

Appendix

Appendix A: Research Instruments

Salt Workgroup Questionnaire

Greetings,

Thanks for taking the time to speak with me today about these issues. I want begin by assuring you that all responses to these questions are completely confidential, and that no respondent can be linked to their comments, so please feel free to speak your mind.

We realize that there are varying levels of knowledge about these issues among members of the workgroup, so simply answer all the questions to the best of your knowledge. All of your opinions and perceptions on these issues are valuable.

3a Identification of specific best management practices, techniques, and technologies used to reduce the application of salt to roadways and parking lots.

- Please indicate which of the following road maintenance options you are aware of, and how much you agree that each one represents a realistic alternative for reducing the impacts of road salt use.

<i>Disagree</i>	<i>Strongly</i>	<i>Aware of?</i>		<i>Strongly</i>	<i>Agree</i>	<i>Neutral</i>		
		<i>Disagree</i>	<i>Strongly</i>	<i>Agree</i>				
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Calcium chloride (under 20 degrees)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Calcium magnesium acetate (CMA)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Liquid potassium acetate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Sodium acetate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Sodium formate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Potassium formate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Magnesium chloride	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Brine	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
New calibrated spreaders	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Ground-speed controlled spreaders	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Reduced speed limits during storms	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Roadway Weather Information Systems	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Operator training	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Pre-wetting of road surface	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Infrared road sensors	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	
Underbelly plows	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD	

- **Are there specific techniques for reducing the impacts of salt you find promising that I did not ask about? Does this relate to the main question?

- Pros/Cons

*****For top 3 options above*****

- In your opinion, why is _____ a realistic alternative for addressing issues related to salt use? (environmental issues)
 - 1)
 - 2)
 - 3)

- What are the barriers to this alternative becoming used more frequently? (ask for each)
 - 1)
 - 2)
 - 3)

*****For least approved 2 options above*****

- In your opinion what are the major issues with the two least viable alternatives (remind them of results above)?
 - 1)
 - 2)

- Are the BMPs you identified well understood among your peers?

- Where do they get their information about these alternatives?

- Are there sources of information they would not rely on?
 - Why?

- What would be the most effective way to create awareness of these types of alternatives?

3(b). Identification of behaviors of the driving public, of safety personnel, of elected officials, and of road maintenance staff relative to the application of salt to roadways and parking lots; and 3(c) Identification of target audiences and communication strategies.

On a scale of 0-5, how important are each of the following issues related to salt use and storage in efforts to reduce the impacts of salt?

	Not at all Important			Very Important		
Use of adequate storage cover	0	1	2	3	4	5
Drainage management to nearby water bodies	0	1	2	3	4	5
Direct management of runoff from storage	0	1	2	3	4	5
Establishing permanent storage facilities	0	1	2	3	4	5
Purposeful site-ing of facilities to reduce impacts from run-off	0	1	2	3	4	5
Establishing common standards for surfaces surrounding storage to enable more broadly applicable mitigation alternatives?	0	1	2	3	4	5
The amount of salt users have “left over” at the end of the year	0	1	2	3	4	5
What is done with salt “left over” at the end of the year	0	1	2	3	4	5
The ratios at which sand and salt are usually mixed	0	1	2	3	4	5
The storage of the mixed medium (salt and sand)	0	1	2	3	4	5
User’s ability to track salt use	0	1	2	3	4	5
Are there issues of concern to you related to the impacts of salt I did not ask about?(specify):						

*****For top 3 options above*****

- In your opinion, why is ____ so important for addressing issues related to salt use?
 - What are the barriers to addressing that issue? (ask for each)
 - Who is in the best position to provide that information?

What kind of training is typically given to **contractors working for DPW**?

- What are their expectations of that training (just basics, or source of new info)?

Are contractors working for DPW aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know?		
Are contractors working for DPW open to using alternatives to current practices to reduce impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i>	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed?		
What do you believe is the most effective way to provide DPW employed contractors with needed information about road salt?		

What kind of training is typically given to **DPW staff**?

- What are their expectations of that training (just basics, or source of new info)?

Are DPW staff aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know?		
Are DPW staff open to using alternatives to current practices to reduce impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i>	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed?		
What do you believe is the most effective way to provide DPW staff with needed information about road salt?		

What kind of training is typically given to **private contractors working on road and lot maintenance**?

- What are their expectations of that training (just basics, or source of new info)?

Are private contractors aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know?		
Are private contractors open to using alternatives to current practices to reduce impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i>	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed?		
What do you believe is the most effective way to provide private contractors with needed information about road salt?		

What kind of training is typically given to **safety service personnel (fire and police)** related to **surface treatment**?

- What are their expectations of that training (just basics, or source of new info)?

Is the training for safety service personnel related to surface treatment mandatory?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Typically, how often does the training take place?		
Are safety service personnel aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know?		
Do you believe safety service personnel would support alternatives to current practices to reduce the impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i>	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Other (specify under question) <input type="checkbox"/> Equal safety	
What are the barriers that need to be addressed?		
What do you believe is the most effective way to provide safety service personnel with needed information about road salt?		

What are the **general public's** expectations of road treatment?

Is there a willingness to change driving behaviors to address issues related to road salt?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does the general public have different expectations for the treatment of public roads vs. private lots?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
What are these differences? (please specify)		
To your knowledge, is there an understanding among the general public of the impacts of road salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know?		
Do you believe the public would support alternatives to current practices to reduce the impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i>	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed?		
What do you believe is the most effective way to provide the general public with needed information about road salt?		

- What are **local leaders'** expectations of road service?

Is there a belief the public would be willing to change driving behaviors to address issues related to road salt?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do leaders have different expectations for the treatment of public roads vs. private lots?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
What are these differences? (please specify)		
To your knowledge, is there an understanding among local leaders of the impacts of road salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know?		
Do you believe local leaders would support using alternatives to current practices to reduce the impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i>	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed?		
What do you believe is the most effective way to provide local leaders with needed information about road salt?		

- Of the groups we've spoken about today (professional road maintenance staff, safety service personnel, general public, local leaders) which one do you think is most important to educate on the issues related to road salt use to stimulate change in practices?
- What would you consider most important to tell them about?

3(d). Identification of feasible methods by which to obtain accurate information on salt usage for winter road maintenance by state, private, and municipal applicators.

- On a scale of 0-5, how important are each of the following sources of information used when making decisions about the application of road salt?

	Not at all Important			Very Important		
Weather reports	0	1	2	3	4	5
Communication with other road maintenance staff	0	1	2	3	4	5
Input from general public	0	1	2	3	4	5
Directives from management	0	1	2	3	4	5
Road condition reports	0	1	2	3	4	5
Personal experience	0	1	2	3	4	5
Other (please specify)	0	1	2	3	4	5
What unavailable sources of information do you wish you had? What available sources of information are unnecessary?						

- Please explain **how** you do (or would) use the sources of information described above in your decision-making processes.

To the best of your knowledge, who collects and maintains information on salt usage?		
Are you satisfied with how road salt usage data is collected and maintained?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is road salt usage data easily accessible to you?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do you find this data useful?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

- Would you suggest any changes to how road salt data is currently collected?

- Any changes to how the data is currently distributed to you?

What would be the most effective way to report road salt usage? <i>(check all that apply):</i>	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Seasonally <input type="checkbox"/> By the truckload <input type="checkbox"/> By weight <input type="checkbox"/> By roadway <input type="checkbox"/> By route <input type="checkbox"/> By time with GPS tracking on trucks <input type="checkbox"/> By total usage in each town <input type="checkbox"/> By operator <input type="checkbox"/> Other (specify at left)
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3(e). Identification of possible regulatory approaches for reducing the application of salt to roadways and parking lots, and the effects it would have on their operations

Do you think a regulatory approach to the reduction of road salt is appropriate?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Why or why not?		

If regulation of road salt takes place, how should the regulations be implemented? (<i>check all that apply</i>):	<input type="checkbox"/> At the municipal level <input type="checkbox"/> At the state level <input type="checkbox"/> At the federal level <input type="checkbox"/> On a case-by-case basis <input type="checkbox"/> Other (specify under question)
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- On a scale of 0-5, please rate the extent to which regulations aimed at reducing road salt application will impact the following:

	No Impact			High Impact		
Overall costs of de-icing	0	1	2	3	4	5
Improvement of the environment along the I-93 corridor	0	1	2	3	4	5
Public awareness of environmental impacts of road salt	0	1	2	3	4	5
Road conditions	0	1	2	3	4	5
Public support for road salt reduction	0	1	2	3	4	5
The amount of salt used	0	1	2	3	4	5
Are there any other impacts not listed above?						

- On a scale of 0-5, please rate the extent to which different types of regulations aimed at reducing road salt application would be effective:

	Not Effective						Effective					
	0	1	2	3	4	5	0	1	2	3	4	5
Registration of road salt applicators	0	1	2	3	4	5	0	1	2	3	4	5
Certification and training for salt applicators	0	1	2	3	4	5	0	1	2	3	4	5
Required reporting of salt usage by salt applicators	0	1	2	3	4	5	0	1	2	3	4	5
Required reporting of salt usage by property owners/managers	0	1	2	3	4	5	0	1	2	3	4	5
Enforcement of water quality standards for chloride	0	1	2	3	4	5	0	1	2	3	4	5
Limits to salt usage for salt applicators	0	1	2	3	4	5	0	1	2	3	4	5
Municipality based ordinances	0	1	2	3	4	5	0	1	2	3	4	5
Are there any other regulatory options you think would be effective that I did not ask about?												

- Could you suggest any alternatives to state regulation of road salt?

3(e). Identification of optimal criteria for distributing funds under the Salt Reduction Grant Program

The Federal Highway Administration received a multi-million dollar earmark for water quality improvements along the I-93 corridor. One of the tasks of the Salt Reduction Workgroup is to develop the criteria by which these funds should be allocated for chloride reduction projects.

How effective do you think it would be to distribute road salt reduction funds using each of the following methods:	Not Effective						Very Effective					
	0	1	2	3	4	5	0	1	2	3	4	5
By project?	0	1	2	3	4	5	0	1	2	3	4	5
By Town?	0	1	2	3	4	5	0	1	2	3	4	5
By Regional Planning Commission?	0	1	2	3	4	5	0	1	2	3	4	5
By County?	0	1	2	3	4	5	0	1	2	3	4	5
Are there other options or combinations that would be effective that I did not ask about?												

If the road salt reduction funds will be distributed by town, should there be:		
Equal grants for each town?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Equal base funding for each town with a competitive process for additional funding?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
A competitive process for all funding?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

- Are there other options or combinations of approaches that I did not ask about which you think would be effective?

- On a scale of 0-5, please rate the importance of each of the following criteria for distributing funds under a competitive grant application for the road salt reduction program:

	Not Important			Very Important		
Salt reduction achieved by the project(s)	0	1	2	3	4	5
Road miles to receive reduced salt	0	1	2	3	4	5
Proximity to sensitive environments	0	1	2	3	4	5
Public support	0	1	2	3	4	5
Likelihood of long-term success	0	1	2	3	4	5
Record of salt reduction activities (history of the entity)	0	1	2	3	4	5
Consistency with the TMDL Implementation Plan	0	1	2	3	4	5
Traffic volume at project site	0	1	2	3	4	5
Local financial resources / matching funds	0	1	2	3	4	5
Public opinion	0	1	2	3	4	5
Prior salt used	0	1	2	3	4	5
Are there any other criteria not listed above?						

- What, if any, additional means would you require to successfully compete for funds under the Salt Reduction Grant Program?
 - If appropriate for respondent (not state and federal folks, etc.) Do you currently have these means at your disposal?

Do you feel that road salt reduction requires resources other than money?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If so, please describe them.		

- In closing, do you have any additional comments or questions?

Demographics / Background information: Ask only if necessary

Employment sector

- NH state government – regulatory agencies
- NH state government – road maintenance
- federal government
- municipality
- private contractor
- Other (specify):

Years in their field relevant to this project:

Type of work:

- regulatory
- “on the ground” road maintenance
- transportation field professional
- Other (specify):

Thanks!

Appendix B:
Qualitative Data from Interviews with Key Informants

The following appendix contains the complete list of responses to the open ended questions on the survey, with the frequency of responses indicated after the input from respondents. The entire questionnaire is presented below to provide context for the responses.

3a Identification of specific best management practices, techniques, and technologies used to reduce the application of salt to roadways and parking lots.

- Please indicate which of the following road maintenance options you are aware of, and how much you agree that each one represents a realistic alternative for reducing the impacts of road salt use.

