

# Clean Sweep

Abigail Lyon – Piscataqua Region Estuaries Partnership (PREP)

**The Future of Stormwater In New England:**  
Strategies to solve our nutrient dilemma




# Three Problems, One Solution

Nutrient pollution is  
mostly nonpoint.

Street cleaning is an  
underutilized BMP.

Science suggests  
*more credit* is  
warranted.



**Empower communities to protect water quality  
& earn more credit through flexible, science-  
based, street cleaning regulations.**

# New Options for Street Cleaning

OPTION 1: Organic Matter Collection Credit (Measured Approach)	OPTION 2: Updated Street Cleaning Credit (Model-Based Approach)
Credit is based on the measured amount of organic matter collected from impervious surfaces throughout the year.	Credit is based on street cleaning technology used, frequency of cleaning, seasonality, and location.
Adapted from Minnesota's Street Sweeping Credit Calculator, which is based on a rigorous study and is now part of that state's stormwater program.	Updated version of the model that informs New Hampshire's current Enhanced Street/Pavement Cleaning Program.
Community scale pilots are collecting local data to ground truth data from Minnesota and develop tools to support adoption of this credit in New Hampshire.	Establishes three tiers of credit (minimum, medium, and maximum). The model uses medium density residential as the default land use and a 10% increase in credit for maximum effort in fall months.
Potential for far more credit than currently available.	Potential for more credit than currently available.

# Resources (hyperlinked)



## Clean Sweep

Protect Water Quality  
for More Credit

New Hampshire communities will have new science-based options to receive more credit under the state's Municipal Separate Storm Sewer System (MS4) Permit. Based on the recommendations of an expert panel, regulatory agencies are updating the state's model-based street/pavement cleaning credit and creating a new, "measured" option that offers credit for the amount of organic matter collected. Both options will significantly increase the credit permittees can earn through street cleaning, while supporting their efforts to protect water quality. Pilots to test the measured option are underway. The results will support the codification of both options in the reissue of the MS4 permit, anticipated for 2024.

### New Options for Street Cleaning

Designed to give MS4 permittees the flexibility they need to pursue street cleaning in ways that best suit their resources, both options provide incentives for communities to implement street cleaning when and where it will have the greatest water quality benefit.

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### How Does Potential Credit From the Two Options Compare?

In the table below, Minnesota data is used to estimate the credit for each option. While both the model-based and measured approaches will yield more credit than is currently available, the measured approach has the potential to generate significantly more.

	Times swept per year	Lane miles swept	Total wet mass collected (lbs)	* OPTION 1: Organic Matter Collection Credit (Measured)		OPTION 2: Updated Street Cleaning Credit (Model-Based)	
				TN credit (lbs/yr)	TP credit (lbs/yr)	TN credit (lbs/yr)	TP credit (lbs/yr)
Min. effort	2	9.5	11,548	13	4.5	1.3	0.18
Med. effort	6	9.5	17,455	25	7.8	19	2.7
Max. effort	19	9.5	52,765	53	19	32	4.5

\* Credit estimates are based on data from a 9.5 mile route in Prior Lake, Minnesota, that was swept 19 times with a regenerative air sweeper in 2011. To support an apples-to-apples comparison of potential credit, effort levels were assigned to the measured approach. Maximum effort is based on mass from 19 sweepings; medium effort is based six fall sweepings; and minimum effort was calculated from one fall and one spring sweeping. In practice, there would not be pre-determined levels of effort for the measured approach—credit would be determined by the total amount of matter collected throughout the year.



