

Social Dynamics of Road Salt Reduction

NH Lakes 2008

Meredith, NH



Potential Solutions for Reducing Road Salt Use in New Hampshire

A Report to the I-93 Salt Reduction Workgroup

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And

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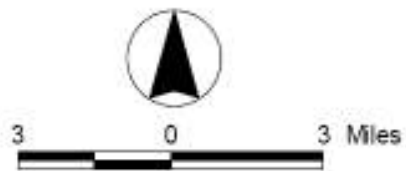
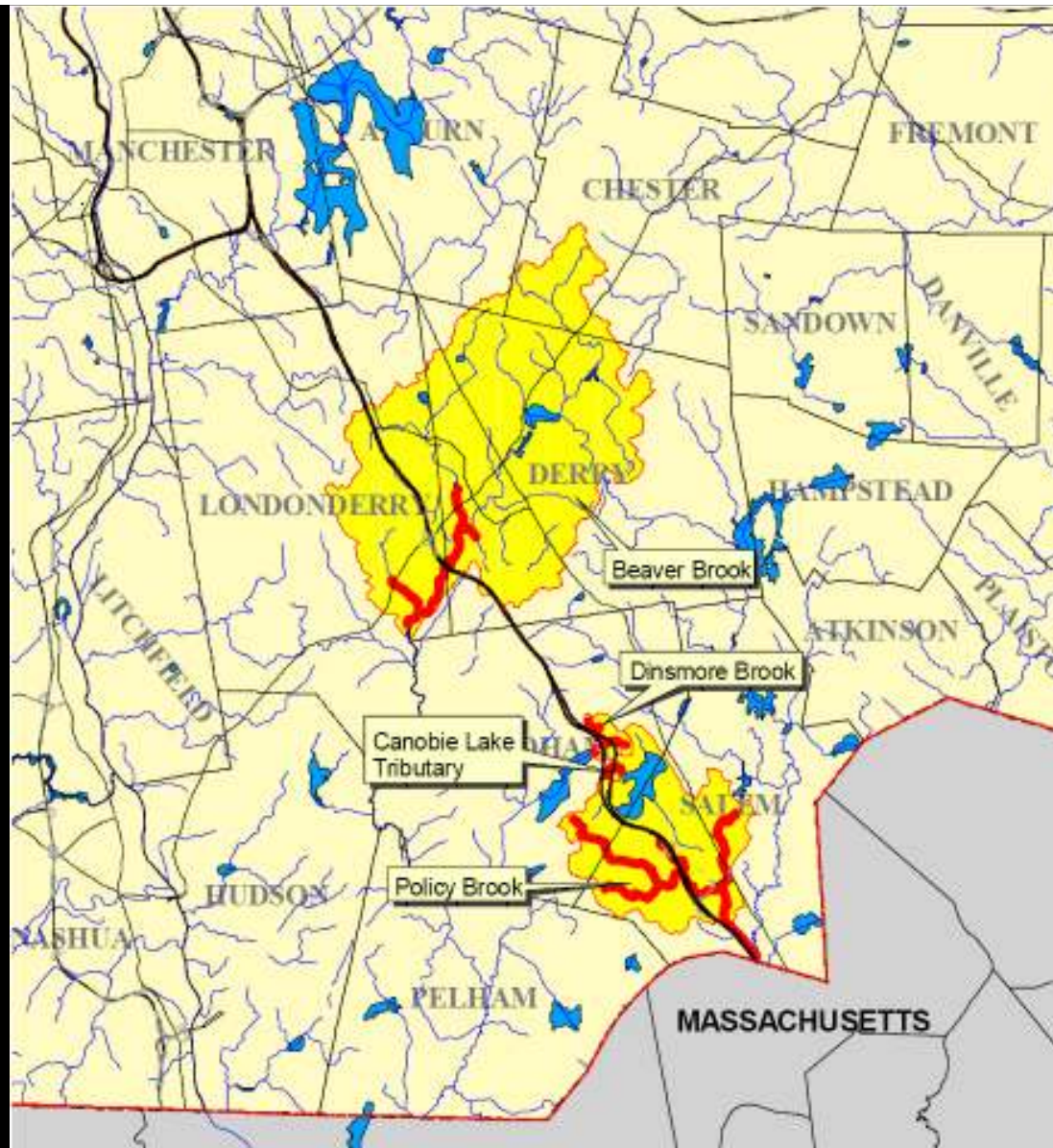


Project Background

- A condition of the 401 Water Quality Certification issued for the I-93 expansion
- Total Maximum Daily Load (TMDL) studies of chlorides in the four impaired watersheds.
- Determine the TMDL of chlorides to each watershed such that water quality standards for chlorides will be met
- NHDES will develop an implementation plan to reduce chloride loads to the TMDL
- Increasing chloride concentrations are a regional and national issue, and New Hampshire is now at the forefront of addressing this issue.

