

Stormwater infiltration and chloride in Minnesota groundwater

Mike Trojan, lead

Carrie Jennings, MGWA White Paper Committee Liaison

MPCA and Mike Trojan's expertise



Minnesota Stormwater Manual

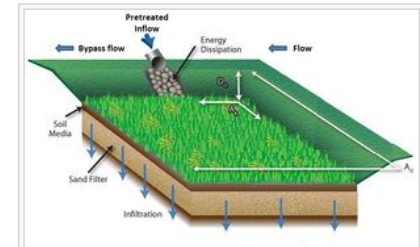
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Stormwater infiltration

Stormwater infiltration

This page contains links to several pages that address infiltration of stormwater runoff. [Link to portal for Infiltration Practices.](#)

- Overview
- Pre-treatment considerations for stormwater infiltration
- Best Management Practices (BMPs)
 - Overview of infiltration BMPs
 - Portal to information for different infiltration BMPs
- Water quality
 - Pollutant fate and transport in stormwater infiltration systems
 - Surface water and groundwater quality impacts from stormwater infiltration
- Water quantity
 - Groundwater mounding
- Separation distances
- Constraints
 - When infiltration is not authorized under a stormwater permit
 - Karst
 - Shallow soils and shallow depth to bedrock
 - Shallow groundwater
 - Soils with low infiltration capacity
 - Potential stormwater hotspots
 - Wellhead protection
 - Contaminated soils and groundwater



Schematic showing an infiltration basin, which is one of several stormwater control practices designed to infiltrate stormwater runoff. Infiltration practices capture stormwater runoff and allow it to infiltrate into the underlying soil. Pollutant removal occurs through a variety of mechanisms, including adsorption, absorption, plant uptake, and degradation. Note that inflow into the practice has undergone pretreatment and that once the practice is filled, runoff bypasses the practice rather than entering it.

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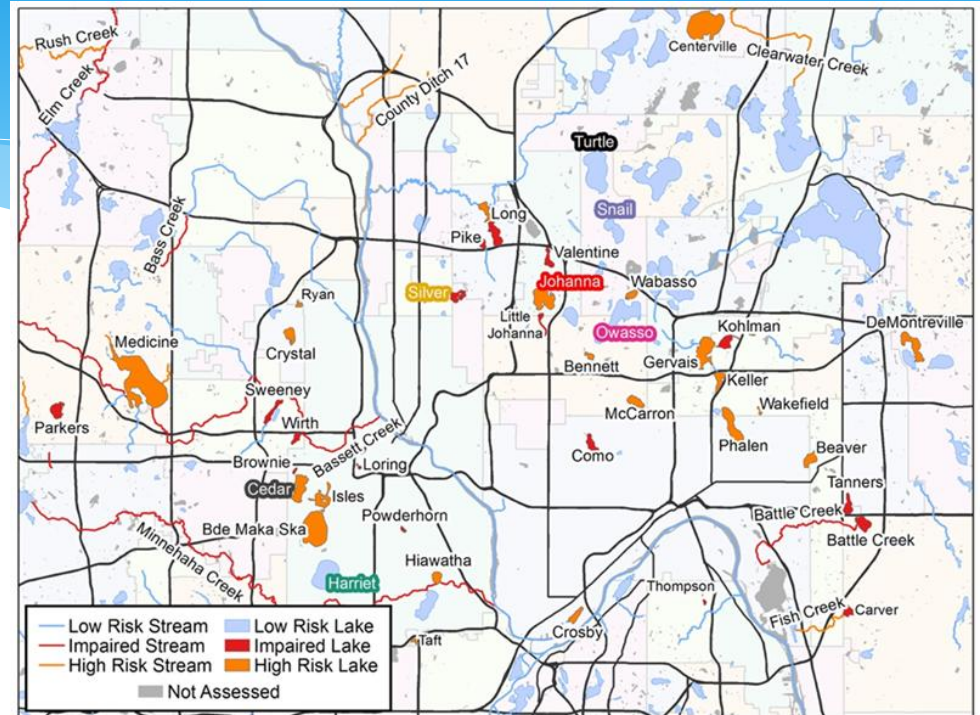
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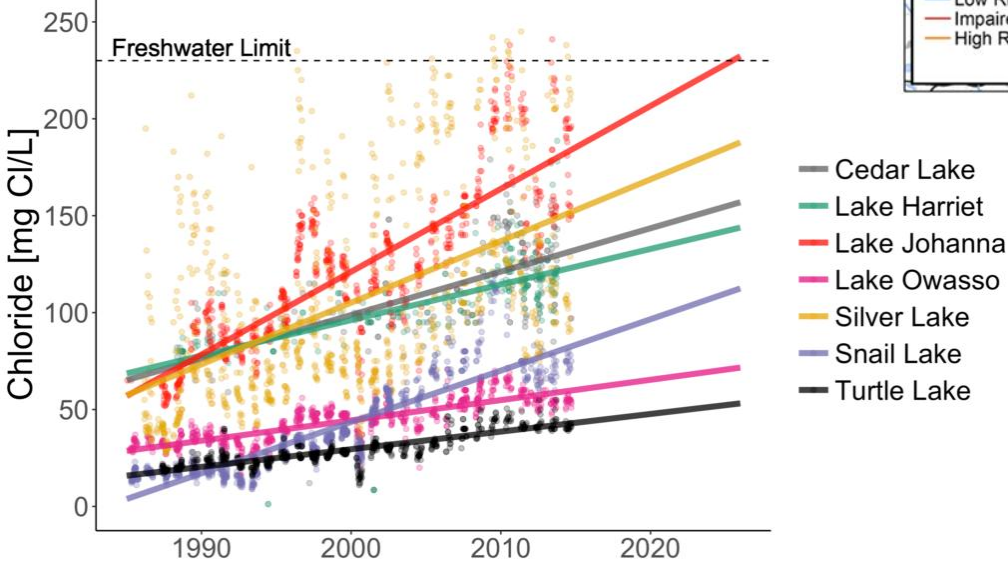
Death Date of Lakes

