



Draft Custom Land Policy BMPs: Results

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Land Use Workgroup Coordinator**

**Water Quality GIT Call
December 10, 2018**

“Conservation Plus” BMP Elements

FOREST CONSERVATION

- Conserve riparian zones (default width = 30m)
- Conserve wetlands (NWI, State Designated Wetlands, and Potential Conservable Wetlands (PA only))
- Conserve all lands subject to inundation due to sea level rise (default = 1m rise by the year 2100)
- Conserve all lands surrounding National Wildlife Refuges (default = 1 mile buffer)
- Conserve all large forest tracts (default \geq 250 acres)
- Conserve Bay shorelines (default = 305m buffer (~1000-ft) of the tidal Bay and Atlantic shorelines)
- Conserve all high-value forest and forested wetlands identified by the Chesapeake Conservation Partnership

GROWTH MANAGEMENT

- Increase proportion of growth occurring as infill/redevelopment (default = 10% per decade)
- Increase urban densities (default = 10% per decade)
- Increase proportion of urban vs rural growth (default = 10% per decade)
- Expand sewer service areas (default = ~1 mile))
- Avoid growth on all soils unsuitable for septic systems (based on depth to bedrock, drainage class, saturated hydraulic conductivity, and flood frequency)

FARMLAND CONSERVATION

- Conserve all farmland within designated Agricultural Districts
- Conserve all lands within the floodplain (default = 100-year recurrence interval)
- Conserve all lands with flooded soils (default = frequently flooded)
- Conserve all prime farmlands and farmland of state importance
- Conserve potential restorable wetlands (applies only to PA farmland)
- Conserve all high-value farmland identified by the Chesapeake Conservation Partnership

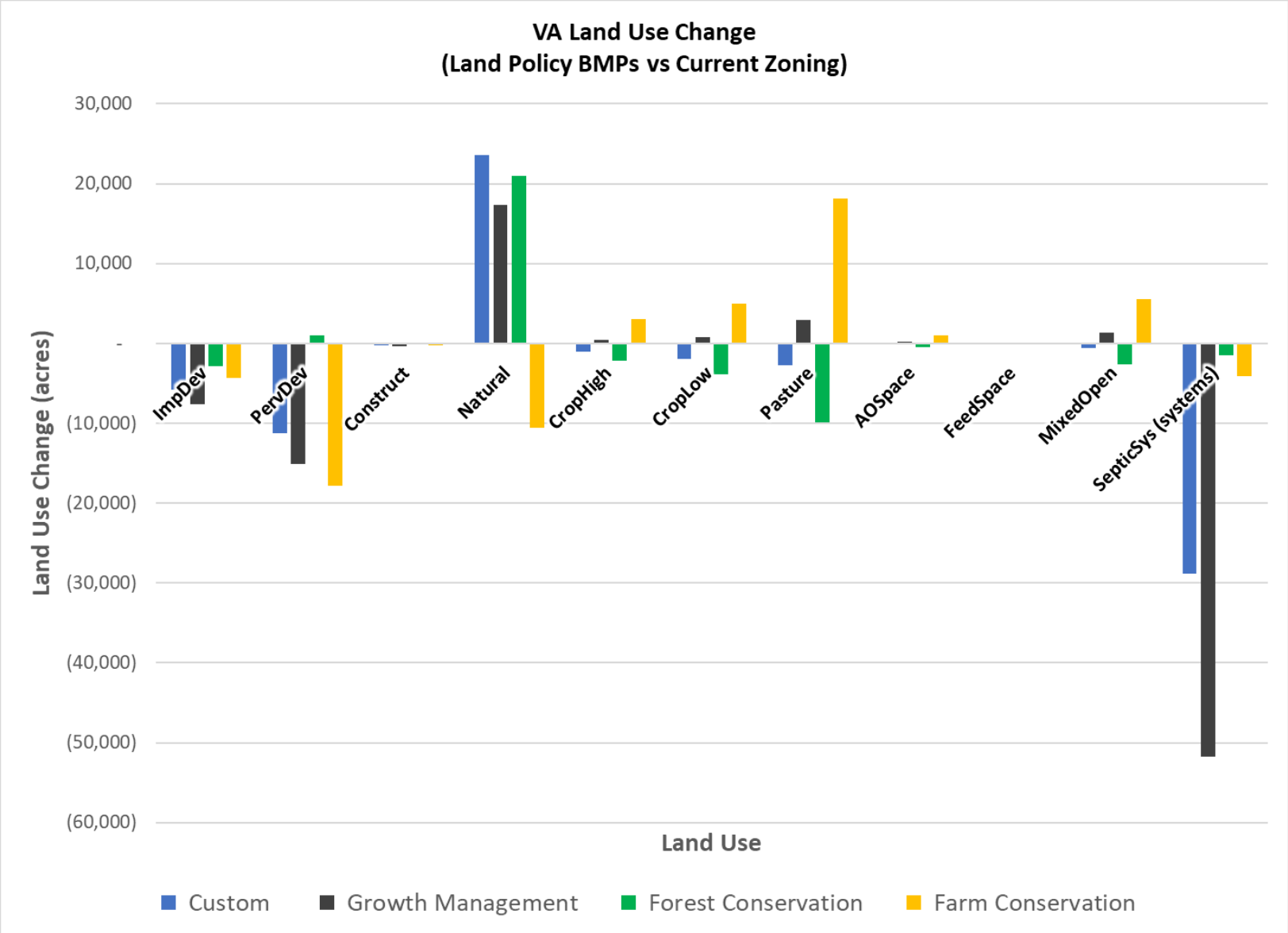
Land Policy BMP

Land Use Implications

- Increase in natural lands
- Decrease in impervious and pervious development
- Decrease in housing units on septic

