

# Evolution of subwatershed planning in the Lake Simcoe watershed

Lake Simcoe Science Forum

February 10, 2026

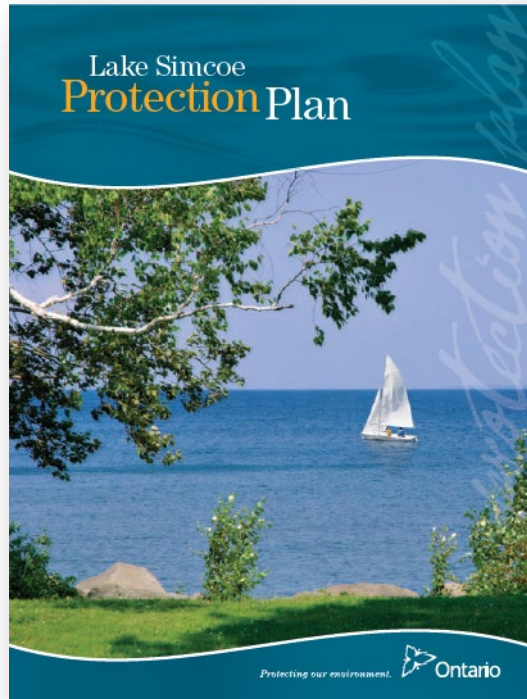
Bill Thompson



Lake Simcoe Region  
conservation authority

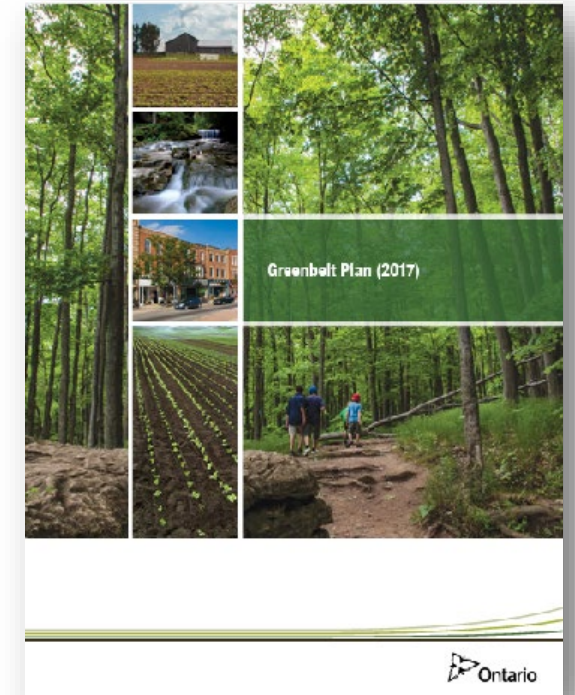


