CONNECTICUT DEPARTMENT *of* PUBLIC HEALTH

DRINKING WATER SECTION

Chloride in Drinking Water

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Drinking Water Section

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- CT Department of Public Health (CTDPH)
  - Regulates public drinking water under its Drinking Water Section
  - Primacy of the Safe Drinking Water Act

- 50 Staff
- Protect Public Health of CT residents and visitors that consume public drinking water
- Responsible for the purity and adequacy oversight statewide for all public water systems
- Work to proactively prevent impacts to public health

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Public Water Supplies in CT

- 2,550 Public Water Systems (PWSs), serving 2.9 million people
  - 550 community water systems
  - 600 non-transient non-community systems
  - 1,400 transient systems
- 150 reservoir systems
- 4,000 wells

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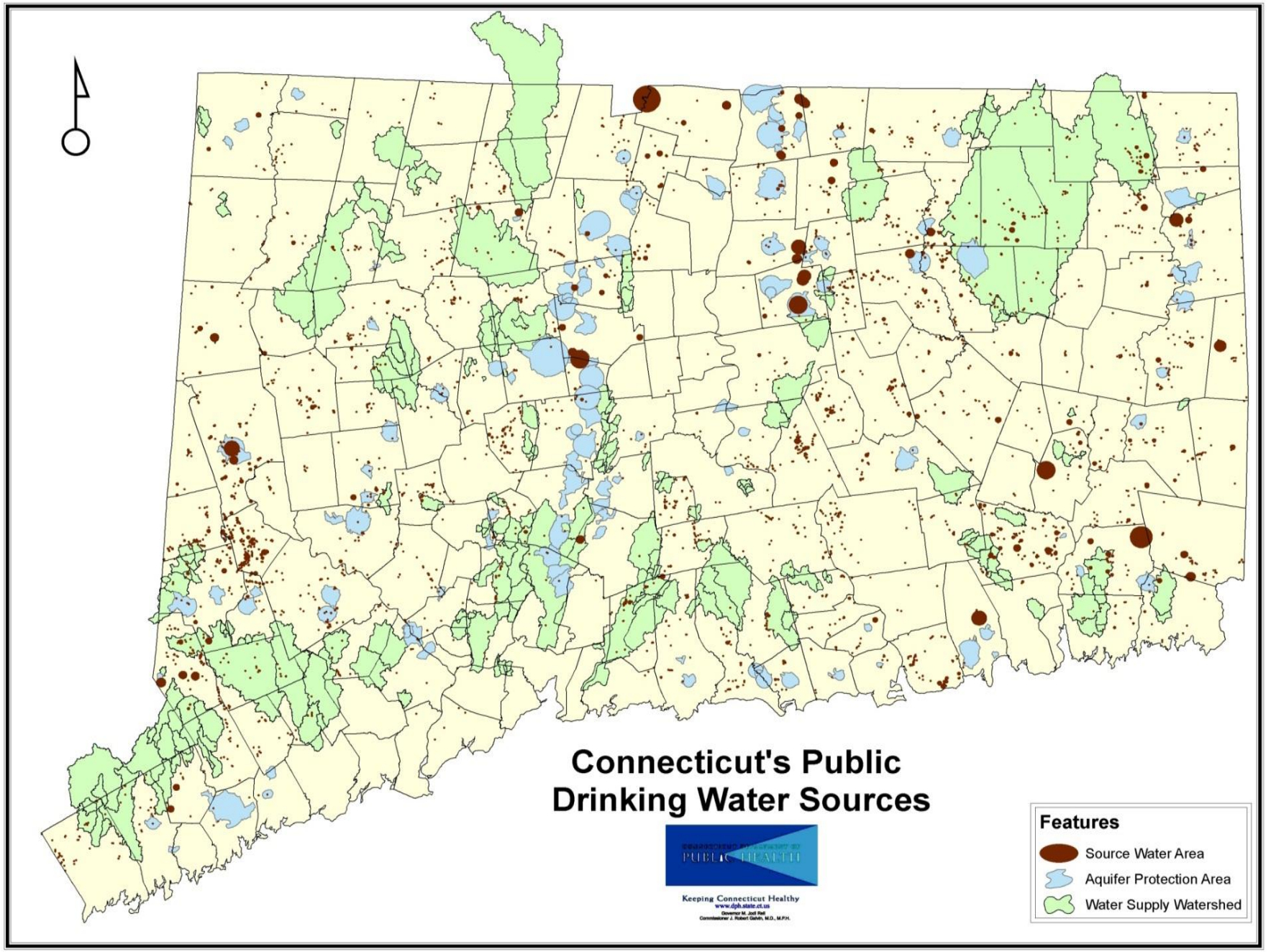

