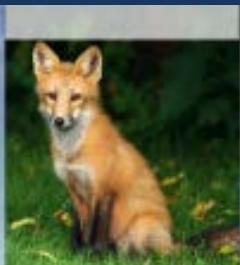




# Connecticut Department of Energy and Environmental Protection



Connecticut Department of  
**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

# Private Well Impacts from Road Salt Applications



CT Private Well Conference  
Goodwin College - March 23, 2017  
Drew Kukucka  
Environmental Analyst  
Potable Water Program Coordinator



Connecticut Department of Energy and Environmental Protection

# Road Salt Impacts to Private Wells

## Overview

- Increasing complaints relating to elevated **sodium** and **chlorides** in drinking water wells
- Statewide increase in **sodium** and **chlorides** in groundwater and surface water (streams, rivers, lakes and ponds)
- DEEP et al. currently assessing environmental impacts statewide (**toxic to fish, kills roadside vegetation, contaminates water supplies**)



# CASE Report

## *Winter Highway Maintenance Operations: Connecticut*

Published July 2015 by the *Connecticut Academy  
of Science and Engineering (CASE)*

*“Currently, the financial cost of applying copious  
amounts of deicing chemicals is far less than the  
costs associated with a single slip and fall injury  
claim”*



Connecticut Department of Energy and Environmental Protection



Connecticut Department of Energy and Environmental Protection



Connecticut Department of Energy and Environmental Protection



Connecticut Department of Energy and Environmental Protection

# Road Salt Usage in CT

- Winter 2006/2007: DOT switched from sand/salt mix to salt only (one of the last states to switch)
- Many municipalities followed suit – some still use sand/salt mix
- Sodium-based salt is the most cost-effective option. Used throughout NE and the entire snow-belt region.