			<i>Aware of?</i>				
			<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Neutral</i>
Calcium chloride (under 20 degrees)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Calcium magnesium acetate (CMA)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Liquid potassium acetate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Sodium acetate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Sodium formate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Potassium formate	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Magnesium chloride	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Brine	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
New calibrated spreaders	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Ground-speed controlled spreaders	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Reduced speed limits during storms	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Roadway Weather Information Systems	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Operator training	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Pre-wetting of road surface	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Infrared road sensors	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD
Underbelly plows	<input type="checkbox"/> Yes	<input type="checkbox"/> No	SA	A	N	D	SD

- ****Are there specific techniques for reducing the impacts of salt you find promising that I did not ask about? Does this relate to the main question?**
 - Certification of operators
 - Logistics/Cost/Reluctance of operators.
 - Public education 7
 - Bus companies use on spot chains
 - Salt tracking and storage
 - Sign low salt or no salt areas
 - Mixture less salt more sand
 - Pavement heating elements

- Automatic Brine sprayers for bridges and Ramps
- 4WD
- Porous pavement
- Outfitting trucks with multiple road treatments
- Policy change
 - Delay in time tables for clear roads.
- Mount brushes on trucks.
- Salt tax
- Wireless reporting from trucks to maintenance office
- Public change behavior – drive slower

*****For top 3 options above*****

- **In your opinion, why is _____ a realistic alternative for addressing issues related to salt use? (environmental issues)**
 - Brine
 - Still a salt but more effective, limited applications 7
 - Stops hard packed snow on roads 2
 - Should be used in towns too.
 - Allows for pre-treatment to melt snow/ice
 - Spreaders: Calibrated and speed control.
 - Effective use of same or less salt 17
 - Calibrate spreaders to specific road conditions.
 - RWIS
 - Weather data guiding treatment 8.
 - Add IT Signs.
 - Reduced speed limits 14
 - With ITS Signs 2
 - Class I Highways 45 mph in storms
 - Calcium Chloride 5
 - Reasonable costs 2
 - Lower melting point when mixed with salt 2
 - Operator training 15
 - Standards for surface application rates.
 - Example of Minnesota private contractor training program
 - More training with locals and private contractors 3
 - Need buy in of operators 2
 - Underbelly plows: removes more materials 4
 - Pre-wetting on low road volumes.
 - Road sensors
 - Monitor surface temperature 4
 - CMA 2
 - Magnesium Chloride

- **What are the barriers to this alternative becoming used more frequently?
(ask for each)**
- Brine
 - Not sure of environmental impacts 2
 - Weather condition and traffic sensitive 2
 - More expensive 4
 - Requires training 5
 - Tough for towns.
 - Effectiveness 2
- Spreaders: Calibrated and speed control.
 - Cost 17
 - Education 3
 - Convincing contractors.
- RWIS
 - Cost 4
 - Might have to be site specific not route wide.
 - Not readily available (locals and privates) 6
- Reduced speed limits
 - Challenge to mandate 2
 - Enforcement 6
 - Education 2
 - Public willingness 3
 - Public has false sense of safety 2
- Calcium Chloride
 - Education 2
 - Personal bias
 - Cost 4
 - Specific equipment and handling
 - Continued Chloride contamination 4
- Operator training
 - How to distribute information
 - More difficult for small companies and towns 2
 - Reluctance to change 3
 - Staff turnover 2
 - Cost 6
 - Need incentive to train
 - User friendly
 - Time 3
 - Requests from others for salt use
 - Supervision
- Underbelly plows
 - Need a rear mounted wing to be effective
 - Rough roads are difficult to clear 2
 - Cost 2
 - Plows are too large for local roads 2

- Pre-wetting
 - Cost
- Road sensors
 - Cost
 - Awareness of technology
 - More useful for highways with consistent conditions.
- CMA
 - Cost
- Magnesium Chloride
 - Cost
 - Chloride loading?

*****For least approved 2 options above*****

- **In your opinion what are the major issues with the two least viable alternatives (remind them of results above)?**
 - Liquid Potassium Acetate
 - Cost 2
 - Environmental issues
 - Magnesium Chloride 4
 - Cost
 - Harmful
 - Effectiveness
 - Acetates
 - Not as viable because of organics and impacts 2
 - Might have other impacts
 - Cost 2
 - CMA
 - Organics would create new problems 2
 - Effectiveness 2
 - Cost 3
 - High energy input production
 - Oxygen depletion
 - Underbelly plow
 - Obstacles in road services 4
 - Used in past: don't work 2
 - Not enough pressure from plow to remove snow
 - Problems with training 2
 - Problems in municipal lots and rural roads
 - Reduced speed limits
 - Public perception of safety issues 3
 - Liability issues
 - Brine
 - Still uses lots of salt (chloride) 2
 - Not as effective 4
 - Local level equipment needs 2
 - Benefits not documented

- Calcium Chloride
 - More toxic than Chloride alone
 - No Chloride reduction 4
 - Effectiveness 2
 - Cost
 - Vehicle corrosion
- RWIS
 - Has not helped
 - Accessibility
- Chemicals
 - All seem to have down sides
- Spreaders
 - Every road is different

- **Are the BMPs you identified well understood among your peers?**
 - Yes outside of State
 - In this latitude
 - Lack details
 - Big Companies
 - Different levels of understanding 2
 - Yes 12
 - No 12
 - Not sure 8
 - Among some fire and police dept

- **Where do they get their information about these alternatives?**
 - T squared 9
 - Internet 9
 - Trade magazines 6
 - General Media
 - DOT 11
 - Snow and Ice Management Association
 - Salt Institute 2
 - Other publications
 - Public Works Association 2
 - Sales people
 - State and local authorities 2
 - Local government center 2
 - Primex
 - Municipal Management Association
 - Airport crews
 - This project
 - DES 2
 - Workshops and seminars 4
 - Newspaper
 - American Trucking Association

- Mailings 3
- Word of Mouth
- National Tank Truck Council
- Road Agents

- **Are there sources of information they would not rely on?**
 - Vendors 6
 - Salt Institute
 - DES and EPA 3
 - Outdated sources
 - Environmental organizations in general 2
 - Heavy Science sources
 - No
 - Anyone with an agenda

- **Why?**
 - Sales
 - DES not responsible for safety removed from consequences
 - Vendors are vague and push products
 - Environmental organizations grab onto concerns without understanding issues
 - Want everyday solutions and facts
 - Distrust of government agencies and inconsistent message
 - In General if well presented and unbiased people were open.

- **What would be the most effective way to create awareness of these types of alternatives?**
 - T squared
 - Training 4
 - Targeted with incentives
 - Publications 6
 - User friendly format
 - Reference specific studies
 - Units magazine (1000 plus units)
 - Get to public officials 4
 - LGC conference 2
 - DPW associations and publications 2
 - Workshops
 - Salt tax
 - Education 5
 - Kids
 - Emphasize benefits
 - Televised regional meetings 2
 - By DOT and RPCs
 - Pilot Projects involving peers in NH 6
 - Have a public works person as spokesperson 2

- Finance alternatives
- Workshops and trade shows 2
- Change the culture of the driving public
- Apartment association of NH
- With RPCs
 - Publicize data about problem
 - Statements on enforcements of standards by DES and others.
- Line of communication with municipal management association.
- International road salt symposium.
- Trade association
- Property management companies
- Local storm water management efforts
- Track down private lot maintainers during storm events.
- Use membership organizations to distribute
- State newsletter to contractors
- TV and other media
- Message IT signs.
- Safety service in this area of NH is very aware because on I-93 projects and press on brine
- Show useful info from elsewhere presented by peer in the field

3(b). Identification of behaviors of the driving public, of safety personnel, of elected officials, and of road maintenance staff relative to the application of salt to roadways and parking lots; and 3(c) Identification of target audiences and communication strategies.

On a scale of 0-5, how important are each of the following issues related to salt use and storage in efforts to reduce the impacts of salt?

	Not at all Important				Very Important		
	0	1	2	3	4	5	
Use of adequate storage cover	0	1	2	3	4	5	
Drainage management to nearby water bodies	0	1	2	3	4	5	
Direct management of runoff from storage	0	1	2	3	4	5	
Establishing permanent storage facilities	0	1	2	3	4	5	
Purposeful site-ing of facilities to reduce impacts from run-off	0	1	2	3	4	5	
Establishing common standards for surfaces surrounding storage to enable more broadly applicable mitigation alternatives?	0	1	2	3	4	5	
The amount of salt users have “left over” at the end of the year	0	1	2	3	4	5	
What is done with salt “left over” at the end of the year	0	1	2	3	4	5	
The ratios at which sand and salt are usually mixed	0	1	2	3	4	5	
The storage of the mixed medium (salt and sand)	0	1	2	3	4	5	
User’s ability to track salt use	0	1	2	3	4	5	

Are there issues of concern to you related to the impacts of salt I did not ask about?(specify):

- Cleaning up spills
- Drainage
- Tracking use (salt)
- Consider regional storage facilities
- Washing areas
- Loading areas should be covered.
- Calibration of spreaders
- Reporting salt usage (licensing)

*****For top 3 options above*****

○ **In your opinion, why is _____ so important for addressing issues related to salt use?**

- Storage cover/Permanent storage 24
 - Prevent loss of material
- Salt tracking 4
- Draining management 4
- Citing of facilities 2
- Direct management of runoff 3
- Sand/salt mix
- Left over salt
- Common standards for surfaces 2

○ **What are the barriers to addressing that issue? (ask for each)**

- Storage cover/Permanent storage
 - Cost 19
 - Local support 2
 - Private lots contract annually: leave storage to contractor.
 - Contactors are transient.
- Salt tracking
 - Time 2
 - Measurement
 - Drivers that don't care or don't want to be watched
- Draining management
 - Cost
 - Lack of information on impacts
- Citing of facilities
 - Need for sophisticated land use analysis
 - Real estate related issues
 - Availability and accessibility of appropriate areas
- Direct management of runoff
 - Cost 4
 - Space
 - Science and monitoring available

- Sand/salt mix
 - Cultural issue
- Left over salt
 - Cost
 - Tracking
- Common standards for surfaces
 - Politics
- Cost is a barrier to all issues

- **Who is in the best position to provide that information?**
 - DES 7
 - DPW 3
 - DPW foreman 2
 - DOT 5
 - State 3
 - Town
 - Public service announcements
 - Different person for different audiences
 - EPA
 - T Squared 3
 - Universities
 - Consultants
 - Planning board and planners 2
 - Politician: Not extreme environmental group.
 - County conservation committee
 - LGC meetings and documents
 - Experienced maintenance professional 2

What kind of training is typically given to contractors working for DPW?

- None 16
- Not sure 10
- Some in house 8
- T Squared Might...
- DOT training

- **What are their expectations of that training (just basics, or source of new info)?**
 - Basics 5
 - (Operations and adjustments)
 - Safety
 - Science 1
 - Not sure 2
 - Comprehensive 1

Are contractors working for DPW aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know? <ul style="list-style-type: none"> ○ Knowledge of when/ how much of specific treatments should be applied (balance of mix) 6 ○ Application of product 2 ○ Environmental impacts on water bodies 11 <ul style="list-style-type: none"> ▪ And severity ▪ Personal effect ○ Environmental impact 4 ○ Why it is an issue of concern ○ New technologies and temperature ○ How to reduce salt usage (and save \$) 4 ○ Need to have buy-in on how much environment matters ○ Town monitoring of salt use ○ Permanence of chlorine buildup ○ Why things are changing in the way treatment is handled 		
Are contractors working for DPW open to using alternatives to current practices to reduce impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i> <ul style="list-style-type: none"> ○ Handling characteristics of material ○ Equipment wear and tear ○ Equipment availability 5 ○ Requirement of contract work 4 ○ Reward system for operators ○ Training on impacts ○ Following orders 4 ○ If more efficient 2 ○ Time efficient 2 ○ Financial incentives 4 ○ Reflects well on town ○ Ease of use of alternative 	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed? <ul style="list-style-type: none"> ○ Costs 16 ○ Training 6 ○ No apparent need to change 3 ○ Driver turnover ○ Individual attitude ○ Impact on equipment 6 ○ Liability 		

<ul style="list-style-type: none"> ○ Economic incentives ○ Public road expectations ○ Less accountability ○ Awareness of salt impacts on environment ○ Client willingness ○ Requirements in contracts 2 <ul style="list-style-type: none"> ○ Pay structure ○ Seasonal nature of industry 	
<p>What do you believe is the most effective way to provide DPW employed contractors with needed information about road salt?</p> <ul style="list-style-type: none"> ○ Peers 2 ○ Orientation meetings/training/workshops 12 <ul style="list-style-type: none"> ○ Town required 5 <ul style="list-style-type: none"> ▪ Contract ○ DES ○ Handouts 2 ○ NHMTA ○ DPW 6 ○ Videos 3 ○ Professional journals and associations 2 ○ Pay increase associated with certification 2 ○ We all need to bleed the same ○ Supervisor 	

What kind of training is typically given to DPW staff?

