

Green Snow-Pro Training: the Only Proven Way to Reduce Road Salt Impacts



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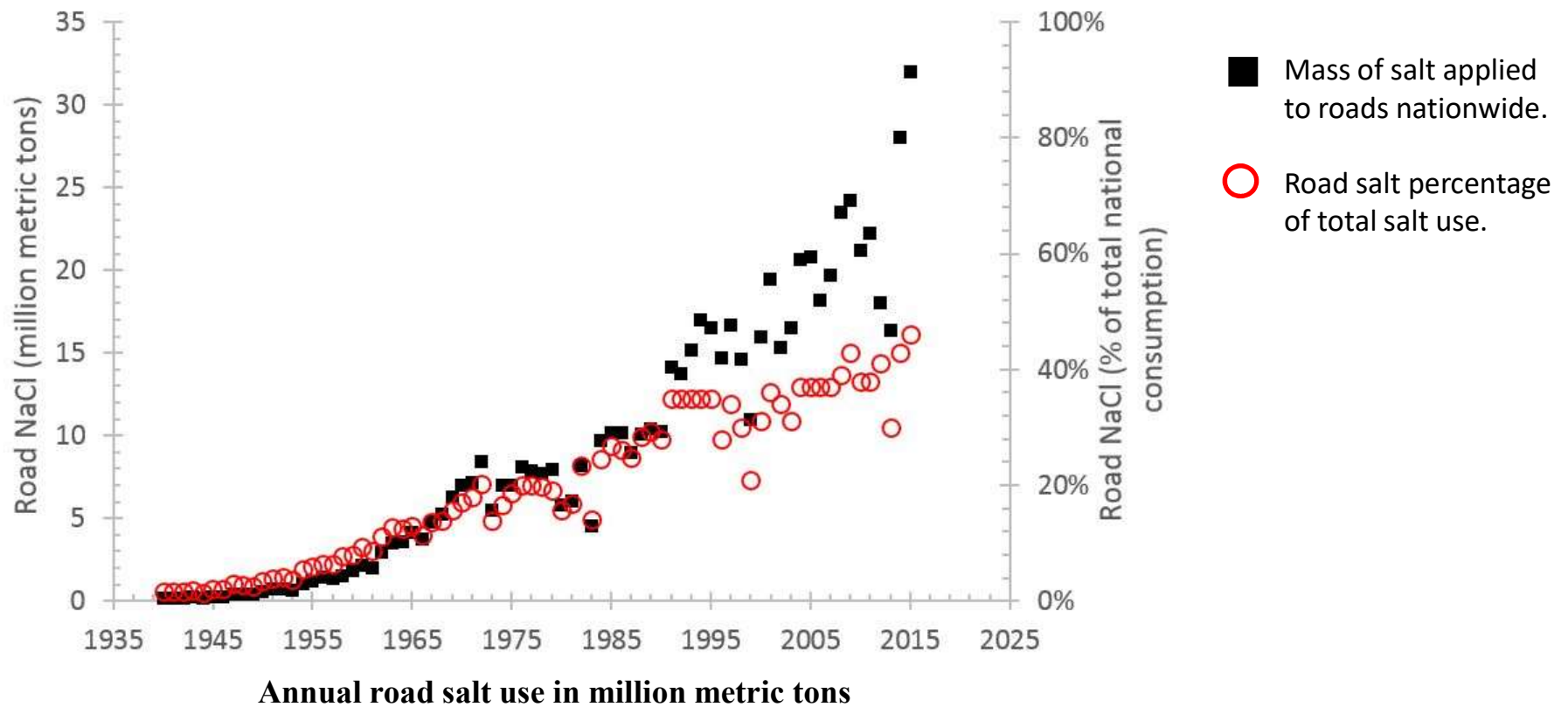
CLEAR mini-webinar series