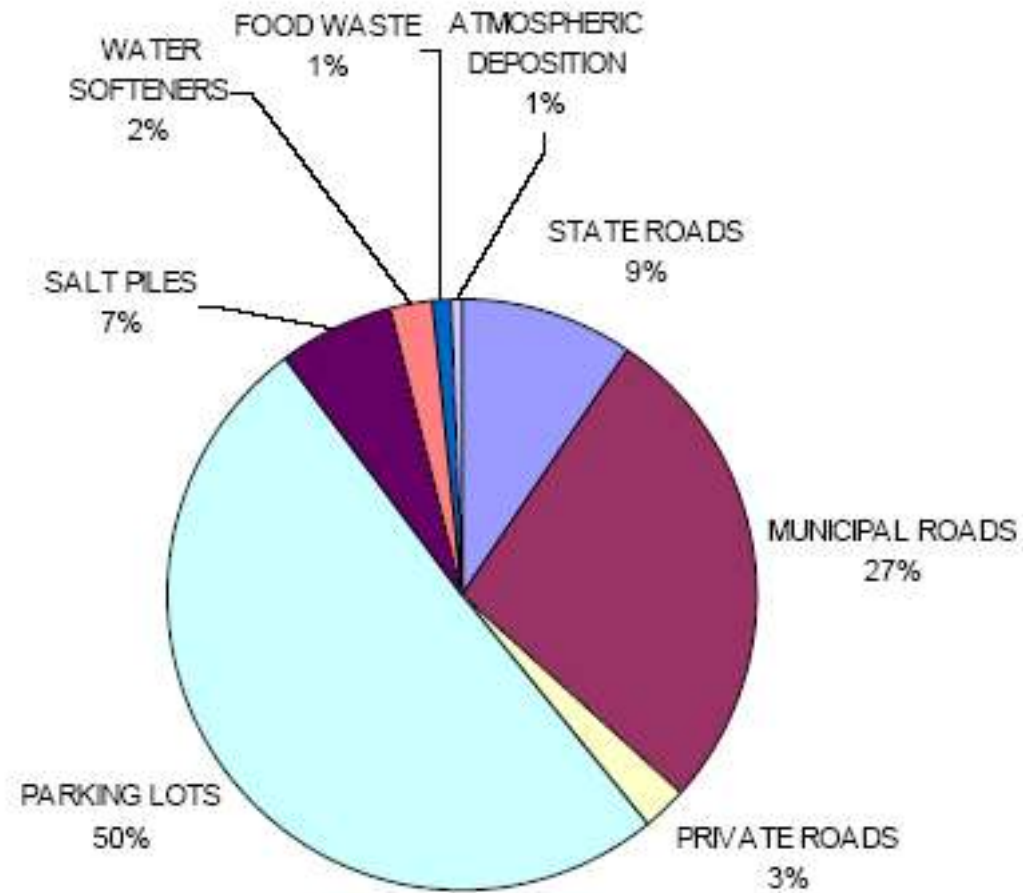
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| <ul style="list-style-type: none"> Political Boundaries ▲ State boundary ▤ County boundary ▥ Town boundary ▧ Roads (NH DOT) ▨ Interstate ▩ State ▪ Local | <ul style="list-style-type: none"> Impaired waterbodies Rivers and streams Lakes and ponds TMDL Watersheds |
|--|--|

Figure 4: Relative Contribution of Each Source to the Total Salt Imports to the Watershed



Project Background

- A Steering Committee including representatives from NHDOT, NHDES, the Federal Highway Administration, and the Environmental Protection Agency
- Salt Reduction Workgroup
- Research methods included:
 - Interview surveys conducted with the Workgroup members;
 - Workgroup meetings;
 - Literature and internet research; and
 - Focus groups with the driving public.

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Broad Research Goals Guiding the Project

- Identification of specific best management practices, techniques, and technologies to reduce salt application to roadways and parking lots;
- Identification of needed behavior changes by the driving public, safety service personnel, elected officials, and road maintenance staff, and the willingness of these parties to change behavior;
- Identification of the optimal design for targeted outreach, education, and hands-on technical assistance programs;
- Identification of the optimal methods necessary to obtain accurate information on salt usage by all applicators (State, private, municipal, other);
- Identification of regulatory approaches to reduce salt application to roadways and parking lots;
- Identification of appropriate evaluation criteria for technical funding requests