- Not Sure 9
- None 4
- Some 1
- Comprehensive
- General In-house 5
- Maintenance and application techniques
- T Squared 13
 - When time permits
 - Road Scholars
- Certification programs though DES
- Public Works association
- Vendors
- American Public works association workshop
- DOT 2
- Public works academy

- **What are their expectations of that training (just basics, or source of new info)?**
 - New Information 7
 - Need more training
 - Basics 2
 - Basics and some new info 5
 - *** “Those that get trained are constrained in the town financially.”

Are DPW staff aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know? <ul style="list-style-type: none"> ○ Application of product 1 ○ Environmental impacts on water bodies 8 ○ Environmental impact 12 ○ Why it is an issue of concern 1 ○ New technologies and temperature 1 ○ How to reduce salt usage (and save \$) 7 ○ Need to have buy-in on how much environment matters 1 ○ Controlling runoff 1 ○ New data 1 ○ They are an integral part of the problem and the solution 1 ○ What are the alternatives 1 ○ How to convince safety services to listen 1 ○ Public safety is extremely important even in sensitive areas 1 ○ Where the violations are 1 		
Are DPW staff open to using alternatives to current practices to reduce impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i> <ul style="list-style-type: none"> ○ Better for environment and equipment overall ○ Know the sensitive areas in town ○ Told to by local leaders ○ Use existing equipment/ or equipment provided by state ○ Supervisors will support added time input or quality sacrifices 3 ○ Longer lasting effect during storm events ○ Need written guidance or documentation for treatment ○ Political will 3 ○ Education ○ Regulations or enforcement 2 ○ Pressure from residents ○ Support from safety services 	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	

<p>What are the barriers that need to be addressed?</p> <ul style="list-style-type: none"> ○ Support from town 6 ○ Education 11 <ul style="list-style-type: none"> ○ Within DPW employee needs ○ Cost 14 ○ Public opinion 3 ○ Inform people they need to stay home or go slow ○ Not empowered to try something new ○ Mindset and resistance to new things 3 ○ Time constraints ○ Safety Services ○ Ineffective alternatives 2 ○ Educate people to stay home or slow down 	
<p>What do you believe is the most effective way to provide DPW staff with needed information about road salt?</p> <ul style="list-style-type: none"> ○ Peers 7 ○ Orientation meetings/training/workshops 12 <ul style="list-style-type: none"> ○ Food and other incentives 2 ○ In house/ on road 1 ○ Handouts 2 ○ Videos 1 ○ Internet 1 ○ DES 2 ○ T Squared 9 ○ Certification program 1 ○ DOT 5 ○ Town required training 2 ○ State Agencies 1 ○ Trade association 1 	

What kind of training is typically given to private contractors working on road and lot maintenance?

- Not sure 9
- None 15
- Volunteer certification program
- Some: but not much 2
- Company trains employees 2
- Snow and Ice association might have something

What are their expectations of that training (just basics, or source of new info)?

- Not as High as DPW
- Basics on how to plow each lot
- Basic safety
- Not sure

Are private contractors aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know? <ul style="list-style-type: none"> ○ Impact of Salt Use <ul style="list-style-type: none"> ○ Environmental 9 ○ On aquatic life and fisheries 2 ○ On road surfaces 2 ○ On water 3 ○ Not Sure 2 ○ Legal Information 3 <ul style="list-style-type: none"> ○ Usage limits ○ Information on safe storage of salt ○ Property owner monitoring practices ○ Financial impacts 2 ○ When to plow and salt ○ Their role <p>Not to waste sand and salt</p>		
Are private contractors open to using alternatives to current practices to reduce impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i> <ul style="list-style-type: none"> ○ Primarily Cost Motivated 5 ○ Incentive based ○ If required by property owners 5 ○ If it effects competition 3 ○ Threat of regulation ○ Regulation 2 ○ Reduce liability ○ Alternatives available ○ Ease of application 	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed? <ul style="list-style-type: none"> ○ Communication between Contractors and Property Owners 2 ○ Difficult to track and locate ○ “Small Time” Operations ○ Training/ Education 6 ○ Perception of cost 2 ○ Liability 3 ○ Costs 6 ○ Reaching them (hard to find) 2 ○ Lack of environmental concern 2 ○ Lack of regulation ○ Property owners wishes 3 		

- Public opinion
- Regulation compliance must be feasible

What do you believe is the most effective way to provide private contractors with needed information about road salt?

- DPW
- Planning Office
- Direct Mailings 2
- Through Property Owners 7
- Develop new training network
- Training/seminars/certification/workshops 6
- Personal contact
- Top down
- Through suppliers
- Trade association 2
- Have public sector take responsibility for educating private sector
- Year round general public focus
- Newsletter
- Chamber of commerce
- Planning board
- T-Squared
- Regulation 2
- Marketing
- Incentives
- Videos

What kind of training is typically given to safety service personnel (fire and police) related to surface treatment?

- Not Sure 9
- None 23
- Districts annual meetings with state police
 - **What are their expectations of that training (just basics, or source of new info)?**
 - Share “Snow and Ice” policy with state police
 - Not sure

Is the training for safety service personnel related to surface treatment mandatory?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Typically, how often does the training take place?		
Are safety service personnel aware of the negative impacts of salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know? <ul style="list-style-type: none"> ○ Impacts on Safety ○ Laws relating to water quality 2 ○ Environmental impact 3 <ul style="list-style-type: none"> ○ On long range transportation plans ○ More salt is not always better ○ Appropriate responses to storm events 2 ○ Health impacts ○ Water quality impacts 6 ○ How and when treatment is applied ○ Effectiveness of alternative treatments 2 ○ Limits 2 ○ Don't need info because they are irrelevant 3 ○ Cost 2 ○ Safety will not be jeopardized 2 ○ Maintenance personnel doing their job based on informed methodology ○ Not interfere with DOT and DPW 		
Do you believe safety service personnel would support alternatives to current practices to reduce the impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i> <ul style="list-style-type: none"> ○ Proven Effectiveness (and timeliness) 9 ○ Political pressure ○ Awareness of alternatives ○ No incurred costs 2 ○ Safety maintained 	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Other (specify under question) <input type="checkbox"/> Equal safety	
What are the barriers that need to be addressed? <ul style="list-style-type: none"> ○ Ideas about alternative treatments ○ High expectations ○ Power and authority balance (DOT/DPW: Police) 3 <ul style="list-style-type: none"> ○ Respect for professionals expertise ○ Narrow focus on safety 7 <ul style="list-style-type: none"> ○ At troop level not higher ups 		

<ul style="list-style-type: none"> ○ Education 9 <ul style="list-style-type: none"> ○ on legal salting limit thresholds ○ Public expectations/image issues 2 ○ Change driving behavior 2 ○ Alternatives proven safe ○ Human health considerations 2 ○ They are equipped to get through tough weather 	
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What do you believe is the most effective way to provide safety service personnel with needed information about road salt?

- LGC 2
- Dept. of Safety
- Workshops/Seminars 6
- Peers or Leaders 4
- DOT follows the policy and safety is priority
- Top down (chain of command) 9
- DES
- Include them in process 2
- Training Academy 2
- Open discussion
- DPW
- Internet/e-mail 2
- News Letter (but they will not care)
- Highway safety
- DOT sheds – they tend to be critical of DOT driver responses during storms
- In service training along with other certifications and reviews annually
- At fire and police academy

What are the general public’s expectations of road treatment?

- Passable and safe within 2 hrs of storm event 2
- No need to change driving habits dependent upon weather 10
- Clear all the time 23
- 70 mph+/- always, expect to do 20 mph over speed limit at all times
- Short periods of inconvenience

Is there a willingness to change driving behaviors to address issues related to road salt?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does the general public have different expectations for the treatment of public roads vs. private lots?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

What are these differences? (please specify)

- Public roads are superior 9
- All the same 7
- Higher expectations of private lots 2
 - More foot traffic
- Cost is less apparent on Public roads
- Private owners have individual expectations 2

<ul style="list-style-type: none"> ○ State and towns responsible for roads <ul style="list-style-type: none"> ○ Supported by taxes ○ Depends on it effects them personally ○ Tax dollars go toward maintaining public roads 		
To your knowledge, is there an understanding among the general public of the impacts of road salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know? <ul style="list-style-type: none"> ○ Pressure put on DPW by these expectations ○ Environmental impact of salt use 26 <ul style="list-style-type: none"> ○ Water sources 15 ○ Fishing 3 ○ Long term issues ○ Financial issues ○ Salt can't be buffered follows gradients ○ Costs of alternatives ○ Knowledge of alternatives ○ Legal restrictions ○ Behavior impacts treatment 3 ○ Sand does not work as well as they think ○ Can impact your well ○ That it is being studied 		
Do you believe the public would support alternatives to current practices to reduce the impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i> <ul style="list-style-type: none"> ○ How alternatives can reduce impacts ○ They will not no matter what 3 ○ Convenience 2 ○ Desire to maintain environmental quality ○ If they are educated ○ If LOS improved ○ If taxes are reduced ○ Would except it 	<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)	
What are the barriers that need to be addressed? <ul style="list-style-type: none"> ○ Awareness of Salt impact 3 ○ Effort put forth by DPW etc. ○ Effectiveness of alternatives must be proven ○ Image problems 3 ○ Cost ○ Changing behavior/driving expectations 6 ○ Changes in road quality will be attributed to changes in treatment ○ Education/awareness 12 		

- Leader support
- “live free or die”
- Cost of signage
- Understanding of LOS and expectations
- General public not part of equation

What do you believe is the most effective way to provide the general public with needed information about road salt?

- Road Signs
- TV, and other media 11
- Town Meetings 2
- Websites 2
- Increase in water bills
- Ad campaign targeting drivers
- “Freshie the Frog”? 2
- Public education system (children) 3
- Newsletter 2
- Shared info on cost and tax impacts
- Police enforcement
- Legislative bodies and town staff/ local leaders 3
- Film/videos 2
- Outreach
- Electric signs 2
- Handouts at toll stations
- Tourist centers have info
- Info handed out at rest areas
- At the DMV – drivers license renewal
- Volunteer monitors to understand the impacts of salt
- Newspaper 3
- PSA’s 3
- DES
- RPC’s

- **What are local leaders’ expectations of road service?**
 - Perceive road conditions as a direct reflection of themselves 2
 - Roads should be safe and clear at all times 15
 - No complaints or accidents 7
 - Cleared in most cost effective manner 4
 - Whatever public demands 2
 - Low salt use – safe roads
 - Reasonable
 - Maintained adequately
 - DPW director decides on needs

Is there a belief the public would be willing to change driving behaviors to address issues related to road salt?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do leaders have different expectations for the treatment of public roads vs. private lots?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
What are these differences? (please specify) <ul style="list-style-type: none"> ○ Primarily concerned with public roads 15 ○ Just members of public 2 ○ Have a concern with environmental impacts of private lots ○ Same LOS for all ○ Higher LOS for their roads 		
To your knowledge, is there an understanding among local leaders of the impacts of road salt use on water quality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are they concerned?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
In your opinion, what is the most important information they should know? <ul style="list-style-type: none"> ○ Safety Information ○ Legal information 2 ○ Environmental impact 11 ○ Impacts on water quality 4 ○ Costs 4 ○ Knowledge about alternatives 5 ○ Impacts on aquatic life Change in driving conditions 		
Do you believe local leaders would support using alternatives to current practices to reduce the impacts from salt use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Under what conditions would they be willing to use alternatives? (mark all that apply) <i>Other (specify):</i> <ul style="list-style-type: none"> ○ If Alternatives promote a progressive image 2 ○ Public pressure 2 ○ If regulated ○ Impact/Safety balance ○ Cost 5 ○ If educated ○ Funding available ○ Effectiveness of alternatives proven 		
What are the barriers that need to be addressed? <ul style="list-style-type: none"> ○ Effectiveness of Alternatives must be shown 3 ○ Awareness of chloride effects ○ Expectations of roads ○ Cost 12 ○ Education 7 ○ Liability concerns 2 ○ Citizen complaints 2 ○ Safety concerns ○ Resistance to change ○ Live free or die 		
<input type="checkbox"/> Low cost <input type="checkbox"/> Equal effectiveness to current techniques <input type="checkbox"/> Awareness of negative impacts of salt use <input type="checkbox"/> Awareness of local impacts of salt use <input type="checkbox"/> Equal safety <input type="checkbox"/> Other (specify under question)		

- Changing behaviors

What do you believe is the most effective way to provide local leaders with needed information about road salt?

