



Clear Roads Overview

WSSC Salt Summit

Patti Caswell

Chair

Oregon Department of Transportation



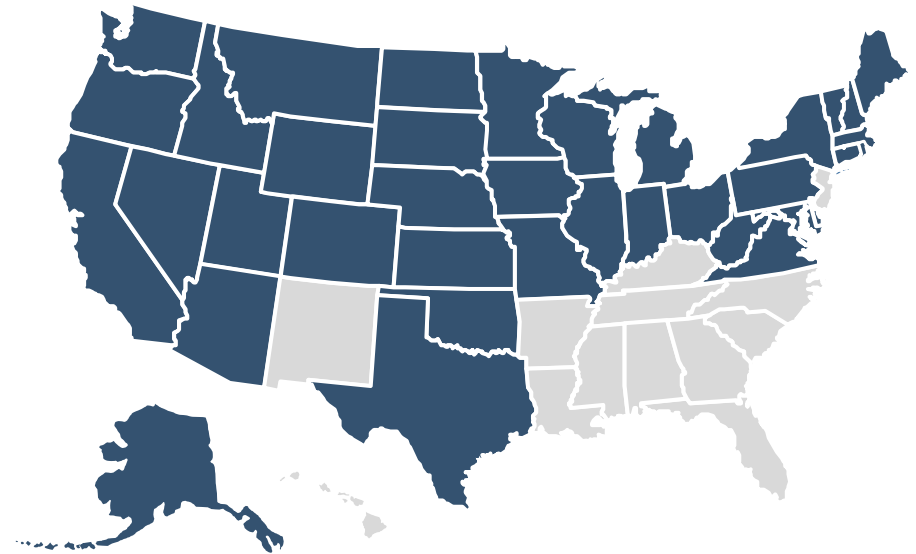
research for winter highway maintenance

Overview

Clear Roads Winter Highway Operations Pooled Fund is a national research consortium that tests, develops, and advances materials, equipment, and methods for winter highway maintenance.

Currently 37 members.

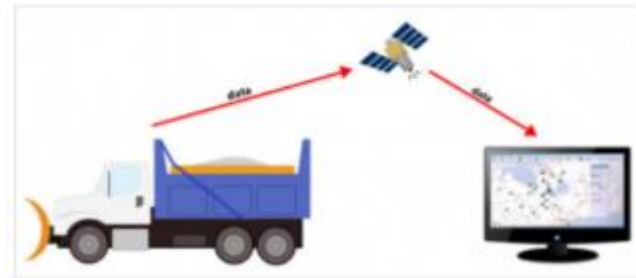
AK	AZ	CA	CO	CT	DE
IA	ID	IL	IN	KS	MA
MD	ME	MI	MN	MO	MT
NE	ND	NH	NV	NY	OH
OK	OR	PA	RI	SD	TX
UT	VA	VT	WA	WI	WV
WY					



Core Activities

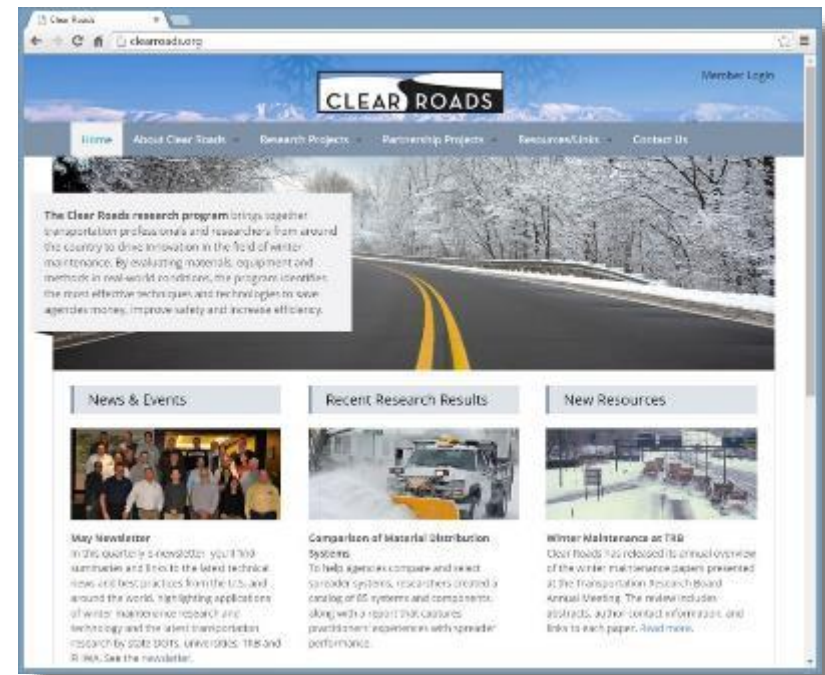
- Evaluate winter maintenance materials, equipment and methods.
- Study and promote innovative techniques and technologies.
- Support technology transfer by developing practical field guides and training curricula to promote the results of research projects.

TECHNOLOGY



Our Website: www.clearroads.org

- Go-to source for all program and project information
- Details on completed and in-progress research
 - All reports, guides, tools
 - Research briefs
 - Recorded closeout videos with investigator Q-and-A
- Winter maintenance news
- Meeting minutes





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New Research Projects

Comprehensive Guide to Pre-Wetting Application Rates and Methods

(James Morin, Washington)



The goal of this project is to determine the optimum pre-wetting rate (gallons per ton of dry material) in different delivery systems and spreader configurations.