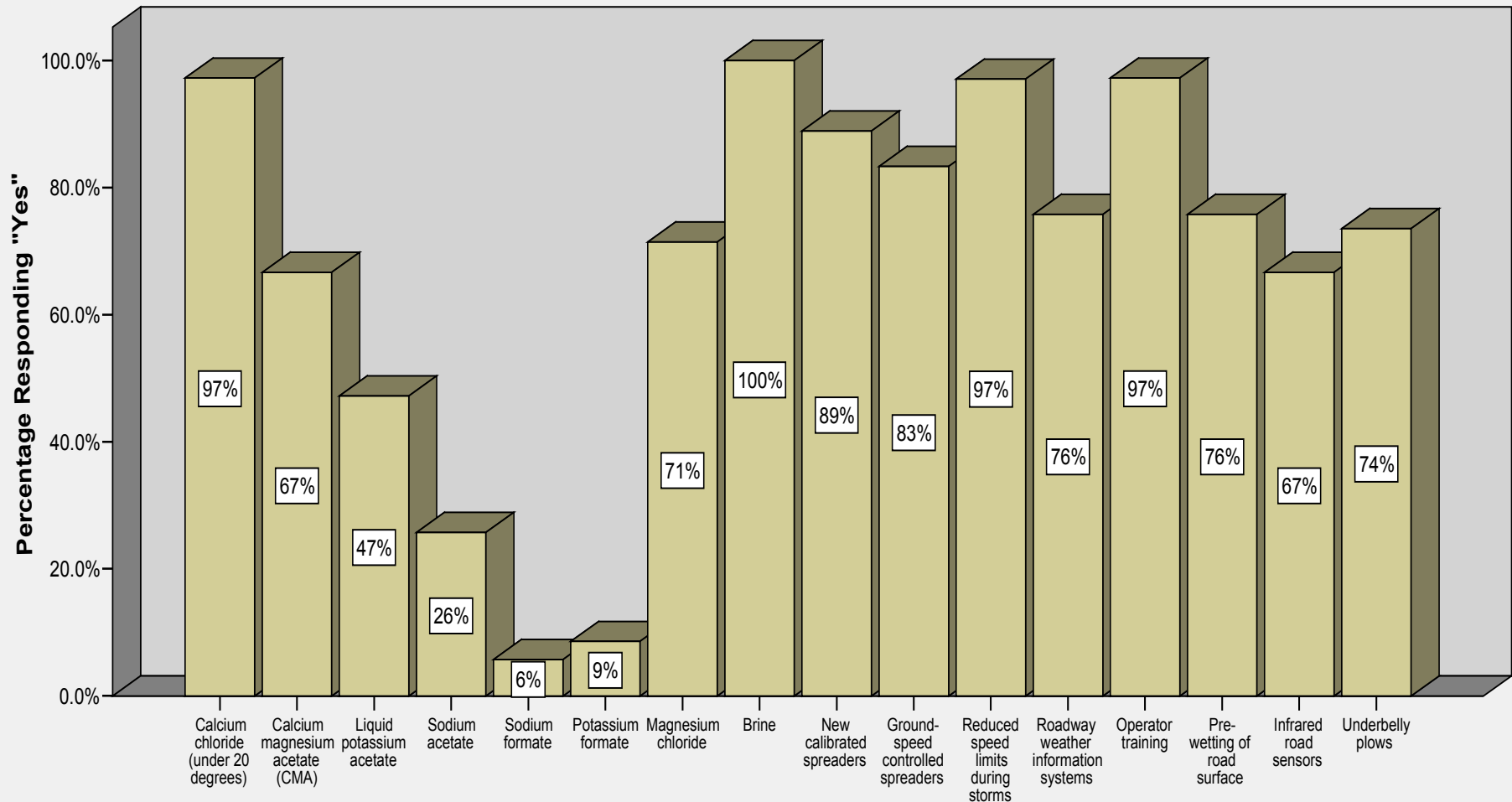


Interview Surveys: Methods and Analyses

- The intent of the survey: understanding opinion leaders' perceptions of barriers, benefits, and related issues
- Conducting the interviews (n=36, 30-120+ minutes each)
 - Standardized questions: quantitative data
 - Open-ended questions: qualitative data
- Analyses conducted
 - Statistical analyses of quantitative data
 - Univariate
 - Bivariate
 - Inductive coding and analyses of qualitative data

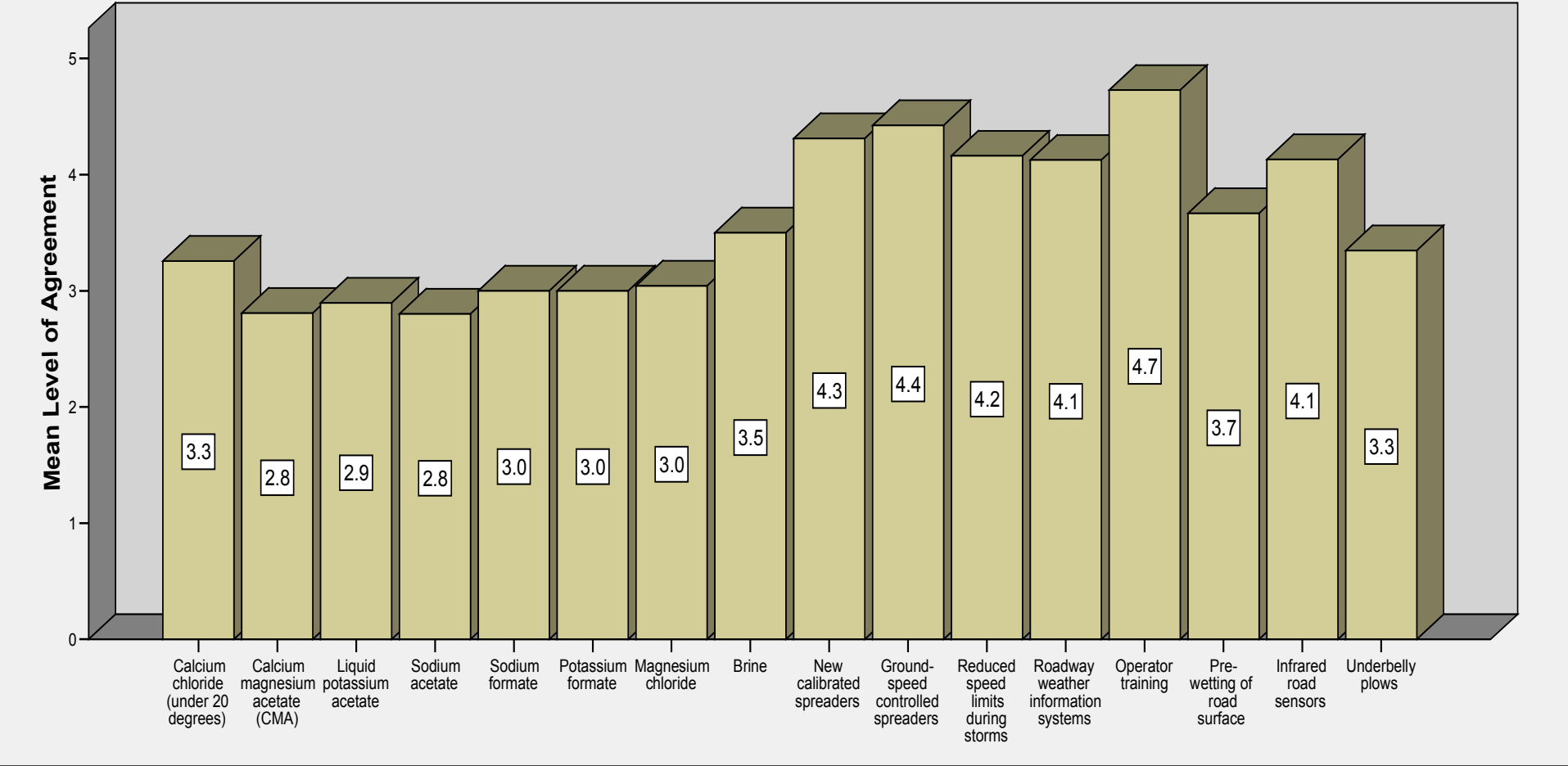


Percentage of Respondents Indicating they are Aware of the Potentially Chloride Reducing Road Maintenance Option