- Direct representation at board meetings
- Meeting/Conference/Seminar 8
- LGC 7
- Assurances that their liability is limited 2
- Newspapers 2
- Municipal organizations
- Experts
- Local science teachers and students
- DES 3
- RPCs
- DOT 3
- TV/Media 2
- Individual contact
- Internet
- DPW
- T-squared
- Certification
- Through town staff 2
- Mailings
- Regulation
- Through constituents
- NHMA/LGC conference
- Handouts
- Demonstrations
- Town/city magazine

Of the groups we've spoken about today (professional road maintenance staff, safety service personnel, general public, local leaders) which one do you think is most important to educate on the issues related to road salt use to stimulate change in practices?

- DPW 11
 - Local staff
 - Get them to accept it first and then get citizens on board
 - Then public
- Municipality
- Local Leaders 8
 - DES do education
 - Get them to accept it first and then get citizens on board
- Professional road maintenance staff 2
 - They budget, define practices, and test

- Safety Service 4
 - Police
 - Forcing over treatment
- The Public 7
 - Will put pressure on others to change
- Private Sector
- Public Works Directors
- DOT 3
 - They are out there doing it
 - Because they treat the biggest area (w/DPW)
 - Then public
- Professional staff
 - Easier to reach and they are more interested
- **What would you consider most important to tell them about?**
 - DPW
 - Need to educate others
 - Different application rates for varying conditions
 - Different means of applying and storing salt
 - They are frontline and can make changes
 - They can reduce use and reduce impacts overall
 - They will not lose jobs, it will be as effective
 - Effective alternatives with no extra effort or money
 - Rate of increase of salt in the environment and how this impacts us and water
 - Local Leaders
 - Changing the expectations for road service
 - There are effective alternatives (safe and affordable) 3
 - Environmental impacts on water (cost secondly)
 - They are in the best position to generate a culture of heightened concern of salt use on the environment and willingness to make sacrifices needed to reduce impacts
 - Alternatives for safe surfaces at reduced cost with less environmental impact
 - Professional road maintenance staff
 - Environmental impacts
 - They know the safety and operative aspects
 - How to follow regulations
 - Safety Service
 - Understand different conditions during winters
 - That publics' driving (SUVs especially) is a factor
 - Don't dwell on problems – focus on changing driving behavior to reduce problems and need for threshold
 - Alternatives can be equally effective
 - Regulatory aspects of water quality standard
 - The Public
 - The environmental damage being done 3
 - Changing the expectations for road service

- Not one approach to handle all storm types and conditions
 - Impacts on water quality (surface water, drinking water)
 - Contact local leaders – be catalysts
- Private Sector
 - Impacts of salt
 - Alternatives that exist
- Public Works Directors
 - Long term effects of salt issues
 - Need to be proactive
 - Get data out clearly
- DOT
 - Need to educate others
 - Rate of increase of salt in the environment and how this impacts us and water

3(d). Identification of feasible methods by which to obtain accurate information on salt usage for winter road maintenance by state, private, and municipal applicators.

- On a scale of 0-5, how important are each of the following sources of information used when making decisions about the application of road salt?

	Not at all Important			Very Important		
Weather reports	0	1	2	3	4	5
Communication with other road maintenance staff	0	1	2	3	4	5
Input from general public	0	1	2	3	4	5
Directives from management	0	1	2	3	4	5
Road condition reports	0	1	2	3	4	5
Personal experience	0	1	2	3	4	5
Other (please specify)	0	1	2	3	4	5
What unavailable sources of information do you wish you had?						
<ul style="list-style-type: none"> ○ MDSS 2 ○ RWIS 5 <ul style="list-style-type: none"> ○ For towns ○ Available everywhere ○ Research on alternatives <ul style="list-style-type: none"> ○ Cost and effectiveness ○ Amounts used and application rates ○ Better predictability of effectiveness of application treatment ○ Track radar on the internet 2 ○ Drive by inspection ○ Forecasts and future conditions of weather 3 ○ Infrared surface temperatures 2 ○ Constant weather reports ○ Timing – rush hour, school open/closed, etc. 						

- Police incident reports 3
 - Feedback from safety services (local police) gives DPW heads up
- Road conditions and weather information easily available in the truck not office
- GPS in trucks to track location and salt used
- Computer access at the shed
- Samples of BMPs from where successful and money they are saving

What available sources of information are unnecessary?

- Safety service input 2
 - Emotionally charged information
- Citizen reports (calls from public) 2

○ Please explain how you do (or would) use the sources of information described above in your decision-making processes.

- GPS in trucks
 - Weather reports to decide on pre-test and clean up at the end
- Research on alternatives/RWIS for towns
 - Look at pilot programs
 - Small scale pilots to try different approaches
- MDSS
 - Devise plan and stick with it for each storm with as little resources a possible
 - Lots of variable to be considered
 - Look for positive approaches with reduced impacts
- RWIS AND MDSS
 - rely on expert decision programs
- Track radar on internet/drive by inspection
 - play by ear
- RWIS/pavement temp reader/police incident reports
 - pre-test them adjust plan based on weather and changing conditions
- Road conditions and weather information in truck
 - after looking decide
- Computer access at shed
 - Check weather, look at roads, determine treatment approach
- Safety service feedback
 - Police get you out(?), look at weather, use personal experience
- Live radar on computer
 - Listen to local and regional weather, develop treatment plan, start treating when roads are wet, treat again after scraping snow off, sand for places if too cold for salt
- Weather
 - Check weather on TV, visual on town roads
- None
 - Staff communicate then visit lot to decide on treatment
 - Look at time and temp of storm, where it will hit, LOS on roads, long term storm conditions, very storm specific

To the best of your knowledge, who collects and maintains information on salt usage?

- DOT 12
 - Foreman (collected by loader full)
- DPW 16
 - Director 2
 - How much purchased 2
 - maybe
- Private Contractor 2
 - For our use
- Road/Highway Agent 4
- DES 2
 - maybe
- Supervisors within company (maybe)
- State Agencies
- Salt institute on (Wet Land?)
- Private lot owners
- Some towns
- No one

Are you satisfied with how road salt usage data is collected and maintained?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is road salt usage data easily accessible to you?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Do you find this data useful?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

○ Would you suggest any changes to how road salt data is currently collected?

- State website on usage
- Report purchase and usage annually to DES by law
- Report to local officials more often
- Only as regulations increase
- Collect it geographically
- How, when, what was used 2
 - Inform public
- More accurately tracked
- Uniform recording 2
 - More accessible and transparent format
- Automate collection through scales, GPS, etc.
- Automated tracking 2
 - Maine registers each truck when it returns to shed, automatically download salt data
- NO 8
 - Current system is working
- Annual purchase/leftover amount
- Town record keeping by trip or trucks
- Scale/weight each truck
- How standard of equipment with new detailed info on usage

- **Any changes to how the data is currently distributed to you?**
 - No 9
 - Electronically 5
 - On web and up to date
 - E-mail
 - Broken down by town and watershed
 - Need to get municipal and private lots
 - NHSalt.gov website
 - Available to public 3
 - GIS shape files
 - By Route
 - Share surface temperature and treatment needs from DOT with private folks – look for trends

<p>What would be the most effective way to report road salt usage? (check all that apply):</p> <ul style="list-style-type: none"> ○ Storm event 7 <ul style="list-style-type: none"> ○ Time interval ○ Link with weather index to normalize the data ○ Square foot or linear mile of road <ul style="list-style-type: none"> ○ Ton per miles and compare to suggested standards ○ Watershed 2 ○ Pilot study areas (if on trial basis) ○ Daily ○ Weight and volume ○ Annually 4 ○ Automate 2 ○ Route (and trip by locals) ○ Statewide standard format for collection of information ○ Sheds by the day ○ Districts by the week ○ Loaders track automated, then compare to calibrated spreaders then download data electronically ○ No effective way because contractors will not take extra steps 	<ul style="list-style-type: none"> <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Seasonally <input type="checkbox"/> By the truckload <input type="checkbox"/> By weight <input type="checkbox"/> By roadway <input type="checkbox"/> By route <input type="checkbox"/> By time with GPS tracking on trucks <input type="checkbox"/> By total usage in each town <input type="checkbox"/> By operator <input type="checkbox"/> Other (specify at left)
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3(e). Identification of possible regulatory approaches for reducing the application of salt to roadways and parking lots, and the effects it would have on their operations

Do you think a regulatory approach to the reduction of road salt is appropriate?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Why or why not?</p> <p><u>NO</u></p> <ul style="list-style-type: none"> ○ Compromises safety ○ Don't know enough about problem ○ Every town is different 2 <ul style="list-style-type: none"> ○ Different impacts on resources ○ Salt used to provide expected LOS of roads, must reduce expectations first ○ Don't need extra government 2 ○ Educate instead 3 ○ Depends on how salt use is tracked ○ Not practical because of magnitude ○ Not pass in NH <p><u>YES</u></p> <ul style="list-style-type: none"> ○ Provides framework/guidelines 3 ○ But public safety needs to be maintained ○ Regulations with incentives of some kind to work 3 <ul style="list-style-type: none"> ○ Mostly for private lots and to track usage ○ Penalties for violators 2 <ul style="list-style-type: none"> ○ steep fines ○ Free them from liability ○ Needed to make change 4 <ul style="list-style-type: none"> ○ Justifies change to constituents ○ Private sector needs regulations to change ○ For protection of drinking water supplies ○ Water quality ○ Importance of environment ○ To comply with storm water regulations 2 ○ Public wellbeing ○ Most effective ○ Will it be considered an unfunded mandate? ○ Delivery needs to be better from state level ○ Not as necessary for state <p><u>Maybe</u></p> <ul style="list-style-type: none"> ○ Legislative body would support if benefits outweigh costs ○ Concern with how it will be enforced ○ Bigger contractors hit hardest 		

<p>If regulation of road salt takes place, how should the regulations be implemented? (<i>check all that apply</i>):</p> <ul style="list-style-type: none"> ○ Where there are problems/violations and needs 3 <ul style="list-style-type: none"> ○ Impaired watershed 2 ○ Town ordinances <ul style="list-style-type: none"> ○ With enabling legislation from state 2 ○ Regulate state DOT rather than locals ○ Allow adjustment locally ○ Not work at local level ○ Partnership ○ Too much variation locally ○ More watershed specific ○ More from state and them local ○ State with minimum role ○ Federal level, then down to lower level ○ Do a pilot project in the I-93 watersheds ○ State or regional so clients understand what the requirements are ○ Enforcement costs needed ○ Based on topography 	<ul style="list-style-type: none"> <input type="checkbox"/> At the municipal level <input type="checkbox"/> At the state level <input type="checkbox"/> At the federal level <input type="checkbox"/> On a case-by-case basis <input type="checkbox"/> Other (specify under question)
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- On a scale of 0-5, please rate the extent to which regulations aimed at reducing road salt application will impact the following:

	No Impact			High Impact		
	0	1	2	3	4	5
Overall costs of de-icing	0	1	2	3	4	5
Improvement of the environment along the I-93 corridor	0	1	2	3	4	5
Public awareness of environmental impacts of road salt	0	1	2	3	4	5
Road conditions	0	1	2	3	4	5
Public support for road salt reduction	0	1	2	3	4	5
The amount of salt used	0	1	2	3	4	5
<p>Are there any other impacts not listed above?</p> <ul style="list-style-type: none"> ○ Future road and lot growth 2 <ul style="list-style-type: none"> ▪ lot construction prohibited because of treatment ○ DES role in enforcement ○ Use of water softeners ○ Alter planning process in towns – role of planning board key ○ Public support could have adverse impact, create human cry 						

- On a scale of 0-5, please rate the extent to which different types of regulations aimed at reducing road salt application would be effective:

	Not Effective					
	0	1	2	3	4	5
Registration of road salt applicators	0	1	2	3	4	5
Certification and training for salt applicators	0	1	2	3	4	5
Required reporting of salt usage by salt applicators	0	1	2	3	4	5
Required reporting of salt usage by property owners/managers	0	1	2	3	4	5
Enforcement of water quality standards for chloride	0	1	2	3	4	5
Limits to salt usage for salt applicators	0	1	2	3	4	5
Municipality based ordinances	0	1	2	3	4	5
Are there any other regulatory options you think would be effective that I did not ask about?						
<ul style="list-style-type: none"> ○ Promote alternatives that are economically viable ○ Water softener regulations 2 ○ TMDL allocation ○ Report sand, salt, and chemical usage ○ Limit liability ○ DOT, towns, and private all treated the same ○ Sodium levels for water table 						

- **Could you suggest any alternatives to state regulation of road salt?**
 - Incentive systems 3
 - Education 8
 - Local regulations 2
 - Voluntary cutbacks 2
 - RPCs could collect data for DES
 - Behavior modification 4
 - Give contractors practical application rates
 - Enforcement of chloride standards for water
 - Chains on tires
 - Pilot program

3(e). Identification of optimal criteria for distributing funds under the Salt Reduction Grant Program

The Federal Highway Administration received a multi-million dollar earmark for water quality improvements along the I-93 corridor. One of the tasks of the Salt Reduction Workgroup is to develop the criteria by which these funds should be allocated for chloride reduction projects.

