

Technical Memorandum

Significant Nutrient Point Sources in the Maryland Coastal Bays Watershed

The U.S. Environmental Protection Agency (USEPA) requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources of the impairing pollutant or pollutants (CFR 2013). The TMDL analysis for the Maryland Coastal Bays sets total nitrogen (TN) and total phosphorus (TP) loading caps for both growing season (May-October) and average annual conditions. This technical memorandum identifies, in detail, the point source discharges of TN and TP in the Maryland Coastal Bays watershed and assigns allocations to the facilities and point source sectors that are included in the TMDL Wasteload Allocations (WLAs). Only the point source facilities and sectors in the Maryland portion of the Coastal Bays watershed are addressed in this technical memorandum. The loads associated with the point sources facilities and sectors in the Virginia and Delaware portions of the watershed are addressed by the Upstream Load assigned to these jurisdictions. This document presents one means of allocating the point source loads among the various permitted entities in the watershed within the loading limits set forth in the TMDL WLAs. These are conceptual values that are designed to meet the TMDL thresholds. Effluent limits and associated discharge conditions will be established at the time of permit issuance or renewal (*i.e.*, the permitting process). The State expressly reserves the right to allocate the loads among different sources using the above mentioned permitting process in any manner that is reasonably calculated to achieve water quality standards.

There are several types of point sources located within the Maryland Coastal Bays watershed, including municipal wastewater treatment plants (WWTPs), industrial facilities, spray irrigation facilities, injection wells, and Concentrated Animal Feeding Operations (CAFOs). WLAs have been assigned for all National Pollutant Elimination System (NPDES) regulated facilities such as municipal WWTPs, industrial wastewater discharges, spray irrigation facilities, injection wells, and CAFOs. NPDES regulated urban stormwater loads from Municipal Separate Storm Sewer Systems (MS4s), industrial stormwater facilities, etc. are considered point sources by USEPA, and therefore they need to be included within the WLA portion of a TMDL. However, there are no NPDES regulated stormwater permits in the Maryland Coastal Bays watershed. Thus, the nitrogen and phosphorus loads associated with urban stormwater are included within the Load Allocation portion of this TMDL, and they are described in further detail in the Nonpoint Source Technical Memorandum, *Significant Nutrient Nonpoint Sources in the Maryland Coastal Bays Watershed*. The nutrient load reductions applied to point sources in the TMDL analysis are designed to protect water quality endpoints for dissolved oxygen (DO) and chlorophyll in the Maryland Coastal Bays.

Tables 1 and 2 below present the nitrogen and phosphorus allocations to the permitted, process water point sources in the Maryland Coastal Bays watershed: municipal WWTPs, industrial discharge facilities, spray irrigation facilities, and injection wells. These allocations were used in the Coastal Bays Eutrophication Model simulation for the TMDL scenario. The allocations were set using the maximum allowable permitted flow and concentrations for the facilities. See Section 4.5 of the main TMDL report for further details.

Under the Clean Water Act, CAFOs require NPDES permits for their surface water discharges, or potential discharges. In January, 2009, Maryland implemented new regulations governing CAFOs (COMAR 2013a,b,c), which were approved by the EPA in January, 2010. Under these regulations, CAFOs are required to fulfill the conditions of a general permit. These conditions include instituting a Comprehensive Nutrient Management Plan that meets the Nine Minimum Standards to Protect Water Quality, which include: 1) ensure adequate storage capacity, 2) ensure proper management of mortalities to prevent the discharge of pollutants into waters of the State, 3) divert clean water, as appropriate, from the production area to keep it separate from process wastewater, 4) prevent direct contact of confined animals with waters of the State, 5) chemical handling, 6) conservation practices to control nutrient loss, 7) protocols for manure and soil testing, 8) protocols for the land application of manure and wastewater, and 9) record keeping. These are described in further detail in the general CAFO permit (MDE 2009b). The general permit also prohibits the discharge of pollutants, including nutrients, from CAFO production areas, except as a result of events greater than the 25-year, 24-hour storm. Estimated TN and TP loads under TMDL conditions for these facilities were based on CAFO loading rates for Worcester and Somerset Counties from the Chesapeake Bay Program Phase 5.3.2 Watershed Model (USEPA 2010). Please refer to Section 4.5 of the main TMDL report for further details. Tables 3 and 4 below present the nitrogen and phosphorus allocations to CAFOs within the Maryland Coastal Bays watershed for the TMDL scenario.