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New Research Projects

Best Management Practices for Liquid Chloride Storage and Pumping Systems

(Brian Burne, Maine)

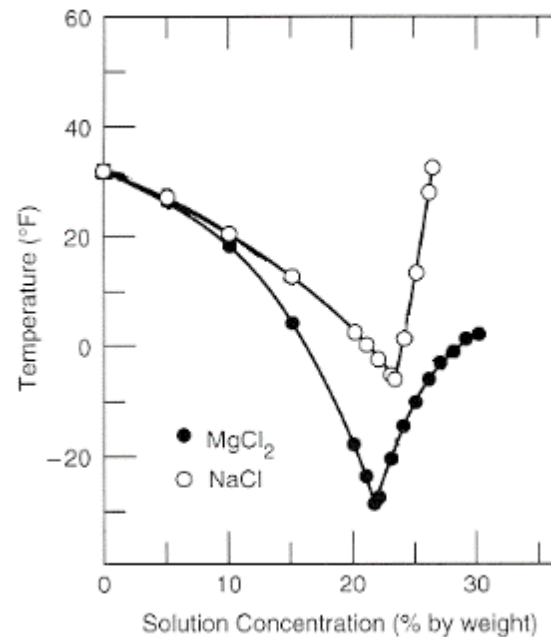


The goal of this project is to document and share optimal system designs and management practices that contribute to safe, sustainable, and cost-effective liquid storage systems.

New Research Projects

Effects of Additives in Lowering the Freezing Point of Deicing Salts

(Rhett Arnell, Utah)

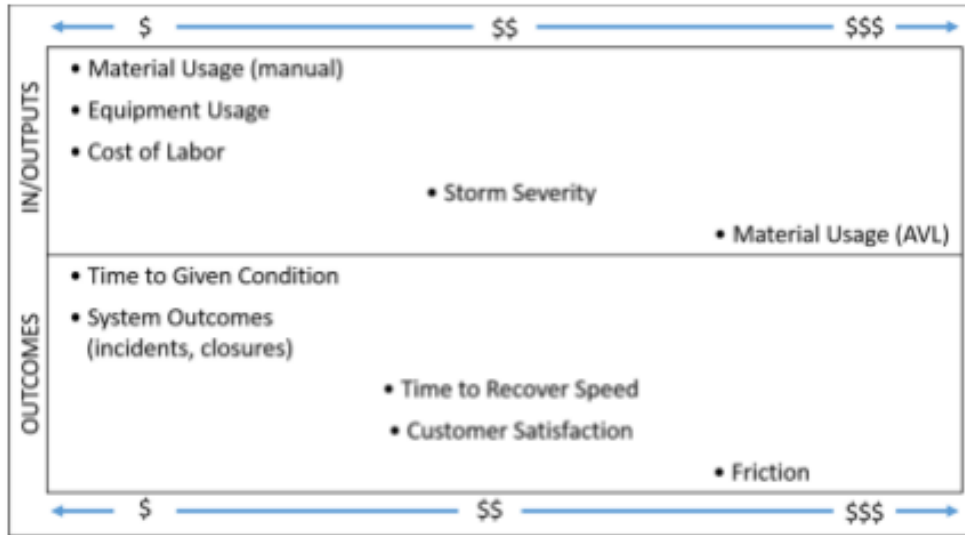


The goal of this project is to compare the eutectic points of various mixed salts (solid deicing salts with additives) to untreated salt to determine how well mixed salt products perform at lower temperatures.

New Research Projects

Evaluation of Direct Liquid Application of Salt Brine Versus Granular Salt as Measured Through Various Performance Metrics

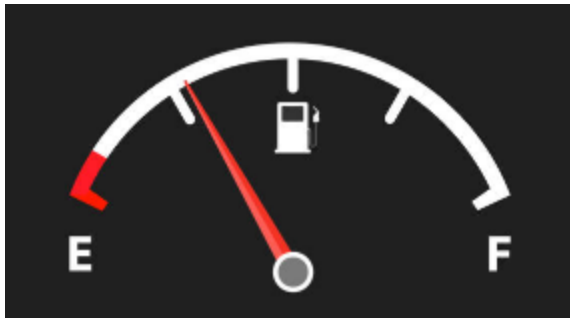
(Emil Juni, Wisconsin)



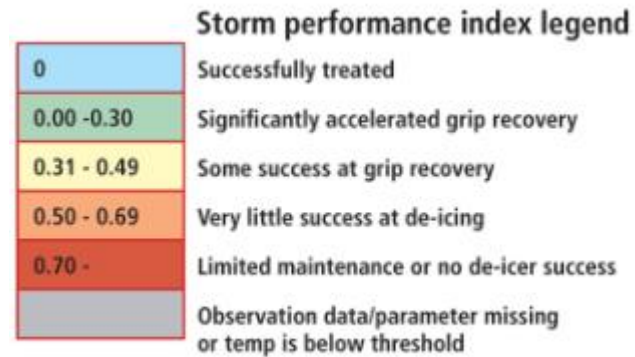
New Research Projects

Use of Dashboards for Winter Operations

(Kevin Duby, Arizona)



