DEPARTMENT OF TRANSPORTATION

Expanding Landowner Adoption of Snow Control Measures Through a Better Understanding of Landowner Knowledge, Attitudes and Practices

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Final Report 2019-44

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16. Abstract (Limit: 250 words)

Previous research demonstrated the ability of snow fences to significantly lower both public and private costs related to the control of blowing and drifting snow. Follow-up research specifically addressed the knowledge of MnDOT staff and attitudes and practices related to the promotion and implementation of snow control measures. These efforts identified a need for a better understanding of landowners' knowledge, attitudes and practices related to snow control measures to develop more effective outreach and foster the adoption of snow control measures. We identified four regions of the state with highway corridors with snow problems. In each region, we carried out listening sessions with landowners and MnDOT personnel, and based on those sessions while applying the KAP (knowledge, attitudes and practices) methodology, we designed a landowner survey to explore landowner knowledge, attitudes and practices related to snow problems and the willingness of landowners to implement snow fences to address the problems. The survey was carried out once prior to an outreach effort and then again after the outreach effort to measure any changes in landowner knowledge, attitudes and practices resulting from the effort. We found that landowners were generally not aware of MnDOT's program to address snow problems and were able to identify constraints to adoption as well as incentives that might be required to promote adoption. We also identified the most acceptable channels for outreach to landowners as well as ways to better structure the MnDOT program to address constraints identified by landowners and provide the assistance and incentives needed to promote greater adoption.

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EXPANDING LANDOWNER ADOPTION OF SNOW CONTROL MEASURES THROUGH A BETTER UNDERSTANDING OF LANDOWNER KNOWLEDGE, ATTITUDES AND PRACTICES

FINAL REPORT

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EXECUTIVE SUMMARY

The goal of this study was to reduce blowing and drifting snow problems and their associated costs as well as to improve public safety through an effective outreach program to landowners and the subsequent adoption of snow control measures. Future effective outreach will be based on a better understanding of landowner knowledge, attitudes and practices related to snow problems and MnDOT's snow control program. The results will help MnDOT design an outreach plan to address landowner constraints, enlist positive attitudes toward snow control measures, and harnesses community support to promote greater adoption of snow control measures and attain the associated public safety and cost-savings benefits. The major tasks, key results, recommendations and suggested follow-up research follow.

IDENTIFICATION OF SNOW PROBLEM CORRIDORS

Four regions and corridors with snow problems were identified by MnDOT and the project team. Criteria were developed and used to select project sites that reflected the state's diverse geography, agroecology, land tenure, and blowing and drifting snow problems. The following four corridors were selected: TH 2 – MnDOT District 2 (Polk County); TH 210/169 – MnDOT District 3 (Aitkin County); TH 250 – MnDOT District 6 (Fillmore County); and TH 4 – MnDOT District 7 (Brown and Watonwan Counties).

THE KAP PROCESS (KNOWLEDGE, ATTITUDES AND PRACTICES METHODOLOGY)

- **Gap exercise**: A Gap exercise identifies information needs of a specific audience, in this case, information MnDOT personnel need to better promote snow fences. An initial Gap exercise was completed with members of the Technical Advisory Panel (TAP) followed by two listening sessions (one with MnDOT district staff members and another with key community stakeholders) in each of the regions that contain the four identified corridors. Findings were used to inform the preparation of the pre- and post-outreach knowledge, attitudes, and practices (KAP) surveys by identifying essential questions and response options.
- **Pre-outreach KAP Survey**: Based on the Gap exercise and listening sessions, a 34-question survey was administered to landowners along each of the snow problem corridors. Questions were designed to understand landowners' knowledge of, attitudes toward, and practices related to snow problems, snow control measures, and MnDOTs' snow control program.
- **Outreach and promotional program**: Pre-outreach KAP survey results were used to design and implement an outreach and promotional program. The outreach plan included a combination of direct (meetings with landowners) and indirect (mixed media campaign – print, radio, television, and social media) outreach to problem-area landowners (PALs), local communities, and MnDOT district staff members.

- **Post-outreach survey**: A second survey was administered to the landowners who received the pre-outreach survey. Most questions on the post-outreach survey were repeated from the pre-outreach survey, thereby enabling evaluation of changes in landowner knowledge, attitudes, and practices as a result of the outreach and promotional program.

KEY RESULTS/RECOMMENDATIONS

Near unanimous recognition existed regarding snow control problems in the identified problem corridors, but there was a lack of knowledge of snow control measures and MnDOT programs. Overall, it was evident that it is difficult to identify a discrete set of recommendations for addressing constraints, preferred incentives, and an outreach approach. This was further evident in the differences found between the four regions of the state. A flexible and tailored approach that can be adapted to address each region and each landowners' particular constraints and incentives will be required.