Mean of Respondents' Level of Agreement with the Assertion Each of the Following Road Treatments is a Realistic Alternative for Reducing the Impacts of Road Salt

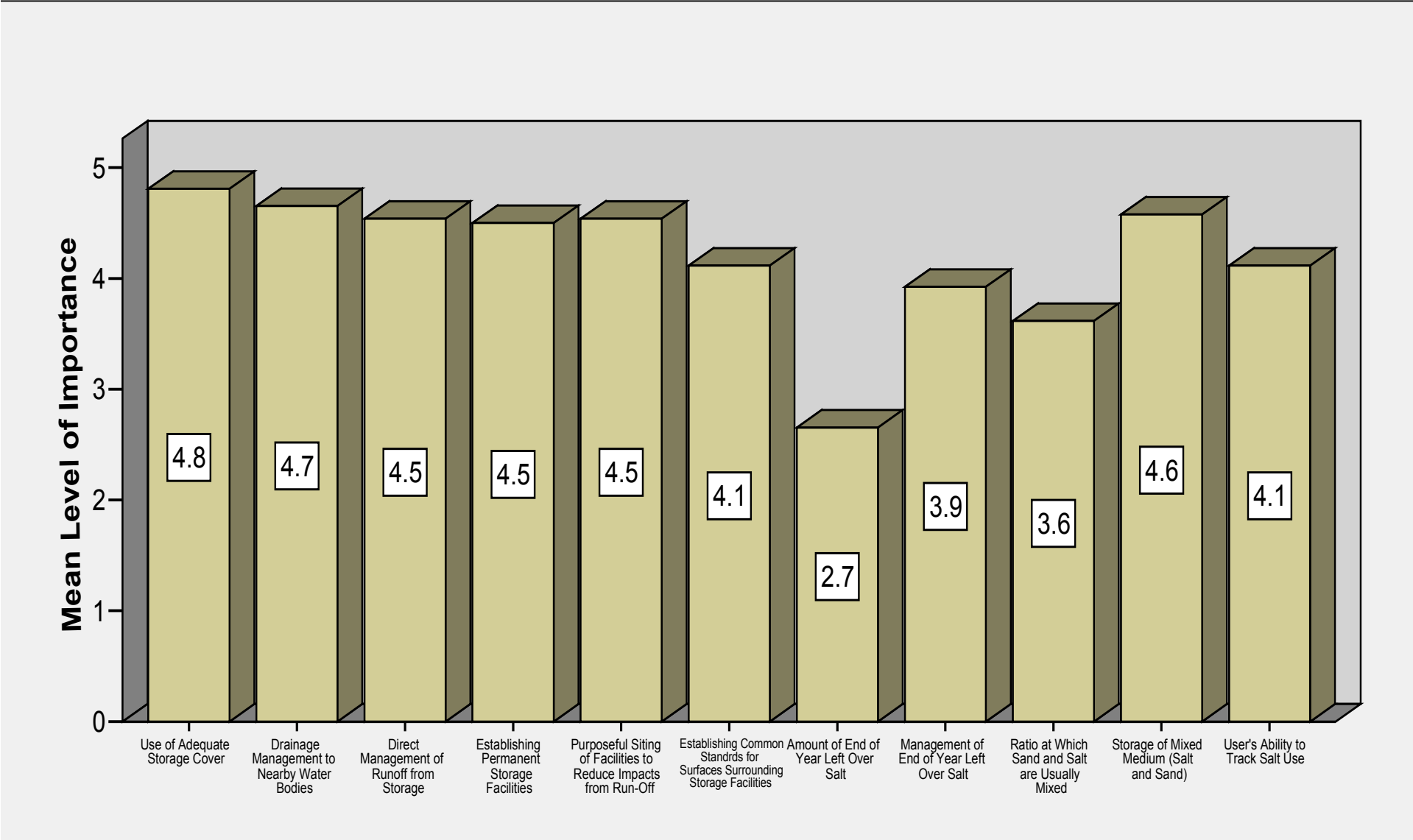
(1=Strongly Disagree, 5=Strongly Agree)



Best Management Practices, Techniques, and Technologies – Trends and Issues Identified:

- More training is needed overall. To enhance the chance of effectiveness, there is a need to go “on the road” to the towns. All new information should be delivered by a peer from the same field.
- Solutions should be focused on training, equipment and infrastructure upgrades, and behavior changes, rather than finding a new product to apply to surfaces.
- In general, if information is well presented by people perceived as unbiased, respondents are open to new information on alternatives.