How effective do you think it would be to distribute road salt reduction funds using each of the following methods:	Not Effective					Very Effective
By project?	0	1	2	3	4	5
By Town?	0	1	2	3	4	5
By Regional Planning Commission?	0	1	2	3	4	5
By County?	0	1	2	3	4	5
Are there other options or combinations that would be effective that I did not ask about? <ul style="list-style-type: none"> ○ Pilot Programs 2 ○ Grant funds ○ Targeted approaches ○ RPC education program and regulation ○ By watershed or water body 2 ○ Factor in political environment ○ Incentives ○ Have the DOT work on their reduction then have multi-town areas focus on group efforts over a multi-year period 						

If the road salt reduction funds will be distributed by town, should there be:		
Equal grants for each town?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Equal base funding for each town with a competitive process for additional funding?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
A competitive process for all funding?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

- **Are there other options or combinations of approaches that I did not ask about which you think would be effective?**
 - Calculation of road miles per town and the bodies of water closest to I-93
 - Focus on most critical roads
 - High risk watersheds 2
 - By resource agency
 - Funding private entities
 - Funding for towns based on population, impact on resources, or funding available
 - Hiring a center like T-squared to train and design operations
 - Need based 2
 - basic funding – second allotment by road miles
 - by road miles 4
 - Look with areas with greatest and fund them

- On a scale of 0-5, please rate the importance of each of the following criteria for distributing funds under a competitive grant application for the road salt reduction program:

	Not Important			Very Important		
Salt reduction achieved by the project(s)	0	1	2	3	4	5
Road miles to receive reduced salt	0	1	2	3	4	5
Proximity to sensitive environments	0	1	2	3	4	5
Public support	0	1	2	3	4	5
Likelihood of long-term success	0	1	2	3	4	5
Record of salt reduction activities (history of the entity)	0	1	2	3	4	5
Consistency with the TMDL Implementation Plan	0	1	2	3	4	5
Traffic volume at project site	0	1	2	3	4	5
Local financial resources / matching funds	0	1	2	3	4	5
Public opinion	0	1	2	3	4	5
Prior salt used	0	1	2	3	4	5
Are there any other criteria not listed above?						

- **What, if any, additional means would you require to successfully compete for funds under the Salt Reduction Grant Program?**
 - Awareness 3
 - State Agency Assistance
 - None 7
 - Need for grant writers 2
 - General technical assistance 2
 - Proving benefits 3
 - Equipment needs
 - An engineer to educate on storing
 - Expertise on calculating salt use

Do you feel that road salt reduction requires resources other than money?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If so, please describe them. <ul style="list-style-type: none"> ○ Education 12 ○ Public Awareness 12 ○ Cooperation from employers ○ Regulation 2 ○ General mindset/ public driving behavior change 3 ○ Knowledge on practices ○ Meaningful discussion ○ Political will 6 ○ Rethinking of safety and emergency criteria ○ Restriction of driving habits during storm events ○ Time 2 ○ Input from private sector 		

<ul style="list-style-type: none"> ○ Bulk contracts for alternatives ○ Improved communication with private contractors ○ Experts (for training) ○ Proven economic benefits ○ Regulators buy-in (willingness to follow through with regulation) ○ Direct mailings ○ Online resources ○ Publications in newspapers/magazines/trade publications ○ Planning ○ Infrastructure changes ○ By-in of leadership 2 	
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- **In closing, do you have any additional comments or questions?**
 - Add 5 cents to gas tax to pay for alternatives
 - No regulation without long term funding
 - Automatic place sensors
 - Be pragmatic, gradual change is needed
 - Private contractors will be biggest hurdle
 - Need to spread environmental impact data
 - Leadership
 - There must be regulation and enforcement
 - EPA and DES should have acted on this issue much sooner.
 - Work with private contractors on special equipment
 - Need records of salt usage
 - Roads need to have consistent conditions (not different from town to town)
 - This should be targeted to sensitive areas
 - Be aware of politics
 - Pilot programs are needed to prove effectiveness

Appendix C: Survey Results and Analyses:
Frequency Tables and Bivariate Analyses

Frequency Tables - All Questionnaire Items

road maintenance - aware of calcium chloride (under 20 degrees)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	35	97.2	97.2	97.2
	no	1	2.8	2.8	100.0
	Total	36	100.0	100.0	

road maintenance - aware of calcium magnesium acetate (CMA)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	24	66.7	66.7	66.7
	no	12	33.3	33.3	100.0
	Total	36	100.0	100.0	

road maintenance - aware of liquid potassium acetate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	17	47.2	47.2	47.2
	no	19	52.8	52.8	100.0
	Total	36	100.0	100.0	

road maintenance - aware of sodium acetate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	9	25.0	25.7	25.7
	no	26	72.2	74.3	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

road maintenance - aware of sodium formate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	5.6	5.7	5.7
	no	33	91.7	94.3	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

road maintenance - aware of potassium formate

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	3	8.3	8.6	8.6
no	32	88.9	91.4	100.0
Total	35	97.2	100.0	
Missing	1	2.8		
Total	36	100.0		

road maintenance - aware of magnesium chloride

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	25	69.4	71.4	71.4
no	10	27.8	28.6	100.0
Total	35	97.2	100.0	
Missing	1	2.8		
Total	36	100.0		

road maintenance - aware of brine

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	36	100.0	100.0	100.0

road maintenance - aware of new calibrated spreaders

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	32	88.9	88.9	88.9
no	4	11.1	11.1	100.0
Total	36	100.0	100.0	

road maintenance - aware of ground-speed controlled spreaders

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	30	83.3	83.3	83.3
no	6	16.7	16.7	100.0
Total	36	100.0	100.0	

road maintenance - aware of reduced speed limits during storms

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	33	91.7	97.1	97.1
no	1	2.8	2.9	100.0
Total	34	94.4	100.0	
Missing	2	5.6		
Total	36	100.0		

road maintenance - aware of roadway wether information systems

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	25	69.4	75.8	75.8
no	8	22.2	24.2	100.0
Total	33	91.7	100.0	
Missing	3	8.3		
Total	36	100.0		

road maintenance - aware of operator training

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	35	97.2	97.2	97.2
no	1	2.8	2.8	100.0
Total	36	100.0	100.0	

road maintenance - aware of pre-wetting of road surface

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	25	69.4	75.8	75.8
no	8	22.2	24.2	100.0
Total	33	91.7	100.0	
Missing	3	8.3		
Total	36	100.0		

road maintenance - aware of infrared road sensors

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	22	61.1	66.7	66.7
no	11	30.6	33.3	100.0
Total	33	91.7	100.0	
Missing	3	8.3		
Total	36	100.0		

road maintenance - aware of underbelly plows

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	25	69.4	73.5	73.5
	no	9	25.0	26.5	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

realistic alternative - calcium chloride

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	5.6	5.6	5.6
	agree	15	41.7	41.7	47.2
	neutral	8	22.2	22.2	69.4
	disagree	10	27.8	27.8	97.2
	NA	1	2.8	2.8	100.0
	Total	36	100.0	100.0	

realistic alternative - calcium magnesium acetate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	4	11.1	11.4	11.4
	neutral	13	36.1	37.1	48.6
	disagree	9	25.0	25.7	74.3
	NA	9	25.0	25.7	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

realistic alternative - liquid potassium acetate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	2	5.6	5.7	5.7
	neutral	13	36.1	37.1	42.9
	disagree	4	11.1	11.4	54.3
	NA	16	44.4	45.7	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

realistic alternative - sodium acetate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	1	2.8	2.9	2.9
	neutral	6	16.7	17.1	20.0
	disagree	3	8.3	8.6	28.6
	NA	25	69.4	71.4	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

realistic alternative - sodium formate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	4	11.1	11.4	11.4
	NA	31	86.1	88.6	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

realistic alternative - potassium formate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neutral	4	11.1	11.4	11.4
	NA	31	86.1	88.6	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

realistic alternative - magnesium chloride

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	agree	6	16.7	17.6	17.6
	neutral	13	36.1	38.2	55.9
	disagree	5	13.9	14.7	70.6
	NA	10	27.8	29.4	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

realistic alternative - brine

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	4	11.1	11.1	11.1
	agree	17	47.2	47.2	58.3
	neutral	9	25.0	25.0	83.3
	disagree	5	13.9	13.9	97.2
	strongly disagree	1	2.8	2.8	100.0
	Total	36	100.0	100.0	

realistic alternative - new calibrated spreaders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	14	38.9	43.8	43.8
	agree	11	30.6	34.4	78.1
	neutral	3	8.3	9.4	87.5
	disagree	1	2.8	3.1	90.6
	NA	3	8.3	9.4	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

realistic alternative - ground-speed controlled spreaders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	16	44.4	51.6	51.6
	agree	6	16.7	19.4	71.0
	neutral	3	8.3	9.7	80.6
	disagree	1	2.8	3.2	83.9
	NA	5	13.9	16.1	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

realistic alternative - reduced speed limits during storms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	13	36.1	41.9	41.9
	agree	13	36.1	41.9	83.9
	neutral	2	5.6	6.5	90.3
	disagree	3	8.3	9.7	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

realistic alternative - roadway weather information systems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	9	25.0	28.1	28.1
	agree	11	30.6	34.4	62.5
	neutral	2	5.6	6.3	68.8
	disagree	2	5.6	6.3	75.0
	NA	8	22.2	25.0	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

realistic alternative - operator training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	25	69.4	75.8	75.8
	agree	7	19.4	21.2	97.0
	neutral	1	2.8	3.0	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

realistic alternative - pre-wetting road surface

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	5	13.9	15.6	15.6
	agree	10	27.8	31.3	46.9
	neutral	10	27.8	31.3	78.1
	disagree	2	5.6	6.3	84.4
	NA	5	13.9	15.6	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

realistic alternative - infrared road sensors

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	8	22.2	25.0	25.0
	agree	11	30.6	34.4	59.4
	neutral	3	8.3	9.4	68.8
	disagree	1	2.8	3.1	71.9
	NA	9	25.0	28.1	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

realistic alternative - underbelly plows

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	8.3	9.1	9.1
	agree	11	30.6	33.3	42.4
	neutral	5	13.9	15.2	57.6
	disagree	6	16.7	18.2	75.8
	strongly disagree	1	2.8	3.0	78.8
	NA	7	19.4	21.2	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

salt use and storage - use of adequate storage cover

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	2.8	2.9	2.9
	4	6	16.7	17.6	20.6
	5-Very important	27	75.0	79.4	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

salt use and storage - drainage management to nearby water bodies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	2	5.6	6.1	6.1
	4	10	27.8	30.3	36.4
	5-Very important	21	58.3	63.6	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

salt use and storage - direct management of runoff from storage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-Not at all important	1	2.8	3.0	3.0
	3	2	5.6	6.1	9.1
	4	7	19.4	21.2	30.3
	5-Very important	23	63.9	69.7	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

salt use and storage - establishing permanent storage facilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	3.0	3.0
	3	4	11.1	12.1	15.2
	4	6	16.7	18.2	33.3
	5-Very important	22	61.1	66.7	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

salt use and storage - purposeful site-ing of facilities to reduce impacts from run-off

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	3.1	3.1
	3	5	13.9	15.6	18.8
	4	7	19.4	21.9	40.6
	5-Very important	19	52.8	59.4	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

salt use and storage - establish common standards for surfaces surrounding storage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	3.2	3.2
	3	7	19.4	22.6	25.8
	4	11	30.6	35.5	61.3
	5-Very important	12	33.3	38.7	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

salt use and storage - amount of salt users have left over at end of year

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-Not at all important	1	2.8	3.2	3.2
	1	7	19.4	22.6	25.8
	2	6	16.7	19.4	45.2
	3	7	19.4	22.6	67.7
	4	6	16.7	19.4	87.1
	5-Very important	4	11.1	12.9	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

salt use and storage - what is done with left over salt at end of year

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-Not at all important	1	2.8	3.2	3.2
	1	4	11.1	12.9	16.1
	2	1	2.8	3.2	19.4
	3	2	5.6	6.5	25.8
	4	7	19.4	22.6	48.4
	5-Very important	16	44.4	51.6	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

salt use and storage - ratio at which sand and salt are usually mixed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-Not at all important	1	2.8	3.7	3.7
	1	3	8.3	11.1	14.8
	2	1	2.8	3.7	18.5
	3	3	8.3	11.1	29.6
	4	11	30.6	40.7	70.4
	5-Very important	8	22.2	29.6	100.0
	Total	27	75.0	100.0	
Missing		9	25.0		
Total		36	100.0		

salt use and storage - storage of mixed medium (salt and sand)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	3	8.3	10.0	10.0
	4	7	19.4	23.3	33.3
	5-Very important	20	55.6	66.7	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

salt use and storage - user's ability to track salt use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	3.1	3.1
	3	7	19.4	21.9	25.0
	4	13	36.1	40.6	65.6
	5-Very important	11	30.6	34.4	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