Material stockpile
volume





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New Research Projects

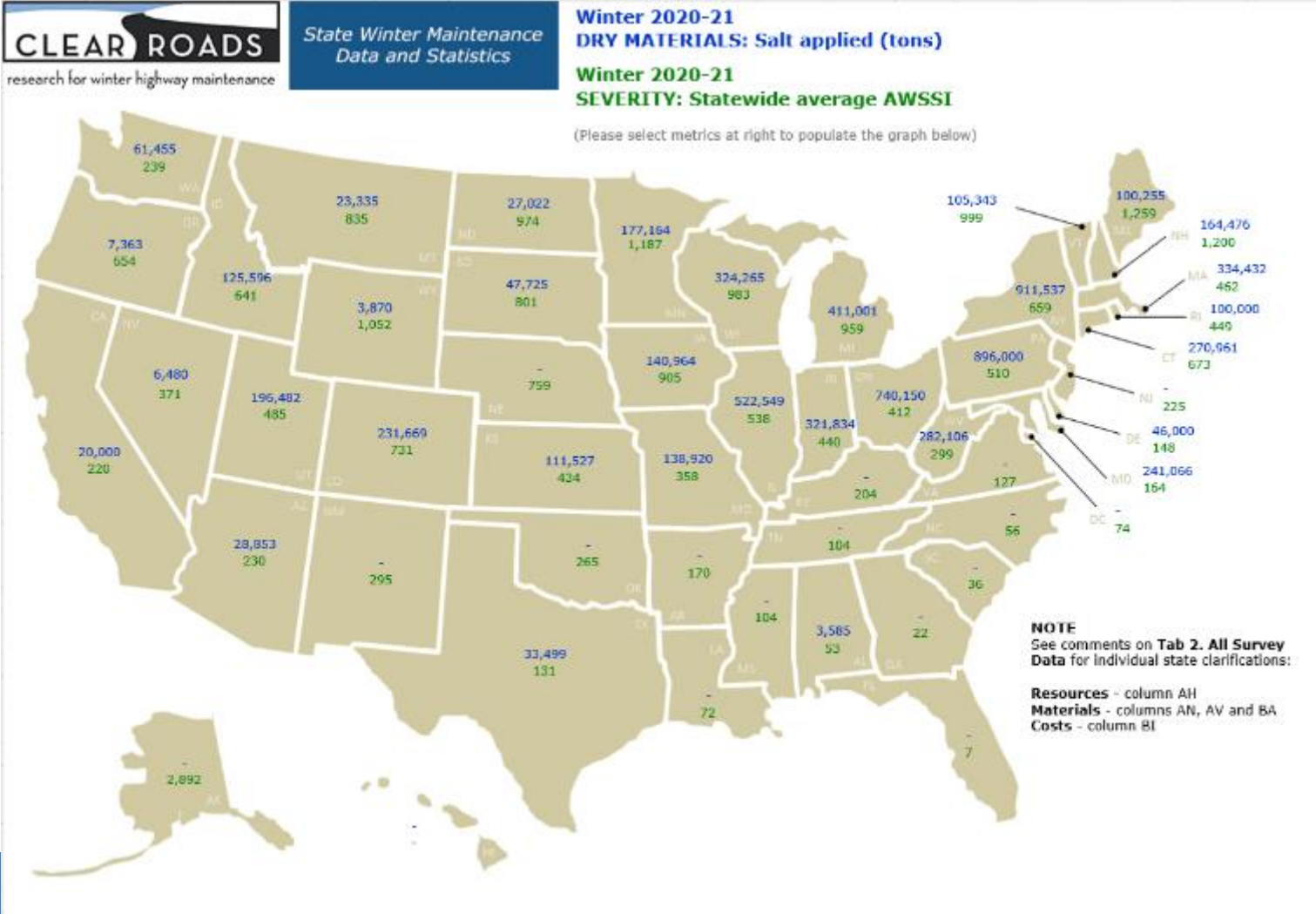
**Synthesis: Corrosion and
Connectors Don't Mix**
(Cliff Spoonemore, Wyoming)





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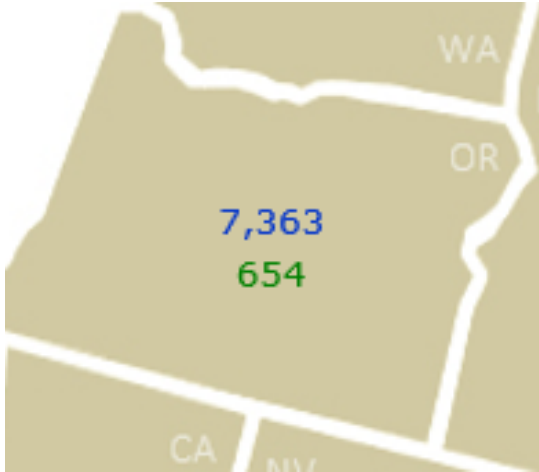
Annual Survey of State Winter Maintenance Data (Year 8)





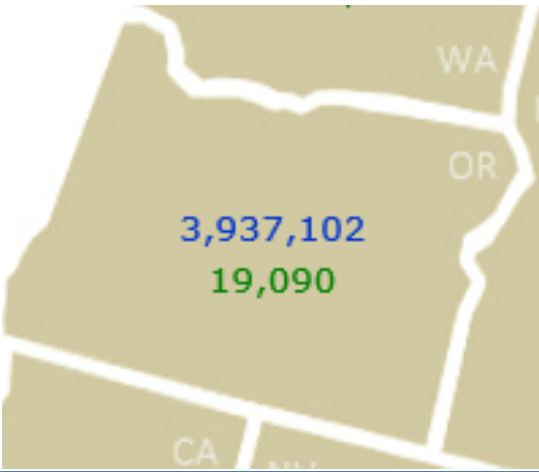
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Annual Survey of State Winter Maintenance Data (Year 8)