Table 1: Process Water Point Source WLAs - Growing Season (May 1st - October 31st)

Basin Name	Sub-basin Name	Facility	Type ¹	Permit Number ¹	Nutrient Loads (lbs/growing season) ²		Flow	Concentration (mg/L) ⁴	
				NPDES/MD #	TN	TP	(MGD) ³	TN	TP
Assawoman Bay	Direct Drainage	Lighthouse Sound WWTP	Spray Irrigation	DP3155	0	-	0.038	12	-
Isle of Wight Bay	Direct Drainage	Ocean Pines WWTP	Municipal WWTP	MD0023477	13,811	2,302	3.0	3	0.5
	Bishopville Prong	Perdue Farms Inc-Bishopville Hatchery	Spray Irrigation	DP0814	333	-	0.004	N/A	-
	Shingle Landing Prong	River Run WWTP	Spray Irrigation	DP2394	1,382	-	0.11	10	-
		Reserved ⁵	Surface Discharge		6,138	614	0.80	5	0.5
	TurvilleCreek	Riddle Farm WWTP-001	Spray Irrigation	DP2710B	0	-	0.058	5	-
Riddle Farm WWTP-002		Spray Irrigation	DP2710B	0	-	0.20	5	-	
Newport Bay	Ayer Creek/Kitts Branch	Berlin WWTP	Municipal WWTP	MD0022632	0	0	0	0	0
		Kelly Foods Corp	Industrial	MD0001309	552	18	0.020	18	0.6
		Reserved ⁵	Surface Discharge		4,911	614	0.80	4	0.5
	Marshall Creek	Newark WWTP	Municipal WWTP	MD0020630	1,934	322	0.070	18	3
Sinexpent Bay	Direct Drainage	Assateague Island National Seashore WWTP	Municipal WWTP	MD0021091	55	6	0.012	3	0.3
		Assateague Pointe WWTP	Spray Irrigation	DP2608	193	-	0.042	10	
		The Mystic Harbour	Injection Well	DP2273	1,151	-	0.25	3	-
		The Landings	Injection Well	DP0121	460	-	0.10	10	
Chincoteague Bay		-	-	-	-	-	-	-	-
		Total⁶			417,629	68,328	N/A	N/A	N/A

¹ Spray irrigation and groundwater injection wastewater disposal practices have Maryland state permits only. They do not have NPDES permits.

² lbs: pounds

³ MGD: millions of gallons per day

⁴ mg/L: milligrams per liter

⁵ The Berlin North WWTP and Perdue Farms Showell Complex are not currently in operation. A 'reserved' allocation has been set aside, should the Department determine that some or all of this allocation remains applicable if these permits are renewed and the facilities come back online, or if the permit(s) is transferred to another operation in the watershed.

⁶ The Ocean City WWTP is located within the watershed but discharges to the Atlantic Ocean, outside of the boundary of the Coastal Bays system. The water quality modeling domain extends into the Atlantic Ocean along Fenwick Island. The facility was incorporated into the analysis for completeness with an average flow of 5 MGD, an estimated delivered load of 386,709 lbs/growing season and an estimated delivered TP load of 64,452 lbs/growing season.