May 6, 2020

The problem

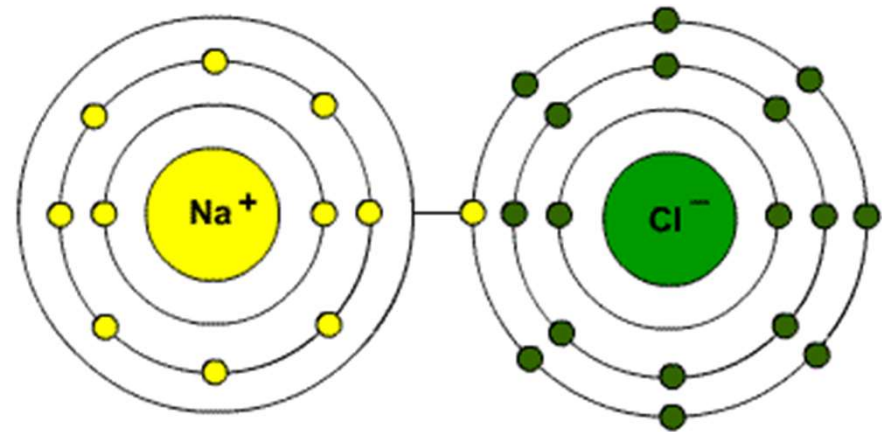


Road salt use in US has increased



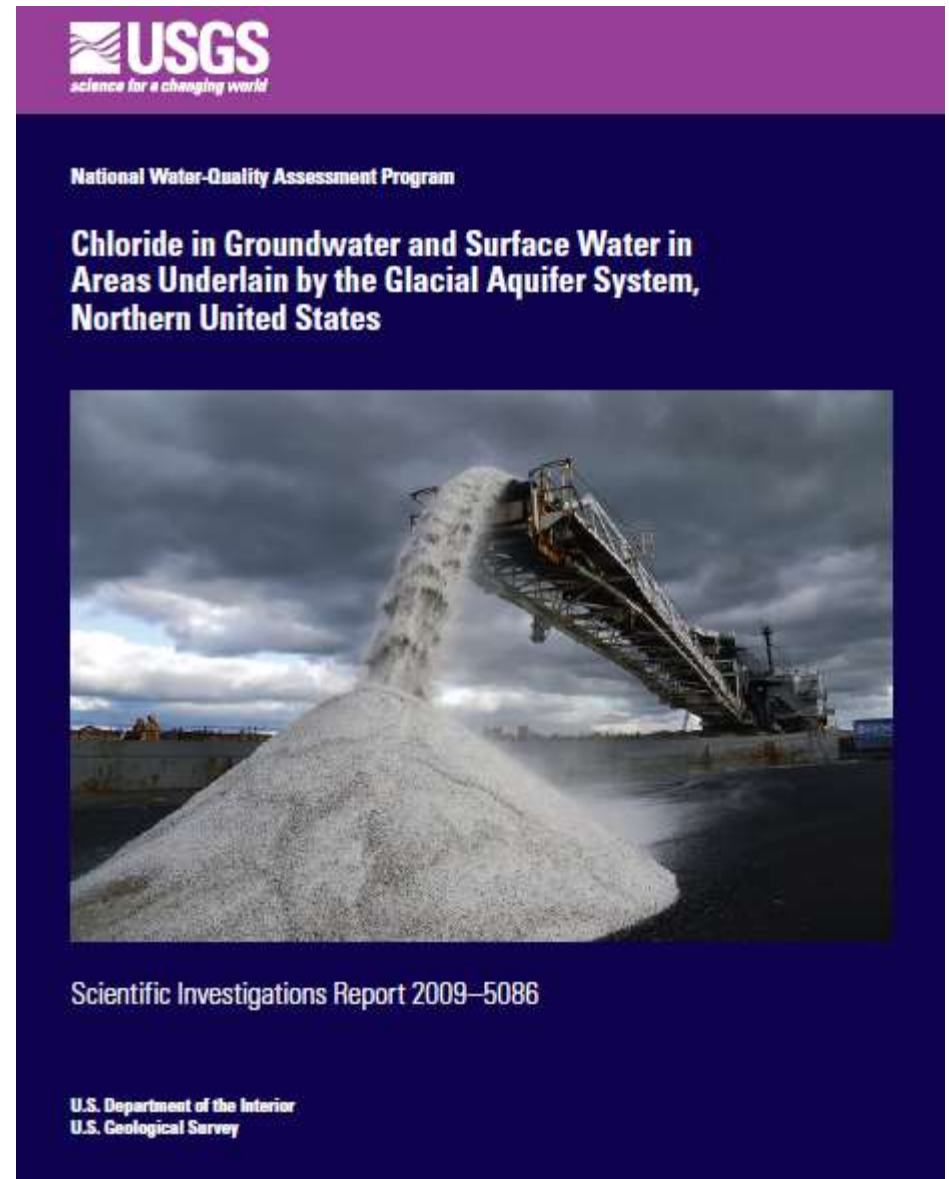
Sodium chloride

- Ionic bond
- Dissociate in water
- Chloride is highly mobile in soil water due to negative charge