# Subwatershed planning provides an effective tool for translating knowledge to action

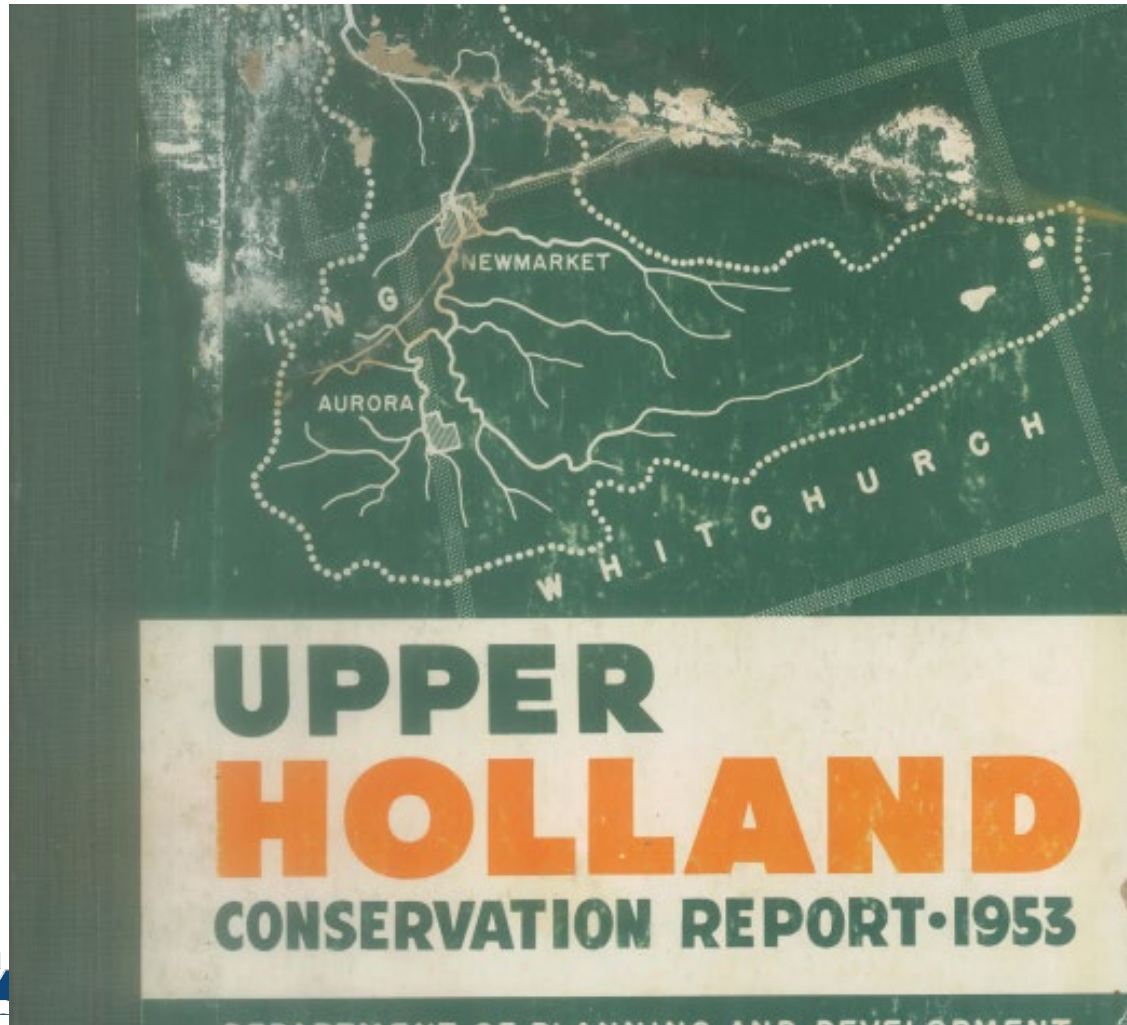


Municipal official plans shall be consistent with subwatershed recommendations

Allocation of growth and planning for water, wastewater and stormwater infrastructure shall be informed by watershed planning