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Two Concepts for today

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How are sodium and chloride currently impacting drinking water?

What is the data telling us?

What are we* going to do about it?

* Partnerships and collaboration will be beneficial

Chloride Overview

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- DWS has seen an overall increase in chloride in drinking water in Connecticut (2001-2018)
- Assumption: most chloride introduced as salt
  Assumption: some salt due to road salt
- DPH Focus → mitigate
- Mitigation strategy:
  - reduce application rates of road salt while maintaining effectiveness;
  - impede pathways to aquifers

Other DW Chloride Inputs

- Chlorination
- Water Softeners (Twice)
- Natural

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Why is Chloride a Concern?

- Corrosion
  - Corrosion of pipe and solder may increase lead and/or copper levels
  - Corrosion of tanks, pipes, etc. may contribute to premature decay
- Ecological
  - Ecological impacts may impact water quality
- Chemical
  - Some evidence indicates that chloride mobilizes drinking water contaminants
- Aesthetics
  - Generally (sodium) chloride taste threshold in DW is 250mg/L

Dick Woodhull, DWS Section Chief, Jan. 13,1976*

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3. In the area of salt on roads and driveways, we are concerned about the buildup of sodium content in the ground water and in reservoirs, and that is not an idle concern. We have a substantial number of public water supplies that have been adversely effected by sodium content already. Here again we have planned to establish guidelines for salt use which would be modeled after those that have been developed in cooperation with the State Department of Transportation. We think they have developed some very excellent procedures for the use of salt on highways, and we'd like to expand those procedures to the towns, to the municipal operations.

* Transcript of the testimony from a Public Hearing for the adoption of Section 19-13-B32 of the RCSA

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- All community (residential) and non-transient non-community (schools, businesses, etc. that serve >25 people) public water systems test for chloride
- Frequency of testing varies
- Testing is collected at the ‘entry point’ of the distribution system
- Same for sodium

