

Final Phase 3 WIP Sediment Targets and Basin-to-Basin Exchanges

Water Quality Goal Implementation Team
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Chesapeake Bay Program
Science, Restoration, Partnership



Final Phase III WIP Sediment Targets

- Previous PSC, MB, & WQGIT decisions on sediment targets.
- Method used to generate sediment targets.
- Final sediment targets.



From PSC Phase III WIP Sediment Planning Target Document

“Sediment loads are managed in the Chesapeake Bay Total Maximum Daily Load to specifically address the water clarity/submerged aquatic vegetation (SAV) water quality standards. Research has shown that the water clarity/SAV water quality standard is generally more responsive to nutrient load reductions than it is to sediment load reductions. The sediment targets developed for the Phase III Watershed Implementation Plans (WIPs), as they have been for previous WIPs, **will be formed on the basis of the sediment load delivered to the Chesapeake Bay associated with management actions taken to address the Phase III WIP nitrogen and phosphorus targets. In other words, the Best Management Practices (BMPs) that are identified in this WIP to meet the Phase III WIP nitrogen and phosphorus targets will be run through the Chesapeake Bay Program (CBP) partnership’s Phase 6 suite of modeling tools, and the resulting sediment loads will form the basis for the Phase III WIP sediment targets.** These sediment loads will be adjusted proportionally to account for any overshooting or undershooting of the Phase III WIP nitrogen and phosphorus targets. **An additional 10% allowance will be added to the calculated Phase III WIP sediment target in each major basin.**

The resulting final Phase III WIP sediment targets will be appended to the final Phase III WIP in October 2019, once they have been approved by the CBP partnership. The Phase III WIP sediment targets will not affect the BMPs called for in the WIP and are not intended to be the driver for implementation moving forward.”



Sediment Target Calculation

Example: Basin Jurisdiction Missed Nutrient Targets



Example: Basin Jurisdiction Exceeded Nutrient Targets





CBP Basin to Basin (B2B) and N:P Exchanges

- The CBP has established B2B and N:P exchange protocols since 2010.
- The B2B and N:P exchanges are applied to the July 2018 PSC Approved Phase III 2025 Planning Targets.
- VA specified interbasin and N:P exchanges in their WIP.
- MD specified interbasin N exchanges in their WIP.
- WV specified that they would be moving a small amount of 2025 target load from the Potomac to the James so that the James target would be met.
- PA specified that they are using all of their P target over-achievement to increase N targets in each of their basins.
- DC, DE, and NY did not request exchanges.

Final
Planning
Targets and
Final WIPs
with
Sediment

StateBasin	2025 Planning Targets with B2B & N:P			Final Phase III WIP		
	Nitrogen	Phosphorus	Sediment	Nitrogen	Phosphorus	Sediment
DC Potomac	2.42	0.130	41.9	2.31	0.105	35.8
DE Eastern Shore	4.55	0.108	26.7	4.46	0.081	23.5
MD Eastern Shore	15.60	1.290	2903.4	15.44	1.211	2585.1
MD Patuxent	3.21	0.300	437.7	3.08	0.241	370.4
MD Potomac	15.80	1.090	1928.0	15.64	0.814	1692.5
MD Susquehanna	1.60	0.050	113.8	1.57	0.050	101.8
MD Western Shore	9.63	0.950	2959.9	8.97	0.918	2526.8
NY Susquehanna	11.53	0.587	532.7	12.53	0.544	518.0
PA Eastern Shore	0.46	0.022	27.4	0.54	0.022	28.9
PA Potomac	6.14	0.338	295.5	7.34	0.338	316.9
PA Susquehanna	66.87	2.544	1838.2	75.38	2.544	1866.3
PA Western Shore	0.02	0.001	0.3	0.02	0.001	0.3
VA Eastern Shore	1.83	0.152	473.3	1.55	0.141	368.1
VA James	21.81	2.241	2015.2	20.92	2.126	1752.4
VA Potomac	16.51	1.823	1929.7	15.38	1.674	1630.2
VA Rappahannock	7.09	0.819	1505.1	6.43	0.764	1247.2
VA York	5.71	0.548	949.1	5.30	0.524	803.6
WV James	0.05	0.006	13.0	0.05	0.005	10.9
WV Potomac	8.18	0.427	595.9	7.45	0.375	492.1