Table 2: Process Water Point Source WLAs - Average Annual

Basin Name	Sub-basin Name	Facility	Type ¹	Permit Number ¹	Nutrient Loads (lbs/year)		Flow	Concentration (mg/L)	
				NPDES/MD #	TN	TP	(MGD)	TN	TP
Assawoman Bay	Direct Drainage	Lighthouse Sound WWTP	Spray Irrigation	DP3155	183	-	0.038	12	-
Isle of Wight Bay	Direct Drainage	Ocean Pines WWTP	Municipal WWTP	MD0023477	31,926	4,566	3.0	3/4***	0.5
	Bishopville Prong	Perdue Farms Inc-Bishopville Hatchery	Spray Irrigation	DP0814	665	-	0.004	N/A	-
	Shingle Landing Prong	River Run WWTP	Spray Irrigation	DP2394	3,102	-	0.11	10/18*	-
		Reserved ²	Surface Discharge		12,176	1,218	0.80	5	0.5
	Turville Creek	Riddle Farm WWTP-001	Spray Irrigation	DP2710B	0	-	0.058	5	-
Riddle Farm WWTP-002		Spray Irrigation	DP2710B	0	-	0.20	5	-	
Newport Bay	Ayer Creek/Kitts Branch	Berlin WWTP	Municipal WWTP	MD0022632	3,378	375	0/0.6**	0/4.5**	0/0.5**
		Kelly Foods Corp	Industrial	MD0001309	1,096	37	0.020	18	0.6
		Reserved ²	Surface Discharge		9,741	1,218	0.80	4	0.5
	Marshall Creek	Newark WWTP	Municipal WWTP	MD0020630	3,836	639	0.070	18	3
Sinepuxent Bay	Direct Drainage	Assateague Island National Seashore WWTP	Municipal WWTP	MD0021091	110	11	0.012	3	0.3
		The Mystic Harbour	Injection Well	DP2273	2,283	-	0.25	3	-
		Assateague Pointe WWTP	Spray Irrigation	DP2608	435	-	0.042	10/18*	-
		The Landings	Injection Well	DP0121	913	-	0.10	10	-
Chincoteague Bay	-	-	-	-	-	-	-	-	
		Total³			836,957	135,915	N/A	N/A	N/A
		* (Mar-Oct)/(Nov-Feb)							
		** (Apr-Oct)/(Nov-Mar)							
		*** (May-Oct)/(Nov-Apr)							

¹ Spray irrigation and groundwater injection wastewater disposal practices have Maryland state permits only. They do not have NPDES permits.

² The Berlin North WWTP and Perdue Farms Showell Complex are not currently in operation. A 'reserved' allocation has been set aside, should the Department determine that some or all of this allocation remains applicable if these permits are renewed and the facilities come back online, or if the permit(s) is transferred to another operation in the watershed.

³ The Ocean City WWTP is located within the watershed but discharges to the Atlantic Ocean, outside of the boundary of the Coastal Bays system. The water quality modeling domain extends into the Atlantic Ocean along Fenwick Island. The facility was incorporated into the analysis for completeness with an average flow of 5 MGD, an estimated delivered load of 767,113 lbs/year and an estimated delivered TP load of 127,852 lbs/year.

Table 3: CAFO WLAs - Growing Season (May 1st - October 31st)

Basin Name	TN	TP
	WLA _{CAFO} (lbs/growing season)	
Greys Creek	339	28
Assawoman Bay¹	339	28
Bishopville Prong	1,411	116
Shingle Landing Prong	678	56
St. Martin River ¹	2,224	183
Herring Creek	0	0
Turville Creek	373	31
Manklin Creek	0	0
Isle of Wight Bay¹	2,597	214
Ayer Creek/Kitts Branch	268	22
Newport Creek	440	36
Marshall Creek	562	46
Newport Bay¹	1,526	125
Sinepuxent Bay	0	0
Chincoteague Bay	2,118	174

¹ Allocation includes the allocations for the applicable sub-basins.

Table 4: CAFO WLAs - Average Annual

Basin Name	TN	TP
	WLA _{CAFO} (lbs/yr)	
Greys Creek	678	56
Assawoman Bay¹	678	56
Bishopville Prong	2,823	232
Shingle Landing Prong	1,357	112
St. Martin River ¹	4,451	366
Herring Creek	0	0
Turville Creek	747	61
Manklin Creek	0	0
Isle of Wight Bay¹	5,198	427
Ayer Creek/Kitts Branch	535	44
Newport Creek	879	72
Marshall Creek	1,124	92
Newport Bay¹	3,050	251
Sinepuxent Bay	0	0
Chincoteague Bay	4,236	348

¹ Allocation includes the allocations for the applicable sub-basins.

REFERENCES

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