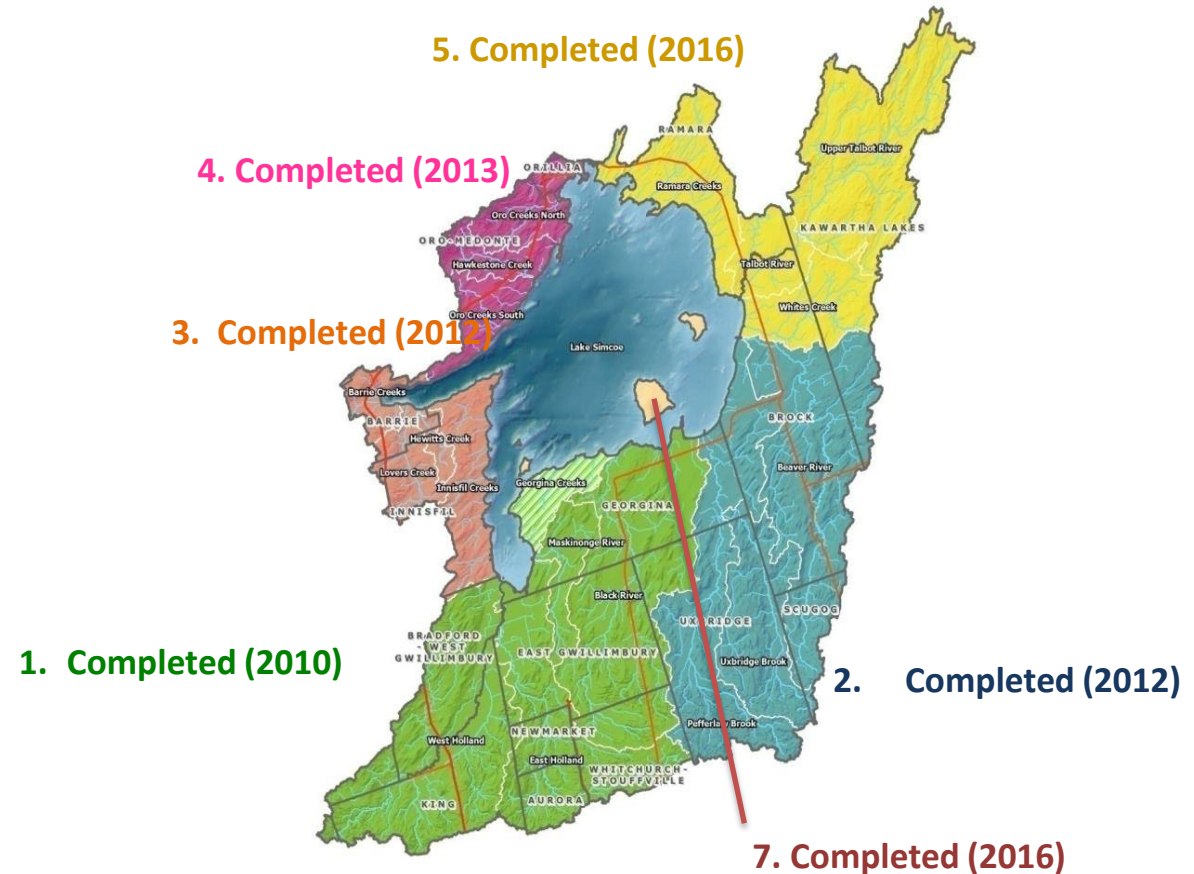
# History of watershed planning



- 1953 – Upper Holland Conservation Report
- 1973 – South Lake Simcoe Conservation Report
- 1979 – Lake Simcoe / Couchiching Basin Environmental Strategy
- 1983 – South Lake Simcoe Watershed Plan
- 2008 – Integrated Watershed Management Plan