Following are recommendations based on the results of this study:

Constraints to adoption: There were numerous constraints mentioned by different landowners/farmers in meetings and on the questionnaires. Using the constraints identified by landowners, MnDOT should be prepared to address the full range of constraints mentioned by landowners and train personnel interacting with landowners on how to discuss these constraints. A document could be developed listing and addressing constraints with illustrative cases for training MnDOT staff.

Incentives for adoption: As is the case with constraints to adoption, there are a number of different incentives that appeal to and motivate individual landowners, although financial incentives are required. Based on the results of this study, MnDOT should review and revise the range of incentives they provide landowners, taking into account location and individual landowner interests.

Outreach program:

- Indirect outreach: Although indirect outreach methods (posters, pamphlets, TV and radio spots, social media) reached few of the surveyed landowners, data from hits and shares from social media indicated considerable interest in the postings. The low impact could have been due to the limited time the outreach program ran. Thus, we recommend a continuous, phased, and strategic program of indirect outreach to target both landowners and communities.
- Direct outreach: The results of the outreach program and answers provided to surveys indicate that a direct approach (letters, phone calls, landowner meetings) could be the best strategy to contact individual landowners with properties adjacent to problem areas. With the newly structured MnDOT snow control program, this approach could be possible. Individuals from that program could also receive the training mentioned previously.
- Engaging communities and local agencies: Local communities and agencies (community groups, law enforcement, soil and water conservation districts [SWCDs], natural resources conservation services [NRCS} demonstrated considerable interest and support, thus MnDOT should coordinate with those groups and agencies.

Follow-up research and demonstration: Landowners expressed interest in seeing snow control measures demonstrated to help them make a decision and were concerned about moisture issues in the snow catch areas of their fields. MnDOT should consider establishing snow control measures to act as demonstrations but also as a way to measure and better understand the impact of snow fences on soil moisture and cropping operations. The farmer-to-farmer networking tool was well received by the snow control team and will probably require maintenance and improvements to ensure its usefulness.

CHAPTER 1: INTRODUCTION

Previous research that estimated the costs and benefits of snow control measures for MnDOT in terms of reducing the costs of mitigating blowing and drifting snow problem areas (MN/RC 2012-03) demonstrated the ability of snow control measures to significantly lower these costs for MnDOT districts. Follow-up research specifically addressed MnDOT staff knowledge, attitudes and practices related to the promotion and implementation of snow control measures (Contract 99008, Work order 206). That research effort identified a need for a better understanding of landowner knowledge, attitudes and practices related to snow control measures (Contract 99008, Work order 206) to expand landowner adoption of these measures. The overall goal of this project was to reduce blowing and drifting snow problems as well as the state's associated costs and to improve public safety through an effective outreach program to landowners and their subsequent adoption of snow control measures. The objectives of the project were: 1) carry out meetings with MnDOT personnel, landowners and community stakeholders in four regions of the state selected to represent different landowner, cropping and physiographic conditions; 2) based on the objective one meetings, design and carry out a landowner KAP (knowledge, attitudes and practices) survey related to snow control problems and mitigation measures; 3) implement a snow fence promotional program; 4) carry out a post-promotion KAP study to measure changes in landowner knowledge, attitudes and practices; 5) based on the results of the KAP study, design an outreach plan that addresses landowner constraints and positive attitudes toward snow control measures to promote greater adoption of these measures to achieve the associated public safety benefits and cost savings; and 5) prepare a snow control practice database and tool that will allow farmer-to-farmer networking relative to snow control measures and also assist MnDOT with reporting on these measures

1.1 KEY EXPECTED BENEFITS FROM THE PROJECT

- **Operations and Maintenance Savings**:
  - Reduction in costs to remove snow drifts and treat blow ice
  - Reduction in travel delays
  - Reduction in costs and damages due to crashes
  - Environmental benefits due to reduced chemical application
  - Increased carbon storage if perennial vegetation is planted
  - Improved landowner outreach
- **Decreased Engineering/Administrative costs:**
  - More efficient and effective landowner engagement
  - Avoiding condemnation costs

The benefits are important because they reduce costs for MnDOT, reduce travel costs and accidents for roadway users improving highway safety, and create important habitat along the state's highways. The results of the project will be used to promote greater adoption of snow control measures throughout the state with the associated benefits described above.