Winter 2020-21
DRY MATERIALS: Salt applied (tons)

Winter 2020-21
SEVERITY: Statewide average AWSSI



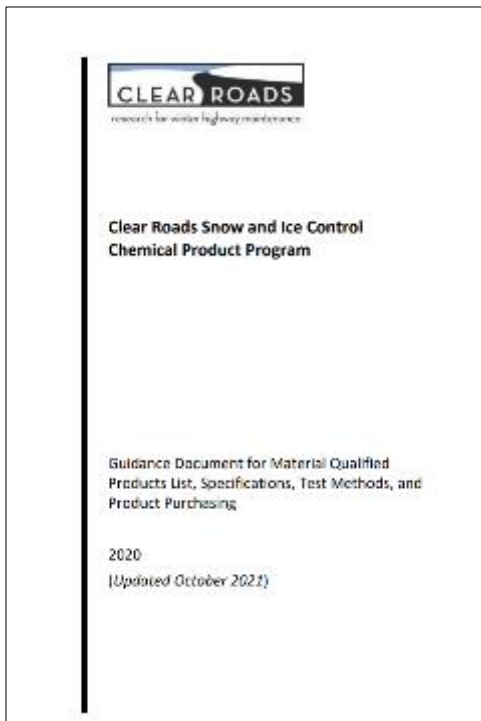
Winter 2020-21
LIQUID MATERIALS: Total liquid applied (gallons)

Winter 2020-21
SYSTEM: Total lane miles



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Clear Roads Qualified Products List (QPL)



Clear Roads Qualified Product List - PRODUCTS Date of Listing: January 26, 2022



Category 1 - Corrosion Inhibited Liquid Magnesium Chloride

Product Name	Manufacturer	Corrosion Rate	% Effectiveness	Concentration	Date Approved	Expiration
Iceban 200*	Earth Friendly Chem.	8		26%	8/15/2002	12/31/2024
Caliber M1000 AP	Envirotech Services Inc.	21		28%	8/2/2004	12/31/2024
Meltdown with Shield AP	Envirotech Services Inc.	26		30%	8/2/2004	12/31/2024
Hydro-Melt Green	Cargill	24		29%	8/1/2005	12/31/2024
Meltdown APEX with Shield AP	Envirotech Services Inc.	25		30%	1/25/2006	12/31/2024
FreezGard CI Plus	Compass Minerals	12		30%	8/28/2006	12/31/2024
Ice B'Gone II HF	Sears Ecological Appl.	29		25%	8/8/2007	12/31/2024
FreezGard LITE CI Plus	Compass Minerals	12		27%	6/13/2011	12/31/2024
HydroMelt Liquid Deicer	Cargill	28		29%	8/15/2011	12/31/2024
FreezGard CI Plus Bulk Zone	Compass Minerals	12		28%	10/14/2014	12/31/2024



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Projects In-Progress

- 18-02 High Performance Blade Evaluation
- 18-06 Standard Test Procedure for Ice Melting Capacity of Deicers
- 20-02 Understanding the NaCl Phase Diagram
- 20-03 Evaluation of Indoor Automated Stockpile Measurement Systems
- 20-04 Expanded Use of AVL/GPS Technology
- 20-05 Using GIS to Highlight Highway Segments Sensitive to Deicing Materials
- 20-06 Salt Shed Design Template
- 21-01 Grip Sensor Technology and Salt Applications
- 21-02 Update to CR 13-04: Best Practices for Protecting DOT Equipment from the Corrosion Effect of Chemical Deicers
- 21-03 Efficacy, Cost, and Impacts of Non-Chloride Deicers
- 21-04 Training Module Development for Evaluation of Storm Severity Index and Winter Severity Index
- 21-05 Evaluation of Electric Vehicle Technologies and Alternative Fuels for Winter Operations
- 21-06 Calculating Plow Cycle Times from AVL Data

Recently Completed Projects

Visit all Clear Roads research at:

<https://clearroads.org/all-research-and-synthesis-projects/>

19-01 Expanding Application Rate Guidance for Salt Brine Blends for Direct Liquid Application and Anti-icing





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Recently Completed Projects (cont'd)

19-02 Recruitment and Retention of Highway Maintenance Workers





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Recently Completed Projects (cont'd)

19-03 Measuring the Efficiencies of Tow Plows and Wing Plows



Winter Driving Safety

This website serves as an information clearinghouse to which state DOTs can direct the traveling public from their own DOT websites.

