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Stormwater Insights Presentation by Dr. Brenda Zollitsch

Maine Commission to Study Unmanaged Storm Water Pollution

September 23, 2026 - Cross Building, Augusta, Maine

Bangor Area Stormwater Group (BASWG)

Formed to address the 'confounding' new MPDES regulations

Major. Complex. Confusing. Extensive New Language and Tasks. Few Staff Available. Many Requirements. Out of Staff Skillsets.

MS4s are mandated to comply, very little federal or state funding.

Capped CWRP funds "don't even touch" repair expenses. Municipalities struggle.

23 years later - Stormwater work has expanded and MS4s remain under-resourced



11 MS4s in the Greater Bangor Urbanized Area (7 municipalities and 4 nontraditional MS4s)



501(c)(3) nonprofit Incorporated in 2003



Focus on MEPDES compliance activities around stormwater pollution prevention education, outreach and public involvement



Coordinated voice, leverage expertise, and achieve economies of scale



Members meet every other month



BASWG has a small budget with huge leverage (\$38,400)

MS4s Need More from Maine Stormwater Regulators

Invest in Maine DEP Supports

- More **resources and technical assistance** to support MS4 compliance activities
- **Clarity and predictability** for regulated entities
- **Timely feedback and support** for compliance improvements
- **Consistent implementation** across regions and **enforcement backup to MS4s**
- Requirements **coordinated across regulatory agencies**
(e.g., SW permit and Ch. 500 LID requirements)
- Opportunities to **work collaboratively**
- Continued **inclusive regulatory planning** processes



What Works for MS4s

Regionalization

Voluntary
exploration

Place- and
context-specific
solutions

Peer-to-peer
sharing

Regulatory
Clarity and
Predictability

Incrementalism



Addressing Unregulated Stormwater Pollutants Chlorides

BASWG has been working to address chlorides as both outreach and behavior change goals with 1) BASWG MS4 Winter Maintenance Managers and 2) homeowners age 30-55 in the Greater BUA

Barriers to Chloride Reduction in the Greater Bangor Urbanized Area

(and the state, the region, the nation...)

What we have found:

- People do not understand that less chloride can still be effective
- They also don't know that salt doesn't work below a certain temperature
- Mainers do not have the appetite for snowy roads and snow tires
- Chloride planning process WMM stakeholder interviews found **passionate unanimity** that public safety is paramount
- Litigious precedent limits enthusiasm for chloride reduction



Chloride Reduction:

Adopting Practicable, Place-based Approaches

While the connections between chloride pollution and stormwater are generally understood, ways of removing chloride from water are not.

Those that do exist are **complex and prohibitively expensive**.

Focus must be on source control, not removal from runoff. *Solutions must be practicable.*

Last five years, a shared exploration and use of best practices

- Statewide and regional discussions
- Learn from both research and those who have had local successes
- Use of vetted BMPs and trusted voices – e.g., Maine Local Roads Program

The state should not push one-size-fits all chloride control requirements

Here's why...

In Common:

Training
SWMP
Aspiration to
reduce
chloride use

Different:

Location
Conditions
Weather
Budget
Resources
Staffing
Equipment
Systems

Chloride Pollution: Behavior Change

MS4 Winter Maintenance Managers (PY1-4)

Maine Environmental "Best Management Practices"
Manual for Snow and Ice Control

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BMP Manual

[Maine Environmental
BMP Manual for
Snow and Ice Control](#)

Individual BASWG MS4s

- Choose
- Adopt
- Track
- Report
- Share
- Learn
- Adjust



Formative Evaluation done in PY4
Summative Impact Evaluation in PY5

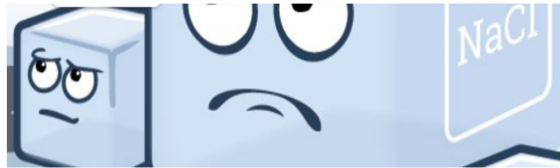


Maine Local Roads Center (MLRC)

- **Increased Use of BMPs**
 - 6 MS4s adopted new optimization efforts (trainings, calibration, optimization, minimization).
 - 5 MS4s adopted one or more new BMPs
 - 4 MS4s increased their BMP use
 - Eight MS4s tracked their use of salt, using the CTT (5) or another tracking systems (3)
- **Savings from regional shared bidding**
- **Reduction in chloride use:**
 - 5 MS4s reported between a 1/4 – 1/3 reduction in salt use in Permit Y 1 and 2
- **Critical: Not one-size-fits-all**
 - Changes when icing events rather than snow
 - What works in one not necessarily the right fit for another

Chloride Pollution: Public Outreach and Behavior Change

Homeowners age 30-55 in the Greater BUA (PY1-4)



Public Outreach Stormwater and Salt: A Difficult Balance

Did you know that the salts used on our roads and driveways can have harmful effects on Maine's lakes and rivers?