Land Use/Load Source Abbreviations

Ag Open Space	Construction	CropLow	CropHigh	PervDev	ImpDev	FeedSpace	MixedOpen	Natural	Other	Pasture
AOS	CNS	CPL	CPH	PRV	IMP	FDS	MO	NAT	OTH	PAS
AOSpace	Regulated Construction	Full Season Soybeans	Double Cropped Land	Non-Regulated Turf Grass	MS4 Tree Canopy over Impervious	Permitted Feeding Space	Mixed Open	True Forest	Stream Bed and Bank	Pasture
	CSS Construction	Other Agronomic Crops	Specialty Crop High	Non-Regulated Tree Canopy over Turf Grass	MS4 Roads	Non-Permitted Feeding Space	CSS Mixed Open	Non-tidal Floodplain Wetland	Shoreline	Other Hay
		Small Grains and Grains	Silage with Manure	MS4 Turf Grass	MS4 Buildings and Other			Headwater or Isolated Wetland		Legume Hay
		Specialty Crop Low	Grain without Manure	MS4 Tree Canopy over Turf Grass	CSS Tree Canopy over Impervious			Harvested Forest		Riparian Pasture Deposition
			Grain with Manure	CSS Turf Grass	CSS Roads			CSS Forest		
			Silage without Manure	CSS Tree Canopy over Turf Grass	CSS Buildings and Other					
					Non-Regulated Tree Canopy over In					
					Non-Regulated Roads					
					Non-Regulated Buildings and Other					

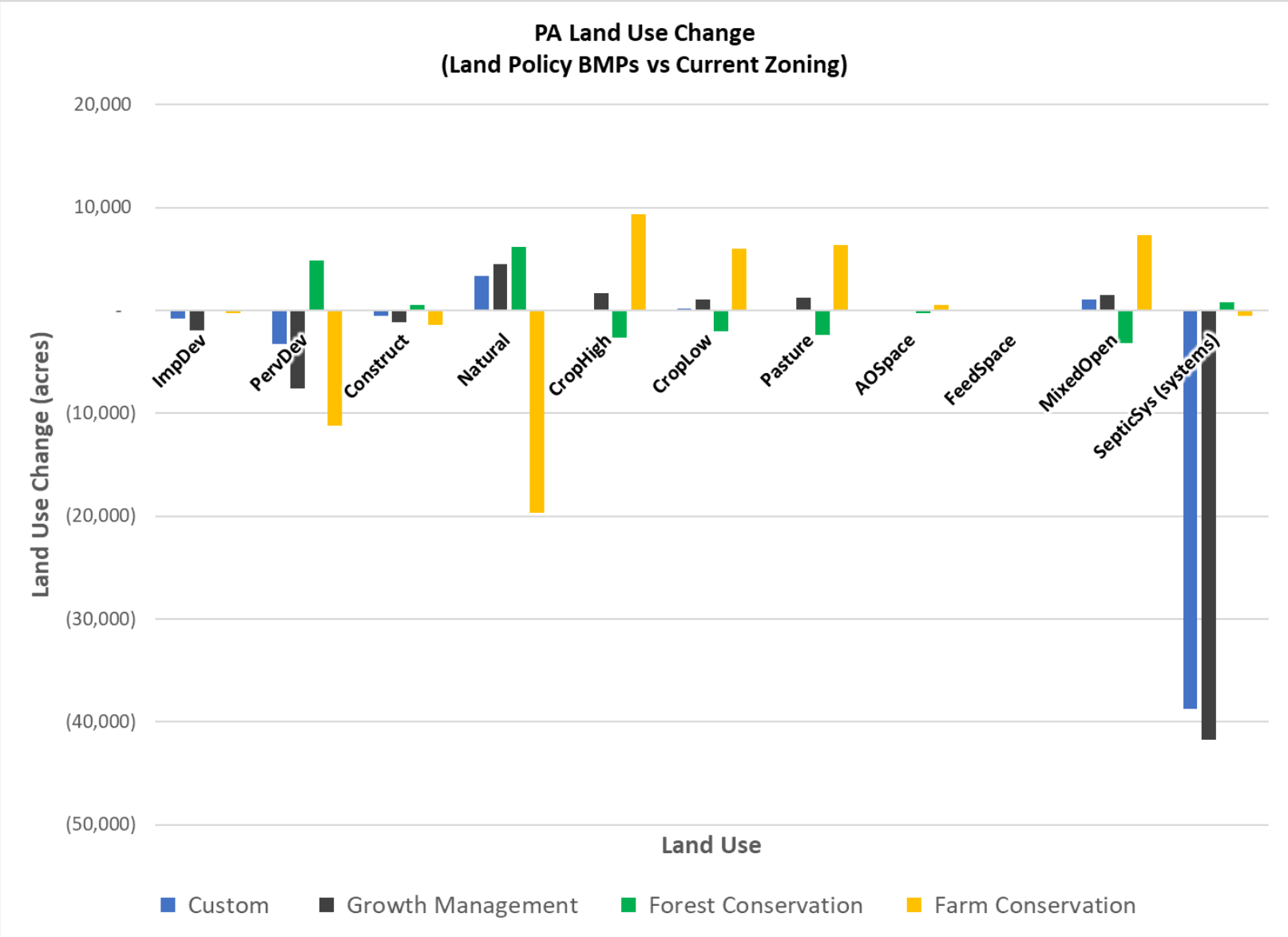


LandPolicyBMP	ImpDev	PervDev	Construct	Natural	CropHigh	CropLow	Pasture	AOSpace	FeedSpace	MixedOpen	SepticSys (systems)
Custom	(5,837)	(11,264)	(242)	23,584	(1,007)	(1,944)	(2,706)	19	-	(599)	(28,821)
Growth Management	(7,573)	(15,146)	(329)	17,369	448	741	2,958	161	-	1,335	(51,740)
Forest Conservation	(2,890)	1,027	107	21,005	(2,187)	(3,905)	(9,903)	(490)	-	(2,684)	(1,494)
Farm Conservation	(4,290)	(17,789)	(204)	(10,557)	2,986	4,964	18,155	976	-	5,574	(4,150)

Custom Land Policy BMPs

Virginia:

- Conserve riparian zones (100-ft; 30m)
- Conserve shorelines (100-ft; 30m)
- Conserve wetlands (NWI)
- Conserve all large forest tracts (≥ 100 acres with high conservation value)
- Increase percentage of growth in urban areas and sewer service areas (10%)
- Simulate a 10% increase in UAUC and Sewer Service Areas areas and expand Sewer Service areas to new boundaries by 2025
- Simulate a 10% increase in the amount of infill and redevelopment for 2025
- Simulate a 10% increase in the density of the UAUC by 2025
- Conserve all designated Agricultural and Forestal Districts as defined by § 58.1-3230
- Conserve 100-year floodplain
- Conserve prime farmlands and farmland of state importance (100 acres or more)