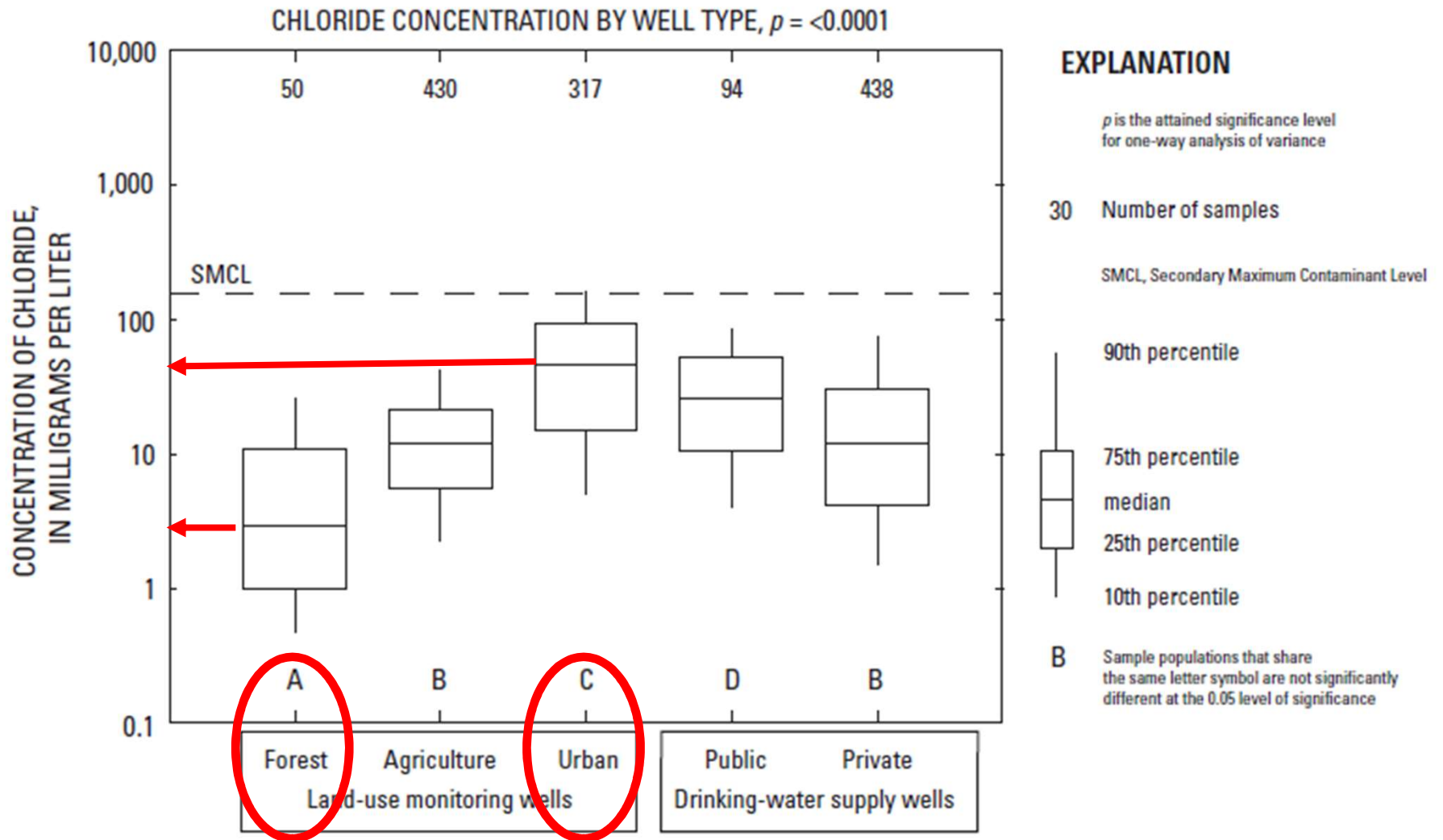


USGS study in northern states

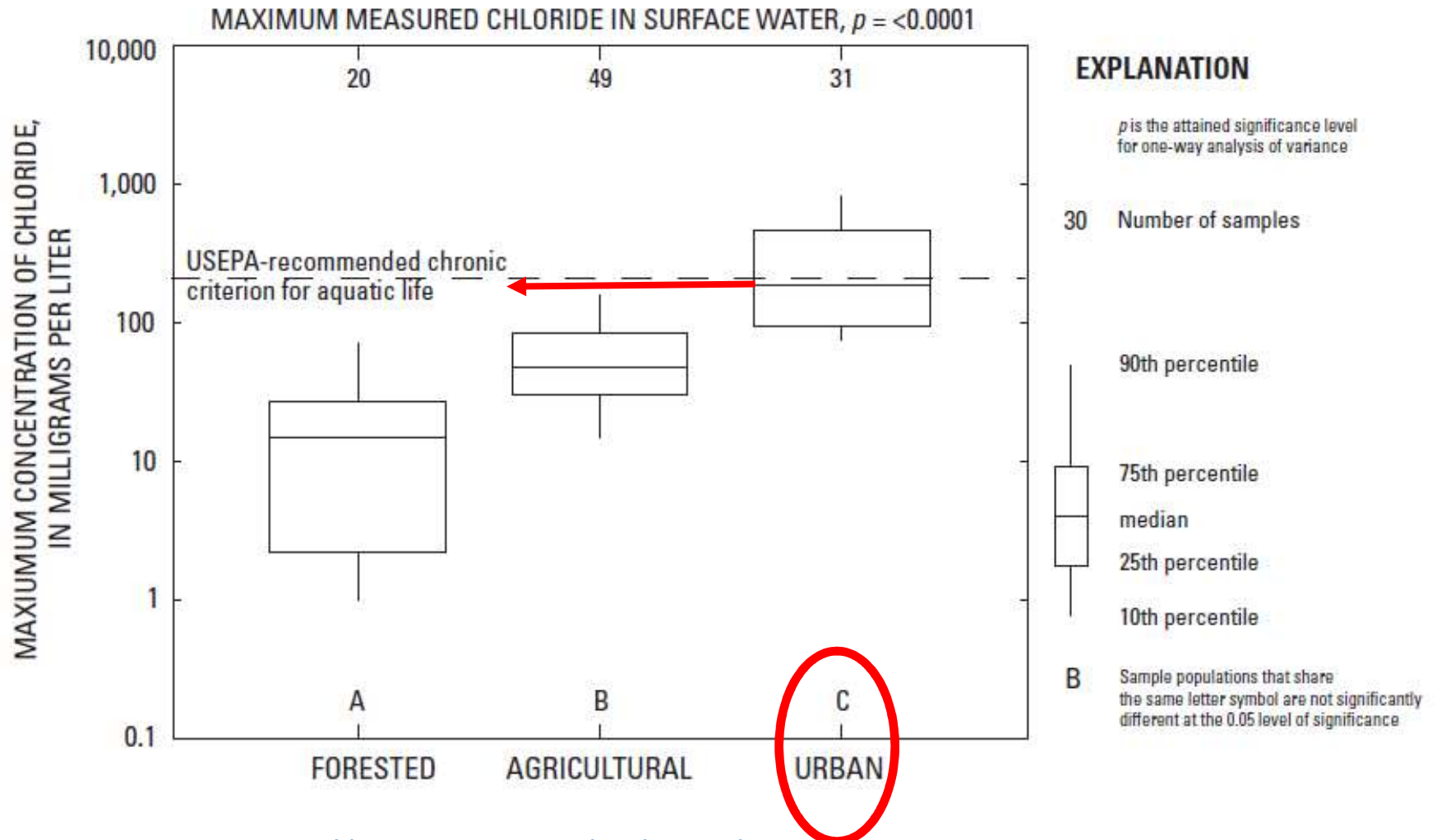
- Analysis of surface and groundwaters in deicing regions of the US
- John Mullaney, David Lorenz, and Alan Arntson
- <https://pubs.usgs.gov/sir/2009/5086/>