Operations and maintenance savings were estimated using existing cost-benefit analyses carried out with the calculator prepared in a previous MnDOT/UMN project (MN/RC 2012-03). Moving forward, MnDOT district personnel will carry out cost-benefit analyses of proposed snow control projects when they demonstrate a positive cost-benefit analysis.

1.2 SUMMARY OF RESEARCH TASKS

The research methodology involved the following tasks. Task 1: Four regions of the state were defined, and problem road corridors identified for the project work. Criteria for region and corridor selection were based on differences in land cover, land use, topography, and other attributes selected to reflect diversity in the state. Task 2: Farmer and stakeholder group meetings were used as an initial evaluation of the knowledge, attitudes and practices demonstrated by landowners and stakeholders relative to the costs, benefits, and interest in implementing snow control measures, gaps in knowledge related to snow control measures, and MnDOT snow control programs. Task 3: A pre-outreach and promotion KAP survey to gauge knowledge, attitudes and practices of landowners relative to snow control measures was designed and carried out. Task 4: Based on the results of the KAP survey and group meetings, an outreach program for landowners to promote their adoption of snow control measures was designed and implemented. Task 5: A second KAP survey was sent to the same landowners located in problem areas to gauge changes in knowledge, attitudes and practices related to snow control measures to evaluate landowner outreach in an effort to design more effective outreach programs for MnDOT districts. Task 6: A farmer-to-farmer networking tool was developed to identify existing snow control measures that prospective farmers could visit and/or discuss with the farmer who implemented them. The same tool will be used by MnDOT to maintain an inventory of snow control measures and report on the snow control program. Task 7: A final memorandum on research benefits and implementation steps was prepared. Tasks 8 and 9: The final report was prepared, reviewed by MnDOT and the Technical Advisory Panel (TAP), and published.

1.3 WHAT IS A KAP STUDY?[1]

We used the KAP methodology for this study to better understand landowner knowledge, attitudes and practices related to snow control measures and MnDOT's snow control program as well as evaluate the impact of the short-term outreach program carried out as part of the research project. A KAP study is a social research method that measures changes in human knowledge, attitudes and practices in response to a specific project activity, usually education or outreach. KAP studies can also detect people's barriers and constraints. Measuring changes in knowledge, attitudes and practices are the minimum values for evaluating outcomes on audiences. The KAP methodology follows standard social research protocols

[1] Much of this description comes from a presentation by Dr. Karlyn Eckman, a UMN expert in the KAP methodology, presented to MnDOT personnel on November 22, 2016. Dr. Eckman was contracted to assist with the application of the methodology.

and can help biophysical scientists and practitioners better understand social dimensions of their research and outreach programs.

1.4 KAP METHODOLOGY USED

The KAP process starts with a Gap exercise to identify the gaps in the team knowledge of their audience or the audiences' understanding of a certain topic. In this case, it was the MnDOT team's understanding of landowner knowledge and concerns related to snow control problems and the MnDOT program to address them as well as the landowners' perceptions of the snow control problem and knowledge of the MnDOT landowner programs meant to address these problems. An initial meeting was held with the TAP and district representatives at the Arden Hills MnDOT Training and Conference Center to gauge their understanding of landowner knowledge and attitudes. Following that meeting, two "listening sessions" were held in all four regions of the state near the selected snow problem highway corridor areas, one with MnDOT district personnel and the other with local landowners and community stakeholders to gauge their perceptions of highway-related snow control problems and knowledge of MnDOT programs.

Based on the results of the MnDOT and landowner meetings/listening sessions, an initial KAP survey of landowners living and farming along the snow-problem corridors was designed and carried out. The survey was designed to identify their knowledge, attitudes and practices relative to snow problems and MnDOT's snow control programs for landowners, as their interest in, ability to, and constraints to adopting these measures on their properties.

The initial KAP study and the information gathered from the listening sessions, as well as suggestions from the TAP, were used to design an outreach program using both direct (mailings, landowner meetings) and indirect (posters, press releases, radio and television spots, as well as social media postings) outreach methods. The outreach program was then followed by a second KAP survey with the original questions plus additional questions to gauge the effectiveness of the different outreach methods. We then compared the changes in knowledge, attitudes and practices between the first and second surveys.

1.5 FARMER-TO-FARMER NETWORKING TOOL

In addition to the KAP study and outreach plan, the project prepared a farmer-to-farmer networking tool. This tool provides information on snow control measures implemented throughout the state by MnDOT in collaboration with landowners. The tool will allow MnDOT to identify existing snow control measures that can be used as demonstrations for landowners interested in installing a practice. Landowners will, with or without assistance from MnDOT, be able to identify and visit an existing installation and hear from one of their peers about the costs and benefits of installing and maintaining snow control measures. MnDOT will decide how to implement the tool. This tool was also designed to provide a database and inventory of existing snow control measures and will provide MnDOT the ability

to produce reports on the snow control program as well as case studies including photos and videos of selected snow control measures as needed.

