

Consensus Recommendations for Improving the Tracking, Reporting, and Verification of Urban Nutrient Management Practices

Urban Stormwater Workgroup
October 21, 2025



Chesapeake Bay Program
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Today's Outline

Urban Nutrient Management Background

Panel Scope and Membership

Literature Review

BMP Recommendations

Other Recommendations & Next Steps

Urban Nutrient Management Background

History of the 2013 Report

2013 UNM Panel Report

Original Panel was launched in 2011 and approved in 2013

Established two (and a half) types of BMPs:

- State-wide P reductions for all states, based on legislation status
 - To be phased out in 2016 and replaced by state-reported estimates of P-fertilizer application
- Individual BMPs for UNM Plans
- MD-specific credit for Nitrogen legislation (DIY and Commercial Applicators)

2013 State P Legislation Credit

- Assumed 70% reduction in P fertilizer application rates for states with legislation
- Assumed 60% reduction in P fertilizer application rates for states without legislation

Table 6. Recommended TP Load Reduction Credit from Pervious Lands Based on Fertilizer Legislation and Industry P Phase-Out			
	<i>TP Reduction (millions of lbs)</i>	<i>& Change in Pervious Load</i>	<i>% Change in Urban Load</i>
Pennsylvania	0.046	-20.0	-10.4
Maryland	0.060	-25.1	-8.6
Virginia	0.125	-26.7	-10.2
Delaware	0.0018	-19.0	-7.8
West Virginia	0.0048	-21.1	-4.4
D.C.	0.0006	-21.2	-3.6
New York	0.012	-26.5	-11.6
Based on analysis by Gary Shenk, CBPO, April 10, 2012 using the CBWM Phase 5.3.2 model, assuming 0% P application rate, and multiplied by 0.7 for legislation states, and 0.6 for non-legislation states. PA legislation was not yet passed at the time of this analysis.			

2013 Individual UNM Plan Credit

Table 9. Nitrogen and P Reduction Credits for Qualifying Individual Urban Nutrient Management BMPs

Turf Management Category	Annual TN Reduction Rate¹	Annual TP Reduction Rate¹
Low Risk Lawns	6%	3%
High Risk Lawns	20%	10%
Blended Rate ²	9%	4.5%
1 Reduction rate applies to pervious land, regardless of fertilization regime (including non-fertilized lawns)		
2 Blended rate is provided as a default if the risk is unknown. It assumes 80% of lawns fall into the low-risk category, and 20% fall into the high-risk category.		

The Challenges

- Best practices and risk factors were defined, qualifying conditions were not clearly established
- Overlap between reductions in N sales and UNM BMPs
- Challenges with tracking and reporting
 - little verification
 - all states took the blended rate for all acres except NY from 2023 forward.
- Fertilizer application method needed a closer look



2025 Panel

Charge and Membership

Charge

- Evaluate the effectiveness of state fertilizer legislation in reducing the application of nitrogen and phosphorus on urban turf grass.
- Evaluate options and implications for providing nutrient reductions for large, non-fertilized lands
- Evaluate potential approaches to streamline tracking, reporting, and verification of both individual urban nutrient management plans, and any pollutant removal associated with state-wide fertilizer legislation.
- Work with the USWG to provide requested feedback on urban nutrient application and physical process simulation, including P export pathways, and P sensitivities

Membership

Expert BMP Review Panel: Urban Nutrient Management	
<i>Panelist</i>	<i>Affiliation</i>
Cecilia Lane	DOEE
Frank Schneider & Denise Uzipis	PA Dept of Agriculture
Martin Hurd	Fairfax County, VA
Dylan Burgevin	MDE
Arianna Johns & Kay Alexander	Virginia DEQ
Dave Montali	Tetra Tech
Kevin Du Bois	Department of Defense
Michael Goatley	Virginia Tech
Gonzalo Ortiz	Virginia Tech, VA DCR
Peter Landschoot	Pennsylvania State
David Wood & Michele Berry	CSN (Panel co-facilitators)

- Membership solicited from USWG to represent states, local govs, and federal agencies
- Representation balanced with turfgrass specialists from academia
- Convened in September 2024
- Held 7 meetings over the course of the year

Literature Review

Process and Highlights

Process

- Science Summary from 2013 Panel Report
- Papers published after 2012
 - Nitrogen dynamics in urban turfgrass (fate and transport)
 - Phosphorus dynamics in urban turfgrass (fate and transport)
 - Best Practices for reducing N and P export from turf
 - Effectiveness of local and state fertilizer legislation
 - Cross-disciplinary studies evaluating fertilizer management
- Soil Test Data from 5 labs
- Updated survey data on fertilization and turf management practices
- Overall: 35 new studies were reviewed in this phase.