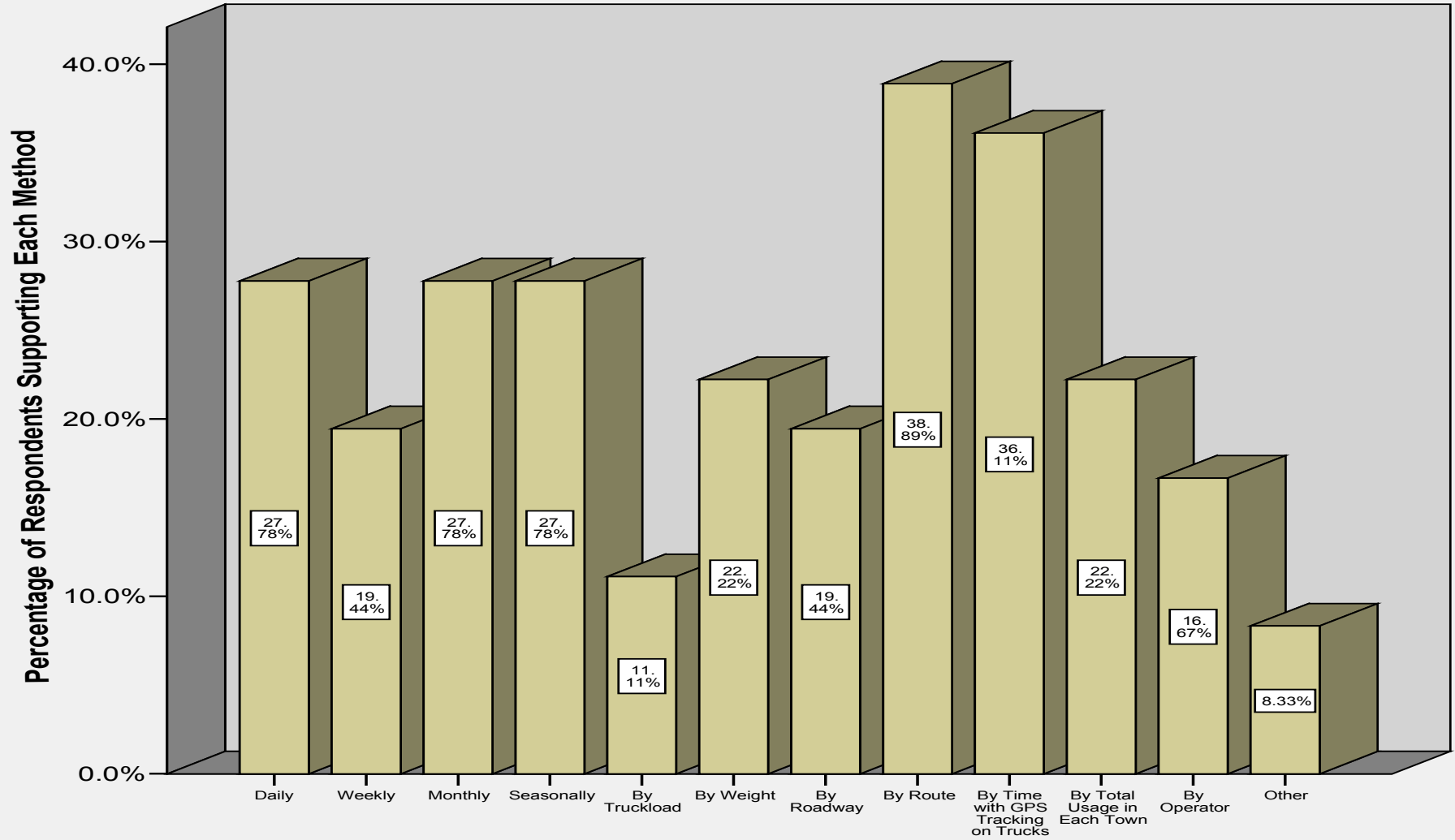
Respondents' Beliefs About How Important Each of the Following Issues Related to Salt and Salt Usage are to Efforts to Reduce the Impacts of Salt



Behaviors Relative to Application, & Communication Strategies – Trends and Issues Identified:

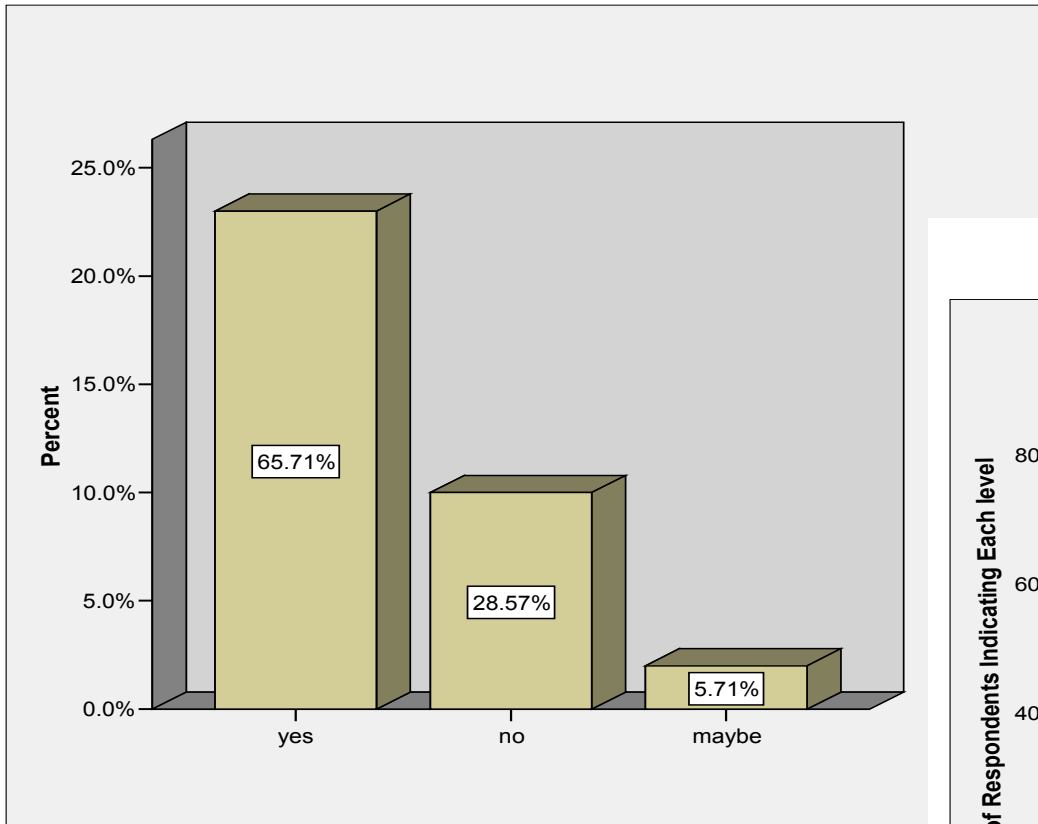
- The general public is key to resolving this issue.
 - Changes in the expectations of winter road surface conditions are needed, and that message needs to come from all levels.
- Most road maintenance professionals are open to changes, but need them to come as a directive that will be backed by the town (regulation, policy change, etc.).
 - Town staff that train with new information & technology are often constrained in their town financially, and can't implement.
- The private sector is very transient, and the structure of their contracts often dictates the degree of treatment they provide.
 - Because the private sector plowing community performs winter maintenance under annual contracts, permanent storage or cover of salt is seldom established.