Web address: <https://clearroads.org/winter-driving-safety/>





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Snowplow Operator and Supervisor Training



To learn more or to request access to the training modules, please visit:
<http://clearroads.org/request-for-training-modules-form/>

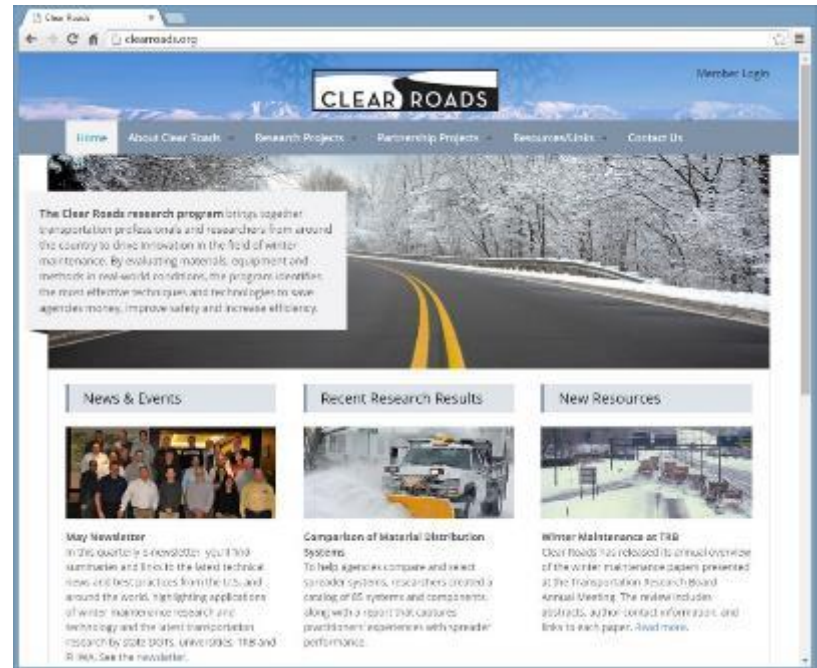
www.clearroads.org



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For More Information

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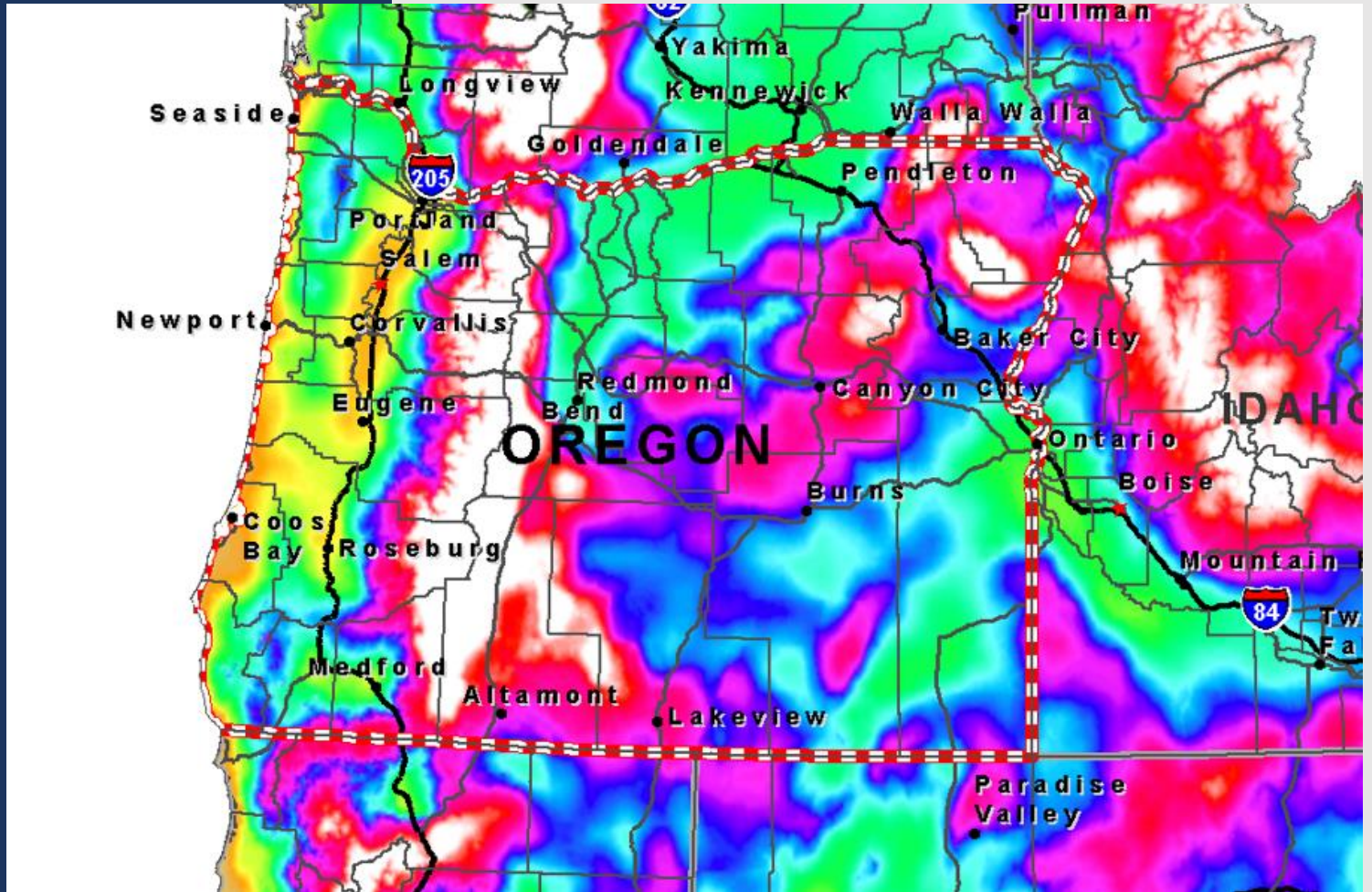
Katie Walker (administration)