## Clean Sweep

Recommendations for New and Updated Credits for Street Cleaning in New Hampshire



### Technical Memorandum

Updated April 21, 2023



Abigail Lyon  
PREP

[Abigail.Lyon@unh.edu](mailto:Abigail.Lyon@unh.edu)



# City of Newton MA Sweeping Program

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**Waneta Trabert**  
Director, Sustainable Materials Management Division

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# Modernizing Street Sweeping

- 600 lane miles in Newton
- Year-round sweeping program
- Goal: leverage technology to keep streets cleaner and increase nutrient control
- Sensors installed on brooms and hoppers
- Data analysis ongoing to identify ways to increase efficiency
- Low hanging fruit
  - Reduce wait times for sweepers to dump
  - Improve sweeping efficiency metric - % time spent with brooms down
  - Track adherence to best practices, such as speed

May 10, 2023

# Phosphorus in Catch Basin Sediments



Stephanie Alimena  
SAlimena@BrwnCald.com



Maria Rose  
mrose2@brooklinema.gov

# Accounting Methodologies

- MA MS4 Permit: reduction factor applied to drainage area load
- Chesapeake Bay: reduction factor applied to mass of sediments removed

Reduction Factor from [MA MS4 Permit](#)

Practice	Reduction Factor (fraction)
Catch Basin Cleaning	0.02

Loading Rates from [Maryland Dept. of Environment](#)

Material Type	Loading Factor (lb./ton/year)
Organic	0.48
Inorganic	0.84



# Sampling Methods and Results

- Quarterly samples from sediment pile
- Preserve seasonality of sediments

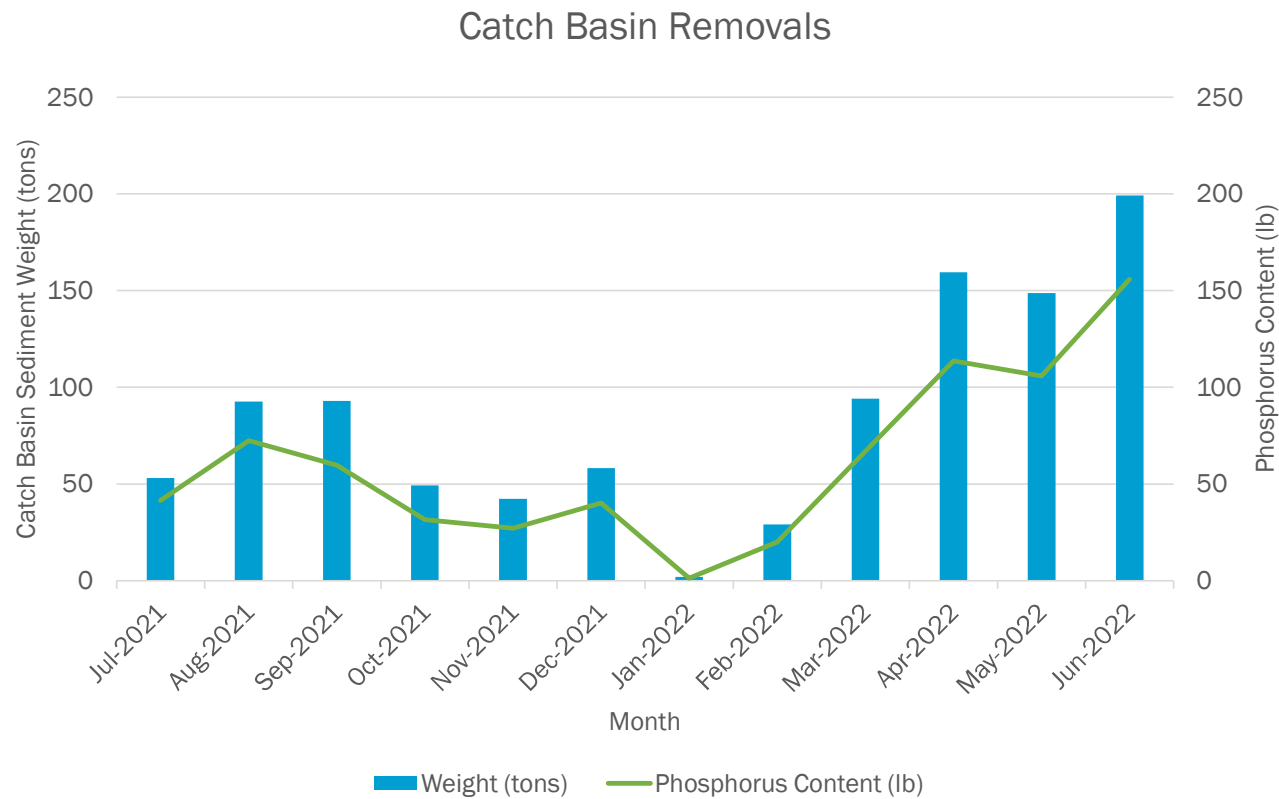
Season	Total Solids (%)	Total Phosphorus (mg/kg)	Loading Rate (lb. TP/ton)
Summer (8/31/22)	58.3	670	0.78
Fall (10/28/22)	58.4	550	0.64
Winter (2/16/22)	69.0	500	0.69
Spring	TBD	TBD	TBD
Average	58.35	610	0.71

