

Accounting for Growth Expectations for the Phase III Watershed Implementation Plans (WIPs)

Chesapeake Bay Program (CBP) Partnership Decisions and USEPA Expectations on Accounting for Growth¹

In December 2017, the CBP partnership's Principals' Staff Committee (PSC) approved the jurisdictions' use of the 2025 projected "Current Zoning" baseline scenario to account for growth (e.g., future change in land uses and animal and human populations) in the development and implementation of the jurisdictions' Phase III Watershed Implementation Plans (WIPs) and two-year milestones. The PSC further decided that the future growth forecasts be updated every two years using the best available data to coincide with the development of the two-year milestones. Accordingly, the Chesapeake Bay Program Office modeling team will run each jurisdictions' respective Phase III WIP input deck of approved Best Management Practices (BMPs) on 2025 forecasted conditions at the state, state-basin, and source sector level, using "Current Zoning" as the baseline scenario. Through the Chesapeake Assessment Scenario Tool (CAST)², jurisdictions will have the opportunity to select among several alternative representations of 2025 land uses (i.e., "Land Policy BMPs"³) which reflect potential combinations of actions focused on growth management, forest conservation, and/or agricultural conservation.

The jurisdictions' Phase III WIP documents should describe how the jurisdictions are going to offset any increases in nutrient and sediment pollutant loads resulting from sector growth (e.g., new development, changes in agriculture, increases in septic systems) at the state-basin level, which is consistent with the expectation in the 2010 Bay TMDL. The jurisdictions will also take any steps required by the Clean Water Act and National Pollutant Discharge Elimination System regulations to offset, or adjust source sector goals for, new or increased loads at the general and/or individual permit level. Additionally, the jurisdictions' Phase III WIP documents should describe the programs and regulations that jurisdictions intend to implement to maintain existing land use/cover, including high quality beneficial land use/cover (e.g., mature forests). As part of the development of their two-year milestones from 2018-2025, the jurisdictions will have the opportunity to factor in updated future growth projections and ensure local partner review of the future growth forecasts with each two-year update, thus adjusting their milestone commitments accordingly. These regular updates will increase the accuracy of the 2025 land use forecasts and inform course corrections, if needed, to achieve actions outlined in the Land Policy BMPs. Any planned or proposed offsets should not adversely affect local water quality (e.g., installing BMPs in a rural area to compensate for increased urban pollution should not allow for significant water quality degradation at the urban site). The US Environmental Protection Agency (EPA) strongly encourages jurisdictions to utilize Partnership-approved approaches, data,

¹ This information was mostly taken directly from EPA's Phase III WIP Expectations document:

https://www.chesapeakebay.net/what/publications/epas_phase_iii_wip_expectations

² The CAST tool is available for use by the public following registration on the site and it has excellent documentation and help screens.

For more information, see: <https://cast.chesapeakebay.net/> and

<http://www.chesapeakeconservation.org/index.php/our-work/current-initiatives/conservation-plus/>

³ Note that Land Policy BMPs have been referenced in previous documents as Conservation Plus BMPs.

and decision support tools (e.g., Chesapeake Bay Land Change Model and CAST), for forecasting conditions to fully account for projected growth at the appropriate geographic scales (i.e., state-basin) and for each source sector in their Phase III WIP development process as well as in their succeeding 2018-2025 two-year milestones.

Gaps in programmatic capacity that the jurisdictions will need to address in the 2018-2025 timeframe through their Phase III WIPs include:

Building, staffing, and implementing the programs and programmatic infrastructure, tracking systems, BMP verification programs, policies, legislation, and regulations necessary to fully account for growth, and offsetting all resultant new or increased pollutant loads through 2025.

The Phase III WIP local engagement strategies should address the following:

Clear description of local, regional, and federal involvement in each jurisdiction's strategy to account for growth (e.g., provisions for maintaining up-to-date communications with stakeholders and the public about progress on Phase III WIP implementation; articulation of the roles that other stakeholders will play in implementation)

Land Policy BMPs

To support the jurisdictions' efforts to account for growth in loads due to changes in land use, the CBP partnership and the jurisdictions have developed a suite of future land use scenarios that are referred to as "Land Policy BMPs" and will be available in CAST for optional inclusion in each jurisdiction's Phase III WIP. The Land Policy BMPs currently in CAST include three developed for illustrative purposes ("Forest Conservation", "Growth Management", and "Agricultural Conservation") and will include at least one custom Land Policy BMP for jurisdictions that expressed interest in developing one (i.e., District of Columbia, Delaware, Maryland, Pennsylvania, and Virginia). Currently proposed custom Land Policy BMPs include a balanced mixture of forest and farmland conservation and growth management. West Virginia will use the "Current Zoning" baseline for its WIP and New York expressed interest in developing a Land Policy BMP but has not yet designed one. Jurisdictions can choose and/or design land conservation and growth management actions to include in their custom Land Policy BMPs and these actions can vary by county or reflect state-wide policies, programs, regulations, and investments. Once finalized and approved by the jurisdictions that developed them, custom Land Policy BMPs will be included in CAST. While the custom Land Policy BMPs will be available to all users, their effects on land use will only apply to the jurisdiction for which they were developed.