DPW contractors - aware of the negative impacts of salt use on water quality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	6	16.7	20.0	20.0
	no	20	55.6	66.7	86.7
	maybe	2	5.6	6.7	93.3
	not sure	2	5.6	6.7	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

DPW contractors - are they concerned?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	3	8.3	10.0	10.0
	no	7	19.4	23.3	33.3
	maybe	2	5.6	6.7	40.0
	NA	18	50.0	60.0	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

DPW contractors - open to using alternatives to current practices to reduce impacts from salt use?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	22	61.1	75.9	75.9
	no	3	8.3	10.3	86.2
	maybe	3	8.3	10.3	96.6
	not sure	1	2.8	3.4	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

DPW contractors - under what conditions would be willing to use alternatives? low cost

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	20	55.6	80.0	80.0
	no	5	13.9	20.0	100.0
	Total	25	69.4	100.0	
Missing		11	30.6		
Total		36	100.0		

DPW contractors - under what conditions would be willing to use alternatives? equal effectiveness to current techniques

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	17	47.2	68.0	68.0
	no	8	22.2	32.0	100.0
	Total	25	69.4	100.0	
Missing		11	30.6		
Total		36	100.0		

DPW contractors - under what conditions would be willing to use alternatives? awareness of negative impacts of salt use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	40.0	40.0
	no	15	41.7	60.0	100.0
	Total	25	69.4	100.0	
Missing		11	30.6		
Total		36	100.0		

DPW contractors - under what conditions would be willing to use alternatives? awareness of local impacts of salt use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	9	25.0	36.0	36.0
	no	16	44.4	64.0	100.0
	Total	25	69.4	100.0	
Missing		11	30.6		
Total		36	100.0		

DPW contractors - under what conditions would be willing to use alternatives? equal safety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	19	52.8	76.0	76.0
	no	6	16.7	24.0	100.0
	Total	25	69.4	100.0	
Missing		11	30.6		
Total		36	100.0		

DPW contractors - under what conditions would be willing to use alternatives? other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	5	13.9	20.0	20.0
no	20	55.6	80.0	100.0
Total	25	69.4	100.0	
Missing	11	30.6		
Total	36	100.0		

DPW staff - aware of the negative impacts of salt use on water quality?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	23	63.9	74.2	74.2
no	5	13.9	16.1	90.3
maybe	3	8.3	9.7	100.0
Total	31	86.1	100.0	
Missing	5	13.9		
Total	36	100.0		

DPW staff - are they concerned?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	16	44.4	53.3	53.3
no	7	19.4	23.3	76.7
maybe	2	5.6	6.7	83.3
not sure	1	2.8	3.3	86.7
NA	4	11.1	13.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

DPW staff - open to using alternatives to current practices to reduce impacts from salt use?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	28	77.8	90.3	90.3
no	1	2.8	3.2	93.5
not sure	2	5.6	6.5	100.0
Total	31	86.1	100.0	
Missing	5	13.9		
Total	36	100.0		

DPW staff - under what conditions would be willing to use alternatives? low cost

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	24	66.7	80.0	80.0
no	6	16.7	20.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

DPW staff - under what conditions would be willing to use alternatives? equal effectiveness to current techniques

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	27	75.0	90.0	90.0
no	3	8.3	10.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

DPW staff - under what conditions would be willing to use alternatives? awareness of negative impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	18	50.0	60.0	60.0
no	12	33.3	40.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

DPW staff - under what conditions would be willing to use alternatives? awareness of local impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	18	50.0	60.0	60.0
no	12	33.3	40.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

DPW staff - under what conditions would be willing to use alternatives? equal safety

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	26	72.2	86.7	86.7
no	4	11.1	13.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

DPW staff - under what conditions would be willing to use alternatives? other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	3	8.3	10.0	10.0
no	27	75.0	90.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

Private contractors - aware of the negative impacts of salt use on water quality?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	3	8.3	11.1	11.1
no	20	55.6	74.1	85.2
maybe	4	11.1	14.8	100.0
Total	27	75.0	100.0	
Missing	9	25.0		
Total	36	100.0		

Private contractors - are they concerned?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	1	2.8	4.2	4.2
no	8	22.2	33.3	37.5
maybe	1	2.8	4.2	41.7
NA	14	38.9	58.3	100.0
Total	24	66.7	100.0	
Missing	12	33.3		
Total	36	100.0		

Private contractors - open to using alternatives to current practices to reduce impacts from salt use?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	14	38.9	60.9	60.9
no	5	13.9	21.7	82.6
maybe	3	8.3	13.0	95.7
not sure	1	2.8	4.3	100.0
Total	23	63.9	100.0	
Missing	13	36.1		
Total	36	100.0		

Private contractors - under what conditions would be willing to use alternatives? low cost

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	24	66.7	100.0	100.0
Missing	12	33.3		
Total	36	100.0		

Private contractors - under what conditions would be willing to use alternatives? equal effectiveness to current techniques

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	18	50.0	75.0	75.0
no	6	16.7	25.0	100.0
Total	24	66.7	100.0	
Missing	12	33.3		
Total	36	100.0		

Private contractors - under what conditions would be willing to use alternatives? awareness of negative impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	5	13.9	20.8	20.8
no	19	52.8	79.2	100.0
Total	24	66.7	100.0	
Missing	12	33.3		
Total	36	100.0		

Private contractors - under what conditions would be willing to use alternatives? awareness of local impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	4	11.1	16.7	16.7
no	20	55.6	83.3	100.0
Total	24	66.7	100.0	
Missing	12	33.3		
Total	36	100.0		

Private contractors - under what conditions would be willing to use alternatives? equal safety

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	16	44.4	66.7	66.7
no	8	22.2	33.3	100.0
Total	24	66.7	100.0	
Missing	12	33.3		
Total	36	100.0		

Private contractors - under what conditions would be willing to use alternatives? other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	1	2.8	4.2	4.2
no	23	63.9	95.8	100.0
Total	24	66.7	100.0	
Missing	12	33.3		
Total	36	100.0		

Safety service personnel - is training related to surface treatment mandatory?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid no	1	2.8	100.0	100.0
Missing	35	97.2		
Total	36	100.0		

Safety service personnel - aware of the negative impacts of salt use on water quality?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	9	25.0	30.0	30.0
no	19	52.8	63.3	93.3
maybe	1	2.8	3.3	96.7
not sure	1	2.8	3.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

Safety service personnel - are they concerned?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	11.1	13.8	13.8
	no	6	16.7	20.7	34.5
	NA	19	52.8	65.5	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Safety service personnel - do you believe ssp would support alternatives to current practices to reduce impacts from salt use?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	23	63.9	79.3	79.3
	no	3	8.3	10.3	89.7
	maybe	1	2.8	3.4	93.1
	not sure	2	5.6	6.9	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Safety service personnel - under what conditions would be willing to use alternatives? low cost

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	11.1	13.8	13.8
	no	25	69.4	86.2	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Safety service personnel - under what conditions would be willing to use alternatives? equal effectiveness to current techniques

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	24	66.7	82.8	82.8
	no	5	13.9	17.2	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Safety service personnel - under what conditions would be willing to use alternatives? awareness of negative impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	2	5.6	6.9	6.9
no	27	75.0	93.1	100.0
Total	29	80.6	100.0	
Missing	7	19.4		
Total	36	100.0		

Safety service personnel - under what conditions would be willing to use alternatives? awareness of local impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	5	13.9	17.2	17.2
no	24	66.7	82.8	100.0
Total	29	80.6	100.0	
Missing	7	19.4		
Total	36	100.0		

Safety service personnel - under what conditions would be willing to use alternatives? equal safety

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	26	72.2	89.7	89.7
no	3	8.3	10.3	100.0
Total	29	80.6	100.0	
Missing	7	19.4		
Total	36	100.0		

Safety service personnel - under what conditions would be willing to use alternatives? other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	4	11.1	13.8	13.8
no	24	66.7	82.8	96.6
10	1	2.8	3.4	100.0
Total	29	80.6	100.0	
Missing	7	19.4		
Total	36	100.0		

General public - willingness to change driving behaviors to address issues related to road salt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	31.3	31.3
	no	20	55.6	62.5	93.8
	maybe	1	2.8	3.1	96.9
	not sure	1	2.8	3.1	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

General public - have different expectations for the treatment of public roads vs. private lots?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	15	41.7	50.0	50.0
	no	14	38.9	46.7	96.7
	not sure	1	2.8	3.3	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

General public - to your knowledge, is there understanding among the gen public of the impacts of road salt on water quality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	30.3	30.3
	no	20	55.6	60.6	90.9
	maybe	2	5.6	6.1	97.0
	not sure	1	2.8	3.0	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

General public - are they concerned?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	11.1	12.1	12.1
	no	11	30.6	33.3	45.5
	maybe	1	2.8	3.0	48.5
	NA	17	47.2	51.5	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

General public - believe they would support alternatives to current practices?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	25	69.4	83.3	83.3
no	3	8.3	10.0	93.3
maybe	1	2.8	3.3	96.7
not sure	1	2.8	3.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

General public - under what conditions would be willing to use alternatives? low cost

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	14	38.9	46.7	46.7
no	16	44.4	53.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

General public - under what conditions would be willing to use alternatives? equal effectiveness to current techniques

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	24	66.7	80.0	80.0
no	6	16.7	20.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

General public - under what conditions would be willing to use alternatives? awareness of negative impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	16	44.4	53.3	53.3
no	14	38.9	46.7	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

General public - under what conditions would be willing to use alternatives? awareness of local impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	17	47.2	56.7	56.7
no	13	36.1	43.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

General public - under what conditions would be willing to use alternatives? equal safety

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	24	66.7	80.0	80.0
no	6	16.7	20.0	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

General public - under what conditions would be willing to use alternatives? other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	2	5.6	6.7	6.7
no	28	77.8	93.3	100.0
Total	30	83.3	100.0	
Missing	6	16.7		
Total	36	100.0		

Local leaders - believe public would be willing to change driving behaviors to address issues related to road salt?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	4	11.1	17.4	17.4
no	16	44.4	69.6	87.0
maybe	2	5.6	8.7	95.7
not sure	1	2.8	4.3	100.0
Total	23	63.9	100.0	
Missing	13	36.1		
Total	36	100.0		

Local leaders - have different expectations for the treatment of public roads vs. private lots?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	20	55.6	74.1	74.1
	no	6	16.7	22.2	96.3
	maybe	1	2.8	3.7	100.0
	Total	27	75.0	100.0	
Missing		9	25.0		
Total		36	100.0		

Local leaders - to your knowledge, is there understanding among local leaders of the impacts of road salt use on water quality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	12	33.3	41.4	41.4
	no	12	33.3	41.4	82.8
	maybe	4	11.1	13.8	96.6
	not sure	1	2.8	3.4	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Local leaders - are they concerned?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	34.5	34.5
	no	4	11.1	13.8	48.3
	maybe	1	2.8	3.4	51.7
	NA	14	38.9	48.3	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Local leaders - believe they would support alternatives to current practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	24	66.7	92.3	92.3
	no	2	5.6	7.7	100.0
	Total	26	72.2	100.0	
Missing		10	27.8		
Total		36	100.0		

Local leaders - under what conditions would be willing to use alternatives? low cost

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	27	75.0	96.4	96.4
no	1	2.8	3.6	100.0
Total	28	77.8	100.0	
Missing	8	22.2		
Total	36	100.0		

Local leaders - under what conditions would be willing to use alternatives? equal effectiveness to current techniques

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	25	69.4	89.3	89.3
no	3	8.3	10.7	100.0
Total	28	77.8	100.0	
Missing	8	22.2		
Total	36	100.0		

Local leaders - under what conditions would be willing to use alternatives? awareness of negative impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	12	33.3	42.9	42.9
no	16	44.4	57.1	100.0
Total	28	77.8	100.0	
Missing	8	22.2		
Total	36	100.0		

Local leaders - under what conditions would be willing to use alternatives? awareness of local impacts of salt use

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	19	52.8	67.9	67.9
no	9	25.0	32.1	100.0
Total	28	77.8	100.0	
Missing	8	22.2		
Total	36	100.0		