Chloride in groundwater related to land use



Chloride in surface water related to land use



<https://pubs.usgs.gov/sir/2009/5086/>

Research



Cite this article: Kaushal SS *et al.* 2019
Novel 'chemical cocktails' in inland waters are
a consequence of the freshwater salinization
syndrome. *Phil. Trans. R. Soc. B* **374**:
20180017.
<http://dx.doi.org/10.1098/rstb.2018.0017>

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WILEY **Freshwater Biology**

REVIEW

A review of the species, community, and ecosystem impacts of
road salt salinisation in fresh waters

William D. Hintz | Rick A. Relyea

Novel 'chemical cocktails' in inland waters
are a consequence of the freshwater
salinization syndrome

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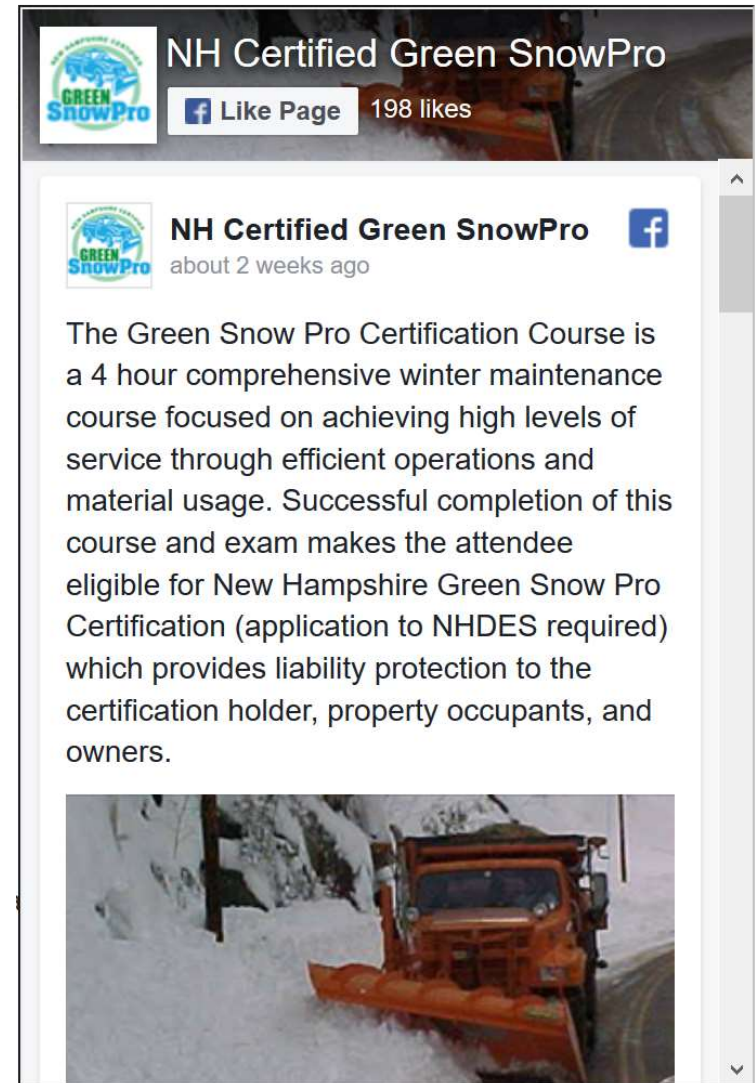
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New Hampshire's Green SnowPro Program

- Training (4 hour) and certification on winter deicing practices focused on “achieving high levels of service through efficient operations and material usage.”
- Class covers:
 - Science of salt
 - Environmental impacts of salt
 - Equipment calibration
 - Targeted spreading using weather and calibration data
 - Record keeping





New Hampshire's Green SnowPro Program

- Additional key piece: liability protection for certificate holders
- <https://t2.unh.edu/green-snowpro-salt-applicator-certification-training>




The screenshot shows a Facebook post from the page "NH Certified Green SnowPro". The page has 198 likes. The post, dated "about 2 weeks ago", features the Green SnowPro logo and a blue Facebook icon. The text of the post describes a 4-hour certification course for winter maintenance, focusing on efficient operations and material usage. It states that successful completion makes attendees eligible for New Hampshire Green Snow Pro Certification, which provides liability protection. Below the text is a photograph of an orange snowplow clearing a snowy road.

NH Certified Green SnowPro  **Like Page** 198 likes

NH Certified Green SnowPro  about 2 weeks ago

The Green Snow Pro Certification Course is a 4 hour comprehensive winter maintenance course focused on achieving high levels of service through efficient operations and material usage. Successful completion of this course and exam makes the attendee eligible for New Hampshire Green Snow Pro Certification (application to NHDES required) which provides liability protection to the certification holder, property occupants, and owners.