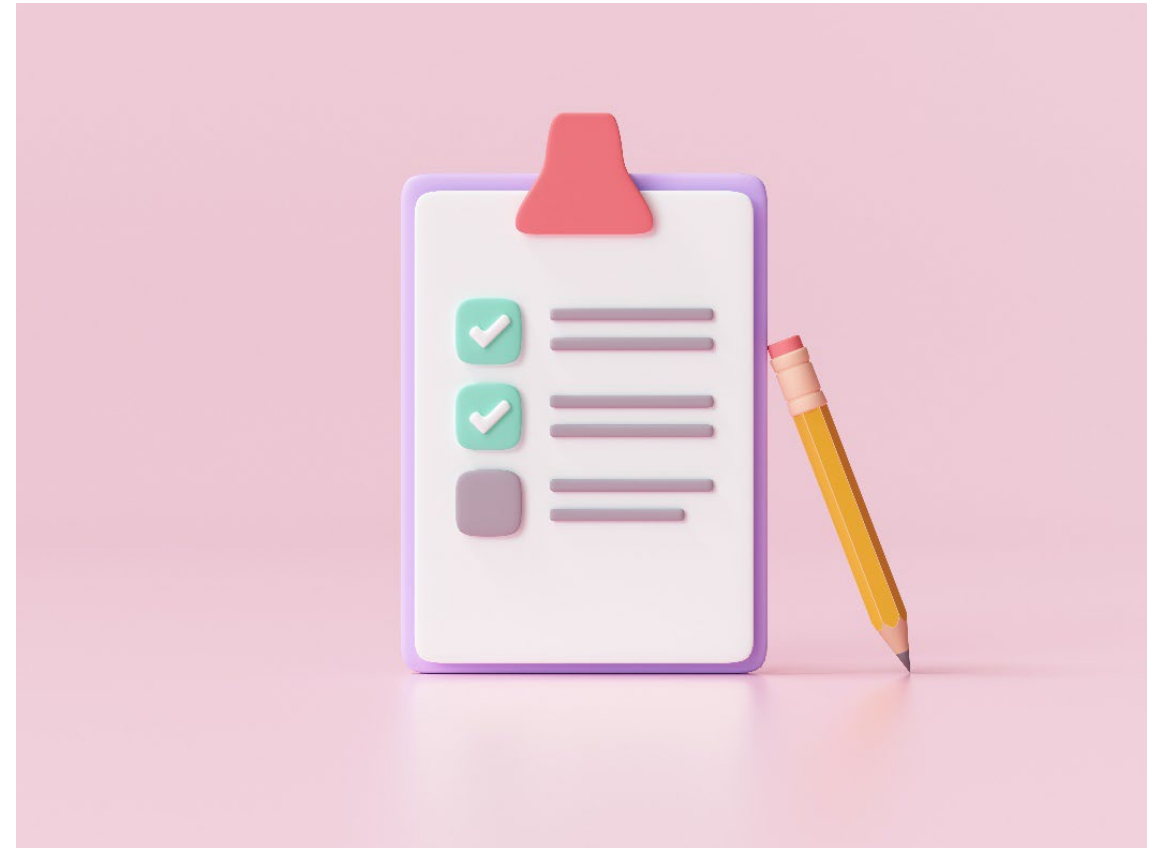
# Most current subwatershed plans

- Time has passed
- More monitoring data
- Newer science
- Changes to provincial policy, land use planning
- Have they achieved what we intended?



# Program review

- Stakeholder survey
  - Municipal and provincial audience
  - Internal audience
  - Peers at other Conservation Authorities
- Jurisdiction scan



# What we heard ...

- Plans well used by municipalities
  - Land use planning
  - Capital planning
  - Policy development
  - Reference tool
- But could:
  - Include more detailed mapping
  - Be updated more frequently
  - Be shorter, more succinct
  - Have more detail on specific topics



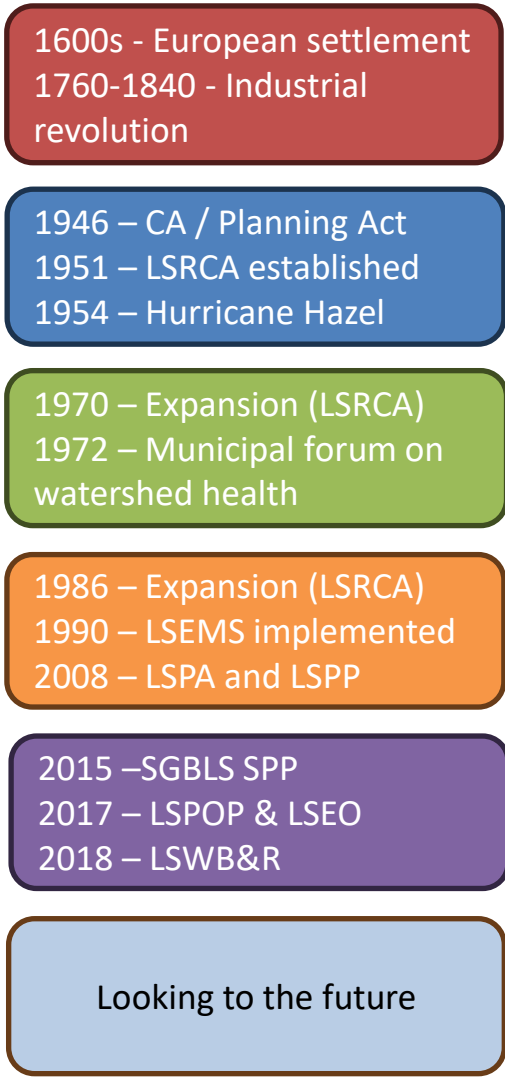
# Modernizing the subwatershed planning program

- Shifted to an online platform (ArcGIS Online)
  - Interactive mapping
  - (Near) real-time data visualization
  - Quicker updates to content
  - Hyperlinks allow for self-directed experience
- Updating plans and recommendations
- Advice and feedback from colleagues and subject matter experts