Although using salt and other chlorides is necessary for public safety, there's an environmental cost associated. Snow and melting snow can carry chlorides and other pollutants from the ground right into our storm drains. Water that enters storm drains is rarely treated before it enters nearby water bodies!

When exposed to chlorides, water bodies can become uninhabitable for fish and other aquatic life. Unfortunately, more and more streams and rivers are becoming contaminated. Here are some tips to reduce your chloride use this winter.

- **Less salt is actually better.** Most ice melt blends will use less salt than you'd think. A single coffee mug full of salt, applied carefully, can be enough for a full driveway. [Watch this video to learn more.](#)
- **Not all salts work the same way.** If it's really cold outside, your salt may not be working, so applying more won't help. Each type of salt has a different temperature range—for sodium chloride (the least expensive and most common salt), at anything below 20°F, the salt will be less effective, and the chemical stops working altogether at 15 degrees. The salt most effective at lower temperatures is calcium chloride, but be careful because this chemical is highly corrosive.
- **Salt before the storm.** If you have to salt, do it before the storm rather than after. One golden rule of road maintenance is that it's always easier to prevent anti-ice than de-ice. Any salt you apply before a storm can easily be several times more effective than salt applied after the storm. [Watch this video for more information.](#)

Summative Impact Evaluation in PY5

Best practices for home snow removal & deicing

Every winter it gets cold outside, and every winter we deal with snow and ice. When just shoveling isn't enough, we often resort to using chemicals like rock salt to keep our driveways and sidewalks clear.

However, the chemicals we use on our driveways and sidewalks can end up in our waterways. When it rains, snow melts, and snow melts directly into our rivers. While you may not think about it, the chemicals we use on our driveways and sidewalks can end up in our waterways.

• Slowly the brine helps to melt the rest of the ice until it's one big solution of brine.

• The colder it gets, the less water can be found on the surface of the ice. This means salt is most effective above 15 degrees Fahrenheit.

Act before the storm

The golden rule is that it's usually easier to anti-ice than to get rid of the ice once it's already settled in.

When you hear a storm is coming, head out ahead of time and apply a very thin layer of your preferred deicer. After the storm, plow or shovel like normal, then apply a little bit more treatment if needed.

Think about the temperature

As it gets colder, chlorides start to become less effective.

If you put down salt and it isn't working, don't put any more down. Instead, try a different kind of mixture or try applying sand for traction. If you're unsure about how cold is too cold, make sure to check the label.

Which deicer is best for my property?

ROCK SALT (NaCl)
The most basic salt. Very inexpensive, but slightly corrosive. Stops working around 15 degrees F.

CALCIUM CHLORIDE (CaCl₂)
Very effective melting agent but highly corrosive. Use sparingly when it gets very cold.

MAGNESIUM CHLORIDE (MgCl₂)
Stronger than rock salt but not as corrosive. A good general use mixture.

CALCIUM MAGNESIUM ACETATE (CMA)
Not a chloride. Non-corrosive and safer for pets and plants, but expensive.

Want to learn more about how you can protect our streams and rivers?

Learn more at BASWG.org/chlorides



Snow & Ice Management for Business Owners

Winter maintenance best practices can save you money and reduce snow and ice removal, and reduce runoff pollution from your property. This winter, try the following:

- 1. Pre-treat before the storm.**
It's always easier to anti-ice than to melt ice once it's formed. Monitor the weather and take action before it snows to reduce the amount of materials required.
- 2. Know your materials.**
Every treatment has a recommended use case, and picking the right treatment will minimize the amount needed. For example, rock salt becomes ineffective under 15°F, and sometimes sand may be a more effective option.
- 3. Know your property.**
Know your property's square footage and apply as much material as recommended. Too much salt can actually be bad for traction.
- 4. Protect your treatment.**
As much as 50% of treatment material can be lost to wind or rain. Cover any sand or sand/salt mixtures stored for treatment purposes to prevent it from being washed or blown away.

Learn more at BASWG.org or contact your local town for more information on winter maintenance best practices.