Phosphorus Literature

- New literature largely re-enforced the P dynamics outlined in the 2013 report:
 - Urban and suburban lawns are largely retentive of P.
 - P export from lawns is primarily driven by surface runoff
 - Runoff P loss risk is greatest when turf is dormant, soils are frozen or compacted, and soil is bare/exposed.
 - P losses occur regardless of fertilizer application, but fertilizer application can sharply increase losses.
 - Newer literature also emphasizes fertilizer P loss is likely driven by localized hotspots

Phosphorus Soil Test Data

- Panel also explored acquiring soil test P data from urban/suburban lawns

Table 11. Soil Test P Data from Turfgrass Reported to the Chesapeake Bay Program		
Lab	# of samples	Median P ppm
University of Delaware	1190	97
Pennsylvania State University	1615	51
Data from 2014, Mehlich-3 P. Delaware data converted from P Fertility Index Value (FIV) to ppm. Delaware data represents “Lawn and Garden” Penn State Data represents Home Lawns, Industrial Lawns, Park Lawns, School Lawns, Athletic Fields, and Golf Courses		

Nitrogen Literature

- New literature again largely re-enforced the N dynamics outlined in the 2013 report:
- More emphasis in new literature on interdisciplinary studies
- More nuance surrounding hotspots and hot moments
- Best practices focused on appropriate rate, timing and placement of fertilizer.
- Clipping management also plays a role in effective N management

Legislation Update

Table 12. Comparison of Bay State Fertilizer Legislation					
Key Element	MD	NY	VA	DC ³	PA
Year Enacted/Effective	2011/13	2011/12	2011/14	2012/13	2022/24
Rate					
P Ban on Lawn Maintenance Fertilizer	Yes	Yes	Yes	No	Yes
Product Labeling Requirement	Yes	Yes	Yes	Yes	Yes
Organic/Biosolids Exemption	No	No	Yes	No	Yes
Retail Display Requirements	No	Yes ¹	No	Yes	No
Maximum N Fertilizer Application	Yes	No	No	Yes	Yes
Slow-Release N Requirements	Yes	No	No	Yes	Yes
Specialty Product Exemptions ²	Yes	Yes	Yes	No	Yes
Certification for Commercial Applicators	Yes	No	Yes	No	No
Enforcement and Fines	Yes	Yes	Yes	Yes	No
Timing					
Starter Lawn Exemption	Yes	Yes	Yes	No	Yes
Winter Application Ban	Yes	Yes	No	Yes	No ⁴
Placement					
Prohibit Application on Paved Surfaces	Yes	Yes	Yes	Yes	Yes
Prohibit Application on or Near Surface Water Features	Yes	Yes	Yes	Yes	Yes

Legislation Effectiveness

- Studies on legislative effectiveness are limited
- Work in MN, FL and WA show signals that legislation results in declining application (MN), and mixed improvements in water quality (FL and WA)
- Evidence suggests resident awareness of legislation is limited, and adherence to best practices has not shifted much since 2013.



BMP

Recommendations

Overview

- BMP #1: Urban Nutrient Management Plan With a Soil Test
- BMP#2: Urban Nutrient Management Plan Without a Soil Test
- BMP#3: Non-Fertilized Turfgrass

Table 1. Summary of Recommended Urban Nutrient Management BMPs

	TN Reduction	TP Reduction	Credit Duration
BMP #1	6 %	4.5 %	3 years
BMP #2	6 %	4.5 %	1 year
BMP #3	7 %	9 %	1 year

UNM Plan BMPs based on Rate, Timing, and Placement of Fertilization

Non-Fertilized Turf based on managed condition w/ clipping management practices

The Core UNM Plan Practices

Apply to BMP #1 and BMP #2

Supplemental Rate Practices:

- Application of N in alignment with Extension guidelines
- Application of P in accordance with soil needs as established by a soil test, including during establishment and repair.

Supplemental Timing Practices:

- Avoid application of N or P outside of the growing season
 - October 31-March 1
- Apply slow-release N
- Apply N at annual Extension application rate suggested by Extension, split into two or three applications during the growing season when turf is actively growing
- Avoid N or P application within 48 hours prior to runoff-inducing rainfall or irrigation event



The Core UNM Plan Practices (cont)

Apply to BMP #1 and BMP #2

Supplemental Location Practices:

- Avoid application of N or P within 15-20 ft of a water feature
- Avoid application of N or P to impervious surface, severely compacted soil, or steep slopes

Clipping Management Practices:

- Retain grass clippings and mulched leaves on the turf and keep them out of streets and storm drains.
- Set mower heights at 3 inches or higher for lawns. If adjustments are needed for specific management contexts they can be addressed in QAPPs or related documentation.