# CASE Report

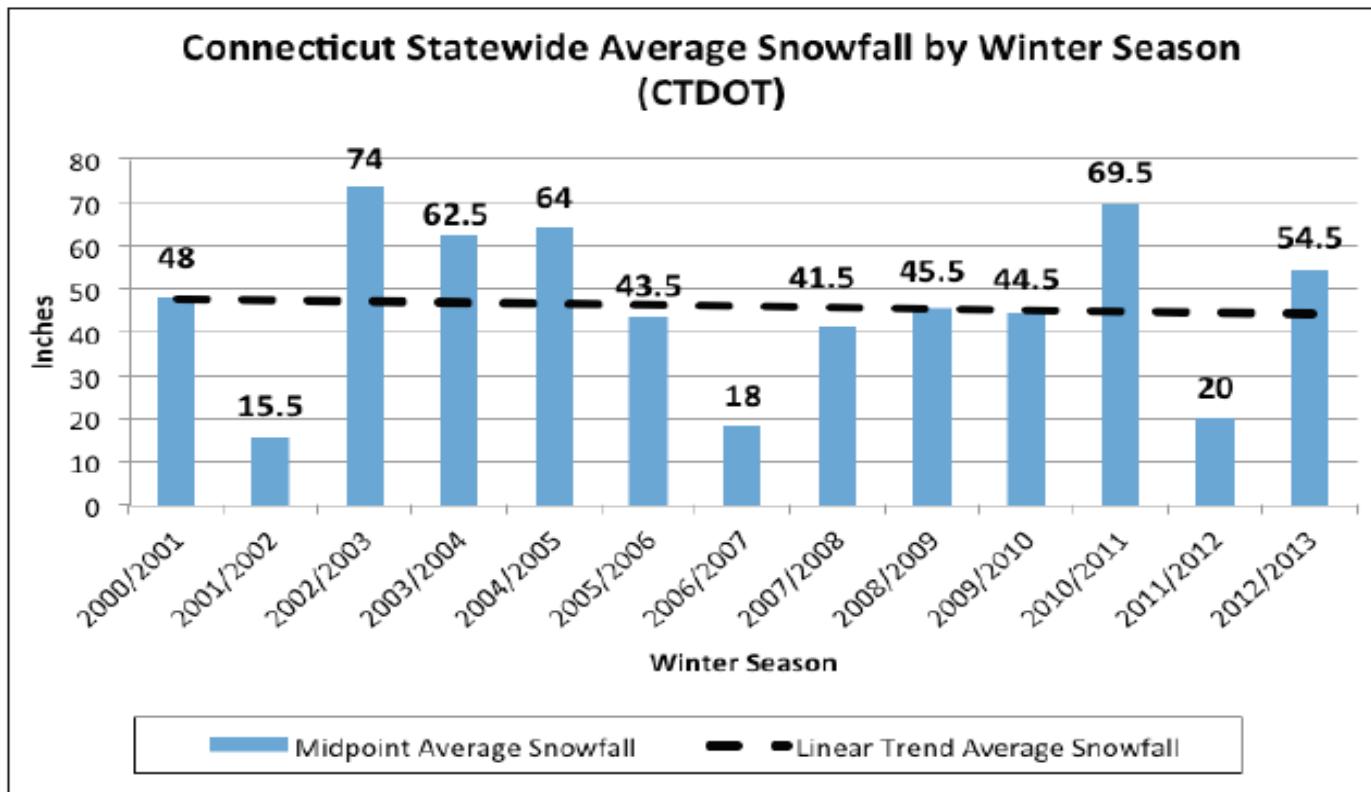


FIGURE 8.4. CONNECTICUT STATEWIDE AVERAGE SEASONAL SNOWFALL  
(SOURCE: REFERENCE [4])



Connecticut Department of Energy and Environmental Protection

# CASE Report

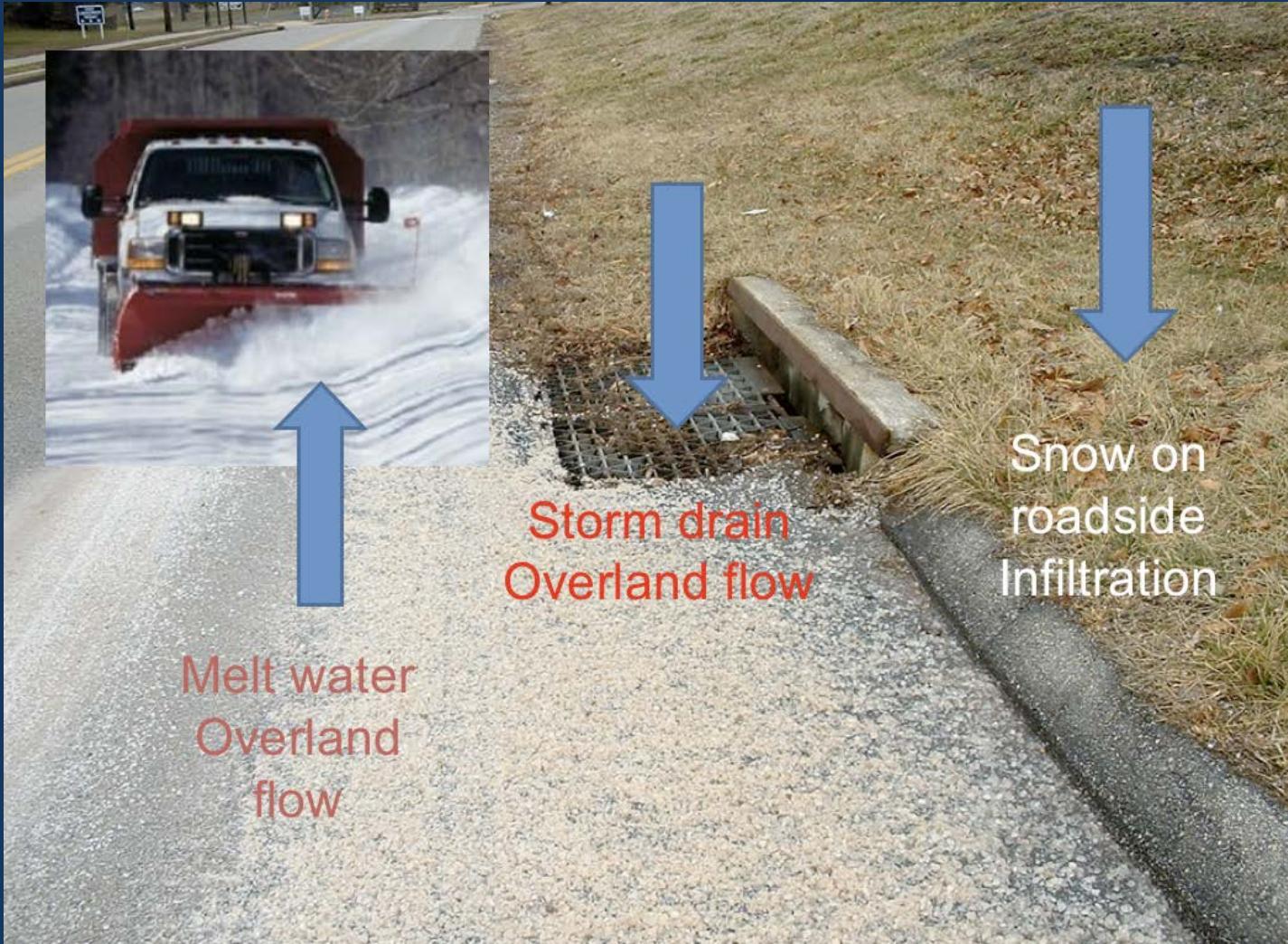
TABLE 2.4. ESTIMATE OF TONS OF TOTAL DEICERS USED STATEWIDE  
DURING FIVE WINTER SEASONS

