



Factoring in Climate Change in EIAs for Alternative Practices

Climate resiliency in the urban stormwater sector is an MDE priority and as a planning metric, EIAs should reflect loads due to future projected climate. Part of a continuous effort to incorporate climate change into its programs, the Water and Science Administration (WSA) performed an investigation on the effect of factoring in climate change in EIAs for alternative practices. This investigation used the Chesapeake Bay Program's (CBP) most up-to-date 2025 and 2035 climate change loading scenarios. Structural stormwater management practices were not included in this investigation because 1) current crediting already includes incentives for additional treatment under future climate scenarios, and 2) credits for structural stormwater management practices are not derived from Bay model loads.

New EIAs were determined using the same method described in the 2020 MS4 Accounting Guidance document but with 2025 and 2035 No Action Climate Scenarios provided by CBP. These new EIAs were compared with the original 2020 MS4 Accounting Guidance document EIAs, which are based on a CAST 2010 No Action Scenario. The results are presented in Table 1 and 2 below.

The investigation found minimal relative changes to total loads and unit loads between the scenarios and as a result, minimal impact on the overall EIA calculation. For land use conversion BMPs, there was no nutrient and sediment loading change between the 2010 No Action and 2025 No Action Climate Scenarios and minimal relative change for forest planting, riparian forest planting, and impervious surface reduction BMPs between the 2010 No Action and 2035 No Action Climate Scenarios. For Efficiency BMPs, the change in scenarios had the greatest effect on street sweeping, although the differences were still relatively minimal. Septic, stream restoration, shoreline management, and forest conservation BMPs showed a slight decrease in EIA between the 2010 No Action and 2025 No Action Climate scenario, but the results were still relatively minimal. A greater percent change was observed across BMPs between the 2010 No Action and 2035 No Action Climate Scenarios, but the majority had a percent change less than 2%.

The best available science indicates that climate change increases loads, but those increases are relatively small compared to historic, anthropogenic loads. MDE will continue to work with CBP to refine and improve our understanding of future climate on watershed loads and their water quality impacts. As a result of this investigation and the minimal relative effect of the 2025 and 2035 Climate Scenarios on EIAs, MDE recommends that jurisdictions continue working with the EIAs currently in the 2020 MS4 Accounting Guidance document. MDE reserves the right to update the EIAs using future research regarding BMP performance under future projected climate. Under future climate, load reduction goals will only continue to increase, and all sectors will need to continue to do more to meet both Chesapeake Bay and local water quality goals. MDE recommends that jurisdictions prepare to include projected future climate into restoration planning and objectives.

Table 1. Land Use Conversion BMP EIA Scenario Comparison

Land Use Conversion BMP	EIA Scenario			Units	2010 - 2025 % Change	2010 - 2035 % Change
	2010 No Action	2025 Climate	2035 Climate			
Forest Planting (<i>Turf → Forest</i>)	1.10	1.10	1.11	Per acre	0.0%	0.9%
Riparian Forest Planting	1.50	1.50	1.52	Per acre	0.0%	1.3%
Conservation Landscaping (<i>Turf → Mixed Open</i>)	0.37	0.37	0.37	Per acre	0.0%	0.0%
Riparian Conservation Landscaping	0.49	0.49	0.49	Per acre	0.0%	0.0%
Impervious Surface Reduction (<i>Impervious → Turf</i>)	0.71	0.71	0.70	Per acre	0.0%	-1.4%
Street Trees (<i>Roads → Tree Canopy over Impervious</i>)	0.40	0.40	0.40	Per acre	0.0%	0.0%
Urban Tree Canopy Planting (<i>Turf → Tree Canopy Over Turf</i>)	0.28	0.28	0.28	Per acre	0.0%	0.0%

Table 2. Efficiency BMP EIA Scenario Comparison

Efficiency BMP	EIA Scenario			Units	2010 - 2025 % Change	2010 - 2035 % Change	
	2010 No Action	2025 Climate	2035 Climate				
Floating Treatment Wetland – 10% Coverage	0.008	0.008	0.008	Per acre treated	0.0%	0.0%	
Floating Treatment Wetland – 20% Coverage	0.017	0.017	0.018		0.0%	5.9%	
Floating Treatment Wetland – 30% Coverage	0.026	0.026	0.026		0.0%	0.0%	
Floating Treatment Wetland – 40% Coverage	0.034	0.034	0.034		0.0%	0.0%	
Floating Treatment Wetland – 50% Coverage	0.042	0.042	0.043		0.0%	2.4%	
IDDE Programmatic	0.001	0.001	0.001	Per acre treated	0.0%	0.0%	
Advanced Sweeping - 1 pass/12 weeks	0.027	0.027	0.027	Per acre/ mile swept	0.0%	0.0%	
Advanced Sweeping - 1 pass/2 weeks	0.156	0.158	0.159		1.3%	1.9%	
Advanced Sweeping - 1 pass/4 weeks	0.087	0.088	0.089		1.1%	2.3%	
Advanced Sweeping - 1 pass/8 weeks	0.059	0.059	0.059		0.0%	0.0%	
Advanced Sweeping - 1 pass/week	0.235	0.237	0.239		0.9%	1.7%	
Advanced Sweeping - 2 pass/week	0.304	0.307	0.309		1.0%	1.6%	
Advanced Sweeping - Fall 1 pass/1-2 weeks else monthly	0.148	0.149	0.150		0.7%	1.4%	
Advanced Sweeping - Spring 1 pass/1-2 weeks else monthly	0.106	0.107	0.108		0.9%	1.9%	
Mechanical Broom - 1 pass/4 weeks	0.001	0.001	0.001		0.0%	0.0%	
Mechanical Broom - 1 pass/week	0.004	0.004	0.004		0.0%	0.0%	
Mechanical Broom - 2 pass/week	0.008	0.008	0.009		0.0%	12.5%	
Septic Pumping	0.016	0.015	0.015		Per system	-6.3%	-6.3%
Septic Denitrification	0.155	0.151	0.151		Per system	-2.6%	-2.6%
Septic Connection	0.226	0.219	0.219	Per system	-3.1%	-3.1%	
Stream Restoration (Planning Rate)	0.022	0.021	0.021	Per linear ft	-4.5%	-4.5%	
Shoreline Management (Planning Rate)	0.018	0.017	0.017	Per linear ft	-5.6%	-5.6%	
Forest Conservation	0.462	0.461	0.462	Per acre	-0.2%	0.0%	