Support Development of a Maine Program Similar to Green SnowPro

Commercial Salt Applicators:

- Give them an **advantage**
 - *Not a disadvantage*
- Provide regular training
- Simple, effective system
- Pre-tested, peer-to-peer sharing
- *Most importantly:*
 - **Liability protections**



New Hampshire Voluntary Commercial Salt Applicator (Green SnowPro) Certification Guide



How to earn Green SnowPro Certification

To receive **initial** Green SnowPro certification and limited liability protection, each applicant must:

1. Complete an approved full course (minimum of four hours) and pass the exam.
 - a. Courses are provided by the Smart About Salt Council (SASC) (virtual and available 24/7), University of New Hampshire Technology Transfer (UNHT2) Center (in-person and virtual) and other NHDES-approved sources.
2. Complete and submit a [Voluntary Commercial Salt Applicator Certification application](#) to NHDES.
3. Provide payment to NHDES for certificate (Master, Individual or Subordinate) with check made out to:
Treasurer- State of NH. Memo: Green SnowPro.
 - a. Send or hand deliver check and application(s) to NHDES (see bottom of second page for mailing address)

Coursework/Training

All levels of certification (Master, Individual and Subordinate) require mandatory coursework by applicants to be eligible for Green SnowPro initial certification, annual renewals and limited liability protection. There are multiple options to complete required coursework:

1. In-person or virtual/hybrid UNHT2 courses: [UNHT2 Training](#)
2. Online full course and exam, and refresher course that:
 - a. The SASC is a Toronto-based company and course
3. Other approved courses and events that become available on the [Certification webpage](#), and via email and social media. To follow [NH Certified Green SnowPro](#) on Facebook for updates.

Levels of Certification

1. **Master Certificate:** A Master Certificate is suitable for performing snow and ice management. While everyone is required to complete the same coursework to receive certification, the Master Certificate holder is responsible for **submitting the annual Salt Use Report** that includes data for the oversight of all employees certified as Green SnowPro.
2. **Subordinate Certificate:** A Subordinate Certificate holds for all other certificate levels. Subordinate salt use is reported on the annual Salt Use Report.
3. **Individual Certificate:** An Individual Certificate is ideal for snow and ice management under their direct supervision. The Individual Certificate holder must submit the annual Salt Use Report.

Cost of Certification:

The annual Green SnowPro certification fee is separate from the training providers. NHDES does not receive any of the training course fees.

1. **Master Certificate:** \$250
2. **Individual Certificate:** \$150
3. **Subordinate Certificate:** \$25 each for the first four Subordinate Certificates held by the Master Certificate holder within the same company.

Link to the program:

[Commercial Green SnowPro Certification | NH Department of Environmental Services](#)

NHDES-W-07-071



ANNUAL SALT ACCOUNTING REPORT Voluntary Certified Salt Applicator Program Watershed Management Bureau Watershed Assistance Section



RSA/Rule: RSA 489-C, Env-Wq 2204

Name: _____ Date: _____
Certificate Number: _____ Type of Certificate: Master / Individual
Affiliated Business Name: (if none, enter "none") _____

Below are the three reporting elements necessary for recertification under the Voluntary Certified Salt Applicator Program (aka. Green SnowPro) per Env-Wq 2200.

1) Deicer type and amount.

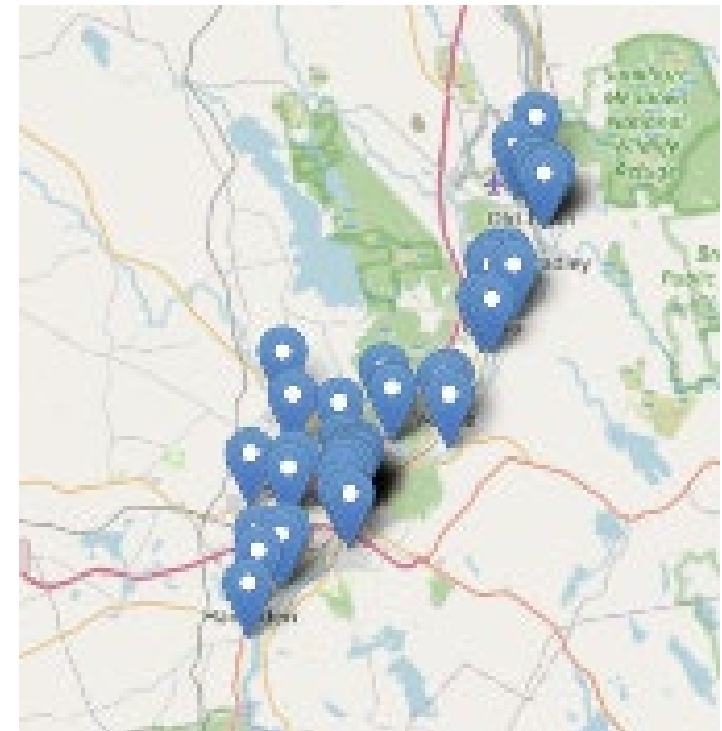
Complete the table below for each type of deicer used last winter including the unit reported. If you do not know the amount of deicer used by type please report the total amount of all deicers used in the TOTAL row at the end of the table.