# Sampling Methods and Results

Sampled loading rates  
within range of Maryland  
guidance:  
0.48 – 0.84 lb./ton

		orus	Loading Rate (lb. TP/ton)
Summer		670	0.78
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# Phosphorus removals from a year of sediment weights



# MS4 Crediting

Newton Tedder – EPA R1

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# Current Credits

Frequency <sup>1</sup>	Sweeper Technology	PRF <sub>sweeping</sub>	NFR <sub>sweeping</sub>
2/year (spring and fall) <sup>2</sup>	Mechanical Broom	0.01	0.01
2/year (spring and fall) <sup>2</sup>	Vacuum Assisted	0.02	0.02
2/year (spring and fall) <sup>2</sup>	High-Efficiency Regenerative Air-Vacuum	0.02	0.02
Monthly	Mechanical Broom	0.03	0.03
Monthly	Vacuum Assisted	0.04	0.04
Monthly	High Efficiency Regenerative Air-Vacuum	0.08	0.08
Weekly	Mechanical Broom	0.05	0.06
Weekly	Vacuum Assisted	0.08	0.07
Weekly	High Efficiency Regenerative Air-Vacuum	0.10	0.10

Frequency	Practice	PRF <sub>CB</sub>	NRF <sub>CB</sub>
Semi-annual	Catch Basin Cleaning	0.02	0.06



# Future Credits?

## New Draft MS4 2023

- Will be reviewing latest science and recommendations from UNH expert panel
- Modeled Approach or Measured Approach
- How much should we rely on non-structural controls for TMDL compliance?



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## State Perspective on Disposal

- Street sweeping and storm basin cleanouts are among the more important practices to improve surface water quality. They are a key measure in the NH MS4 permit. I have long said that if had the money, I would give a sweeper and a vac truck to every community (and a crew to run it!)
- As surface water folks, we have not paid much attention to the fate of the spoils that are collected after sweeping and vactoring .
- Given the heightened concerns about groundwater quality in this era of PFAS and MTBE, trading surface water quality for groundwater quality is not an option. And, doing so opens up communities to potential financial liabilities if material needs to be removed at some future date.



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# State Perspective on Disposal

- The advice given from DES on this issue to the communities over the years has been unclear.
- For many years, our solid waste management bureau and the services it could provide were shrinking due to lack of resource. In the past couple of years, interest from the public and the legislature and demand expressed by local officials have resulted in resources returning to the program, and this year, the solid waste bureau became fully staffed for the first time in 20 years. As a result, we are now able to begin to give attention to solid waste issues that had previously been back burner-ed due to lack of resources.
- One of those issues is the applicability of the solid waste rules to management of municipal roadway soils.





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# State Perspective on Disposal

- The bottom line is that communities will need to address this issue through the solid waste disposal rules. It will involve sampling of materials and planning for disposal well in advance. It will take resources to hire consultants who can recommend sampling regimes and interpret the results.
- After going through this process, both the state and the municipalities will be able to tell the public that we have addressed this issue, which is critical to instilling trust and allowing for both surface and groundwater resources to be protected.