CHAPTER 2: IDENTIFICATION OF SNOW PROBLEM CORRIDORS

In the initial step of the present study, four regions and corridors with snow problems were identified. We selected regions to reflect the state's diverse geography, agroecology, land tenure, and blowing and drifting snow problems. At the outset, MnDOT employees Dan Gullickson and Julie Groetsch recommended 13 potential sites, all of which were Trunk Highways (TH) within State Transportation Improvement Program (STIP) areas and had documented blowing and drifting snow problems. Members of the Technical Advisory Panel (TAP) met to discuss and later to vote upon the proposed sites. The following four corridors were selected: TH 2 – MnDOT District 2 (Polk County), TH 210/169 – MnDOT District 3 (Aitkin County), TH 250 – MnDOT District 6 (Fillmore County), and TH 4 – MnDOT District 7 (Brown and Watonwan Counties). Abbreviations for district names (i.e. using D2 to refer to District 2) will be used throughout this report.

2.1 SELECTION CRITERIA

TAP members considered the following characteristics when selecting a diverse, representative sample of four Minnesota regions and corridors:

- Agroecological zone
- Land use – urban, rural, agricultural, etc.
- Land cover – farm, forest, lake, wetland, etc.
- Road type – interstate/limited access, four-lane, two-lane, etc.
- Topography – flat, hilly, driftless, etc.
- Type of land ownership – owner-operators, renters, corporate, etc.
- Involvement in STIP
- MnDOT Project Managers' willingness to carry out study

2.2 IDENTIFIED REGIONS/CORRIDORS

2.2.1 TH 2 – MnDOT District 2 – Polk County

This corridor is in the northwestern region of the state in the ag-dominated Red River Valley. The area is flat and characterized by soybean and sugar beet fields with relatively high land values. The corridor is a straight, northwest-southeast, four-lane highway between the town of Fischer and East Grand Forks and has six to nine identified snow trap sites. It is representative of other snow problem areas in the northwestern part of the state.

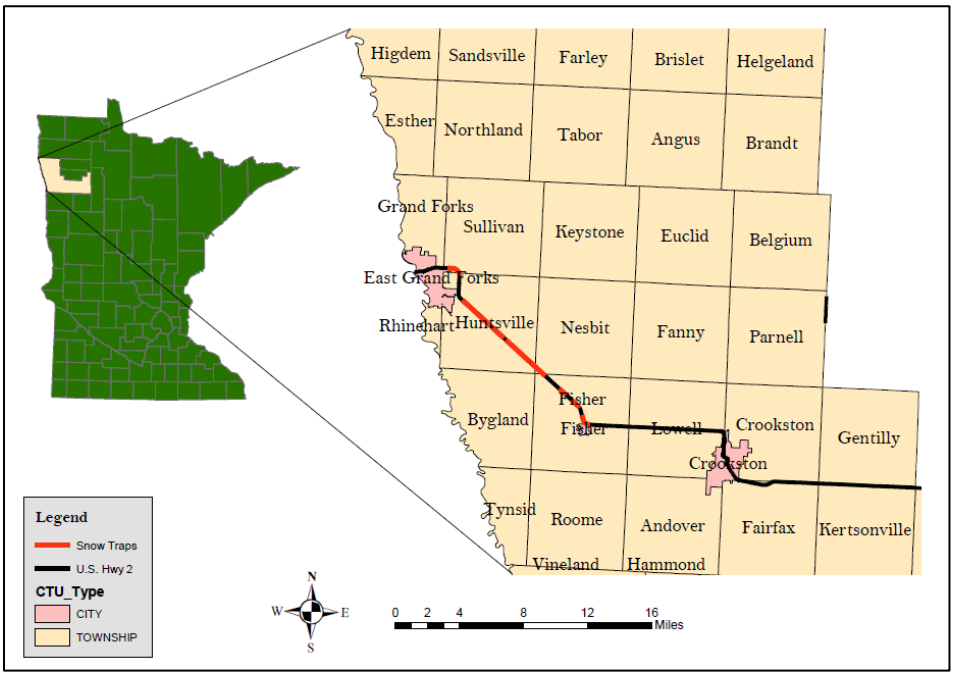


Figure 2-1: Map of TH 2 - District 2 (Polk Co) Snow Traps

2.2.2 TH 210/169 – MnDOT District 3 – Aitkin County

This corridor is in an area called the Aitkin Flats and is characterized by peatland harvesting, corn and soybean fields, and hay meadows. There are seven snow trap sites within the corridor, some of which are of significant size. The concept of snow control measures is not new to all landowners, as one farmer in the area established standing corn rows during the 2017-2018 winter season. The corridor, which is a straight, two-lane highway, is representative of other snow problem areas in the northeastern and north-central parts of the state.

