COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER PERMITTING DIVISION

Subject: Guidance Memo No. 20-2001 - **Addendum to Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners**

To: Water Permitting Division Staff

From: Melanie D. Davenport, Director, Water Permitting Division

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Date: January 13, 2020

Summary:
This guidance memo serves as an addendum to *Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners*. The purpose of this addendum is to provide updated nutrient and sediment credit values for conversion of agricultural and developed lands to less intensive uses for inclusion in the nonpoint source nutrient trading program. The new rates are effective immediately and apply to all new land conversion applications for nonpoint source credit trading.

Electronic Copy:
Once effective, an electronic copy of this guidance will be available on DEQ's website https://www.deq.virginia.gov/Programs/Water/PermittingCompliance/PollutionDischargeElimination/NutrientTrading.aspx

Contact Information:
Please contact Sara Felker, Office of VPDES Permits, (804) 698-4203, sara.felker@deq.virginia.gov, with any questions regarding the application of this guidance.

Certification:
As required by Subsection B of § 2.2-4002.1 of the APA, the agency certifies that this guidance document conforms to the definition of a guidance document in § 2.2-4101 of the Code of Virginia.

Disclaimer:
This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does no mandate or prohibit any particular action no otherwise required or prohibited by law or regulation. If alternative proposals are made, such proposals will be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Introduction

In 2005, the state legislature created the Chesapeake Bay Watershed Nutrient Credit Exchange Program to allow Virginia's point and nonpoint sources of nutrient pollution in the Bay watershed to meet required nutrient reductions through trading (VA Code § 62.1-44.19:14 et seq). Credits generated through this program are also transferable in accordance with the Virginia Stormwater Offset Program (VA Code § 62.1-44.15:35) and the Virginia Soil and Water Conservation Board's Guidance Document on Stormwater Nonpoint Nutrient Offsets approved on July 23, 2009, to those regulated entities qualifying for nutrient credits. The primary guidance for generating nonpoint source credits is the *Trading Nutrient Reductions from Nonpoint Source Best Management Practices in the Chesapeake Bay Watershed: Guidance for Agricultural Landowners and Your Potential Trading Partners (DEQ 2008).* Legislation authorizing sediment credit trading for use by Municipal Separate Storm Sewer System (MS4) permittees was established in 2016 (VA Code § 62.1-44.19:21.1), so sediment credit rates were not provided in the 2008 guidance.

The 2008 guidance document provides nitrogen and phosphorus credit values for the conversion of agricultural land uses to less intensive uses on a per acre basis. Rates depend on pre- and post-conversion land use. Pre-conversion land use is determined from July 1, 2005, for nutrient credits generated within the Chesapeake Bay Watershed, and July 1, 2009, for credits generated outside of the Chesapeake Bay Watershed. Baseline land use is determined by DEQ using historical imagery and may be supported by crop insurance, sales, or other records.

The 2008 rates were derived using the Chesapeake Bay Model v. 4.3 and assumed that best management practices for the pre-conversion land uses were in place. Rates account for edge-of-stream attenuation and tributary delivery factors for nitrogen and phosphorus but not the 2:1 non-point source to point source trading ratio. Credit generation rates were provided for east and west of I-95 in each of the Chesapeake Bay tributaries (Eastern Shore, James, Potomac/Shenandoah, Rappahannock, and York). An average of rates in the Chesapeake Bay Watershed was used to calculate credit generation rates for the Southern Rivers watersheds (Albemarle, Atlantic Ocean, Big Sandy, Chowan, Clinch/Powell, Holston, New, Roanoke, and Yadkin).

Guidance Changes

This addendum revises the credit generation rates for land use conversion based on the updated Chesapeake Bay Watershed Model (Phase 6). New rates are provide for fourth order watersheds, also called 8-digit Hydrological Unit Codes (HUC8), rather than tributary-wide east and west of I-95 (see http://consapps.dcr.virginia.gov/htdocs/maps/HUExplorer.htm to identify the HUC8 for a specific location). This unit is consistent with the Virginia Stormwater Management Program requirement that buyers purchase credits from within the same or adjacent HUC8 unless none are available. The updated credit rates combine pasture and hay into one land use category for assessing historical land use because of the difficulty in differentiating them in aerial imagery and common mixed management. Additionally, the new rates include sediment credit values, which were not authorized at the time of the original guidance. Updated rates for the Southern Rivers watersheds are based on the average of those in the Chesapeake Bay Watershed for each type of land conversion (VA Code § 62.1-44.19:20.C).