(NOTE: BLUE SHADING = REPORTED DATA;  
RED SHADING = ESTIMATE BASED ON EXTRAPOLATION OF REPORTED DATA)

	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
<b>46 Survey Towns Reported Solid Deicer Used (tons) (from bottom line of Table 2.3)</b>	93,835	110,926	63,438	102,236	141,307
<b>169 Town <u>Estimate</u> of Solid Deicer Used (tons)</b>	320,000	379,000	219,000	349,000	483,000
<b>CTDOT Reported <u>Actual</u> Deicer Used on State Roads (tons) (from Table 2.1)</b>	132,373	181,330	63,113	162,657	227,511
<b><u>Estimate</u> of Total Deicer Used on Connecticut Public Roads (tons) (sum of 169 towns plus CTDOT not including parking areas or private use)</b>	<b>452,373</b>	<b>560,330</b>	<b>282,113</b>	<b>511,657</b>	<b>710,511</b>



# Where Does All that Road Salt Go?



Connecticut Department of Energy and Environmental Protection

# Where Does All that Road Salt Go?



Connecticut Department of Energy and Environmental Protection

# Road Salt Composition

- Primarily sodium chloride
- Liquid magnesium chloride used to pre-wet road salt to help adhere to road surface and increase performance in cold weather
- Brine treatment: 23% sodium chloride solution and water
- Some other options and additives...



# Road Salt Impacts to Private Wells

- Starting around 2013, DEEP has seen an increase in complaints relating to elevated sodium and chloride in private wells
- 50+ impacted wells identified within past 3 years
- Typical concentrations:
  - Sodium = 200 – 400 mg/L
  - Chloride = 400 – 900 mg/L



# Road Salt Impacts to Private Wells

## *Private Well Standards:*

Sodium: 100 mg/L (CTDPH guidance level)

- Based on increasing dietary salt intake
- Increased concern for people on salt-restricted diets

Chlorides: 250 mg/L (MCL)

- Based on corrosiveness and aesthetics



# Well Water Quality Concerns

*Elevated Sodium and Chloride in Drinking Water supplies can cause:*

- Health impacts associated w/ high sodium intake
- Corrosivity: plumbing failures, leaching of lead and copper
- Mobilization of Manganese, Iron, Radium, and Radon



# How Road Salt gets into Drinking Water Wells

*Common links between Road Salt application and elevated sodium/chloride levels in wells:*