Most Public Water Systems Test for Chloride

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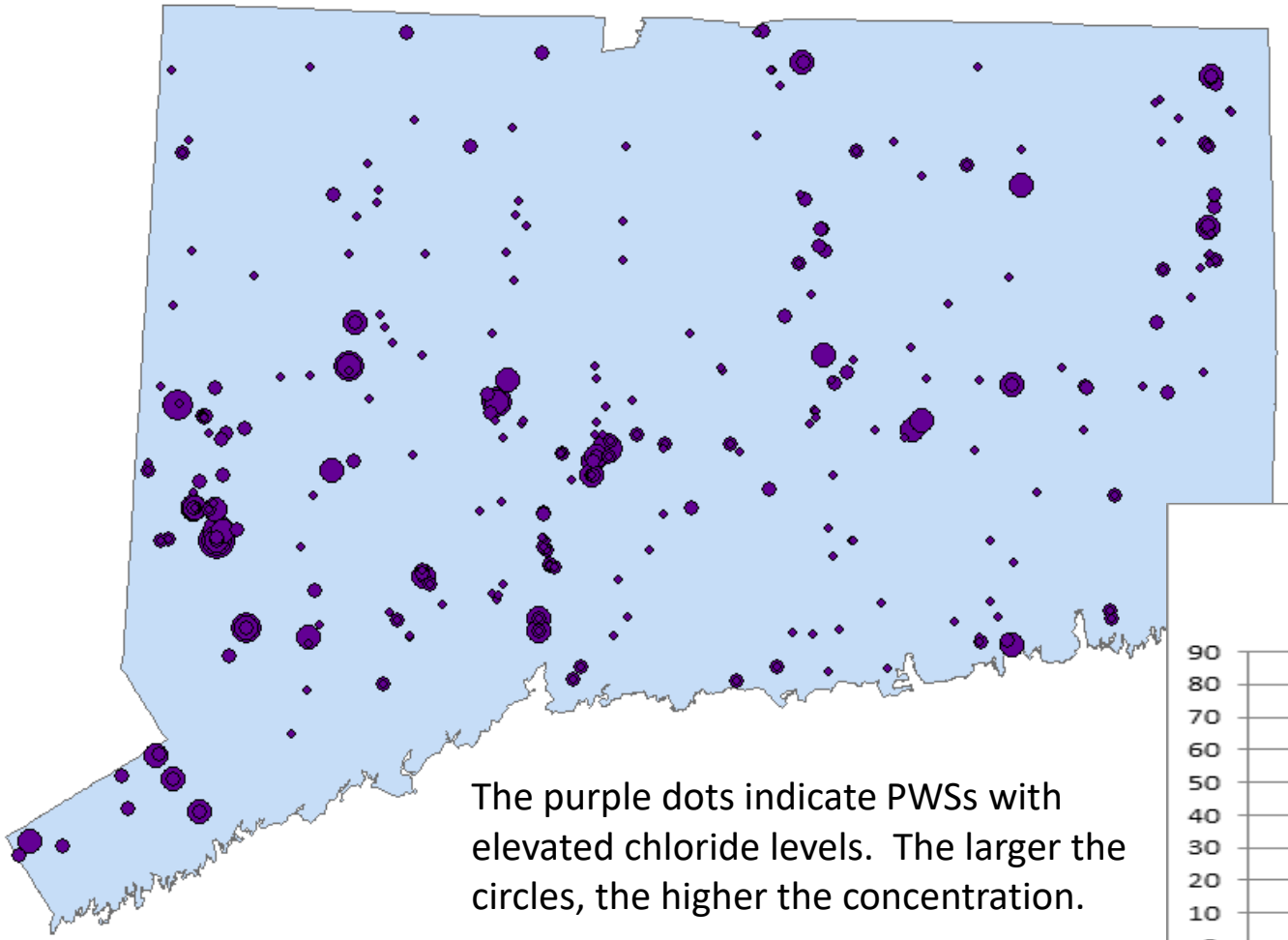
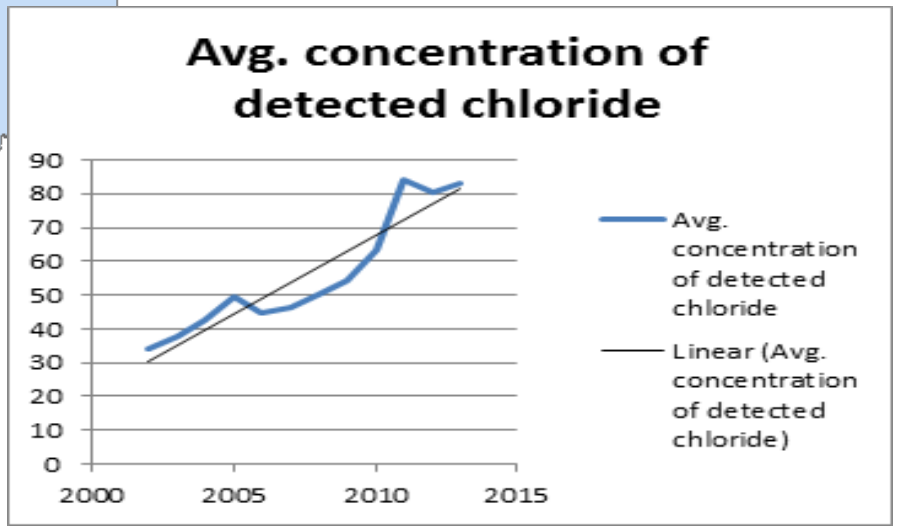


The purple dots indicate PWSs with elevated chloride levels. The larger the circles, the higher the concentration.