Methods

Two scenarios were developed using the Chesapeake Assessment Scenario Tool (CAST-2017d v 5.8.0 http://cast.chesapeakebay.net/Scenario) to determine the nutrient and sediment loadings of different land uses by land river segments. The first scenario was used to analyze agricultural land use conversions and included the following baseline agricultural BMPs: 35-foot grass buffers, streamside exclusion fencing, nutrient management plans, cover cropping, and soil and water conservation plans for all managed agricultural lands. A second scenario to assess developed land use conversions (pervious and impervious to forest) was created using WIP II planned reductions. These scenarios provided total edge-of-tide nitrogen, phosphorus, and sediment loads (pounds) by land river segments for all modeled land uses.

Land uses from CAST were mapped to land uses for the nonpoint source trading categories, which are pasture/hay combined, crop, fallow, forest, developed pervious, and developed impervious. For each of these land uses, the total land area (acres) and edge-of-tide pollutant loadings for nitrogen, phosphorus, and sediment (pounds/year) were calculated for each HUC8 watershed. Delivered pollutant loading rates (pounds/acre/year) were then calculated for each HUC8 for each pollutant and land use.

Next, credit generation rates (pounds/acre) were calculated for each type of conversion (e.g., crop to forest) in each HUC8 and for each pollutant. The pollution credits generated through land conversion were calculated as the difference between the higher pre-conversion loading rates and the lower post-conversion rates. Credit was not generated for conversions to more intensive land uses or where credits for a specific pollutant would be negative. For tributaries outside of the Chesapeake Bay watershed, rates were an average of those within the Bay watershed weighted by area. The credit generation table is shown in Appendix A.

Applicability

This guidance is effective March 5, 2020. Complete applications submitted prior to this guidance, but not yet approved, may use the rates established in 2008.

This guidance does not apply to or alter nitrogen and phosphorus credits that were approved prior to this guidance. Existing banks may request a review and determination of sediment credits generated. Sediment credits will be based on the phosphorus credits approved using the updated ratio of phosphorus to sediment credit generation based on the type of land conversion (Appendix B). In compliance with VA Code § 62.1-44.19:21.1.B), sediment associated with phosphorus credits that were sold for compliance with post-construction stormwater quality criteria may not be used for MS4 permit compliance.

This document does not alter the credits generated through the implementation of non-land conversion agricultural or stormwater best management practices.

Appendix A: Land Conversion Credit Generation (lbs/ac)