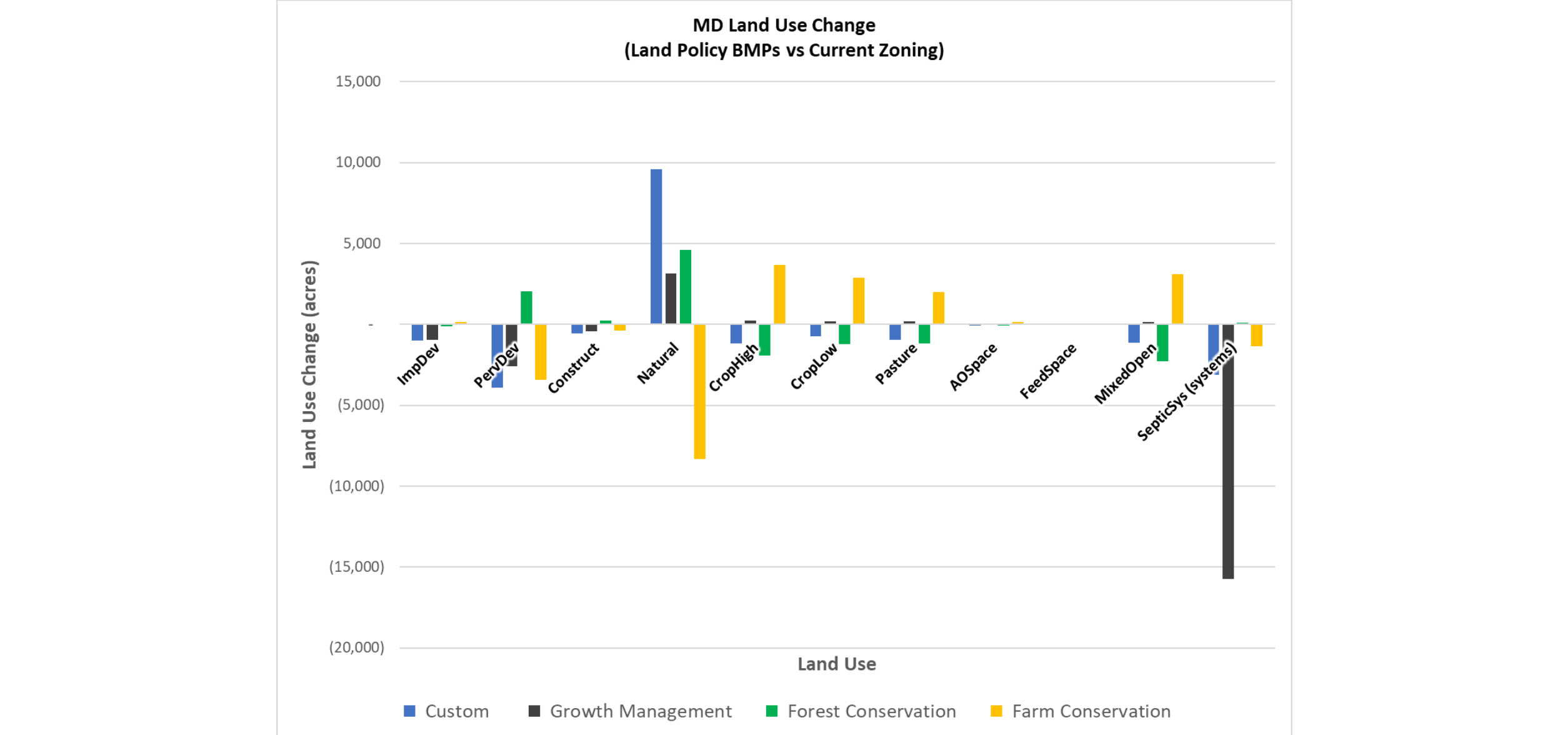


LandPolicyBMP	ImpDev	PervDev	Construct	Natural	CropHigh	CropLow	Pasture	AOSpace	FeedSpace	MixedOpen	SepticSys (systems)
Custom	(782)	(3,290)	(493)	3,341	(16)	207	(91)	8	-	1,100	(38,757)
Growth Management	(1,935)	(7,610)	(1,151)	4,497	1,701	1,091	1,255	134	-	1,502	(41,765)
Forest Conservation	(128)	4,870	567	6,201	(2,680)	(2,012)	(2,366)	(284)	-	(3,176)	829
Farm Conservation	(276)	(11,230)	(1,384)	(19,636)	9,319	5,968	6,389	566	-	7,335	(493)

Custom Land Policy BMPs

Pennsylvania:

- Conserve riparian zones (width = 30m)
- Conserve wetlands (NWI and Potential Forested Wetlands (inside watershed only))
- Increase proportion of growth occurring as infill/redevelopment (10% per decade)
- Increase urban densities (10% per decade)
- Increase proportion of urban vs rural growth (10% per decade)
- Expand sewer service areas (1 mile buffer)
- Avoid growth on soils unsuitable for septic systems
- Stochastically simulate rate of forest conservation by County based on participation in state programs and land trust activities.
- Stochastically simulate rate of farmland conservation by County on participation in state programs and land trust activities.



LandPolicyBMP	ImpDev	PervDev	Construct	Natural	CropHigh	CropLow	Pasture	AOSpace	FeedSpace	MixedOpen	SepticSys (systems)
Custom	(1,013)	(3,893)	(553)	9,600	(1,156)	(730)	(976)	(67)	-	(1,122)	(3,119)
Growth Management	(951)	(2,568)	(424)	3,142	227	197	177	11	-	169	(15,745)
Forest Conservation	(124)	2,064	233	4,605	(1,939)	(1,219)	(1,171)	(84)	-	(2,267)	83
Farm Conservation	139	(3,442)	(397)	(8,301)	3,660	2,900	1,995	160	-	3,123	(1,371)