Efforts in CT

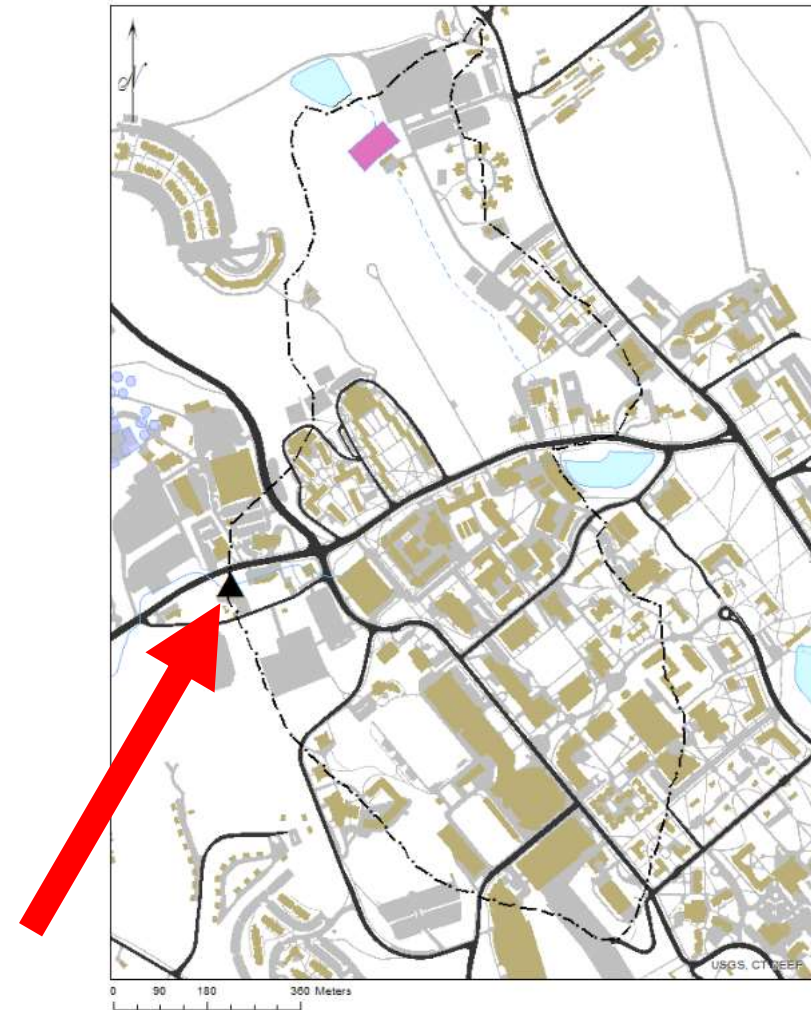
- UConn's Training and Technical Assistance Center coordinating Green SnowPro adaptation and implementation in CT
 - DOT, CLEAR, DEEP, DPH
- Piloted at UConn in 2017

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

 	
Training and Events	
Green Snow Pro: Sustainable Winter Operations A CT Road Scholar Program <i>ELECTIVE Workshop</i> 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.	Dates & Locations November 7, 2018 South Windsor, CT November 9, 2018 Durham, CT Session is 8:30am—2:00pm (Registration begins at 8:00am) <i>Lunch will be provided</i>

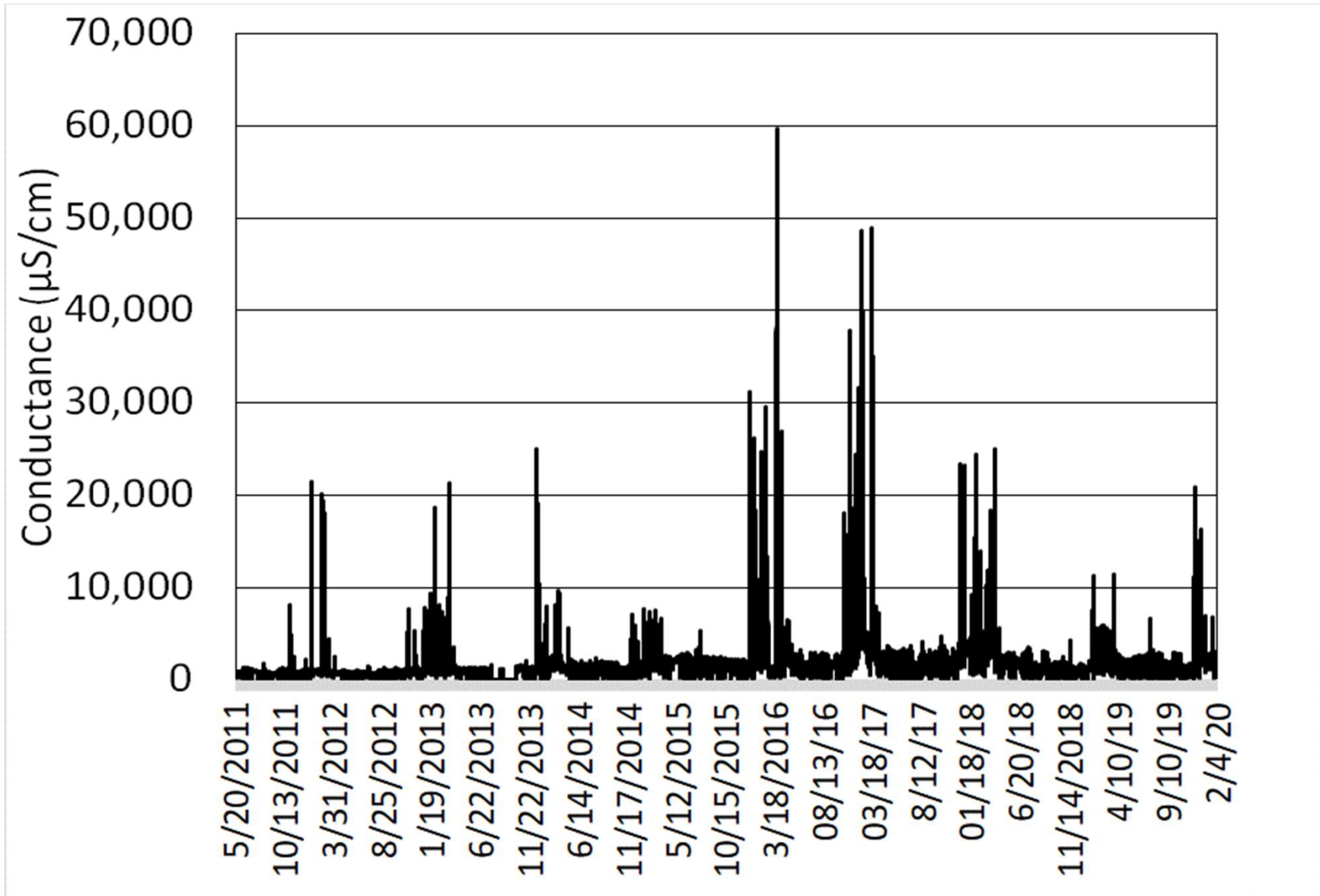
Real-time data collection on Eagleville Brook at UConn