TYPE OF DEICER USED	SOLID MATERIAL AMOUNT: (Indicate tons, pounds or yards)	LIQUID VOLUME: (in gallons)
SALT, DRY		
SALT, PREWETTED IN THE SPREADER		
SALT, PREWETTED IN THE PILE		
CALCIUM CHLORIDE, DRY		
CALCIUM CHLORIDE, LIQUID		
CALCIUM MAGNESIUM ACETATE, DRY		
CALCIUM MAGNESIUM ACETATE, LIQUID		
POTASSIUM ACETATE, DRY		
POTASSIUM ACETATE, LIQUID		
SAND		
SAND/SALT MIX		
LIQUID BRINE		
OTHER:		
TOTAL DEICER USED LAST WINTER		

Form Continued on Next Page →

Some Other Considerations

- **Low Impact Development (LID)** needs to be *in the right context* to be effective
- Be open to evolving learning and studies
- Support **native plants** for stormwater pollution protection
- BASWG was involved as a stakeholder study by UMaine. **Microplastic pollution** is present in Maine stormwater; However, a year-long focus group process indicated that MS4 engagement, if any, should be limited to conducting consumer **outreach** encouraging source control.
- DEP's **1-acre threshold** excludes many contributing projects, but MS4s cannot do any more without radical increase in supports.

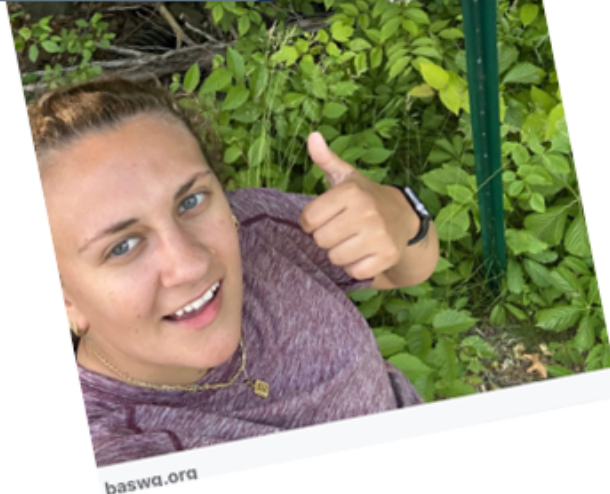


What Happens When MS4s Can Innovate their Way to Compliance Success

BASWG SignSearch Launched March 2025



Interactive outfall signs installed in 40 highly visible, safe, public facing BUA locations



One Year Later By the Numbers

180,642 online impressions about the BASWG Outfall Sign Search within the Greater Bangor Urbanized Area

50,000 individual video viewings by regional residents of content created by this project

20,348 regional residents have seen information about the Sign Search

Over 500 individual users have actively engaged with the outreach signs at site-based locations.

276 individuals are categorized as "active ongoing users" of the Sign Search elements

More than 200 individuals have completed the citizen engagement survey linked via the QR code