July 2018 PSC Approved 2025 Phase III Planning Targets and Exchange Ratios

Major	Geography		Planning Target	
	State	StateBasin	Nitrogen	Phosphorus
Potomac	DC	DC Potomac	2.42	0.130
Eastern Shore	DE	DE Eastern Shore	4.55	0.108
Eastern Shore	MD	MD Eastern Shore	15.21	1.286
Patuxent	MD	MD Patuxent	3.21	0.301
Potomac	MD	MD Potomac	15.30	1.092
Susquehanna	MD	MD Susquehanna	1.18	0.053
Western Shore	MD	MD Western Shore	10.89	0.948
Susquehanna	NY	NY Susquehanna	11.53	0.587
Eastern Shore	PA	PA Eastern Shore	0.45	0.025
Potomac	PA	PA Potomac	6.11	0.357
Susquehanna	PA	PA Susquehanna	66.59	2.661
Western Shore	PA	PA Western Shore	0.02	0.001
Eastern Shore	VA	VA Eastern Shore	1.43	0.164
James	VA	VA James	25.92	2.731
Potomac	VA	VA Potomac	16.00	1.892
Rappahannock	VA	VA Rappahannock	6.85	0.849
York	VA	VA York	5.52	0.556
James	WV	WV James	0.04	0.005
Potomac	WV	WV Potomac	8.18	0.427

GeoBasin	N	P	N:P Ratio
Susquehanna	16.325	38.503	2.36
Western Shore	14.109	35.264	2.50
Patuxent AFL	10.931	27.505	2.52
Patuxent BFL	13.514	35.667	2.64
Potomac AFL	14.045	22.210	1.58
Potomac BFL	13.201	22.165	1.68
Rappahannock AFL	8.065	11.765	1.46
Rappahannock BFL	9.278	15.453	1.67
York AFL	4.630	9.111	1.97
York BFL	5.165	8.681	1.68
James AFL	2.647	7.673	2.90
James BFL	2.351	7.434	3.16
Upper Eastern Shore	10.709	31.840	2.97
Middle Eastern Shore	11.244	43.196	3.84
Lower Eastern Shore	9.782	25.243	2.58
Virginia Eastern Shore	15.214	20.404	1.34
Atmospheric Deposition	15.827		



Virginia Exchanges

Table 4: Phosphorus:Nitrogen and Basin:Basin Exchanges

Exchange From	From Amount (pounds)	Exchange To	To Amount (pounds)
Potomac P	68,500	Potomac N	115,000
James N	2,270,000	Potomac N	404,000
Eastern Shore P	11,900	Eastern Shore N	20,000
James N	2,320,000	Eastern Shore N	358,000
Rappahannock P	29,800	Rappahannock N	50,000
James N	670,000	Rappahannock N	170,000
York P	8,700	York N	15,000
James N	360,000	York N	164,000
James P	490,800	James N	1,552,000

Note: Using precise values for weighted average exchanges factors, the “To Amount” was recalculated.



Maryland Exchanges

Maryland Basin	Nitrogen (M Pounds per Year)			Approximate Exchange Factor*	Phosphorus (M Pounds per Year)			Approximate Exchange Factor*
	Planning Target	State-Basin Target	Phase III WIP Plan		Planning Target	State-Basin Target	Phase III WIP Plan	
Eastern Shore	15.2	15.6	15.6	10.6	1.29	1.29	1.23	33.4
Patuxent	3.2	3.1	3.1	12.2	0.30	0.30	0.27	31.6
Potomac	15.3	15.8	15.8	13.6	1.09	1.09	0.87	22.2
Susquehanna	1.2	1.6	1.6	16.3	0.05	0.05	0.05	38.5
Western Shore	10.9	9.6	9.0	14.1	0.95	0.95	0.96	35.3
Statewide	45.8	45.8	45.2	-	3.68	3.68	3.38	-

* The Approximate Exchange Factor is expressed in units of micrograms of dissolved oxygen per liter for one million pounds of nutrients reduced. The values shown here are approximated based on the average of minor basins within the state basin.

Note: Using precise values for weighted average exchanges factors an additional 0.1 million pounds was added to the Patuxent.

Source: Final Maryland Phase III WIP



WV and PA Narrative Requests

- “West Virginia cannot achieve its James Basin planning targets and requests accommodation through small exchanges of surplus nutrient loads from the West Virginia Potomac Basin.”
- “Since Pennsylvania successfully exceeded its 2025 reduction goal for phosphorus by 139,367 pounds, Pennsylvania is proposing to exchange that phosphorus reduction for nitrogen reduction based on the EPA’s provided conversion factors.”