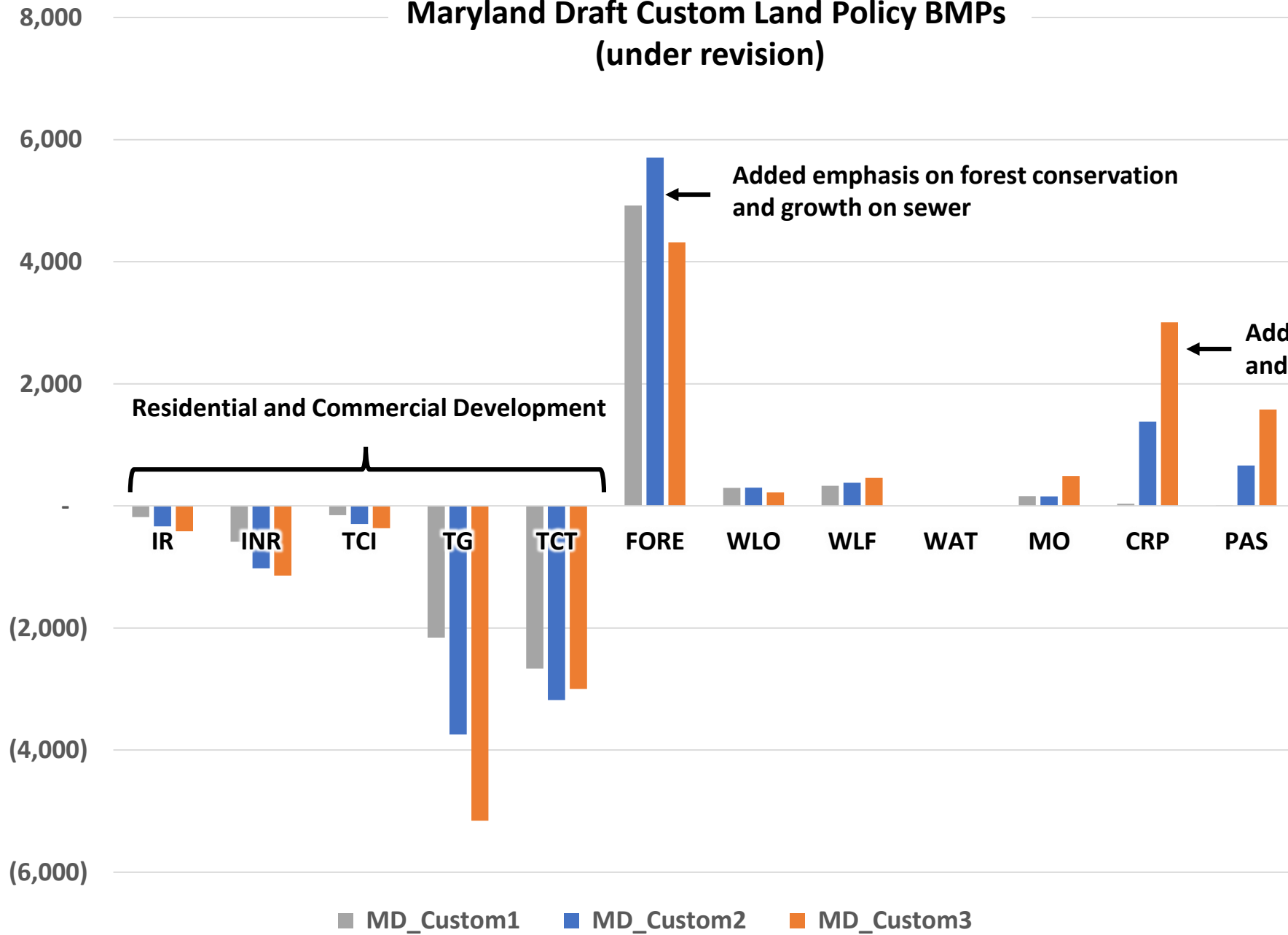
Custom Land Policy BMPs

Maryland (Current Regulatory Scenario):

- Conserve riparian zones (width = 30m)
- Conserve wetlands (NWI)
- Conserve Resource Conservation Areas and Wetlands of Special State Concern
- Establish maximum residential densities based on local and state regulations
- Stochastically conserve farmland within 30m riparian zone based on expected County-level rates of CREP participation (acres)
- Stochastically conserve 15% of undeveloped land within modeled urban areas.
- Stochastically conserve forests by County based on participation in state programs and land trust activities
- Stochastically conserve farmland by County based on participation in state programs

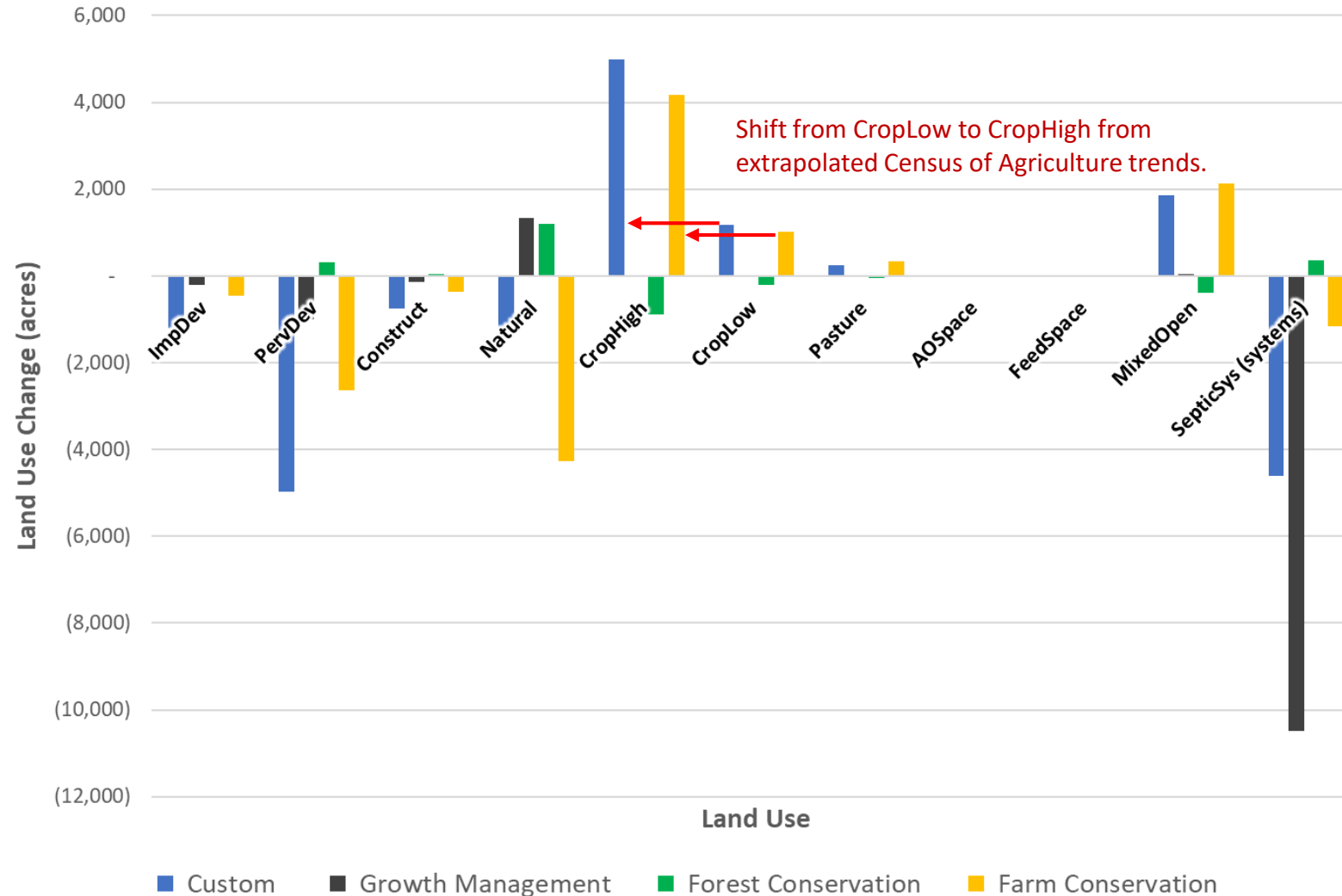
Maryland Draft Custom Land Policy BMPs (under revision)