Basin and HUC8	*Agricultural Conversions*																		*Urban Conversions*					
	Crop to Forest			Hay/Pasture to Forest			Fallow to Forest			Crop to Fallow			Hay/Pasture to Fallow			Crop to Hay			Impervious to Forest			Pervious to Forest		
	N	P	S	N	P	S	N	P	S	N	P	S	N	P	S	N	P	S	N	P	S	N	P	S
Eastern Shore																								
2080111	18.80	0.86	43.21	7.40	0.32	10.45	0.55	0.23	24.05	18.25	0.63	19.16	6.85	0.09	0.00	10.72	0.62	41.17	12.76	0.41	36.09	6.56	0.71	14.23
James																								
2080108	14.03	0.28	30.89	8.53	0.71	43.34	0.34	0.05	20.60	13.68	0.23	10.29	8.19	0.66	22.74	5.90	0.27	29.87	10.59	0.41	25.92	5.01	0.64	8.08
2080201	6.16	0.67	477.51	3.08	0.38	21.33	0.43	0.35	475.37	5.74	0.32	2.14	2.66	0.03	0.00	2.89	0.55	476.95	5.34	0.35	1221.54	2.80	0.61	380.72
2080202	6.21	0.85	1036.32	3.46	0.80	40.51	0.54	0.54	541.24	5.68	0.31	495.08	2.92	0.26	0.00	3.02	0.62	1038.70	5.11	0.48	1583.28	2.90	0.87	522.05
2080203	6.30	0.69	727.86	4.42	0.47	40.74	0.56	0.32	352.46	5.74	0.37	375.40	3.86	0.15	0.00	2.24	0.60	736.97	5.99	0.40	918.65	3.20	0.68	264.69
2080204	6.16	0.67	754.23	4.02	0.38	27.60	0.55	0.35	295.28	5.61	0.32	458.95	3.47	0.03	0.00	2.17	0.59	762.69	6.47	0.49	1006.14	3.24	0.82	251.21
2080205	6.89	0.33	200.50	3.68	0.72	29.30	0.36	0.20	126.11	6.53	0.12	74.39	3.33	0.52	0.00	3.47	0.00	197.57	5.25	0.35	324.41	2.82	0.62	87.12
2080206	10.89	0.11	82.35	4.70	0.25	16.06	0.24	0.08	54.30	10.65	0.04	28.05	4.46	0.17	0.00	6.31	0.06	80.78	5.82	0.34	109.14	3.12	0.56	32.37
2080207	4.43	0.35	57.85	2.67	0.43	12.44	0.30	0.12	43.99	4.13	0.23	13.86	2.37	0.31	0.00	2.09	0.04	56.97	4.42	0.25	105.66	2.26	0.42	27.09
2080208	4.51	0.14	26.10	2.46	0.34	6.86	0.86	0.13	48.72	3.65	0.01	0.00	1.60	0.21	0.00	2.12	0.00	25.43	10.29	0.63	68.35	4.93	0.93	18.71
Shenandoah/Potomac																								
2070001	7.83	0.58	294.28	4.68	0.52	17.95	0.98	0.71	697.23	6.85	0.00	0.00	3.70	0.00	0.00	2.37	0.17	264.23	8.35	0.42	3102.24	4.48	0.77	1015.80
2070004	5.68	0.73	605.15	4.99	0.28	25.66	0.74	0.35	205.23	4.94	0.38	399.92	4.25	0.00	0.00	0.87	0.69	607.99	6.64	0.50	587.56	3.70	0.88	172.98
2070005	9.91	1.59	860.58	4.98	1.19	83.84	0.57	0.34	476.49	9.34	1.24	384.10	4.41	0.85	0.00	5.67	0.94	879.01	6.28	0.52	1141.77	3.35	0.95	341.63
2070006	11.36	1.15	1073.47	5.82	1.01	86.82	0.75	0.37	393.71	10.61	0.78	679.76	5.07	0.64	0.00	6.57	0.64	1067.19	7.40	0.47	1011.33	4.00	0.88	319.31
2070007	7.16	0.34	349.74	4.58	0.26	18.77	0.66	0.36	253.52	6.50	0.00	96.22	3.92	0.00	0.00	2.76	0.33	367.11	7.51	0.49	880.50	4.14	0.89	283.70
2070008	6.46	0.47	432.14	3.88	0.30	32.29	0.39	0.22	221.94	6.07	0.26	210.20	3.48	0.08	0.00	2.55	0.45	433.66	5.73	0.36	530.28	3.07	0.66	150.45
2070010	4.57	0.36	85.17	2.33	0.45	12.84	0.33	0.19	181.54	4.24	0.17	0.00	2.00	0.26	0.00	2.49	0.20	85.84	5.71	0.41	378.87	2.54	0.64	91.20
2070011	15.07	0.11	131.17	5.09	0.26	25.44	0.25	0.23	233.78	14.82	0.00	0.00	4.85	0.03	0.00	10.58	0.10	128.97	6.39	0.44	526.22	3.60	0.69	133.70
Rappahannock																								
2080102	15.47	0.12	96.75	6.07	0.16	10.69	0.47	0.13	54.76	15.00	0.00	41.98	5.60	0.03	0.00	8.60	0.01	95.39	10.27	0.39	80.98	5.21	0.67	26.03
2080103	10.48	0.88	929.69	5.23	0.95	87.49	0.65	0.58	311.00	9.83	0.30	618.69	4.58	0.37	0.00	5.62	0.57	942.15	6.85	0.63	1061.83	3.57	1.13	272.70
2080104	13.73	0.07	72.85	6.67	0.53	31.90	0.36	0.13	110.71	13.36	0.00	0.00	6.31	0.40	0.00	7.50	0.00	69.36	7.89	0.40	263.21	4.40	0.66	77.19
York																								
2080102	10.45	0.06	74.24	6.90	0.42	26.10	0.51	0.09	34.41	9.94	0.00	39.83	6.40	0.32	0.00	3.89	0.01	71.02	9.26	0.31	54.31	5.16	0.60	18.56
2080105	8.40	0.03	27.89	2.66	0.32	7.83	0.09	0.08	14.80	8.31	0.00	13.09	2.57	0.24	0.00	6.01	0.00	27.31	3.86	0.21	33.53	2.00	0.38	10.38
2080106	8.89	0.08	80.01	2.26	0.30	19.11	0.25	0.14	66.55	8.64	0.00	13.47	2.01	0.16	0.00	6.71	0.00	77.44	4.46	0.23	120.19	2.27	0.41	36.13
2080107	13.83	0.04	50.19	6.72	0.19	17.75	0.46	0.10	75.45	13.37	0.00	0.00	6.26	0.09	0.00	7.24	0.03	47.58	9.21	0.33	110.15	4.78	0.52	29.34
2080108	8.22	0.66	7.97	5.86	0.23	13.92	0.38	0.12	39.19	7.84	0.54	0.00	5.48	0.11	0.00	1.73	0.54	3.01	9.72	0.51	75.96	4.79	0.82	18.30
Southern Rivers	8.39	0.56	436.79	4.16	0.54	35.90	0.45	0.27	246.34	7.94	0.30	201.79	3.71	0.27	0.08	4.49	0.36	439.38	6.12	0.40	655.97	3.23	0.69	192.29