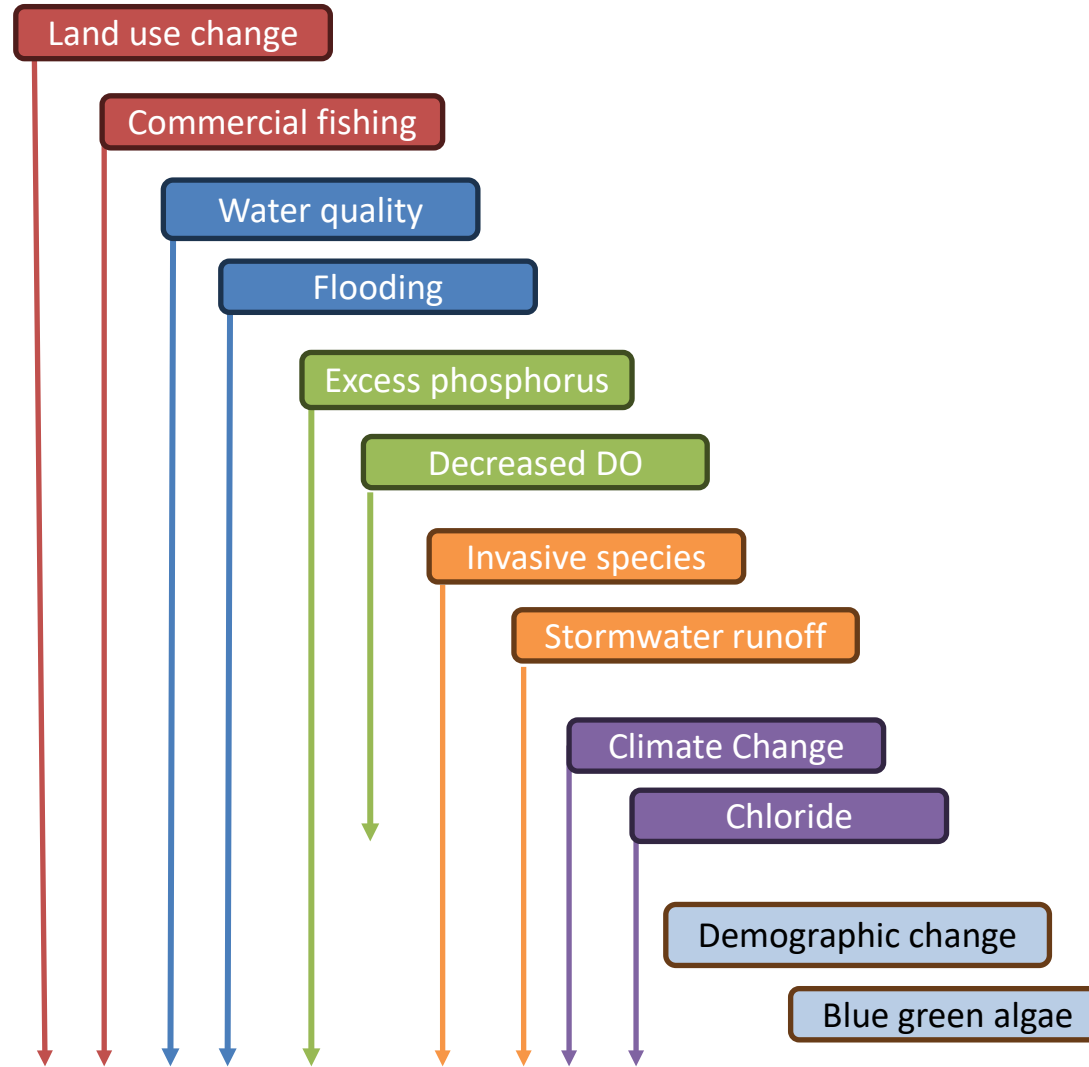


# Evolution of issues

## Key Milestones

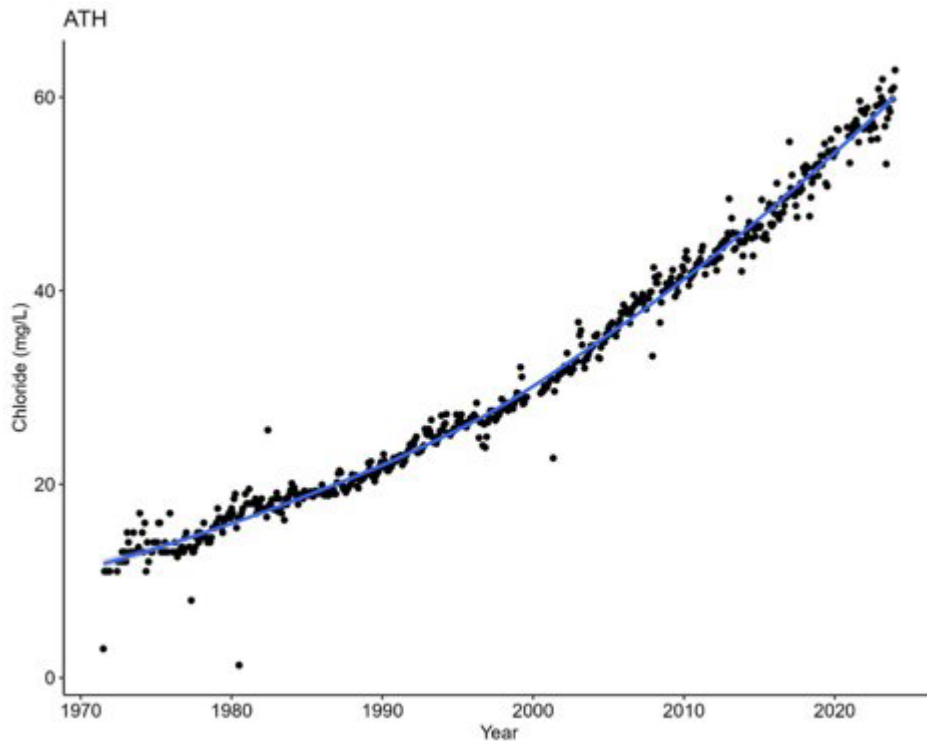


## Watershed Stressors



# New program area ... winter salt

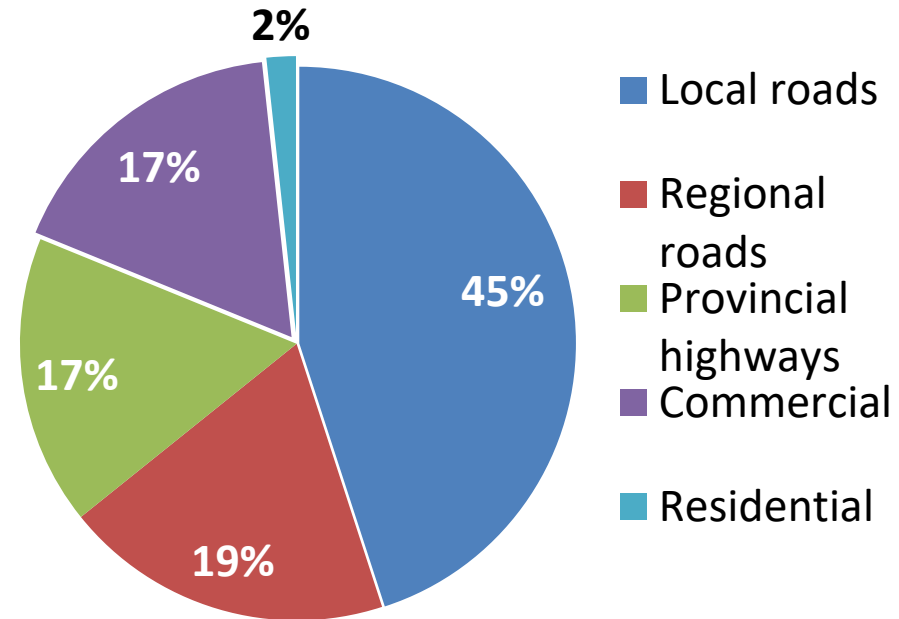
## The issue:



## Subwatershed plan recommendations

- Engage users to promote better practices
- Gain an understanding of barriers to adoption
- Address barriers

# Application in Lake Simcoe watershed



Total of 100,000 T in 2012

# Engaging the public sector

## Lake Simcoe Salt Working Group

- Upper Tier, urban, urbanizing municipalities
- Roads staff, land use planners, source protection staff
- University researchers
- LSRCA



**Lake Simcoe Region conservation authority**

### Friction and Parking Lots

Technical Bulletin, Volume 3 September 2020

#### Introduction

The issue of high levels of salt application has been gaining attention over the past few years. While decades of research has been conducted on the efficient use of salt on roads, parking lots represent unique challenges including the types of traffic, the mix of pedestrians and vehicles, varied surfaces (e.g. drive aisles, parking stalls, walkways, sidewalks, etc.), and the requirement to store snow. However, research is now beginning to emerge which shows how salt use can also be optimized in parking lots.