Acres



■ MD_Custom1 ■ MD_Custom2 ■ MD_Custom3

DE Land Use Change
(Land Policy BMPs vs Current Zoning)



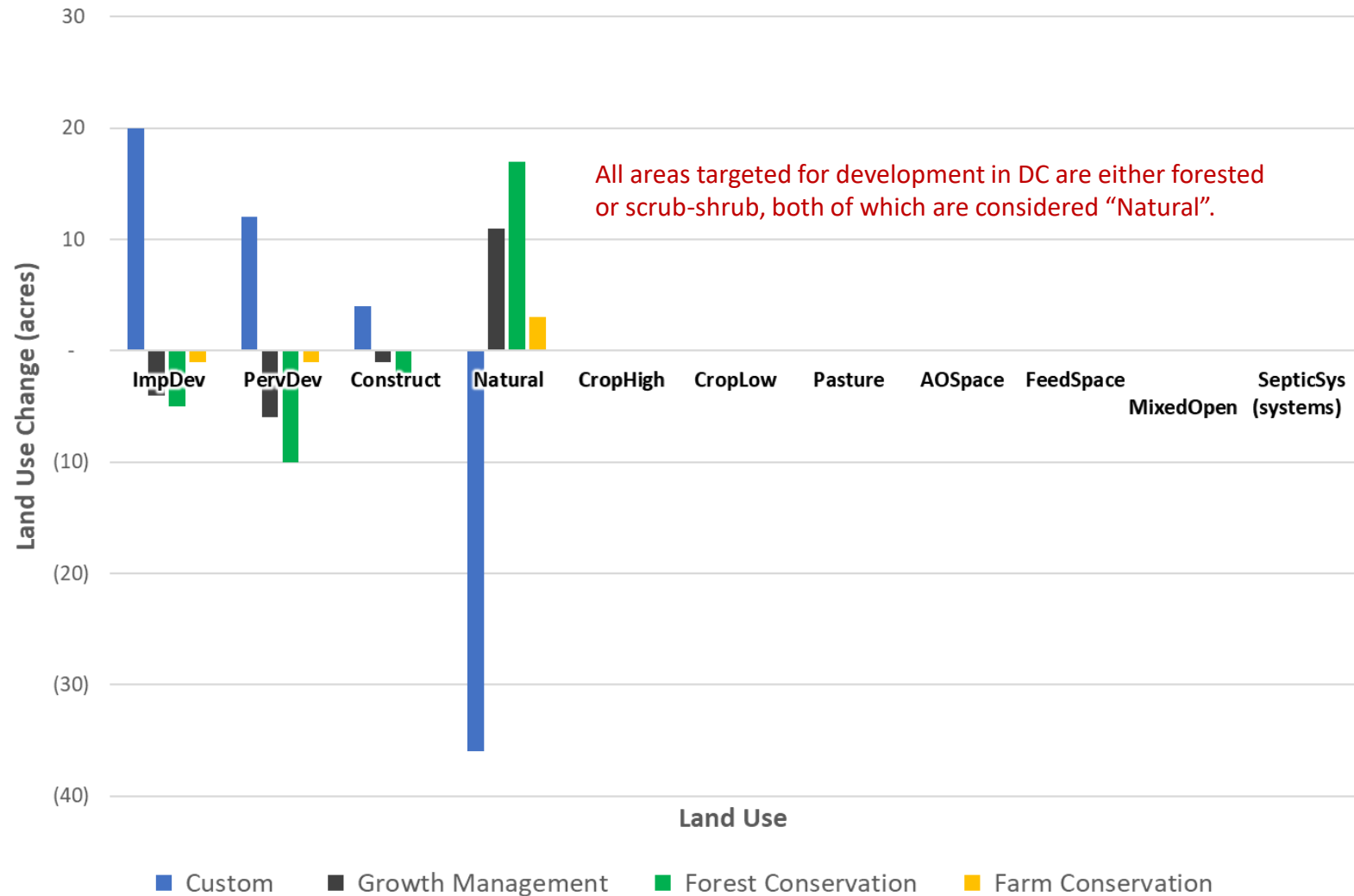
LandPolicyBMP	ImpDev	PervDev	Construct	Natural	CropHigh	CropLow	Pasture	AOSpace	FeedSpace	MixedOpen	SepticSys (systems)
Custom	(1,199)	(4,970)	(743)	(1,410)	4,987	1,168	245	4	-	1,866	(4,604)
Growth Management	(206)	(999)	(145)	1,328	8	(27)	(6)	-	-	48	(10,480)
Forest Conservation	29	307	41	1,190	(898)	(211)	(56)	-	-	(387)	359
Farm Conservation	(457)	(2,625)	(371)	(4,266)	4,171	1,012	335	3	-	2,137	(1,171)