Note: The increase in the nitrogen target was applied individually to each PA basin.

Source: Final West Virginia and Pennsylvania
Phase III WIPs, respectively

Final Planning Targets after B2B and N:P Exchanges

StateBasin	2025 Planning Targets Approved by PSC 8/18		2025 Planning Targets with B2B & N:P		Difference	
	Nitrogen	Phosphorus	Nitrogen	Phosphorus	Nitrogen	Phosphorus
DC Potomac	2.42	0.130	2.42	0.130	0.00	0.00
DE Eastern Shore	4.55	0.108	4.55	0.108	0.00	0.00
MD Eastern Shore	15.21	1.286	15.60	1.290	0.39	0.00
MD Patuxent	3.21	0.301	3.21	0.300	0.00	0.00
MD Potomac	15.30	1.092	15.80	1.090	0.50	0.00
MD Susquehanna	1.18	0.053	1.60	0.050	0.42	0.00
MD Western Shore	10.89	0.948	9.63	0.950	-1.26	0.00
NY Susquehanna	11.53	0.587	11.53	0.587	0.00	0.00
PA Eastern Shore	0.45	0.025	0.46	0.022	0.01	0.00
PA Potomac	6.11	0.357	6.14	0.338	0.03	-0.02
PA Susquehanna	66.59	2.661	66.87	2.544	0.27	-0.12
PA Western Shore	0.02	0.001	0.02	0.001	0.00	0.00
VA Eastern Shore	1.43	0.164	1.83	0.152	0.39	-0.01
VA James	25.92	2.731	21.81	2.241	-4.11	-0.49
VA Potomac	16.00	1.892	16.51	1.823	0.52	-0.07
VA Rappahannock	6.85	0.849	7.09	0.819	0.24	-0.03
VA York	5.52	0.556	5.71	0.548	0.19	-0.01
WV James	0.04	0.005	0.05	0.006	0.01	0.00
WV Potomac	8.18	0.427	8.18	0.427	0.00	0.00

Final Planning Targets and Final WIPs

StateBasin	2025 Planning Targets with B2B & N:P		Final Phase III WIP	
	Nitrogen	Phosphorus	Nitrogen	Phosphorus
DC Potomac	2.42	0.130	2.31	0.105
DE Eastern Shore	4.55	0.108	4.46	0.081
MD Eastern Shore	15.60	1.290	15.44	1.211
MD Patuxent	3.21	0.300	3.08	0.241
MD Potomac	15.80	1.090	15.64	0.814
MD Susquehanna	1.60	0.050	1.57	0.050
MD Western Shore	9.63	0.950	8.97	0.918
NY Susquehanna	11.53	0.587	12.53	0.544
PA Eastern Shore	0.46	0.022	0.54	0.022
PA Potomac	6.14	0.338	7.34	0.338
PA Susquehanna	66.87	2.544	75.38	2.544
PA Western Shore	0.02	0.001	0.02	0.001
VA Eastern Shore	1.83	0.152	1.55	0.141
VA James	21.81	2.241	20.92	2.126
VA Potomac	16.51	1.823	15.38	1.674
VA Rappahannock	7.09	0.819	6.43	0.764
VA York	5.71	0.548	5.30	0.524
WV James	0.05	0.006	0.05	0.005
WV Potomac	8.18	0.427	7.45	0.375

Final Planning Targets and Final WIPs with Sediment

These will be the 2025
Planning Targets Tracked
by the CBP partnership
going forward.

StateBasin	2025 Planning Targets with B2B & N:P			Final Phase III WIP		
	Nitrogen	Phosphorus	Sediment	Nitrogen	Phosphorus	Sediment
DC Potomac	2.42	0.130	41.9	2.31	0.105	35.8
DE Eastern Shore	4.55	0.108	26.7	4.46	0.081	23.5
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Summary:

- The basin-to-basin (B2B) and nitrogen to phosphorus (N:P) exchanges have been established in the CBP since 2010 and allow plans for efficient and effective implementation in the watershed with equivalent environmental (water quality standard) outcomes in the tidal Bay.
- In no instances were the Phase III WIP B2B or N:P exchanges found to cause water quality detriment in tidal tributaries and embayments.
- The 2025 Planning Targets with B2B and N:P exchanges are equivalent to the July 2018 PSC approved 2025 Phase III Planning Targets and will be used to track progress going forward.
- The Final Phase III WIPs in most cases exceed the 2025 Planning targets providing freeboard for future risk of climate change and growth.