Minnesota DOT

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Average Winter Weather Storm Severity



Winter Maintenance Materials



Corrosion inhibited liquid
magnesium chloride (1990s)



Rock salt (2011)

Abrasives



Prior to late 1990's



Abrasives:

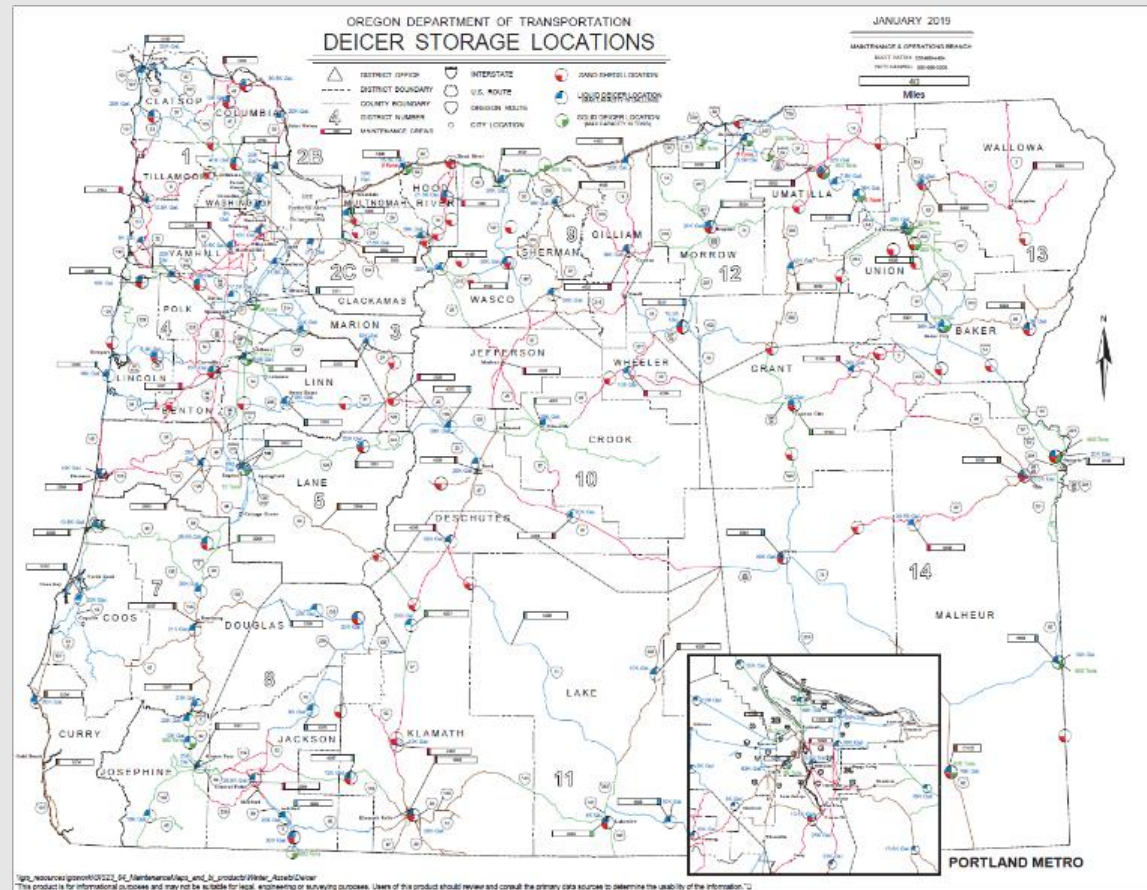
- Cinder, rock
- 100+ stockpile sites

Liquid deicer:

- Mag chloride
- 105 stockpile sites (single to multiple tanks)
- 2.1 M gallon capacity
- 5-year annual average use: 4.7 M