What is the Most Effective Way to Report Salt Usage?

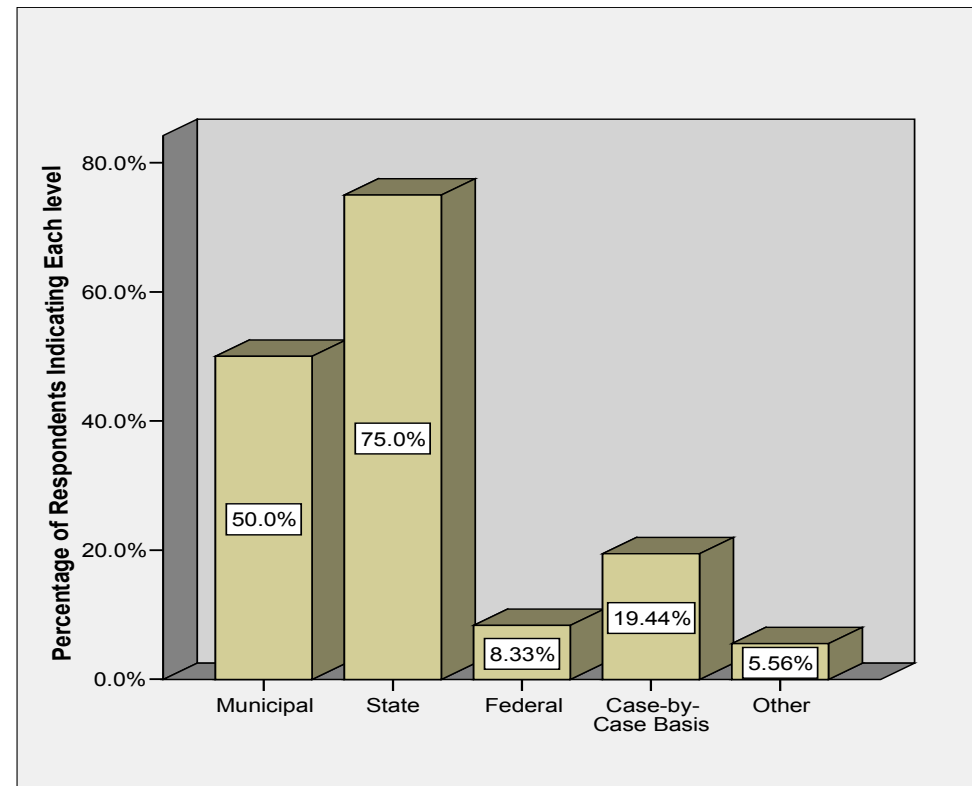


Perceptions of Regulatory Approaches

Is a Regulatory Approach to the Reduction of Road Salt Appropriate?