Brian Bohman, PhD candidate
Water Resources
and Freshwater Research and
Policy Fellow

from MPCA data



Measured Chloride Concentration in Lakes





Mississippi WMO

@MississippiWMO

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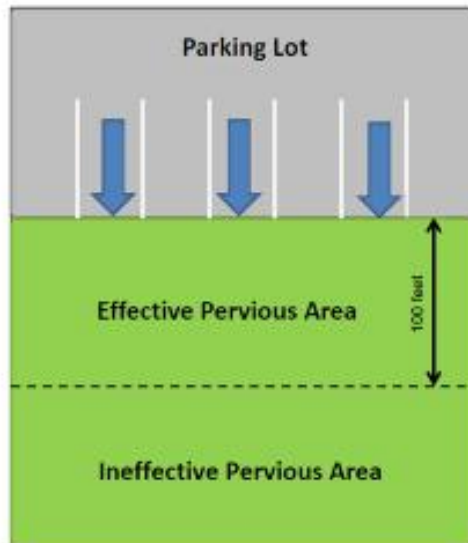
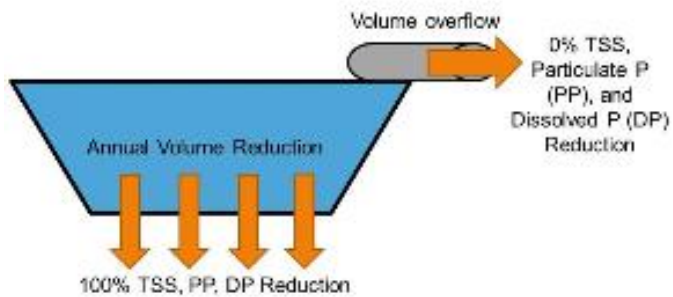


Here's a classic example of over-salting. Leftover [#salt](#) like this gets washed down stormdrains and contaminates nearby lakes and rivers with toxic [#chloride](#). More salt doesn't equal more melting, so use [#smartsalting](#) techniques: bit.ly/2y7D0ct



1:42 PM - 10 Dec 2017

Can we continue to infiltrate wisely while protecting surface water and shallow groundwater?



From North Country Public Radio, Archive Photo of the Day 2/28/12:
Lizette Colon Haenel, Canton NY.

Problem statement

- * Excessive chloride concentrations in groundwater restrict its use for drinking and may degrade aquatic habitat if groundwater discharges to surface waters.
- * Trend analysis indicates chloride concentrations in shallow groundwater in urban areas of Minnesota are increasing and may reach levels of concern in the future.
- *
- * Stormwater runoff in urban areas typically has high concentrations of chloride. Many government units require or encourage infiltration of stormwater runoff, but impacts to groundwater resources are unknown.
- * An analysis of potential impacts of widespread use of stormwater infiltration practices on chloride concentrations in groundwater would aid in developing stormwater management practices that are protective of groundwater.

MPCA monitoring data

- * Monitoring data from MPCA's Ambient Monitoring Program indicate chloride concentrations in shallow sand and gravel aquifers in urban areas of Minnesota are significantly greater than other areas of the state.
- * About ¼ of samples exceeded the secondary maximum contaminant level (SMCL) of 250 mg/L.
- * About one-third of sampled wells showed an increasing trend in concentration over the last 15 to 20 years.
- * Analysis of chloride to bromide ratios in groundwater samples indicates the majority of the chloride was likely from the application of winter de-icing chemicals (MPCA, 2013).

Subtopics

- * Chloride and groundwater
- * Chloride and stormwater
- * Chloride in the environment
- * Stormwater infiltration practices

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