- 10 year record of discharge, 9 year record of conductivity

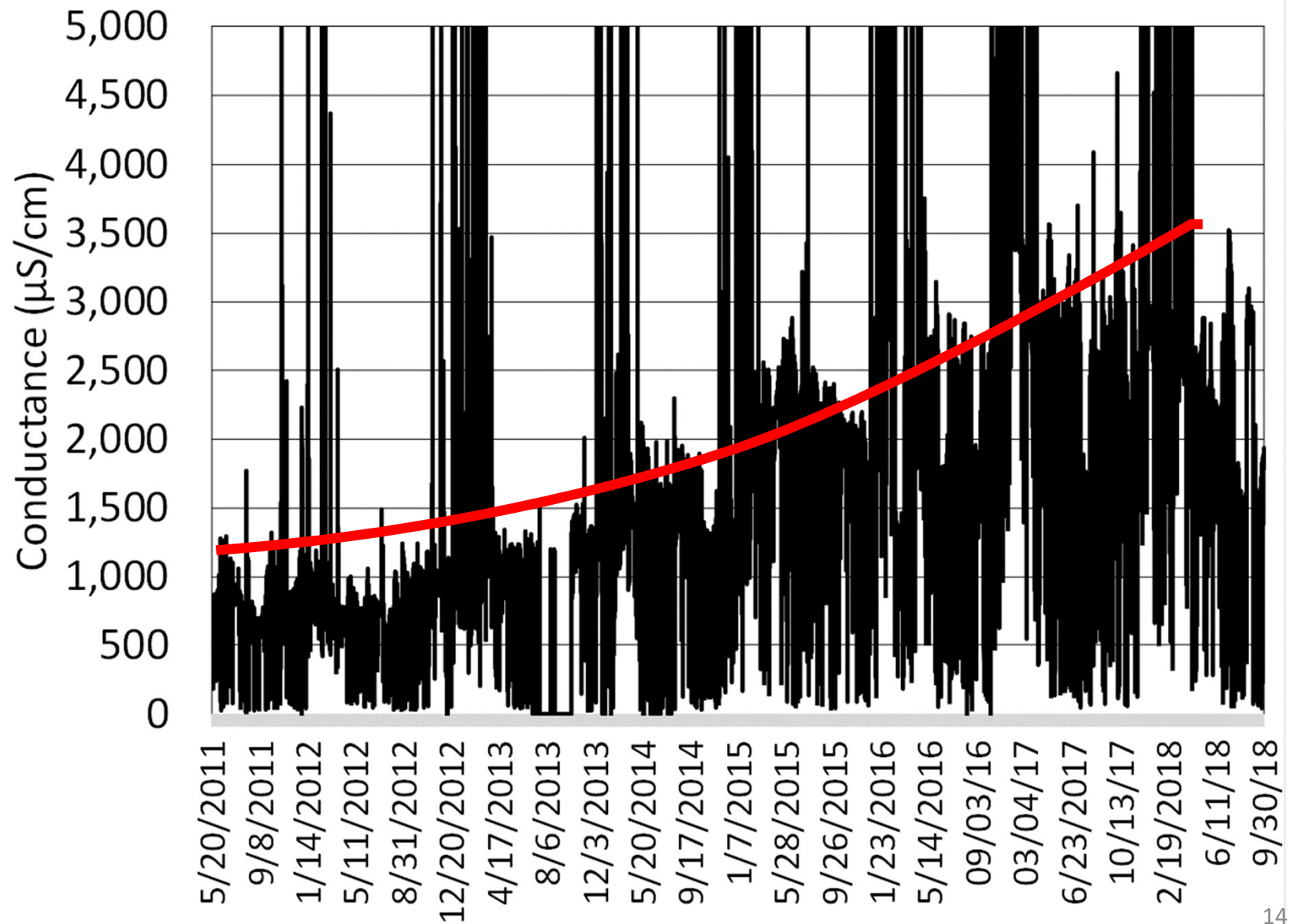


<http://clear.uconn.edu/projects/eagleville>

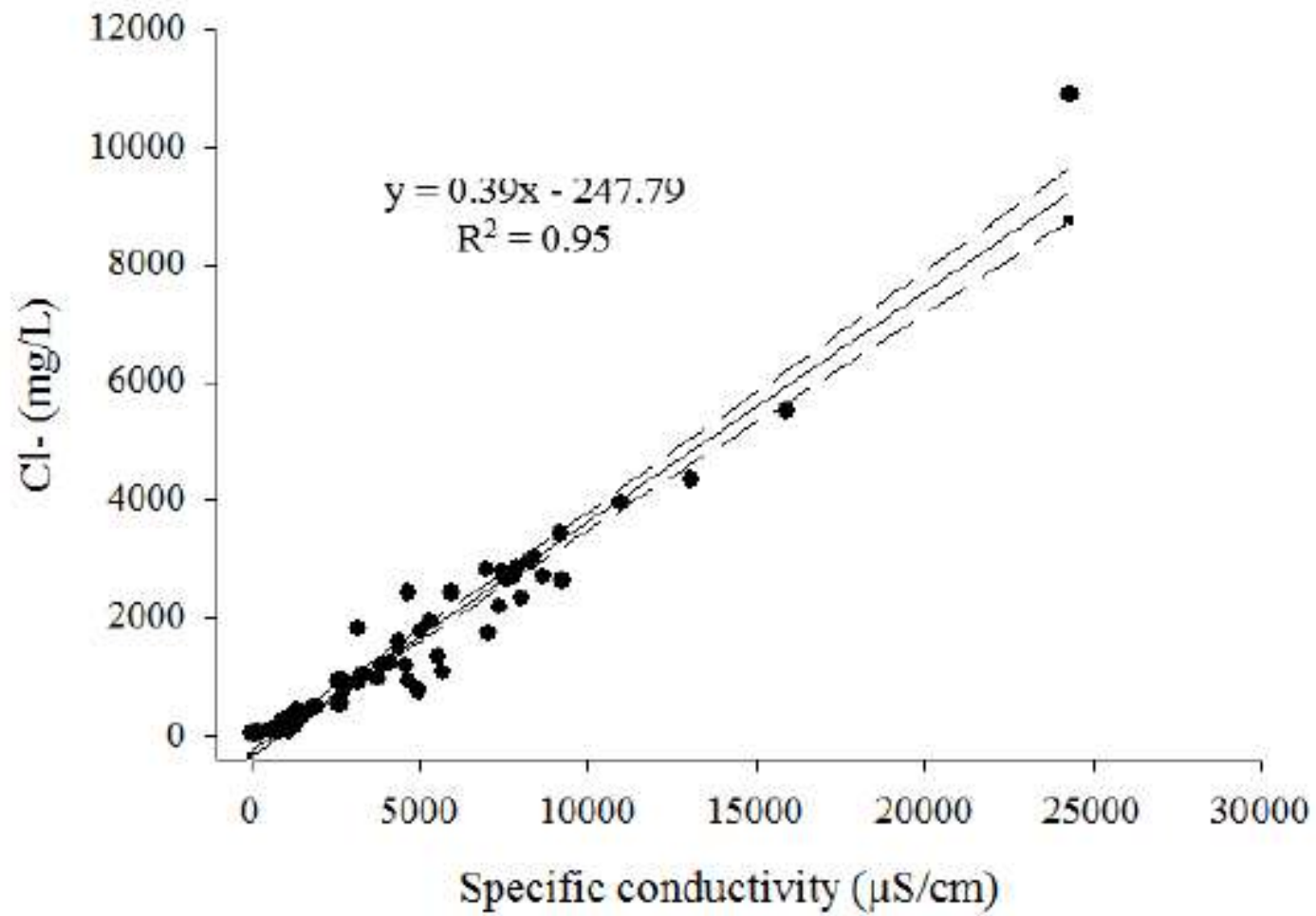
Eagleville Brook-UConn Storrs



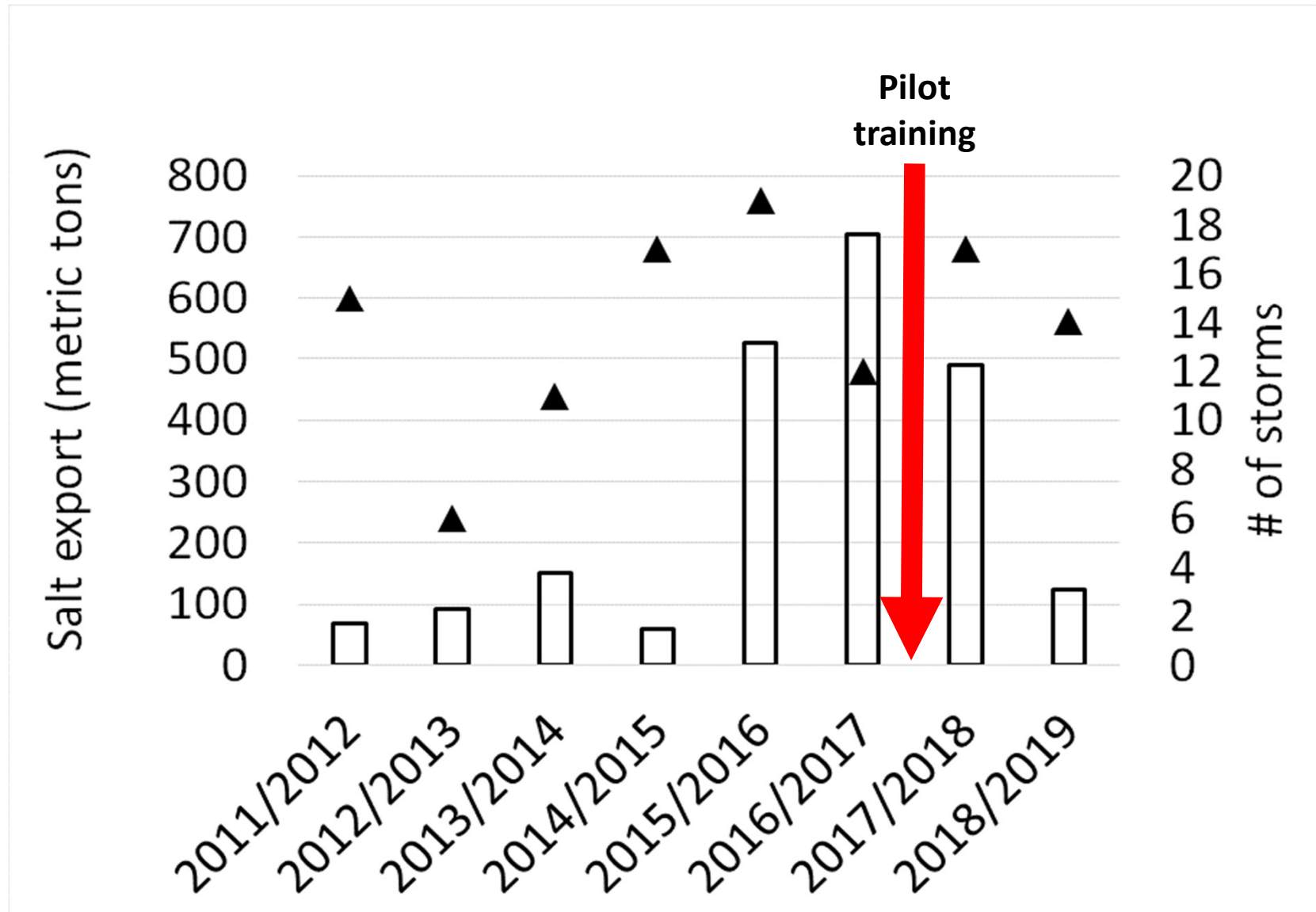
Eagleville Brook- UConn Storrs



Chloride/conductance regression



Salt export



THIS SURVEY IS COMPLETELY ANONYMOUS AND VOLUNTARY

I found the winter operations training we did last fall useful

(1=strongly disagree, 5=strongly agree) 1 2 3 4 5

Please list any other topics you are interested in for a future training

Please indicate your agreement on these questions:

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I was more aware of how much salt I was applying this season					
I applied less salt this season compared to past years					
I felt that I was able to make roads/sidewalks safe this season					
I plan on trying to apply less salt next season					

Please list any other actions you took this winter that were different from previous years:

List any other thoughts/questions:

Survey results (n=25)

#	Question	Median response
1	I found the winter operations training we did last fall useful	5
2	I was more aware of how much salt I was applying this season	5
3	I applied less salt this season compared to past years	5