Custom Land Policy BMPs

Delaware:

- Conserve riparian zones excluding tax ditches (width = 30m)
- Conserve wetlands (NWI and State Designated Wetlands)
- Conserve all lands subject to inundation due to sea level rise (1m rise by the year 2100)
- Conserve all lands surrounding National Wildlife Refuges (1/2 mile buffer)
- Conserve all large forest tracts (≥ 20 acres) in Legacy areas
- Conserve all Commercial Forest Plantation Areas
- Conserve all high-value forest and forested wetlands identified by the Chesapeake Conservation Partnership
- Increase proportion of growth occurring as infill/redevelopment (10% per decade)
- Increase urban densities (10% per decade)
- Increase proportion of urban vs rural growth (10% per decade)
- Expand sewer service areas in proportion to County-level demand for greenfield residential growth (4-14%)
- Conserve all farmland within designated Agricultural Districts
- Conserve all lands within the floodplain (100-year recurrence interval)
- Conserve all lands with flooded soils (frequently flooded)
- Conserve all prime farmlands and farmland of state importance
- Conserve all center-pivot irrigated farmland parcels
- Conserve all high-value farmland identified by the Chesapeake Conservation Partnership

DC Land Use Change (Land Policy BMPs vs Current Zoning)



LandPolicyBMP	ImpDev	PervDev	Construct	Natural	CropHigh	CropLow	Pasture	AOSpace	FeedSpace	MixedOpen	SepticSys (systems)
Custom	20	12	4	(36)	-	-	-	-	-	-	-
Growth Management	(4)	(6)	(1)	11	-	-	-	-	-	-	-
Forest Conservation	(5)	(10)	(2)	17	-	-	-	-	-	-	-
Farm Conservation	(1)	(1)	-	3	-	-	-	-	-	-	-

Custom Land Policy BMPs

District of Columbia:

- Restrict new development to areas where local forecasts indicate storm water management regulations will be triggered by future development and/or redevelopment activities.

Land Policy BMP

Nutrient and Sediment Implications

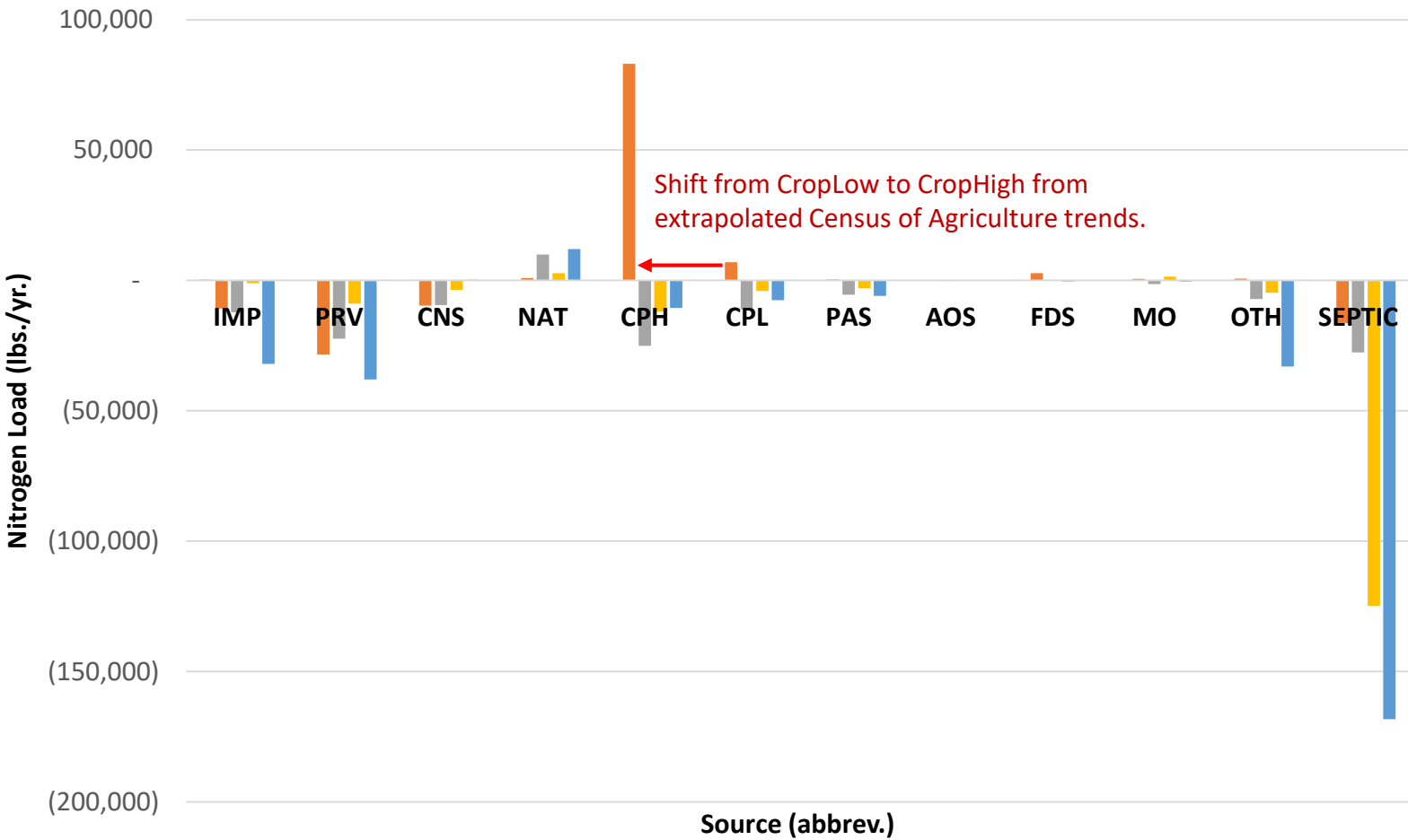
Overall decrease in loads from all jurisdictions (except DC and DE)