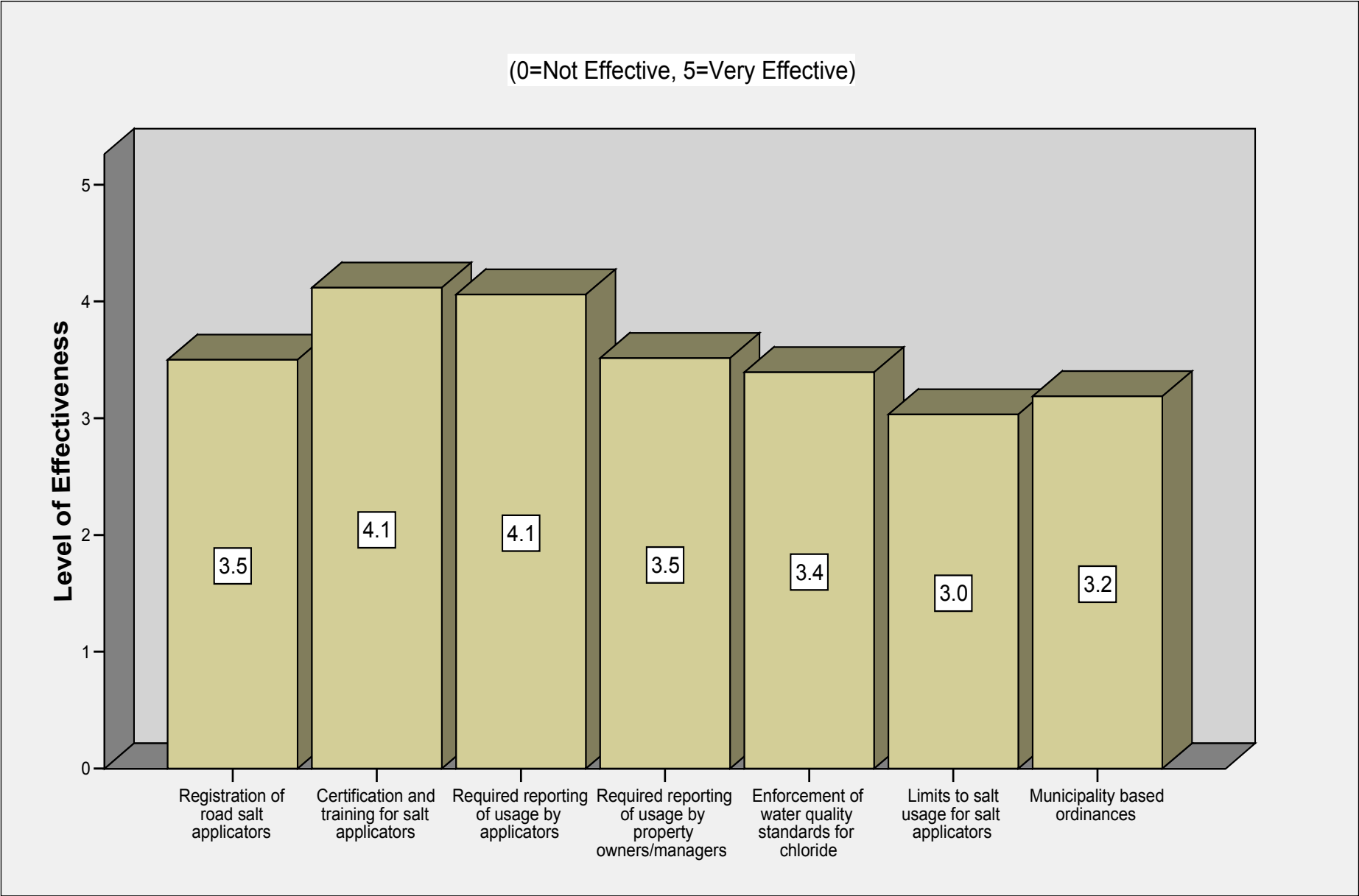


Level at Which Regulation Should Take Place



Means of Respondents' Beliefs About the Extent to which Types of Regulations Aimed at Reducing Road Salt Application would be Effective

(0=Not Effective, 5=Very Effective)



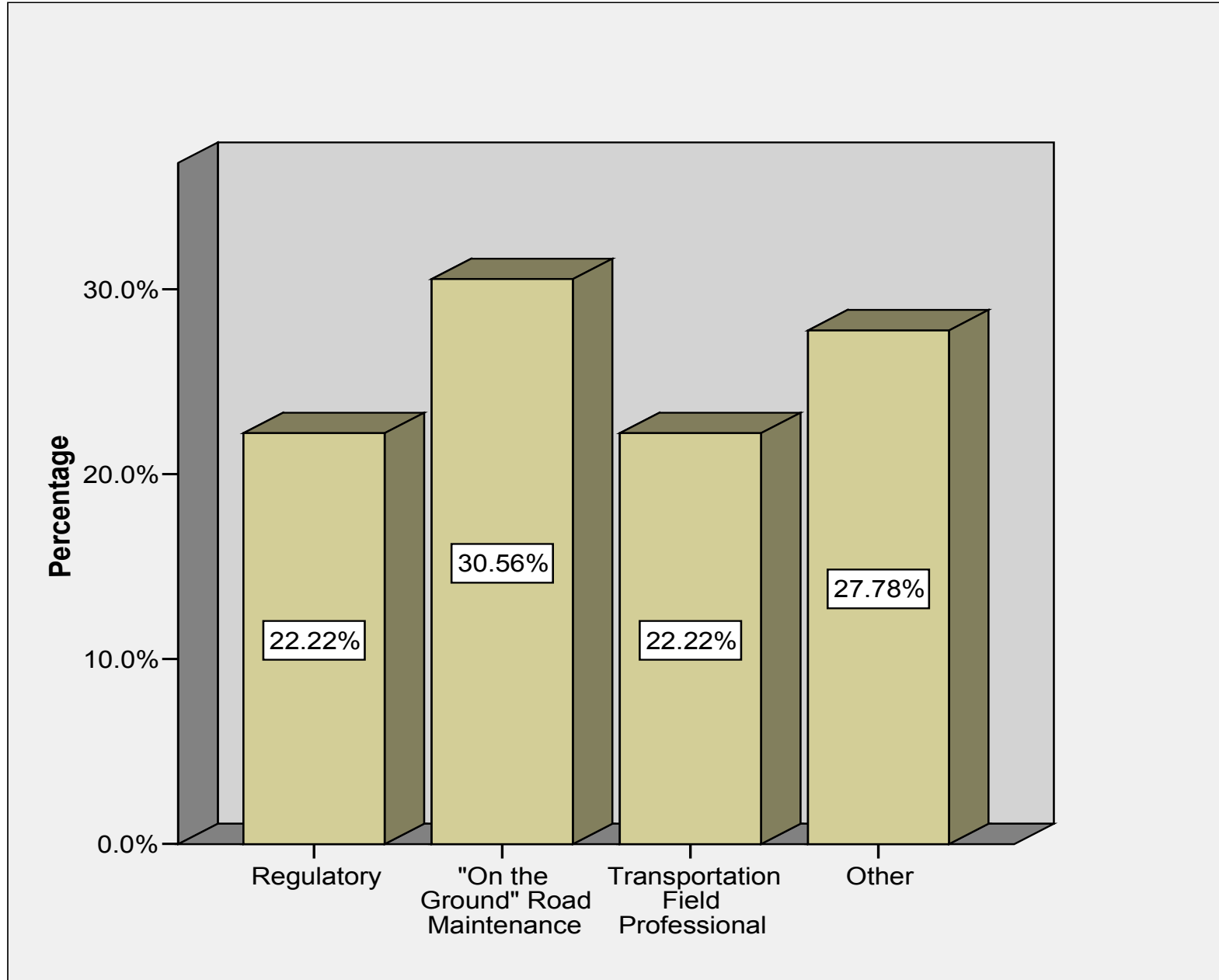
Regulations - Trends and Issues Identified:

- There were many concerns over how regulations will be implemented, but the majority felt that was the only way to change practices.
- Depending on the structure of the regulations, and the salt application reductions required, many Workgroup members felt that some funding will be necessary for implementation.
- Although there may be a need for some general distribution of funding, most workgroup members felt that the funding should be used to address problem areas and to create positive examples of solutions in NH.