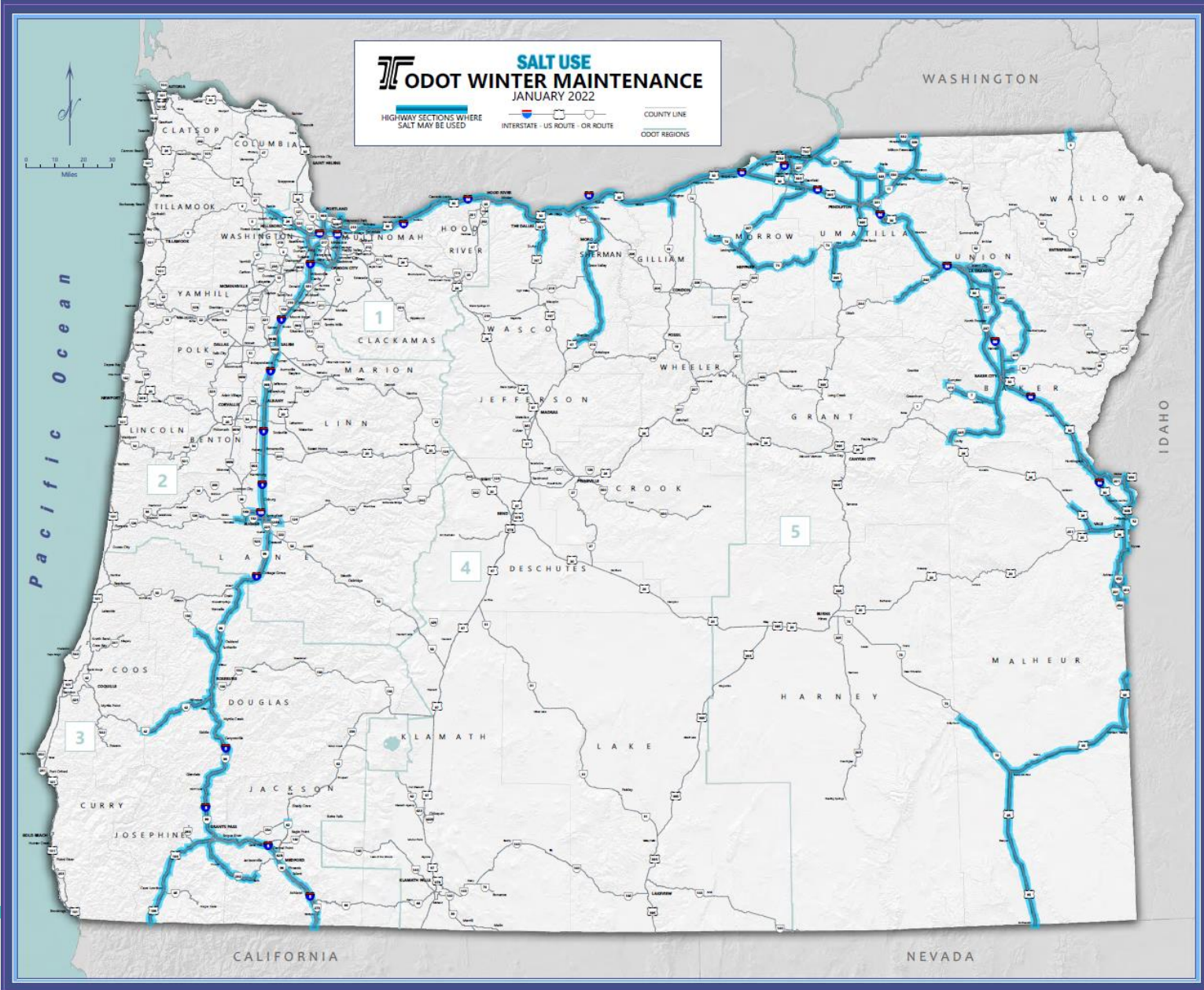
Solid salt

- Sodium chloride
- 28 stockpile sites (sheds, bagged salt storage) salt sheds
- 21 ton capacity
- 5-year annual average use: 5.5 tons