Calculating Load Reductions from Land Policy BMPs

Pollutant loads (pounds of nitrogen, phosphorus, and sediment) from Land Policy BMPs are estimated using CAST -- which has been designed to help jurisdictions develop their Phase III WIPs and estimate pollution loads from all BMPs, including Land Policy BMPs. The effects of land use planning and land conservation actions on future land use conditions and septic systems are initially simulated using the Chesapeake Bay Land Change Model (CBLCM) in combination with five-year extrapolations of trends in crops, hay, pasture, and animal populations from the Census of

Agriculture (1982 -2012). These forecasted/extrapolated land use, septic, and animal population data are combined with state-reported harvested forest and construction acres in CAST to form the final 2025 land use datasets associated with each Land Policy BMP. Within CAST, pollutant loads resulting from the Land Policy BMPs can be estimated on one of two base conditions: Historic Trends or Current Zoning. Because the “Current Zoning” base condition was accepted as the official 2025 baseline used by the CBP partnership to evaluate the effects of Land Policy BMPs on 2025 conditions, it is recommended that this baseline be chosen to estimate pollutant load reductions from Land Policy BMPs. To evaluate the effects of Land Policy BMPs, CAST users should compute pollutant loads for a 2025 Current Zoning baseline and from the same 2025 base condition with the addition of a Land Policy BMP. To be comparable, these CAST scenarios should include the same wastewater and BMP datasets (e.g., “2017 Wastewater” and “2017 Progress v9”) and be computed for full-county extents to ensure consistent spatial allocation of BMPs. Once these two scenarios are produced, comparative reports can be generated in CAST showing the differences in Edge-of-Tide pollutant loads associated with a specific Land Policy BMP. When a jurisdiction develops their Phase III WIP with a specific Land Policy BMP, the net pollutant load reductions associated with that Land Policy BMP (compared to Current Zoning) will be credited towards the jurisdiction’s required reductions under its Phase III WIP planning targets. These loading differences can be calculated in CAST.

The following tables illustrate expected changes in nitrogen, phosphorus, and sediment loads for each of the three illustrative Land Policy BMPs and for the draft custom Land Policy BMPs. The custom, jurisdiction-specific Land Policy BMPs include unique mixtures of growth management, forest conservation, and farmland conservation actions. The effects of these collective actions on future land use conditions and septic systems were simulated using the CBLCM and then input to CAST to estimate their effects on pollutant loads. Negative values, i.e., reductions compared to the baseline, are in parentheses. As a percentage of the total needed reductions in pollutant loads required from 2017 – 2025 across all jurisdictions, the Land Policy BMPs result in changes ranging from: -1.6% to +1.2% TN, -3.7% to -1.1% TP, and -4.2% to +1.6% TSS. Increases in pollutant loads may result from a Land Policy BMP with more, higher-loading land use acres (e.g., cropland) or fewer, lower-loading land use acres (e.g., forest) compared to the Current Zoning baseline. Land Policy BMPs may also decrease loads for one pollutant, e.g., phosphorus, while increasing loads from another, e.g., nitrogen. This occurs in the draft custom Land Policy BMP for Delaware because extrapolated changes in crop types from the Census of Agriculture lead to relatively large increases in nitrogen that counter the decreases in the developed sector due to growth management actions. These changes in crop type, however, cause only minor increases in phosphorus relative to the changes expected due to growth management, which is why the net change in phosphorus is negative.

Because the effects of Land Policy BMPs on nutrient pollution are complex and sometimes counter intuitive, jurisdictions are encouraged to evaluate their effects and refine them in ways that generate greater pollutant reductions while remaining realistic. Land Policy BMPs should be evaluated with the recognition that their effects on avoiding future pollution will increase over time. This becomes increasingly relevant post-2025 when the pollution reduction targets must be maintained to prevent water quality degradation.