Drinking Water Section Chloride Policy

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- Multi-faceted, multi-agency effort underway to reduce inputs
- Understand the physical linkage between road salt applications and public supply sources
- Design/maintain/improve infrastructure to lessen the impact of chloride in DW
- Require BMPs in some instances

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DWS Policy: Addressing Sodium/Chloride in Public Drinking Water Supplies

Background

The Department of Public Health Drinking Water Section is charged with protecting and preserving water quality for all sources of public drinking water. Sodium and chloride concentrations have increased in recent years in public drinking water wells throughout the state, based on public water systems' required water quality monitoring data.

The Drinking Water Section is working with partners to initiate a number of tasks in a mitigation effort:

- Enforcing existing regulations to reduce impacts on drinking water supplies from anti-icing/deicing practices;
- providing broad and targeted education of state, local and regional officials;
- working with affected communities toward solutions;
- educate stakeholders, developing an understanding of the cause and effect linkage; and
- working to develop and institute best practices to protect drinking water sources

Strategy

Initially these initiatives are to implemented via the following tasks:

USE EXISTING LAWS TO REQUIRE BMPs for Public Water Systems with Sodium/Chloride Concerns

TRAIN Municipalities to use less Product while Maintaining Equal Effectiveness

CONSIDER SALT IMPLICATIONS when DPH Inspects or approves a PWS Source

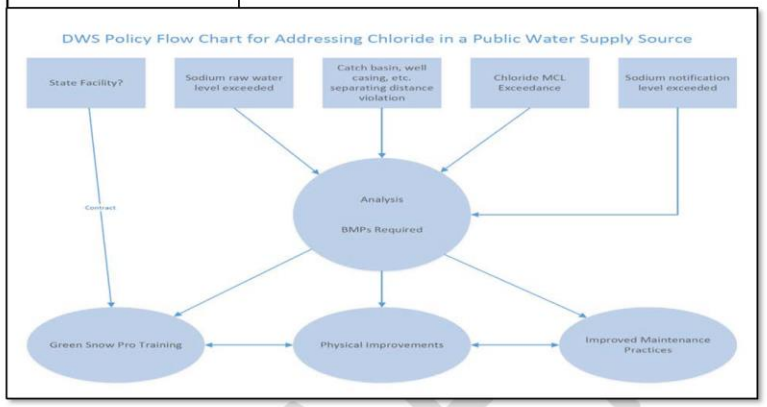
Requiring BMPs

The Drinking Water Section will require Best Management Practices when a Public Water System exceeds the raw water sodium level (15 mg/L, RCSA Section 19-13-B32), the treated water notification level for sodium (28 mg/L, RCSA Section 19-13-B102), the raw water level for chloride (250 mg/L, RCSA Section 19-13-B102), or the maximum contaminant level for chloride in treated drinking water (250 mg/L, RCSA Section 19-13-B102).

The BMPs will include, minimally, training equivalent to the Green Snow Pro training and/or a management plan for anti-icing/deicing applications and source protection.

As an example, the Department will immediately modify the letter issued to a public water system to document an exceedance of the maximum contaminant level for chloride to include a required corrective action. The corrective action will be required to include specific best management practices to mitigate the chloride levels.

Figure 1: BMP Flow Chart



Training Municipalities

An initial and critical element is to ensure that municipalities are equipped with the best knowledge and technology in their anti-icing/deicing operations that use salt. This can be accomplished with two efforts: 1) encouraging municipal attendance and implementation of concepts gleaned from the Connecticut Technology Transfer Center's Green Snow Pro Training, and 2) encourage municipal/municipal and municipal/state peer to peer information sharing.