Local leaders - under what conditions would be willing to use alternatives? equal safety

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	24	66.7	85.7	85.7
	no	4	11.1	14.3	100.0
	Total	28	77.8	100.0	
Missing		8	22.2		
Total		36	100.0		

Local leaders - under what conditions would be willing to use alternatives? other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	28	77.8	100.0	100.0
Missing		8	22.2		
Total		36	100.0		

Importance of source of information for decisions about road salt application - weather reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	10	27.8	34.5	34.5
	very important	19	52.8	65.5	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Importance of source of information for decisions about road salt application - communications with other road maintenance staff

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all important	1	2.8	3.4	3.4
	1	1	2.8	3.4	6.9
	3	4	11.1	13.8	20.7
	4	10	27.8	34.5	55.2
	very important	13	36.1	44.8	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Importance of source of information for decisions about road salt application - input from general public

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	8.3	10.3	10.3
	2	8	22.2	27.6	37.9
	3	12	33.3	41.4	79.3
	4	5	13.9	17.2	96.6
	very important	1	2.8	3.4	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Importance of source of information for decisions about road salt application - directives from management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	3.4	3.4
	3	5	13.9	17.2	20.7
	4	11	30.6	37.9	58.6
	very important	12	33.3	41.4	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Importance of source of information for decisions about road salt application - road condition reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	11.1	14.8	14.8
	3	3	8.3	11.1	25.9
	4	5	13.9	18.5	44.4
	very important	15	41.7	55.6	100.0
	Total	27	75.0	100.0	
Missing		8	22.2		
	System	1	2.8		
	Total	9	25.0		
Total		36	100.0		

Importance of source of information for decisions about road salt application - personal experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	5.6	6.9	6.9
	3	4	11.1	13.8	20.7
	4	9	25.0	31.0	51.7
	very important	14	38.9	48.3	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Importance of source of information for decisions about road salt application - other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	2.8	3.4	3.4
	very important	1	2.8	3.4	6.9
	NA	27	75.0	93.1	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Are you satisfied with how road salt usage data is collected and maintained?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	13	36.1	43.3	43.3
	no	11	30.6	36.7	80.0
	not sure	6	16.7	20.0	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Is road salt usage data easily accessible to you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	18	50.0	60.0	60.0
	no	9	25.0	30.0	90.0
	not sure	3	8.3	10.0	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Do you find this data useful?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	20	55.6	69.0	69.0
	no	6	16.7	20.7	89.7
	not sure	2	5.6	6.9	96.6
	77	1	2.8	3.4	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Most effective way to report road salt usage? Daily

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	27.8	27.8
	no	18	50.0	50.0	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? Weekly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	7	19.4	19.4	19.4
	no	21	58.3	58.3	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? Monthly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	27.8	27.8
	no	18	50.0	50.0	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? Seasonally

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	27.8	27.8
	no	18	50.0	50.0	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By truckload

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	11.1	11.1	11.1
	no	24	66.7	66.7	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By weight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	8	22.2	22.2	22.2
	no	20	55.6	55.6	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By roadway

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	7	19.4	19.4	19.4
	no	21	58.3	58.3	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By route

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	14	38.9	38.9	38.9
	no	14	38.9	38.9	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By time with GPS tracking on trucks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	13	36.1	36.1	36.1
	no	15	41.7	41.7	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By total usage in each town

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	8	22.2	22.2	22.2
	no	20	55.6	55.6	77.8
		8	22.2	22.2	100.0
	Total	36	100.0	100.0	

Most effective way to report road salt usage? By operator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	6	16.7	16.7	16.7
	no	22	61.1	61.1	77.8
		8	22.2	22.2	100.0
Total		36	100.0	100.0	

Most effective way to report road salt usage? Other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	3	8.3	8.3	8.3
	no	25	69.4	69.4	77.8
		8	22.2	22.2	100.0
Total		36	100.0	100.0	

Do you think a regulatory approach to the reduction of road salt is appropriate?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	23	63.9	69.7	69.7
	no	10	27.8	30.3	100.0
	Total	33	91.7	100.0	
Missing	2	2	5.6		
		1	2.8		
Total		3	8.3		
Total		36	100.0		

If regulation takes place, how should regulations be implemented? municipal level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	18	50.0	50.0	50.0
	no	17	47.2	47.2	97.2
		1	2.8	2.8	100.0
Total		36	100.0	100.0	

If regulation takes place, how should regulations be implemented? state level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	27	75.0	75.0	75.0
	no	8	22.2	22.2	97.2
		1	2.8	2.8	100.0
Total		36	100.0	100.0	

If regulation takes place, how should regulations be implemented? federal level

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	3	8.3	8.3	8.3
no	32	88.9	88.9	97.2
	1	2.8	2.8	100.0
Total	36	100.0	100.0	

If regulation takes place, how should regulations be implemented? case-by-case basis

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	7	19.4	19.4	19.4
no	28	77.8	77.8	97.2
	1	2.8	2.8	100.0
Total	36	100.0	100.0	

If regulation takes place, how should regulations be implemented? other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yes	2	5.6	5.6	5.6
no	33	91.7	91.7	97.2
	1	2.8	2.8	100.0
Total	36	100.0	100.0	

Impact of regulations reducing road salt application on - overall cost of de-icing

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No impact	1	2.8	4.0	4.0
1	1	2.8	4.0	8.0
2	1	2.8	4.0	12.0
3	8	22.2	32.0	44.0
4	9	25.0	36.0	80.0
High impact	5	13.9	20.0	100.0
Total	25	69.4	100.0	
Missing	10	27.8		
System	1	2.8		
Total	11	30.6		
Total	36	100.0		

Impact of regulations reducing road salt application on - improvement of environment along I-93

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	4.0	4.0
	2	2	5.6	8.0	12.0
	3	4	11.1	16.0	28.0
	4	9	25.0	36.0	64.0
	High impact	9	25.0	36.0	100.0
	Total	25	69.4	100.0	
Missing		10	27.8		
	System	1	2.8		
	Total	11	30.6		
Total		36	100.0		

Impact of regulations reducing road salt application on - public awareness of environmental impacts of road salt

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	4.0	4.0
	2	2	5.6	8.0	12.0
	3	5	13.9	20.0	32.0
	4	10	27.8	40.0	72.0
	High impact	7	19.4	28.0	100.0
	Total	25	69.4	100.0	
Missing		10	27.8		
	System	1	2.8		
	Total	11	30.6		
Total		36	100.0		

Impact of regulations reducing road salt application on - road conditions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No impact	1	2.8	4.0	4.0
	1	1	2.8	4.0	8.0
	2	6	16.7	24.0	32.0
	3	5	13.9	20.0	52.0
	4	8	22.2	32.0	84.0
	High impact	4	11.1	16.0	100.0
	Total	25	69.4	100.0	
Missing		10	27.8		
	System	1	2.8		
	Total	11	30.6		
Total		36	100.0		

Impact of regulations reducing road salt application on - public support for road salt reduction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No impact	1	2.8	4.0	4.0
	1	2	5.6	8.0	12.0
	2	3	8.3	12.0	24.0
	3	11	30.6	44.0	68.0
	4	7	19.4	28.0	96.0
	High impact	1	2.8	4.0	100.0
	Total	25	69.4	100.0	
Missing		10	27.8		
	System	1	2.8		
	Total	11	30.6		
Total		36	100.0		

Impact of regulations reducing road salt application on - amount of salt used

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	4.2	4.2
	3	4	11.1	16.7	20.8
	4	10	27.8	41.7	62.5
	High impact	9	25.0	37.5	100.0
	Total	24	66.7	100.0	
Missing		11	30.6		
	System	1	2.8		
	Total	12	33.3		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - registration of road salt applicators

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	2	5.6	5.9	5.9
	1	4	11.1	11.8	17.6
	2	1	2.8	2.9	20.6
	3	4	11.1	11.8	32.4
	4	14	38.9	41.2	73.5
	Effective	9	25.0	26.5	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - certification and training for salt applicators

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	8.3	8.8	8.8
	2	1	2.8	2.9	11.8
	3	3	8.3	8.8	20.6
	4	9	25.0	26.5	47.1
	Effective	18	50.0	52.9	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - required reporting of usage by applicators

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	2.9	2.9
	2	3	8.3	8.8	11.8
	3	4	11.1	11.8	23.5
	4	11	30.6	32.4	55.9
	Effective	15	41.7	44.1	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - required reporting of usage by property owners/managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	1	2.8	3.0	3.0
	1	3	8.3	9.1	12.1
	2	4	11.1	12.1	24.2
	3	4	11.1	12.1	36.4
	4	12	33.3	36.4	72.7
	Effective	9	25.0	27.3	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - enforcement of water quality standards for chloride

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	2	5.6	6.1	6.1
	1	4	11.1	12.1	18.2
	2	2	5.6	6.1	24.2
	3	5	13.9	15.2	39.4
	4	11	30.6	33.3	72.7
	Effective	9	25.0	27.3	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - limits to salt usage for salt applicators

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	1	2.8	3.2	3.2
	1	9	25.0	29.0	32.3
	2	2	5.6	6.5	38.7
	3	2	5.6	6.5	45.2
	4	10	27.8	32.3	77.4
	Effective	7	19.4	22.6	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

Regulations effectiveness at reducing road salt application - municipality based ordinances

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	22.2	25.0	25.0
	2	2	5.6	6.3	31.3
	3	3	8.3	9.4	40.6
	4	14	38.9	43.8	84.4
	Effective	5	13.9	15.6	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

Effectiveness of distributing road salt reduction funds using method - by project?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	3	8.3	8.8	8.8
	1	2	5.6	5.9	14.7
	2	4	11.1	11.8	26.5
	3	5	13.9	14.7	41.2
	4	11	30.6	32.4	73.5
	Effective	9	25.0	26.5	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Effectiveness of distributing road salt reduction funds using method - by town?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	2	5.6	5.9	5.9
	1	5	13.9	14.7	20.6
	2	3	8.3	8.8	29.4
	3	9	25.0	26.5	55.9
	4	5	13.9	14.7	70.6
	Effective	10	27.8	29.4	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Effectiveness of distributing road salt reduction funds using method - by regional planning commission?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	5	13.9	14.7	14.7
	1	7	19.4	20.6	35.3
	2	6	16.7	17.6	52.9
	3	9	25.0	26.5	79.4
	4	4	11.1	11.8	91.2
	Effective	3	8.3	8.8	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Effectiveness of distributing road salt reduction funds using method - by county

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not effective	11	30.6	31.4	31.4
	1	10	27.8	28.6	60.0
	2	7	19.4	20.0	80.0
	3	4	11.1	11.4	91.4
	4	3	8.3	8.6	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

If the road salt reduction funds will be distributed by town, should there be: equal grants for each town?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	6	16.7	18.2	18.2
	no	27	75.0	81.8	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

If the road salt reduction funds will be distributed by town, should there be: equal base funding for each town with competitive process for additional funding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	21	58.3	63.6	63.6
	no	12	33.3	36.4	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

If the road salt reduction funds will be distributed by town, should there be: a competitive process for all funding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	13	36.1	39.4	39.4
	no	20	55.6	60.6	100.0
	Total	33	91.7	100.0	
Missing		3	8.3		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - salt reduction achieved the project(s)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	3.4	3.4
	3	6	16.7	20.7	24.1
	4	5	13.9	17.2	41.4
	Very important	17	47.2	58.6	100.0
	Total	29	80.6	100.0	
Missing		7	19.4		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - road miles to receive reduced salt

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	3.3	3.3
	3	5	13.9	16.7	20.0
	4	14	38.9	46.7	66.7
	Very important	10	27.8	33.3	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - proximity to sensitive environments

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	3.2	3.2
	3	4	11.1	12.9	16.1
	4	9	25.0	29.0	45.2
	Very important	17	47.2	54.8	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - public support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	8.3	10.0	10.0
	2	3	8.3	10.0	20.0
	3	9	25.0	30.0	50.0
	4	8	22.2	26.7	76.7
	Very important	7	19.4	23.3	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - likelihood of long-term success

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	3.3	3.3
	3	1	2.8	3.3	6.7
	4	9	25.0	30.0	36.7
	Very important	19	52.8	63.3	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - record of salt reduction activities (history of entity)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.8	3.3	3.3
	2	9	25.0	30.0	33.3
	3	7	19.4	23.3	56.7
	4	5	13.9	16.7	73.3
	Very important	8	22.2	26.7	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - consistency with the TMDL Implementation Plan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.8	3.2	3.2
	3	8	22.2	25.8	29.0
	4	12	33.3	38.7	67.7
	Very important	10	27.8	32.3	100.0
	Total	31	86.1	100.0	
Missing		5	13.9		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - traffic volume at project site