Changes in Total Pollutant Loads (TN, TP, and TSS) associated with Land Policy BMPs

DC				DE				MD			
LandPolicyBMP	TN	TP	TSS	LandPolicyBMP	TN	TP	TSS	LandPolicyBMP	TN	TP	TSS
DC Custom (draft)	303	27	58,219	DE Custom (draft)	30,050	(2,826)	(122,264)	MD Custom (draft)	(111,926)	(6,317)	(6,722,178)
Growth Management	(88)	(10)	(14,255)	Growth Management	(26,372)	(202)	(28,066)	Growth Management	(156,504)	(3,193)	(2,401,336)
Forest Conservation	(133)	(15)	(21,471)	Forest Conservation	(1,050)	(77)	(57,551)	Forest Conservation	(58,016)	(693)	(4,455,942)
Farmland Conservation	(27)	(2)	(4,078)	Farmland Conservation	28,501	(1,414)	40,912	Farmland Conservation	124,614	1,051	7,225,114
NY				PA				VA			
LandPolicyBMP	TN	TP	TSS	LandPolicyBMP	TN	TP	TSS	LandPolicyBMP	TN	TP	TSS
	-	-	-	PA Custom (draft)	(158,146)	(943)	(1,080,715)	VA Custom (draft)	(283,547)	(13,949)	(10,203,626)
Growth Management	(272)	(8)	(14,192)	Growth Management	(144,057)	(2,282)	(2,773,207)	Growth Management	(354,972)	(17,354)	(12,779,306)
Forest Conservation	(372)	2	(11,502)	Forest Conservation	(71,604)	(286)	(1,938,386)	Forest Conservation	(124,234)	(6,024)	(8,517,902)
Farmland Conservation	844	(67)	(88,202)	Farmland Conservation	294,538	505	4,676,093	Farmland Conservation	28,028	(12,568)	(4,317,837)
WV				Overall Changes in Loads (all Jurisdictions).							
LandPolicyBMP	TN	TP	TSS	LandPolicyBMP	TN	TN(%)*	TP	TP(%)*	TSS	TSS(%)*	
	-	-	-	Custom	(523,266)	-1.2%	(24,008)	-3.7%	(18,070,564)	-4.0%	
Growth Management	(5,976)	(645)	(555,454)	Growth Management	(688,241)	-1.6%	(23,694)	-3.7%	(18,565,816)	-4.2%	
Forest Conservation	13,601	(5)	(39,159)	Forest Conservation	(241,808)	-0.6%	(7,098)	-1.1%	(15,041,913)	-3.4%	
Farmland Conservation	19,559	(890)	(235,193)	Farmland Conservation	496,057	1.2%	(13,385)	-2.1%	7,296,809	1.6%	
* percentages represent the percent of the total needed reductions from 2017 - 2025: 43.1M lbs TN; 0.64M lbs TP; and 447B lbs TSS											
source = https://www.chesapeakeprogress.com/clean-water/watershed-implementation-plans											

Updating Observations of Land Use Change and 2025 “Current Zoning” baseline

Regular updates to the Chesapeake Bay land use data will inform an adaptive management approach to achieve pollution reduction targets and will constitute an important part of the process to verify the effects of Land Policy BMPs. Coarse-scale, “hot spots” of land use change (approx. >= 10 acres) will be observed every two years (with a 1 to 2-year lag) through the interpretation of satellite imagery. Fine-scale changes in land use (approx. >= 1 acre) will be observed every four years (with a 2 to 3-year lag) through the interpretation of aerial imagery. These data will be provided to the jurisdictions to inform their two-year milestones and annual progress narratives, indicating the need for greater or lesser emphasis on BMPs for different sectors. The data will also be evaluated for use in updating the 2025 Current Zoning baseline. The future baseline condition will be updated every odd year, coinciding with the two-year milestones, using the best available data (e.g., population and employment projections, protected lands, Census of Agriculture, and potentially new observed patterns of land use change). The updated baseline will be used to inform the two-year milestones and annual progress assessments and to help the jurisdictions verify the effects of actions specified in their Land Policy BMPs. For example, updating the Current Zoning baseline in the summer of 2019 will inform 2019 and 2020 Progress and the 2021-2022 Milestones.

Annual Progress Reporting Recommendations

Every year, the Bay jurisdictions must report progress towards achieving the goals outlined in their WIPs and two-year milestones. Reporting progress has a narrative programmatic component and a data table of approved BMPs that were implemented over the previous year. Implemented BMPs are combined with expected land use conditions in CAST to quantify their expected nutrient and sediment reductions. Land Policy BMPs determine the expected land use conditions for 2025 and affect land use conditions for interim years between the latest mapped land uses (i.e., 2013) and 2025. Actions specified in the Phase III WIPs to achieve the Land Policy BMPs adopted by each jurisdiction should not be included in the data tables of implemented BMPs. However, verification of the Land Policy BMPs warrants narrative, programmatic, and numeric reporting of actions implemented each year to ensure that the jurisdictions are on track towards achieving them. For example, annual progress reporting might include documentation of acres of forest and farmland conserved by county, investments to expand wastewater infrastructure, issuance of new subdivision ordinances, or implementation of zoning regulations that protect riparian zones from development. Annual reporting of activities along with monitored changes in land use will help verify Land Policy BMP actions intended to reduce and minimize potential future increases in water pollution due to land use activities. The Land Use Workgroup, Water Quality Goal Implementation Team, and Management Board will be asked to clarify CBP partnership expectations about the level of detail needed to verify Land Policy BMP actions in annual progress narratives.