This certification, modeled after a similar New Hampshire program, teaches municipal Public Works Departments to apply less road salt materials in an effort to minimize the impact on Connecticut's groundwater and surface water supplies, roadway and water infrastructure, and natural environment, while maintaining equivalent effectiveness in removing ice and snow. Latent benefits of enhanced anti-icing/deicing procedures would include cost savings and data collection/analysis.

Consider Implications for Public Supply Sources

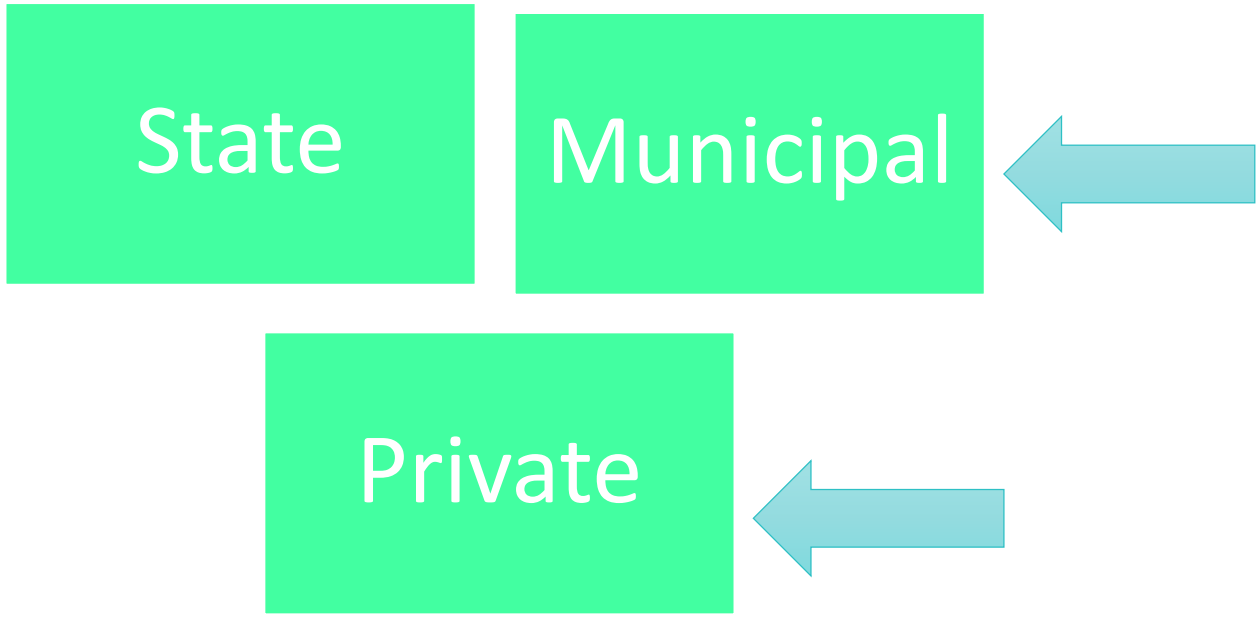
When infrastructure changes or additions are considered at a public water system, including: wells, parking lots, catch basins, stormwater/infiltration systems, etc., the impact of the location and configuration of the infrastructure as it relates to anti-icing/deicing practices should be considered. Configurations that could contribute to salt contamination will be subject to BMPs and/or corrective action.

Proposals for new public water supply wells shall consider the implications of anti-icing/deicing operations using salt. This includes analysis of roads, parking lots, sidewalks, stormwater systems, etc. as part of the approval review process and maximizing separation of risks.

For more information, please visit: https://portal.ct.gov/DPH/Drinking-Water/DWS/Drinking-Water-Section
For information on anti-icing/deicing training, please visit: https://www.t2center.uconn.edu/

Reducing Chloride in DW - Education

- Education/Training – effort will likely be separated to focus on 2 of the 3 groups individually:



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Opportunity!