Bivariate Analyses: Understanding Differences

- Bivariate analyses enabled a comparison of responses across respondents
 - It is important to understand how opinion leaders with differing orientations to these issues perceive them
 - Two bases for comparisons
 - type of work
 - current employment (federal, state, municipal, etc.)
 - examine differences across self-identified “type of work performed” as example...

Type of Work Done by Respondents



Important Differences Among Respondents Involved in Differing Types of Work

- Overall, there is high consistency among respondents' views
- There are differences about the belief that brine, RWIS, or pre-wetting are realistic alternatives
 - “On the ground” road maintenance workers are most skeptical of these options
 - Overall “Transportation field professionals” were most skeptical of alternatives, as a whole
- Issues related to salt storage we perceived as important by all, with few variations
- Views were also not significantly different regarding:
 - Conditions under which alternatives would be considered & used
 - the importance of information sources
 - regulatory approaches
 - means for distributing funds

Bivariate Analyses: Overall Conclusions

- The consistency is widespread – an encouraging finding
- However, existing differences are important
 - peer based education is suggested to overcome them
 - interviews indicated that there is frequent skepticism about information that comes from sources outside the type of work stakeholders perform
- Stakeholder involvement is essential moving forward

Selected Conclusions from the Survey

This is not a one size fits all situation

- The general public has a central role in this issue.
 - Expectations are a critical part of the issue
- There are far fewer differences across these groups of stakeholders than anticipated.
- The most popular treatment and management solutions included training, equipment and infrastructure upgrades, and behavior change, and willingness to change exists.
- More data on the impacts of salt on the environment in New Hampshire and on alternatives is needed.
- Another long term concern related to winter maintenance is the hiring of competent contractors.
- Concerns exist over how regulations will be implemented, and over potential costs that will be passed along to the local communities and private property owners. Incentives are needed.

Focus Groups with the Driving Public : Methods and Analyses

- Focus Groups as a social research method
 - The moderator's guide
 - Group level process
 - Consistency across groups
- Conducting the focus groups
 - Participation and incentives
 - 34 total participants (17 Windham, 17 Concord)
 - Variety of occupations, ages, perspectives
 - Discovered opportunity in various ways
- Analysis: Inductive coding of qualitative data



Example Focus Group Findings: *Driving routines and expectations for wintertime road conditions.*

- Perspective differences:
 - Windham participants viewed the issue of changing driving behaviors and reducing road salt as an environmental issue
 - Concord participants voiced a broader concern with the economic, political, and social impacts of the issue.
- Participants expect bad road conditions in the wintertime, and are prepared to use “extra caution” while driving during winter weather (but others are not, especially from out of state).
 - Across all groups, this “extra caution” was described as reduced driving speeds, the allocation of extra driving time, and the use of different travel routes.
 - Many participants saw themselves as capable winter drivers, with ample experience driving in adverse conditions.



Example Focus Group Findings: *Driving routines and expectations for wintertime road conditions.*

- Road salt and water quality are viewed primarily as state issues.
 - Despite inquiries into participant experiences with parking lots, local roads, etc, most folks framed their opinions in terms of "the state should do certain things" or "the state needs to apply less salt."
 - One of the more strident comments, "the state's black-road policy is white with salt" was actually voiced word-for-word by two separate individuals in two different groups.



Example Focus Group Findings: Do you believe that the application of road salt plays a role in water quality? If so, do you believe reducing salt will improve the quality of New Hampshire's rivers and streams? Is reduced water quality an acceptable trade-off for clear roads?

- Most of the participants did not possess clear opinions about the connections between road salt and water quality
 - not enough information about the issue to understand it
 - did not realize that salt was a contaminant
- When asked if reduced water quality was an acceptable trade-off for clear roads,
 - Windham participants felt that reduced water quality is unacceptable, whether or not road salt is the main culprit.
 - Concord groups were largely willing to accept reduced water quality as an unfortunate, but necessary, by-product of clean roads. Safety issues were perceived as paramount.



Example Focus Group Findings: Do you believe that the application of road salt plays a role in water quality? If so, do you believe reducing salt will improve the quality of New Hampshire's rivers and streams? Is reduced water quality an acceptable trade-off for clear roads?

- As with the application of new technologies, the importance of education about the impacts of road salt was a noticeable strand woven throughout the discussion of water quality.
- The general consensus was that this education should come from state agencies such as NHDES and NHDOT.
- Example quotes from groups:
 - “I don't think most people are aware that – I never thought about the salt and the environment being related”
 - “I think people who live around here are generally concerned, that's why I think the education is important.”
- To conclude, a review of overall findings

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Possible Solutions

Identified by multiple research methods

- Training on treatment practices for maintenance professionals (public and private) to ensure appropriate storage and application of road salt;
- Equipment and infrastructure upgrades including new decision making tools for winter maintenance professionals;
- Behavior change programs to assist with voluntary and mandatory approaches both for the driving public and maintenance personnel;
- Lower speed limit during storm events; and
- Mandatory use of snow tires for the public.

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Additional Solutions ~ *Grouped by Topic*

- Best Management Practices, Techniques, and Technologies
- Opportunities for Behavior Changes
- Monitoring Road Salt Usage
- Regulatory Approaches
- Evaluating and Documenting Success

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Next Steps

- Community and State implementation plans
- Regional efforts:
 - Education materials and training opportunities for public and private sector
 - Salt tracking system
 - Social marketing campaign



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Thanks to the CFE project team!

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