BMP #1 vs BMP #2

- Soil Test = a basic soil test from an accredited lab that, at a minimum, assesses P, K, and pH
- Credit duration for BMP #1 tied to recommended soil test frequency
- Allows credit for certified applicator programs (BMP #1) and homeowner pledges (BMP #2)

Urban Nutrient Management Online Pledge Submission

Urban Nutrient Management Pledge

By completing this survey, I pledge to use the top 10 urban nutrient management practices to protect water and soil by applying fertilizer sparingly.

Top 10 BMPs for Lawns and Turfgrass in New York

1. Avoid spillage of fertilizer and turfgrass clippings onto impervious surfaces.
2. Return clippings to turf to recycle nutrients (not applicable on golf course putting greens).
3. Avoid late-season applications (after mid-October) of all nitrogen sources and avoid high rate early-spring soluble (quick release) nitrogen sources.
4. Per NYSDEC regulation: Avoid fertilizer applications within 20 feet of water *unless*
 - (a) there is a 10 foot buffer of vegetation between the management area and waterbody, or
 - (b) a spreader guard or other control device is used (then the closest you can get is 3 feet)
5. Conduct soil testing to establish nutrient requirements for non-nitrogen nutrients (MLSN Guidelines prefer phosphorus application is controlled under a NYSDEC regulation).
6. If turf has desirable function, growth, and quality, fertilizer (of any kind) is not required.
7. Set mower height at 3.5 inches or taller.
8. Fertilizer applications should not be made when soil temperatures are under 50° Fahrenheit.
9. Maximize use of slow-release nitrogen fertilizer, especially on sandy soils.
10. If more assistance is needed, work with a professional to develop a UNMP based on a soil test analysis.

For questions or concerns, email urbannutrients@u-s-c.org



Maryland Department of Agriculture Nutrient Management Program

2024 Annual Fertilizer Application Report

Company Name / Branch Location

Business License Number: MDA-F County of Business:

County	Total Fertilized Turf Acres	Total Nutrients Applied (in pounds)		
		N	P ₂ O ₅	K ₂ O
Allegany				
Anne Arundel				
Baltimore City				
Baltimore Co.				
Calvert				
Caroline				
Carroll				
Cecil				
Charles				

BMP #3: Non-Fertilized Turfgrass

For properties effectively maintaining healthy turfgrass to reduce nutrient export without the use of fertilizer. These turf acres must be actively managed turf (not successional), often under a “mow-only” designation

There must contain a signed commitment by the owner/property manager that they intend to adhere to the following clipping management practices:

- Grass clippings must remain on-site to ensure cycling of nutrients
- Mower heights should be set at 3 inches or higher for lawns. If adjustments are needed for specific management contexts (based on type of turf, or mowing frequency), they can be addressed in QAPPs or related documentation
- Turf must demonstrate absence of exposed soil (less than 15% exposed)

Record-keeping Guidance for UNM Plans

The Panel recommends they keep the following records over time:

- Electronic or hard copy of the individual UNM plan or lawn maintenance program
- Property owner contact information and street and watershed address
- A UNM contact database so that they can communicate by mail or e-mail, and send at least one reinforcement message to each UNM owner/applicator each year.
- A UNM tracking database to track required data elements for NEIEN reporting and the status of UNM plans over time
- Documentation of procedures, and guidance for defining, and documenting triggers for more detailed investigation and/or ultimate pass/fail determinations (i.e. application rate >10% over extension recommended, significant variance in application rate compared to prior years).