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https://www.t2center.uconn.edu/

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CTI Connecticut Transportation Institute
Technology Transfer Center
Celebrating 35 Years

Connecticut Technology Transfer Center

Training and Events

Green Snow Pro: Sustainable Winter Operations

A CT Road Scholar Program *ELECTIVE Workshop*

Sustainability in Winter Operations is more important than ever. With environmental impacts increasing and budgets continuing to decline, towns must employ best practices to minimize salt use and maximize their operations for both fiscal and environmental stewardship. This class focuses on those best practices for salt application and maintenance of public works facilities and equipment and uses demonstrations and case studies to illustrate the positive impact these strategies can have on your community and operations.

Who Should Attend

This course is designed for those responsible for overseeing winter operations in their public works departments.

Directors of Public Works, Fleet Managers, Highway Superintendents and Supervisors are encouraged to attend.

Course Instructors

James Mahoney is the Executive Program Director of the Connecticut Transportation Institute and the Program Director of the Connecticut Advanced Pavement Laboratory (CAP Lab) at the University of Connecticut. Jim has over 20 years experience in the pavement materials research and design. He received his Master's degree from the University of Connecticut in 1995 and has been with the CAP Lab since that time.

Bill Eyberse is the Lead Instructor of Signal 54 Training and has been teaching for the T2 Center since 2002. Bill has over 30 years of experience in transportation and snow fighting. He conducts training across the region on operational safety and winter maintenance topics.

Dates & Locations

November 7, 2018
South Windsor, CT

November 9, 2018
Durham, CT

Session is 8:30am—2:00pm
(Registration begins at 8:00am)
Lunch will be provided

Learning Objectives

Upon completion of this class, participants will be able to:

- Explain the environmental impacts of chlorides on our environment and infrastructure.
- Describe best practices for maintenance of facilities and equipment; before, during and after the storm.
- Discuss the importance of calibration and pre-treatment in winter operations.

RCSA Section 19-13-B32 - Sodium in DW

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Sec. 19-13-B32. Sanitation of watersheds

Unless specifically limited, the following regulations apply to land and watercourses tributary to a public water supply including both surface and ground water sources.

(h) Where sodium occurs in excess of 15 mg/l in a public drinking water supply, no sodium chlorine shall be used for maintenance of roads, driveways, or parking areas draining to that water supply except under application rates approved by the commissioner of health, designed to prevent the sodium content of the public drinking water from exceeding 20 mg/l.

RCSA Section 19-13-B102(c) – Chloride in Raw Water

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(c) **Standards for quality of untreated water prior to treatment**.

(1) All parameters in Table 1-C of this subdivision shall be tested for each surface water source at least annually, except bacteriological and physical tests which shall be done quarterly.

TABLE 1-C. MONITORING PARAMETERS FOR SURFACE WATER SOURCES

Parameter	*Degree of Treatment*	
	Disinfection and Chemical Treatment	*Filtration*
Chloride	250	250

RCSA Section 19-13-B102 – Chloride in DW

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(2) Inorganic Chemicals

Community and non-transient non-community water systems shall test for inorganic chemicals specified below. Transient non-community water systems shall test for nitrate and nitrite only.

Inorganic chemicals[(a)] and their limits

Chemical	Maximum Contaminant Level mg/L
Chloride	250

Changes in DWS Practices

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- CGS Section 25-33(b): PWS Source Approval
  - More emphasis on potential road salt impacts for public supply source reviews:
    - Catch basins
    - Stormwater
    - Curbing/parking lots

- Chloride MCL Exceedance
  - Required BMP development following MCL exceedance for chloride
  - Update violation letter to reflect BMP requirement