Salt is typically applied at heavy rates in parking lots, for a number of reasons:

- A lack of clarity or understanding of what the "right" application rate is
- Rising insurance rates, and concerns around liability
- Pressure from parking lot users to apply heavy amounts under the perception that more salt is safer conditions

The environmental impacts of excessive salt use are well known, and include effects on fish and other aquatic organisms, impacts to surface and ground water, and damage to vegetation.

#### Best Practices for Parking Lots

Some best management practices (BMPs) have been developed specifically for winter maintenance in parking lots. Along with recommendations around the proper use and calibration of equipment, many of these practices relate to planning the lot and walkways before applying salt, and applying the recommended amount



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### Sand versus Salt

Should sand be used for winter maintenance?

Technical Bulletin, Volume 1 October 2018

#### Sand as an alternative to salt

Road and property managers are tasked with keeping surfaces including roads, parking lots, and sidewalks clear of snow and ice in the winter months to ensure public safety. This is most often accomplished through plowing and the use of either salt or sand, or some mixture of the two.

High levels of chloride, one of the main components of winter salt, however, have been identified as an issue across northeastern North America, and the Lake Simcoe watershed is no exception. The main source of this chloride is winter salt. Property managers often turn to sand as an alternative to salt, as it is thought to be a less harmful option.

This technical bulletin will explore the efficacy of the use of sand for winter maintenance, its associated environmental issues, and where its use is most appropriate.

#### Why is sand used?

Sand has been used, either on its own or mixed with salt, as a core part of many municipalities' property management winter maintenance practices. It is used to increase friction between snowy or icy pavement and the vehicles passing over it.

Of those municipalities that use sand, rural ones with a higher proportion of gravel roads use almost exclusively sand (with a small percentage of salt mixed in to prevent freezing and caking), while other municipalities often use a sand-salt mix at various rates.

The common thinking is that the salt in the mixture will melt the snow or ice, while the sand will provide traction. In addition, traditional rock salt is only effective at temperatures above -7°C, so sand is commonly used to provide traction and make roads safer at colder temperatures.



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### Alternatives to Salt

What else melts snow and ice?

Technical Bulletin, Volume 1 October 2018

The impacts of salt are numerous, and include the corrosion of infrastructure and other metal structures such as railings and downspouts; damage to vehicles; contamination of surface and groundwater; impacts to roadside vegetation; increased wildlife collision rates, and large amounts of product waste due to blowing or bouncing off roadways (Prechank et al., 2001).

These impacts have led many road management agencies to test alternatives to traditional rock salt (NaCl). This Technical Brief discusses a number of these alternatives. Each of these products has pros and cons; it is up to each road management authority or parking lot manager to assess its needs and evaluate the materials to determine what is most appropriate for them. These decisions may be based on cost, application rates, lowest practical working temperatures, potential environmental impacts, and the potential for the material to damage infrastructure. Of note, sand and/or other abrasives are often used as a complement or alternative to road salt for the provision of traction. Sand is discussed in detail in the first Technical Bulletin in the series ([www.LSRCA.on.ca/watershed-health/yat/](http://www.LSRCA.on.ca/watershed-health/yat/)).

Given the high rate of urban development in the Greater Toronto Area, the amount of salt being applied each year is continuing to increase. In combination with plowing, the application of road salt has traditionally been the primary means to remove snow and ice across NorthWestern, North America. This is due to salt's high degree of effectiveness, ease of use, and low initial cost (Sookak, 2006). Only in recent years have the environmental impacts of the application of road salt been considered.

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# Engaging the private sector




- Ontario Freshwater Roundtable
- A multi-stakeholder group, representing contractors, property owners, NGOs
- Collaborated to produce the **Discussion Paper: Road Salt Use on Commercial Properties**

# Case studies and design guidelines

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## Town of Newmarket: Operational Changes and Effects on Chloride Application



Municipal salt application for road safety in the winter months is among the highest sources of chloride in the Lake Simcoe watershed (Figure 1), and in southern Ontario in general. In recent years, several municipalities in the watershed have been working to refine their practices and apply less material to roadways. This is being undertaken for several reasons:

- The recognition of the environmental impact of large volumes of chloride entering our aquatic systems
- The desire to remove sand from the mix, as sand clogs waterways and stormwater infrastructure (where it requires removal) and adds to operational costs.
- The exploration of new, potentially more effective materials, such as treated salt products (e.g. Thawrox®).
- A desire to find the optimal application rate to ensure safety, while reducing the amount of material applied.
- Optimization of winter maintenance budgets; costs are lower if less material is applied and spring cleanup costs are reduced.