Winter materials

ODOT Salt use highways



Salt Storage



Under cover unloading

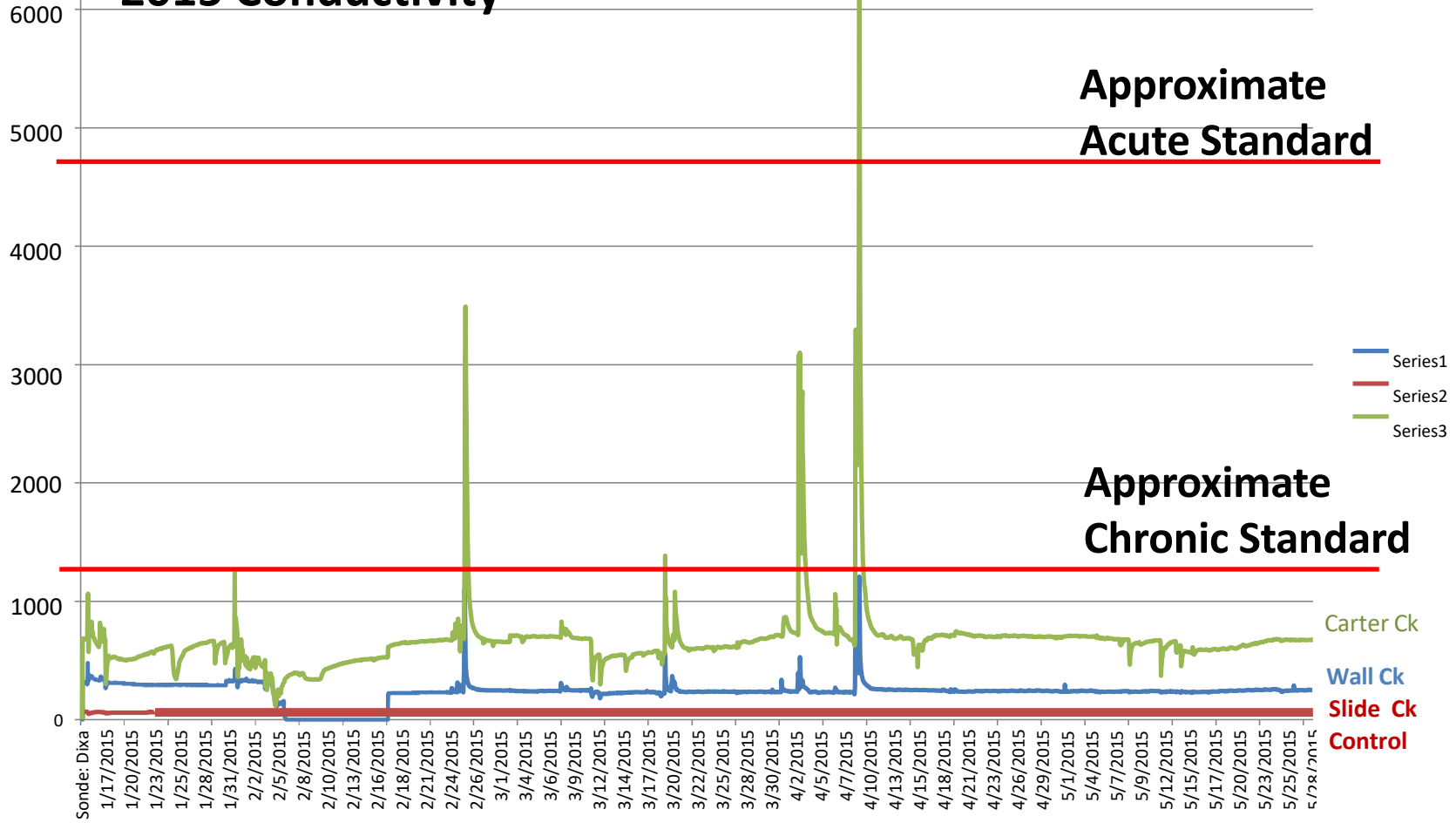


1st Generation
\$200k



2nd Generation
\$750K

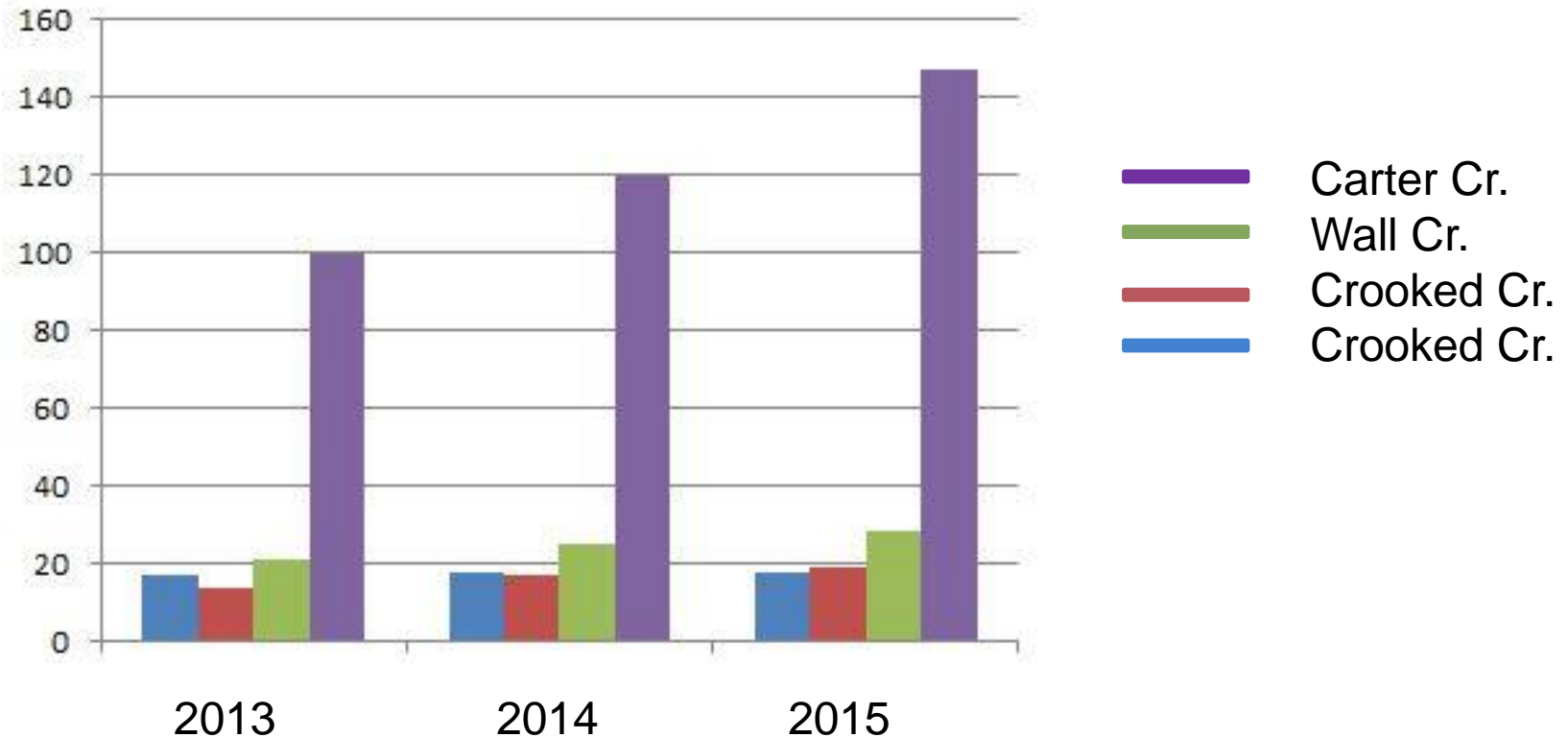
2015 Conductivity



Water Quality Analysis

Grab sample results

ppm Chloride



Questions?

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