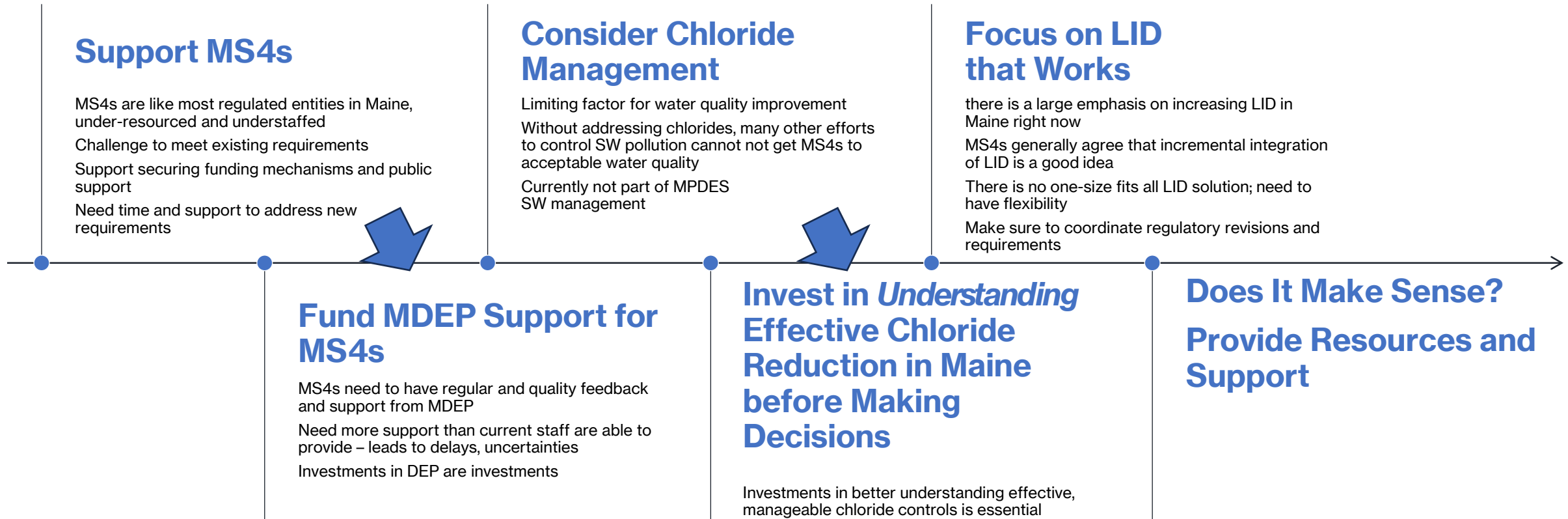
Over 1,000 participants in the Maine Science Festival in Bangor were exposed to/interacted with the Sign Search project

Short-term: Engagement and awareness

Medium-term: Behavior change

Long-term: Improvements in water quality

Summary of Key Points for Commission Consideration



Thank you!

Contact Information:

Dr. Brenda Zollitsch

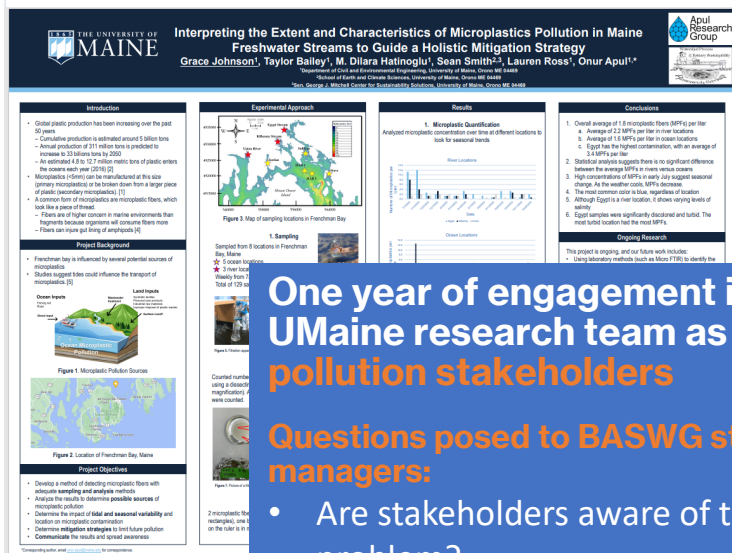
Websites:

- www.baswg.org
- www.resilientrootsmaine.com



Another Unregulated Stormwater Pollutant: Microplastics

BASWG Participation in University of Maine Microplastics Pollution Study



Part of Larger Microplastics and Stormwater Sustainability study (2024)

Dr. Lauren Ross
Dr. Sean Smith
Dr. Caroline Noblet
Dr. Onur Apul
Dr. Brenda Zollitsch
Grace Johnson

One year of engagement in focus groups with UMaine research team as **microplastic pollution stakeholders**

Questions posed to BASWG stormwater pollution managers:

- Are stakeholders aware of the microplastics pollution problem?
- Do stakeholders understand the components of the problem and what it looks like?
- Do stakeholders care about the impacts of microplastics pollution? For what reasons?
- What would they be willing to do to address the issue (including behavior change)?
- What future research questions would they like asked?
- How would they like to be involved over time?



Ms4 Stakeholder Findings:

- Most MS4 members were aware of the issue, but not sure of its **magnitude, severity, or associated risks.**
- Care about microplastics and risks,
- Know that the relationship between stormwater and microplastics is not well understood
- Aware of emerging studies with nascent information:
 - Levels of toxicity and impacts
 - Exploring if sediment testing is possible
 - How microplastics can be removed
- MS4s have no resources or support to do this work; No tools available; source control primary approach

Appropriate MS4 Role:

Incorporating messaging about microplastics source control into MS4 outreach