Appendix B: Land Conversion
Sediment Credit Generated per Pound of Phosphorus (lbs/ac)

	Agricultural Conversions						*Urban Conversions*	
Basin and HUC8	**Crop to Forest**	**Hay/Pasture to Forest**	**Fallow to Forest**	**Crop to Fallow**	**Hay/Pasture to Fallow**	**Crop to Hay**	**Impervious to Forest**	**Pervious to Forest**
	S:P	**S:P**	**S:P**	**S:P**	**S:P**	**S:P**	**S:P**	**S:P**
Eastern Shore								
2080111	50.36	32.56	105.75	30.39	0.00	65.97	87.89	19.93
James								
2080108	109.48	61.02	380.78	45.13	34.66	108.77	62.65	12.66
2080201	712.41	56.78	1368.73	6.64	0.00	874.46	3520.02	622.73
2080202	1223.29	50.33	998.65	1622.20	0.00	1665.95	3307.32	600.50
2080203	1059.21	86.12	1101.07	1022.70	0.00	1221.64	2309.64	388.62
2080204	1121.57	72.78	837.49	1434.69	0.00	1292.27	2073.40	307.48
2080205	613.90	40.65	615.20	611.69	0.00	0.00	929.31	141.14
2080206	718.85	64.37	714.27	727.88	0.00	1386.99	317.98	57.89
2080207	164.96	28.73	363.50	60.33	0.00	1299.03	418.85	64.28
2080208	181.65	19.94	376.96	0.00	0.00	0.00	109.20	20.04
Shenandoah/Potomac								
2070001	504.65	34.66	981.90	0.00	0.00	1551.14	7367.21	1316.93
2070004	830.87	93.19	585.39	1058.70	0.00	884.92	1176.05	196.81
2070005	542.77	70.28	1393.70	308.85	0.00	931.06	2182.59	361.41
2070006	933.03	86.28	1064.19	870.86	0.00	1672.98	2133.45	363.33
2070007	1036.83	71.30	695.33	0.00	0.00	1108.48	1808.69	318.27
2070008	910.50	107.07	1021.28	816.94	0.00	957.26	1460.16	227.75
2070010	235.18	28.62	948.35	0.00	0.00	419.19	928.07	143.05
2070011	1141.35	97.09	1029.37	0.00	0.00	1321.23	1206.49	193.48
Rappahannock								
2080102	804.64	65.05	410.82	0.00	0.00	6538.45	205.73	38.97
2080103	1051.98	92.02	532.06	2067.66	0.00	1654.12	1694.54	241.35
2080104	981.34	60.66	882.97	0.00	0.00	0.00	662.34	116.43
York								
2080102	1312.25	62.75	375.41	0.00	0.00	9788.65	176.07	30.94
2080105	837.53	24.50	196.52	0.00	0.00	0.00	161.89	27.63
2080106	1054.76	63.94	470.42	0.00	0.00	0.00	521.60	88.91
2080107	1197.35	91.59	726.16	0.00	0.00	1633.52	334.06	56.23
2080108	12.08	61.40	333.10	0.00	0.00	5.54	148.99	22.40
Southern Rivers	783.32	66.44	914.24	664.03	0.30	1217.07	1641.91	276.96