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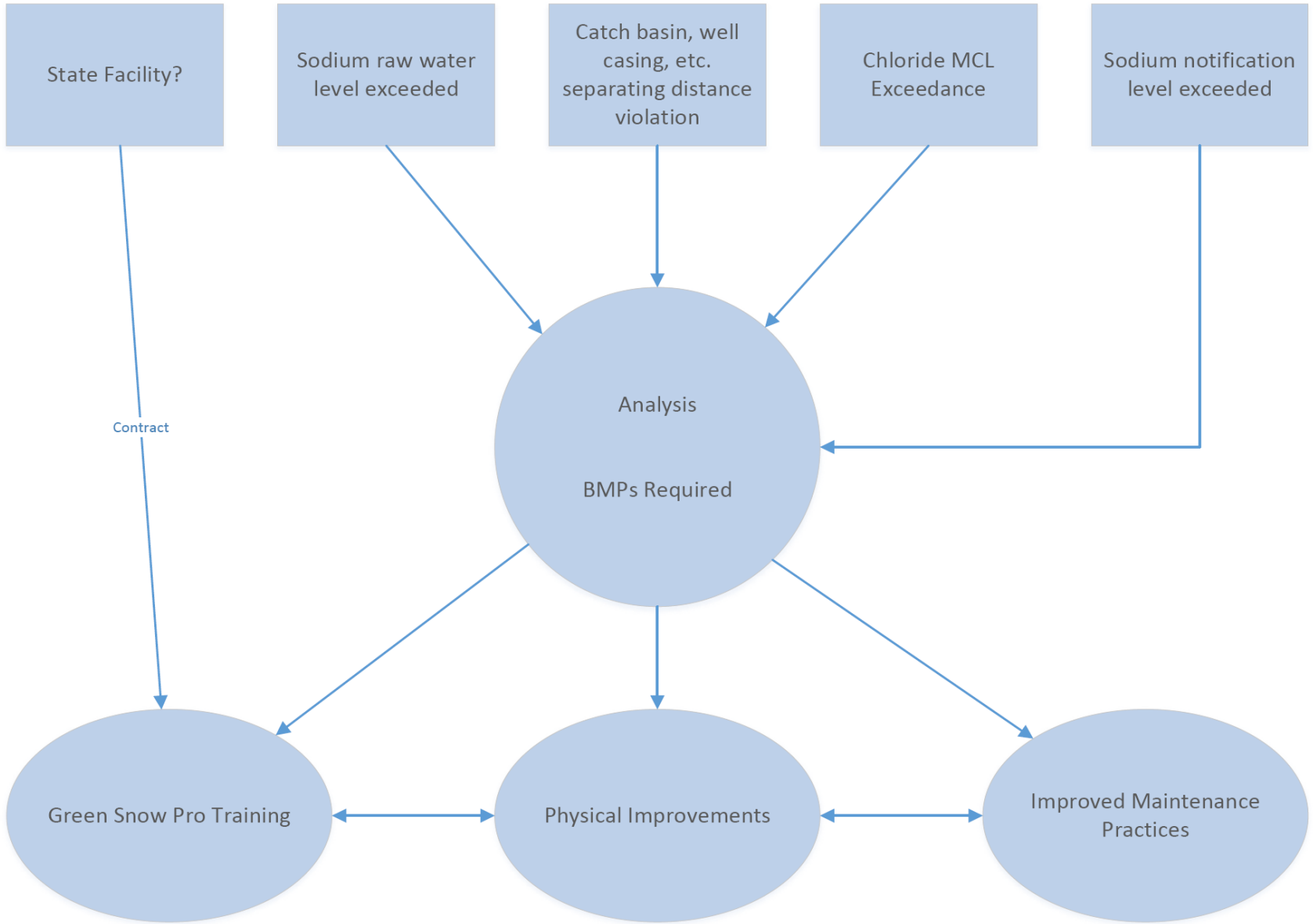
DWS Policy Flow Chart for Addressing Chloride in a Public Water Supply Source



More ideas

- DOT/municipal communication?
- State/university contracts?
- Case study at a commercial property with a large parking lot ?
- UConn or Municipal case study?
- Don’t forget about watershed inspectors

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Thank You

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