4	I felt that I was able to make roads/sidewalks safe this season	5
5	I plan on trying to apply less salt next season	5

Predicted vs. actual salt export

Winter season	Predicted salt export (metric tons)	Actual Salt Export (metric tons)	Difference (metric tons)	Campus-wide reduction (metric tons)	Cost savings (\$)
2017/2018	998.0	489.3	508.8	1,467.6	\$193,729
2018/2019	821.9	124.6	697.3	2,011.5	\$265,521
TOTAL	1,820.0	613.9	1206.1	3,479.2	\$459,251

NOTE: Predicted salt export was calculated from the 2016-2017 season metric tons/storm application rate.

Conclusions

- Winter deicing has increased chloride concentrations in Eagleville Brook
 - Late summer low-flow, high temperature of concern
- The Green SnowPro program has been shown to reduce salt applications while still keeping roads safe
- A pilot of this program at UConn resulted in greatly reduced salt export, and over \$450,000 savings in salt costs

Other info

- Next T2 GSP session September 29, 2020 in Canterbury
 - <https://t2center.uconn.edu/workshopschedule.php>
- Article just published in Journal of Extension:
<https://joe.org/joe/2020april/rb5.php>



The screenshot shows the Journal of Extension website interface. At the top left is the logo with the text "Journal of Extension" and the tagline "Sharing Knowledge, Enriching Extension". A search bar is located at the top right. Below the logo is a navigation menu with links for HOME, JOURNAL, ABOUT JOE, JOE FAQs, CONTACT, and NATIONAL JOB BANK. A secondary menu includes Current Issue, Back Issues, Search, and Subscribe. The main content area displays the issue information: "April 2020 // Volume 58 // Number 2 // Research In Brief // v58-2rb5". Navigation buttons for "PREVIOUS ARTICLE", "ISSUE CONTENTS", and "NEXT ARTICLE" are visible. Social media icons for YouTube, Facebook, and Twitter are also present. The article title is "Tipping the Balance on Winter Deicing Impacts: Education Is the Key". The abstract text reads: "Winter deicing results in substantial export of road salts to fresh waters and causes numerous ecological problems. Extension faculty and other educators at the University of Connecticut implemented New Hampshire's Green SnowPro program, a voluntary training program for salt applicators. University of Connecticut facilities staff applied 3,479 fewer metric tons of salt to campus in the 2 years after the educational training, equating to a cost savings of \$459,251. Substantial environmental and economic benefits can be realized in northern climates if Extension and other educators rally behind this program." The keywords listed are "conductivity, deicing, road salt, Green SnowPro, education".