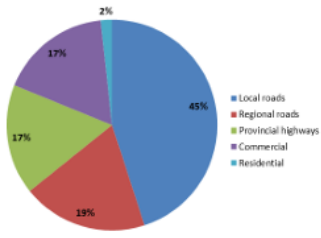


Figure 1: Sources of salt in the Lake Simcoe watershed(2015).

The Town of Newmarket, in York Region, is one of the Lake Simcoe municipalities that has been working to refine its practices. Until the 2016/2017 winter season, the Town used a mix of salt and sand, like many municipalities in the area (an exploration of salt vs. sand can be found in this Technical Bulletin). From 1995 to 2015, the Town used a ratio

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## A comparison of two approaches for winter maintenance of a large commercial property



**Background**

LSRCA has been working with winter maintenance contractors on a large (~14.2 ha) commercial site in the Lake Simcoe watershed. Over the course of the study, there have been two different contractors responsible for winter maintenance: "Contractor A" from fall 2012 to spring 2016, and "Contractor B" for the period since the 2016/2017 season. LSRCA has been studying road salt use at the site and monitoring chlorides in stormwater since the 2014/2015 season as part of its efforts to better understand the issues related to winter salt use in the watershed. This case study compares the different approaches taken by the contractors to manage snow and ice hazards over the course of the study. Each approach focused on maintaining site safety using different management practices what was interesting with the corresponding environmental benefits of Contractor B's approach.


The main concerns for both contractors throughout their time at the site have been firstly to ensure that parking lots and walkway surfaces are sufficiently cleared of snow and ice to ensure the safety of patrons of the site, but secondly to ensure to the extent possible that their treatment of the site reduces their risk of being subject to complaints and particularly to slip and fall claims, which has become a significant concern for snow and ice contractors. This study will show how the use of best practices can benefit contractors in this regard. Failing to use these practices can result in issues including the freezing of melt water in drive areas, loose salt piles reducing traction, blowing snow, and reduced visibility, increasing the contractor's exposure to liability. Careful thought about the site and close monitoring of on-site weather conditions can reduce or eliminate these issues.



Figure 1: Sources of salt in the Lake Simcoe watershed(2015).

Of course, there are environmental costs associated with using more salt to treat a site. High levels of chloride from winter salt can have a number of impacts on water resources and aquatic life. This site was ideal for a study of this type, as the entire site drains to a single stormwater pond, and LSRCA staff have been able to instrument the outlet of the parking lot to the pond and calculate the amount of chloride (from winter salt) entering the pond, and eventually the receiving watercourse, throughout the study period. While safety and liability were recognized as the main concerns for both contractors working at the site over the period of study, they each had different approaches in ensuring the safety

**GHD**



## Parking Lot Design Guidelines to Promote Salt Reduction

Lake Simcoe Region Conservation Authority

# New program area ... stormwater management

## The issue:

- Conventional practices:
  - Ongoing geomorphic impacts
  - Loss of infiltration
  - Maintenance deficit
- Growth continues
  - 297 SWM ponds in 2007
  - 500 SWM ponds in 2025

## Subwatershed plan recommendations

- Promote adoption of low impact development practices
  - Training
  - Policy development
- Promote greater maintenance of existing facilities
- Explore supplementary measures to address phosphorus loading

# Engaging practitioners

## Working groups



## Training



# Demonstration sites



# Mainstreaming improved practices

## Policy



**Technical Guidelines for Stormwater Management Submissions**

April 2022

## Funding



## Inspections



# In summary

## Indicators of success

- ✓ Subwatershed plans were well-used by primary audience
- ✓ New subwatershed plan platform well-used too
- ✓ Almost all recommendations have been implemented
- ✓ New successful programs have been developed



# In summary



## Factors underpinning that success

- Staff position created to ensure plans are implemented
- Annual progress report and meetings
- Very engaged partners
- Corporate investments in new programs
- Funding and technical support from MECP

# Thank you

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