- Decrease in loads from developed lands
- Decrease in loads from septic systems (particularly in PA and VA)
- Decrease in loads from farmland (except in DE)
- Decrease in loads from shorelines and stream beds/banks (“OTH”)
- Increase in loads from natural lands

Land Use/Load Source Abbreviations

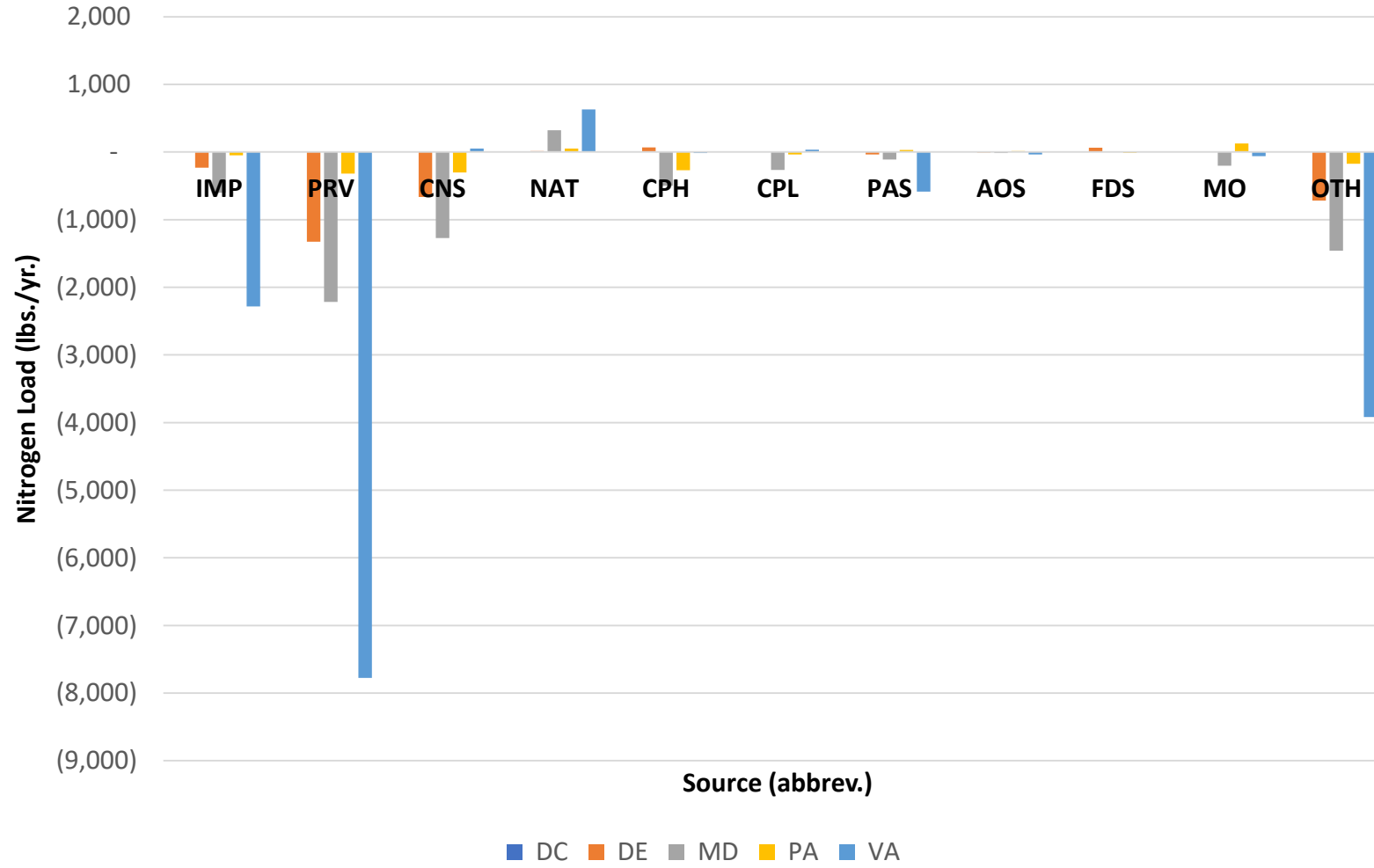
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					Non-Regulated Roads					
					Non-Regulated Buildings and Other					