Recordkeeping for Pledges

- Electronic or hard copy of the individual UNM pledge
- Database with pledge contact information and location so agencies/partners can communicate by mail or e-mail, and send at least one reinforcement message to each contact annually when it is time to renew the pledge.
- A UNM tracking database to track required data elements for NEIEN reporting and the status of UNM pledges over time

Non-Fertilized Turf

An annual BMP, but is recommended periodic spot-checks for turf health

The following are potential visual indicators of turf health in adherence with BMP #3 criteria:

- Turfgrass ground cover – evaluation of treated area for bare patches
- Turfgrass density – visual estimate of grass shoots per unit area
- Turfgrass stress – visual assessment of impacts due to disease, drought, or other stressor resulting in discoloration, or die-off
- Surface Compaction – Turf injury due to high traffic and surface compaction
- Clipping Management – evidence of clippings removed or swept to impervious surfaces

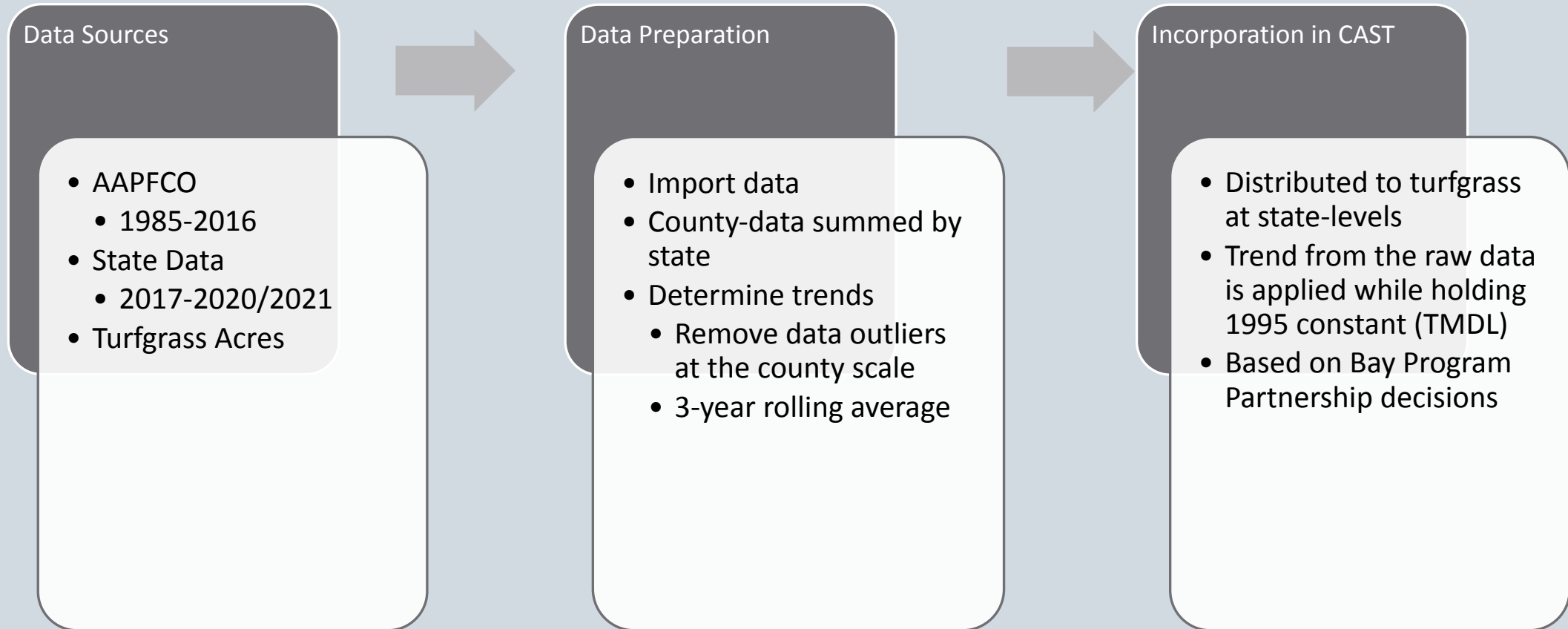
Other Recommendations

Application Methodology and Future Research

Update to Fertilizer Application Rate Methodology

- Keep the 2023 approved methodology with two tweaks:
 - Include construction acres and solar pervious acres to the denominator of the non-farm fertilizer application rate equation
 - Adjust DC's methodology to base their fertilizer application rates on an average of the immediate adjacent counties with similar development patterns: Arlington, Alexandria, and Falls Church.
- Panel sought data sources that might improve the Watershed Model's P sensitivities for pervious acres but ultimately did not find any data to support specific changes or improvements
- Panel recommends investment in more widespread soil testing from non-agricultural soils

Turfgrass Fertilizer Application Method



Future Research

- Compaction and runoff from turfgrass
- UNM and ecosystem health
- Human dimensions of soil health
- Impact of urban gardening and small scale urban agriculture

Next Steps

October 27 - Briefing to the WQGIT

November 6 - WTWG Approval of Technical Appendix

Week of November 10 - USWG Approval (via email)

November 17 - WQGIT Approval

Questions

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