000	2.463
Elkton	3.050	1.732

WWTP	Approved Design Capacity (MGD)	Average Flow (MGD)*
Emmitsburg	0.750	0.495
Federalsburg	0.750	0.272
Fort Detrick	2.000	0.840
Fort Meade	4.500	3.538
Frederick	8.000	5.943
Freedom District	3.500	2.017
Fruitland	0.800	0.593
Georges Creek	0.600	0.907
Hagerstown	8.000	6.732
Hampstead	0.900	0.510
Havre de Grace	2.275	1.928
Hurlock	1.650	1.231
Indian Head	0.500	0.352
Joppatowne	0.950	0.851
Kent Island	3.000	1.916
La Plata	1.500	1.098
Leonardtown	0.680	0.538
Little Patuxent	25.000	18.271
Marlay Taylor (Pine Hill Run)	6.000	3.737
Maryland City	2.500	1.241
Maryland Correctional Institute	1.600	0.873
Mattawoman	20.000	9.290
Mayo Large Communal	0.820	0.359
Mount Airy	1.200	0.707
Northeast River	3.000	1.104
NSWC-Indian Head	0.500	0.403
Parkway	7.500	6.230

WWTP	Approved Design Capacity (MGD)	Average Flow (MGD)*
Patapsco	73.000	55.584
Patuxent	7.500	5.149
Perryville	1.650	0.664
Piney Orchard	1.200	0.593
Piscataway	30.000	24.204
Pocomoke City	1.470	0.962
Poolesville	0.750	0.507
Princess Anne	1.260	0.551
Salisbury	8.500	4.359
Seneca Creek	26.000	14.008
Snow Hill	0.500	0.322
Sod Run	20.000	10.893
Swan Point	0.600	0.109
Talbot County Region II	0.660	0.346
Taneytown	1.100	0.735
Thurmont	1.000	0.630
US Naval Academy	1.000	0.080
Western Branch	30.600	19.957
Westminster	5.000	4.702
Winebrenner	1.000	0.206
Total Volume	**787.555**	**535.636**

*Based on data from State Fiscal years 2016-2018

Strategies

Accounting for Growth

Maryland has a four-pronged strategy to account for growth in the Phase III WIP. These strategies consider growth impacts to the 2025 restoration deadline and address growth in loads beyond 2025:

1. *Projected 2025 Conditions Have Been Built into the 2025 Pollution Reduction Targets*

In developing the Phase III WIP to meet 2025 pollution reduction targets, the CBP's Principals Staff Committee (PSC) agreed in December 2017 to use 2025 projected conditions to account for growth impacts on land use and populations. Consequently, Maryland's Phase III WIP strategies have already accounted for projected 2025 growth in calculating each sector's load reduction. The Chesapeake Bay Program (CBP) modeling team will confirm each jurisdiction's Phase III WIP pollution reduction practices on their 2025 forecasted conditions to ensure practices account for growth and achieve restoration targets.

2. *Maryland's Current Land Use Policy BMPs Conservation and Protection Plans Have Been Incorporated in the 2025 Land Use*

CBP allowed Bay jurisdictions to modify the future land use scenarios for projecting 2025 growth conditions to reflect existing and proposed conservation and protection efforts, such as agricultural and forest conservation, and growth management (e.g., local zoning). Because Maryland and local governments have many existing land use preservation and protection programs in place, the State included these programs in a Conservation Plus scenario (Appendix D) and incorporated it into the Bay model. This process allowed Maryland to take credit for the nutrient load reductions from these programs. This credit helps to account for a specific portion of future projected growth in loads.

Maryland worked to have existing State and local Land Use Policy BMPs credited for load reductions. There is also the possibility of getting additional credit for new Land Use Policy BMPs that entities propose to implement through 2025. However, Maryland has not yet determined the load reduction effect of new Land Use Policy BMPs, including expanded and targeted land preservation programs.

3. *Maryland's Resource Protection Programs and Associated Strategies for Increasing Those Protections are Being Incorporated into the Phase III WIP*

Appendix D describes current natural and aquatic resource protection and conservation programs, as well as the strategies for programmatic improvement. Because the model cannot quantify this information, it represents a qualitative approach to managing growth and land change. However, this approach is essential to successful Bay cleanup because it is significantly less expensive than restoration to protect and conserve high functioning ecosystems and the lands on which they depend.

4. *Adaptive Management to Address Growth in Loads Post-2025*

Maryland projects that expected load reductions under the Phase III WIP overcompensate for the growth in loads from development and agriculture and keep the State under its Phase III WIP nutrient targets beyond 2045. Through two-year milestones and associated progress evaluations, Maryland uses an adaptive management process to ensure any growth in loads does not exceed restoration targets.

Challenges and Opportunities

Once achieved, Maryland will need to maintain the Bay TMDL beyond 2025. The anticipated load increases from Conowingo Dam, population growth, and climate change highlight the importance of Maryland having a proactive and adaptive policy that addresses growth in pollution loads. In order to maintain the Bay TMDL after 2025, Maryland needs to continue to achieve sufficient load reductions that offset increases in loads from growth. Post-2025 load reductions can contain a variety of measures, including continued MS4 permit implementation, innovative WWTP technology improvements, land use policy BMPs (defined below, i.e., Conservation Plus), and accounting for growth policies. The types of post-2025 load reductions needed will depend on specific growth patterns, trends, and implementation of the adaptive management framework to establish appropriate offsets to new pollution.