Nitrogen Load Change (Edge-of-Tide)
Land Policy BMPs vs Current Zoning



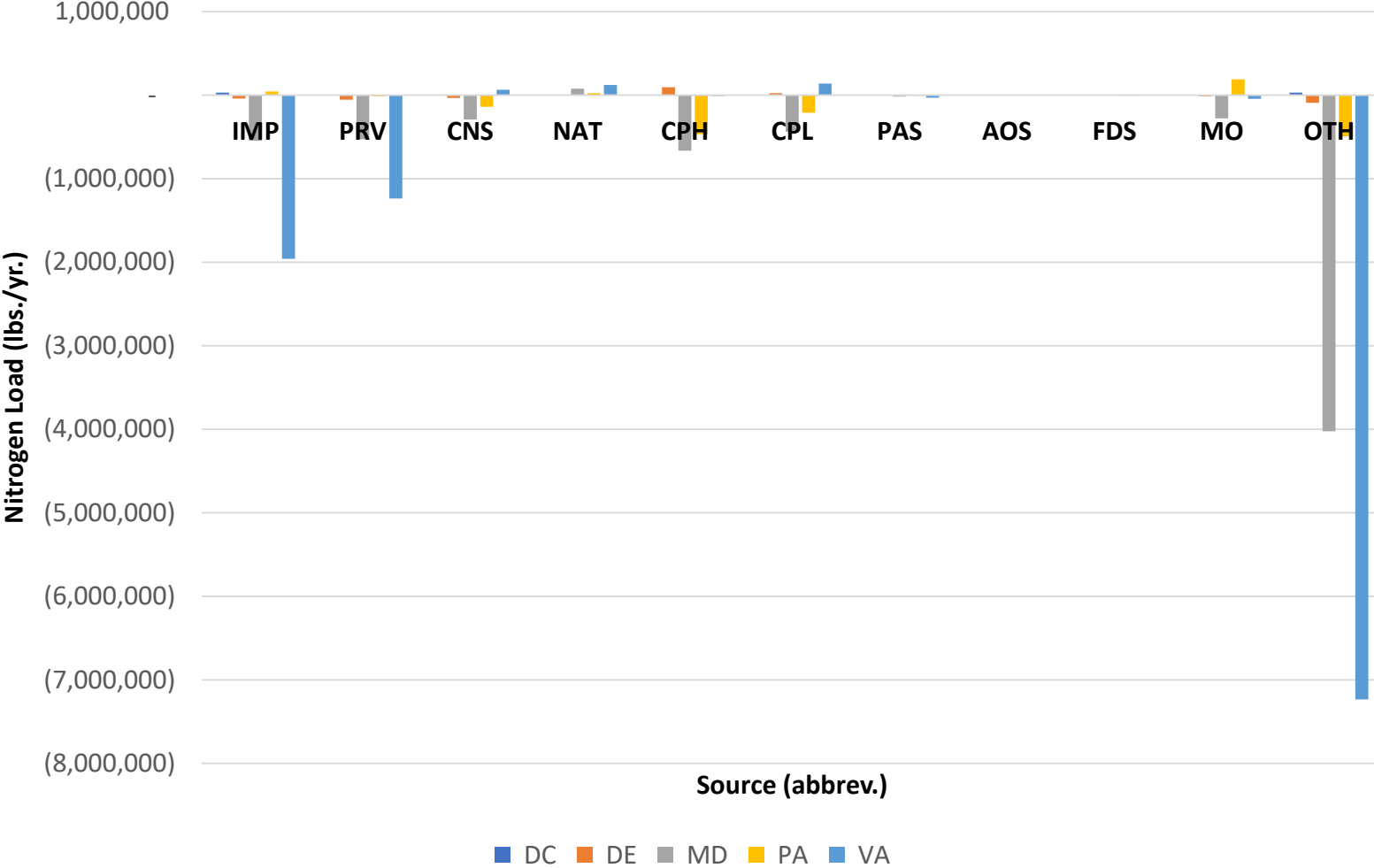
Jursdiction	IMP	PRV	CNS	NAT	CPH	CPL	PAS	AOS	FDS	MO	OTH	SEPTIC	TOT
DC	209	50	54	(33)	-	-	-	-	-	-	23	-	303
DE	(10,728)	(28,352)	(9,671)	890	83,091	6,999	321	(94)	2,761	552	683	(16,403)	30,050
MD	(12,254)	(22,289)	(9,410)	9,910	(25,098)	(11,058)	(5,462)	(162)	15	(1,385)	(7,155)	(27,577)	(111,926)
PA	(1,024)	(8,932)	(3,557)	2,752	(11,865)	(3,996)	(2,997)	(64)	(470)	1,448	(4,658)	(124,781)	(158,146)
VA	(32,048)	(37,959)	236	12,057	(10,495)	(7,621)	(5,889)	(124)	84	(466)	(33,000)	(168,310)	(283,547)

Phosphorus Load Change (Edge-of-Tide)
Land Policy BMPs vs Current Zoning



Jursidiction	IMP	PRV	CNS	NAT	CPH	CPL	PAS	AOS	FDS	MO	OTH	TOT
DC	10	2	6	-	-	-	-	-	-	-	9	27
DE	(234)	(1,328)	(666)	12	69	10	(36)	(9)	65	8	(717)	(2,826)
MD	(602)	(2,215)	(1,273)	320	(500)	(265)	(111)	(17)	7	(201)	(1,460)	(6,317)
PA	(49)	(321)	(303)	51	(268)	(37)	32	12	(11)	124	(173)	(943)
VA	(2,284)	(7,774)	50	630	(15)	34	(584)	(35)	6	(60)	(3,917)	(13,949)

Sediment Load Change (Edge-of-Tide) Land Policy BMPs vs Current Zoning



Jursidiction	IMP	PRV	CNS	NAT	CPH	CPL	PAS	AOS	FDS	MO	OTH	TOT
DC	28,505	(3,044)	2,974	(810)	-	-	-	-	-	-	30,594	58,219
DE	(40,619)	(56,830)	(35,512)	813	94,304	22,284	193	(68)	207	(14,316)	(92,720)	(122,264)
MD	(548,418)	(530,151)	(293,058)	77,427	(665,742)	(437,103)	(19,017)	(1,136)	(70)	(278,938)	(4,025,972)	(6,722,178)
PA	44,216	(13,922)	(140,575)	22,260	(469,920)	(212,120)	(9,020)	(286)	3,712	187,934	(492,994)	(1,080,715)
VA	(1,959,015)	(1,239,722)	62,474	121,576	(9,971)	137,180	(32,484)	(958)	(3,210)	(43,988)	(7,235,508)	(10,203,626)

Land Policy BMP Results Summary

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)	-2.0%	(24,008)	-4.8%	(18,070,564)	-4.0%	
Growth Management	(5,976)	(645)	(555,454)	Growth Management	(688,241)	-2.7%	(23,694)	-4.7%	(18,565,816)	-4.1%	
Forest Conservation	13,601	(5)	(39,159)	Forest Conservation	(241,808)	-0.9%	(7,098)	-1.4%	(15,041,913)	-3.3%	
Farmland Conservation	19,559	(890)	(235,193)	Farmland Conservation	496,057	1.9%	(13,385)	-2.7%	7,296,809	1.6%	
				* percentages represent the percent of the total needed reductions from 2017 - 2025: 23.53M lbs TN; 0.5M lbs TP; and 450M lbs TSS							

Land Policy BMPs in Phase III WIPs

PIII WIPs* should include:

- documentation regarding “building and implementing the 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.”
- “Clear description of local, regional, and federal involvement in their jurisdiction’s strategy to account for growth.”

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

Verification of Land Policy BMPs

2-year Milestone Updates of Model Inputs:

- Change in crops and pasture from 2017 Census of Agriculture data
- Change in land cover/use from Landsat-derived hot spot mapping
- Change in land cover/use from updated high-resolution land cover/use

Verification of Land Policy BMPs

Potential Reporting Examples:

- New local or state growth management policies and regulations
- New/enhanced programs and investments in land conservation
E.g., Riparian area conservation fund, increased Farm Bill support for CREP
- Annual extent of forest and farmland conservation (acres) by county (MD and PA)

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