- Road drainage: open drainage, catch basins
- Disposal/stockpiling of snow: plowed off road, salt spray, snow placed in front yards
- Shallow depth to bedrock
- Poor well construction: shallow/dug wells, damaged casing, well sealed below ground



# Other Sources of Sodium and Chloride

- Seawater: brackish water, salt-water intrusion
- Natural salt deposits: not common in CT
- Water softeners: add salt to water supply, brine backwash
- Salt water pool backwash
- Agricultural, industrial chemicals



# DEEP's Potable Water Program

## CT's Potable Water Law – Connecticut General Statutes Section 22a-471

- DEEP investigates complaints regarding potential impacts to public or private drinking water supplies as the result of man-made sources of pollution



# DEEP's Potable Water Program (22a-471)

- DEEP can order the Responsible Party to provide a **short-term supply of drinking water** and evaluate long-term solution for safe supply of drinking water



# DEEP's Potable Water Program (22a-471)

## *2013 Statute Amendments*

- Potable Water funding eliminated
- DEEP can no longer provide short-term supply of drinking water (bottled water/filters)
- Limited resources to investigate
- Relying on well owners to identify problems



# DEEP's Potable Water Program (22a-471)

## *DEEP's Investigation*

- Well water sampling, data analysis
- Well-head inspection, water treatment system use
- File Review: well completion reports, well water quality reports
- Geologic mapping data – aerial photos, bedrock geologic map, surficial geology map
- Further testing (if necessary)
- Work with local and state Health Departments



# Corrective Actions

*Solutions for wells impacted by Road Salt:*

- Providing **bottled water** by responsible party
- Roadway **drainage improvements**
- Road salt application **BMPs**
- Connecting to **public water** (if available – permanent solution)
- Drilling **new well** (not always feasible)
- Replacing plumbing/appliances
- Using alternative deicers



# What about DOT and other states?

- MassDOT: Salt Remediation Program
- NHDOT: Well Replacement Program
- ME Road Salt Program
- CTDOT working on in-house procedure for addressing road salt impacts
  - DOT currently addressing several road salt impacted wells along state roads



# Town Roads and Private Contractors

## DEEP & Local Health Collaboration

- Shared goals and responsibilities
  - Ensure safe supply of drinking water
- Local knowledge of area and contact with residents
- Knowledge of, or inspection of water treatment systems
- Working relationship with local officials



# Changing Expectations...



Connecticut Department of Energy and Environmental Protection

# Resources

- *CASE Study:* [www.ctcase.org/reports/WinterHighway2015/winter-highway-2015.pdf](http://www.ctcase.org/reports/WinterHighway2015/winter-highway-2015.pdf)
- *CTDPH Sodium & Chloride in Well Water: Health Considerations:*  
[http://www.ct.gov/dph/lib/dph/environmental\\_health/eoha/groundwater\\_well\\_contamination/082415\\_sodium %20chloride\\_fs.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/eoha/groundwater_well_contamination/082415_sodium_%20chloride_fs.pdf)

## Best Management Practices

- *CTDEEP – Disposal of Snow Accumulations from Roadways and Parking Lots:*  
[www.ct.gov/deep/cwp/view.asp?a=2721&a=325692&deepNav\\_GID=1654%20](http://www.ct.gov/deep/cwp/view.asp?a=2721&a=325692&deepNav_GID=1654%20)
- *NH Salt Reduction Initiative:*  
<http://www.des.nh.gov/organization/divisions/water/wmb/was/salt-reduction-initiative/tech-assist-bmp-practices.htm>
- *EPA Source Water Protection Bulletin: Managing Highway Deicing to Prevent Contamination of Drinking Water:*  
<https://nepis.epa.gov/Exe/ZyPDF.cgi/P100A2CF.PDF?Dockey=P100A2CF.PDF>



# Questions?

Drew Kukucka  
Environmental Analyst  
Potable Water Program Coordinator  
CTDEEP, Remediation Division  
*drew.kukucka@ct.gov*  
860-418-5955



Connecticut Department of Energy and Environmental Protection