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	5.6	6.7	6.7
	2	7	19.4	23.3	30.0
	3	6	16.7	20.0	50.0
	4	11	30.6	36.7	86.7
	Very important	4	11.1	13.3	100.0
	Total	30	83.3	100.0	
Missing	99	6	16.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - local financial resources/matching funds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not important	1	2.8	3.3	3.3
	1	2	5.6	6.7	10.0
	2	4	11.1	13.3	23.3
	3	10	27.8	33.3	56.7
	4	11	30.6	36.7	93.3
	Very important	2	5.6	6.7	100.0
	Total	30	83.3	100.0	
Missing		6	16.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - public opinion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not important	2	5.6	16.7	16.7
	1	2	5.6	16.7	33.3
	2	1	2.8	8.3	41.7
	3	4	11.1	33.3	75.0
	4	2	5.6	16.7	91.7
	Very important	1	2.8	8.3	100.0
	Total	12	33.3	100.0	
Missing		24	66.7		
Total		36	100.0		

Importance of criteria for distributing funds under a competitive grant application for the program - prior salt used

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not important	3	8.3	10.7	10.7
	1	6	16.7	21.4	32.1
	2	6	16.7	21.4	53.6
	3	3	8.3	10.7	64.3
	4	9	25.0	32.1	96.4
	Very important	1	2.8	3.6	100.0
	Total	28	77.8	100.0	
Missing		8	22.2		
Total		36	100.0		

Do you feel that road salt reduction requires resources other than money?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	30	83.3	93.8	93.8
	no	2	5.6	6.3	100.0
	Total	32	88.9	100.0	
Missing		4	11.1		
Total		36	100.0		

Employment sector - NH state government - regulatory agencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	5	13.9	14.7	14.7
	no	29	80.6	85.3	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Employment sector - NH state government - road maintenance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	5	13.9	14.7	14.7
	no	29	80.6	85.3	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Employment sector - federal government

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	2	5.6	5.9	5.9
	no	32	88.9	94.1	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Employment sector - municipality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	12	33.3	35.3	35.3
	no	22	61.1	64.7	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Employment sector - private sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	3	8.3	8.8	8.8
	no	31	86.1	91.2	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Employment sector - other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	7	19.4	20.6	20.6
	no	27	75.0	79.4	100.0
	Total	34	94.4	100.0	
Missing		2	5.6		
Total		36	100.0		

Type of work - regulatory

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	8	22.2	22.9	22.9
	no	27	75.0	77.1	100.0
	Total	35	97.2	100.0	
Missing		1	2.8		
Total		36	100.0		

Type of work - "on the ground" road maintenance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	11	30.6	31.4	31.4
	no	24	66.7	68.6	100.0
	Total	35	97.2	100.0	
Missing	99	1	2.8		
Total		36	100.0		

Type of work - transportation field professional

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	8	22.2	22.9	22.9
	no	27	75.0	77.1	100.0
	Total	35	97.2	100.0	
Missing	99	1	2.8		
Total		36	100.0		

Type of work - other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	27.8	28.6	28.6
	no	25	69.4	71.4	100.0
	Total	35	97.2	100.0	
Missing	99	1	2.8		
Total		36	100.0		

Bivariate Analysis – ANOVA Charts 2 and 3

First Series Analysis

Research Question 1

The first research question guiding the inquiry asked researcher to engage in the;

- *3(a). Identification of specific best management practices, techniques, and technologies used to reduce the application of salt to roadways and parking lots.*

ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
realistic alternative - liquid potassium acetate * Type of Work	Between Groups (Combined)	2.181	3	.727	2.638	.094
	Within Groups	3.583	13	.276		
	Total	5.765	16			
realistic alternative - brine * Type of Work	Between Groups (Combined)	11.564	3	3.855	5.532	.004
	Within Groups	20.906	30	.697		
	Total	32.471	33			
realistic alternative - roadway weather information systems * Type of Work	Between Groups (Combined)	7.056	3	2.352	3.934	.025
	Within Groups	10.762	18	.598		
	Total	17.818	21			
realistic alternative - pre-wetting road surface * Type of Work	Between Groups (Combined)	8.183	3	2.728	5.088	.008
	Within Groups	11.257	21	.536		
	Total	19.440	24			
realistic alternative - underbelly plows * Type of Work	Between Groups (Combined)	8.425	3	2.808	2.925	.059
	Within Groups	19.200	20	.960		
	Total	27.625	23			

Measures of Association

	Eta	Eta Squared
realistic alternative - liquid potassium acetate * Type of Work	.615	.378
realistic alternative - brine * Type of Work	.597	.356
realistic alternative - roadway weather information systems * Type of Work	.629	.396
realistic alternative - pre-wetting road surface * Type of Work	.649	.421
realistic alternative - underbelly plows * Type of Work	.552	.305

Research Questions 2 and 3

The second and third research question explored the;

- *3(b). Identification of behaviors of the driving public, of safety personnel, of elected officials, and of road maintenance staff relative to the application of salt to roadways and parking lots; and 3(c) Identification of target audiences and communication strategies*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
salt use and storage - what is done with left over salt at end of year * Type of Work	Between Groups	(Combined)	18.257	3	6.086	2.824	.059
	Within Groups		53.881	25	2.155		
	Total		72.138	28			

Measures of Association

	Eta	Eta Squared
salt use and storage - what is done with left over salt at end of year * Type of Work	.503	.253

Research Question 4

The fourth research question asked researchers to collect information from respondents on the;

- *3(d). Identification of feasible methods by which to obtain accurate information on salt usage for winter road maintenance by state, private, and municipal applicators.*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Importance of source of information for decisions about road salt application - directives from management * Type of Work	Between Groups	(Combined)	3.769	3	1.256	2.652	.073
	Within Groups		10.898	23	.474		
	Total		14.667	26			

Measures of Association

	Eta	Eta Squared
Importance of source of information for decisions about road salt application - directives from management * Type of Work	.507	.257

Research Question 5

The fifth research question posed asked researchers to consider various regulatory approaches and their impacts;

- o *3(e). Identification of possible regulatory approaches for reducing the application of salt to roadways and parking lots, and the effects it would have on their operations*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Impact of regulations reducing road salt application on - overall cost of de-icing * Type of Work	Between Groups	(Combined)	9.965	3	3.322	2.449	.095
	Within Groups		25.774	19	1.357		
	Total		35.739	22			

Measures of Association

	Eta	Eta Squared
Impact of regulations reducing road salt application on - overall cost of de-icing * Type of Work	.528	.279

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Regulations effectiveness at reducing road salt application - required reporting of usage by property owners/managers * Type of Work	Between Groups	(Combined)	13.699	3	4.566	2.464	.084
	Within Groups		50.043	27	1.853		
	Total		63.742	30			

Measures of Association

	Eta	Eta Squared
Regulations effectiveness at reducing road salt application - required reporting of usage by property owners/managers * Type of Work	.464	.215

Research Question 6

The final research question addressed in the questionnaire focused on the;
3(f). Identification of optimal criteria for distributing funds under the Salt Reduction Grant Program

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Importance of criteria for distributing funds under a competitive grant application for the program - road miles to receive reduced salt * Type of Work	Between Groups	(Combined)	5.542	3	1.847	3.375	.035
	Within Groups		13.137	24	.547		
	Total		18.679	27			

Measures of Association

	Eta	Eta Squared
Importance of criteria for distributing funds under a competitive grant application for the program - road miles to receive reduced salt * Type of Work	.545	.297

Second Series Analysis

Research Question 1

The first research question asked;

- *3(a). Identification of specific best management practices, techniques, and technologies used to reduce the application of salt to roadways and parking lots.*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
realistic alternative - sodium acetate * Employment Sector	Between Groups	(Combined)	2.889	4	.722	4.333	.092
	Within Groups		.667	4	.167		
	Total		3.556	8			
realistic alternative - magnesium chloride * Employment Sector	Between Groups	(Combined)	7.397	5	1.479	6.655	.002
	Within Groups		3.557	16	.222		
	Total		10.955	21			
realistic alternative - pre-wetting road surface * Employment Sector	Between Groups	(Combined)	8.110	5	1.622	3.194	.029
	Within Groups		9.650	19	.508		
	Total		17.760	24			
realistic alternative - underbelly plows * Employment Sector	Between Groups	(Combined)	12.292	5	2.458	2.597	.062
	Within Groups		17.042	18	.947		
	Total		29.333	23			

Measures of Association

	Eta	Eta Squared
realistic alternative - sodium acetate * Employment Sector	.901	.813
realistic alternative - magnesium chloride * Employment Sector	.822	.675
realistic alternative - pre-wetting road surface * Employment Sector	.676	.457
realistic alternative - underbelly plows * Employment Sector	.647	.419

Research Question 2 and 3

The second and third research question asked;

- *3(b). Identification of behaviors of the driving public, of safety personnel, of elected officials, and of road maintenance staff relative to the application of salt to roadways and parking lots; and 3(c) Identification of target audiences and communication strategies*

(No Tables Created)

Research Question 4

The fourth research question tried to gauge;

- *3(c). Identification of feasible methods by which to obtain accurate information on salt usage for winter road maintenance by state, private, and municipal applicators.*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Importance of source of information for decisions about road salt application - road condition reports * Employment Sector	Between Groups	(Combined)	24.343	5	4.869	3.233	.028
	Within Groups		28.617	19	1.506		
	Total		52.960	24			

Measures of Association

	Eta	Eta Squared
Importance of source of information for decisions about road salt application - road condition reports * Employment Sector	.678	.460

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Most effective way to report road salt usage? By roadway * Employment Sector	Between Groups	(Combined)	3.288	5	.658	17.538	.000
	Within Groups		.750	20	.038		
	Total		4.038	25			

Measures of Association

	Eta	Eta Squared
Most effective way to report road salt usage? By roadway * Employment Sector	.902	.814

Research Question 5

The fifth research question posed asked researchers to consider various regulatory approaches and their impacts;

- o *3(e). Identification of possible regulatory approaches for reducing the application of salt to roadways and parking lots, and the effects it would have on their operations*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
If regulation takes place, how should regulations be implemented? state level * Employment Sector	Between Groups	(Combined)	3.394	5	.679	6.873	.000
	Within Groups		2.667	27	.099		
	Total		6.061	32			
If regulation takes place, how should regulations be implemented? federal level * Employment Sector	Between Groups	(Combined)	.629	5	.126	2.716	.041
	Within Groups		1.250	27	.046		
	Total		1.879	32			
If regulation takes place, how should regulations be implemented? case-by-case basis * Employment Sector	Between Groups	(Combined)	1.658	5	.332	2.321	.071
	Within Groups		3.857	27	.143		
	Total		5.515	32			

Measures of Association

	Eta	Eta Squared
If regulation takes place, how should regulations be implemented? state level * Employment Sector	.748	.560
If regulation takes place, how should regulations be implemented? federal level * Employment Sector	.579	.335
If regulation takes place, how should regulations be implemented? case-by-case basis * Employment Sector	.548	.301

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Regulations effectiveness at reducing road salt application - registration of road salt applicators * Employment Sector	Between Groups	(Combined)	25.684	5	5.137	3.022	.028
	Within Groups		44.191	26	1.700		
	Total		69.875	31			
Regulations effectiveness at reducing road salt application - required reporting of usage by property owners/managers * Employment Sector	Between Groups	(Combined)	19.472	5	3.894	2.199	.086
	Within Groups		44.270	25	1.771		
	Total		63.742	30			

Measures of Association

	Eta	Eta Squared
Regulations effectiveness at reducing road salt application - registration of road salt applicators * Employment Sector	.606	.368
Regulations effectiveness at reducing road salt application - required reporting of usage by property owners/managers * Employment Sector	.553	.305

Research Question 6

The final research question addressed in the questionnaire focused on the;

- o 3(f). *Identification of optimal criteria for distributing funds under the Salt Reduction Grant Program*

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Effectiveness of distributing road salt reduction funds using method - by county * Employment Sector	Between Groups	(Combined)	16.424	5	3.285	2.519	.054
	Within Groups		35.212	27	1.304		
	Total		51.636	32			

Measures of Association

	Eta	Eta Squared
Effectiveness of distributing road salt reduction funds using method - by county * Employment Sector	.564	.318

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Importance of criteria for distributing funds under a competitive grant application for the program - salt reduction achieved the project(s) * Employment Sector	Between Groups	(Combined)	14.252	5	2.850	4.526	.005
	Within Groups		13.856	22	.630		
	Total		28.107	27			

Measures of Association

	Eta	Eta Squared
Importance of criteria for distributing funds under a competitive grant application for the program - salt reduction achieved the project(s) * Employment Sector	.712	.507