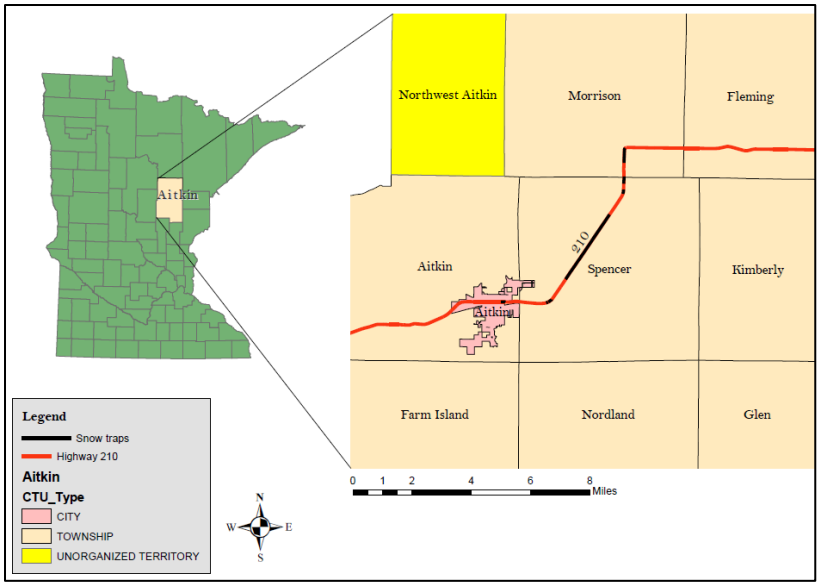


Figure 2-2: Map of TH 210/169 - District 3 (Aitkin Co) Snow Traps

2.2.3 TH – 250 – MnDOT District 6 – Fillmore County

This corridor is in Minnesota's Driftless Area, a region that was never glaciated, thus resulting in deeply-carved river valleys and hilly terrain. It is characterized by smaller agricultural fields for crops (primarily corn, soybeans, and canning crops) and dairy operations. The corridor is a north-south, two-lane highway with straight and curvy sections. It is representative of other snow problem areas in the southeastern portion of the state.

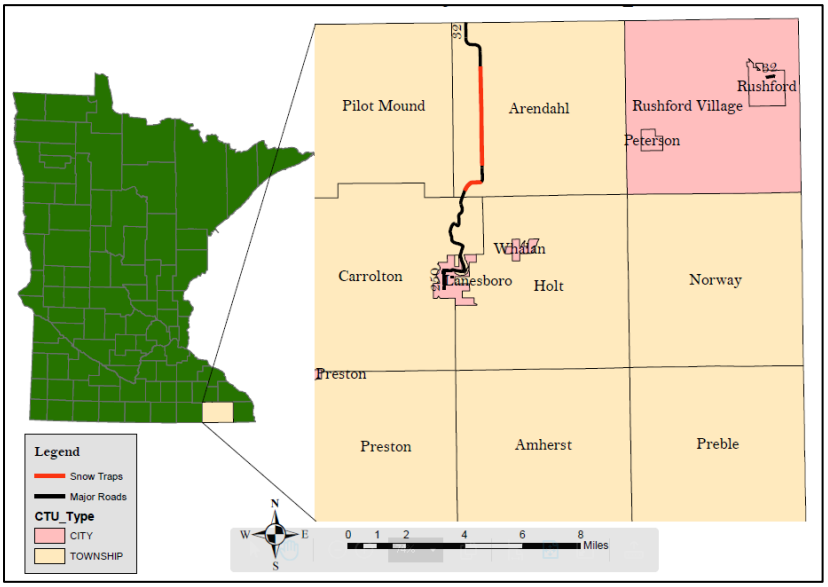


Figure 2-3: Map of TH 250 - District 6 (Fillmore Co) Snow Traps

2.2.4 TH – 4 MnDOT District 7 – Brown and Watonwan Counties

This corridor is in the southwestern portion of the state, which is flat, open and dominated by corn and soybean fields. It is a straight, north-south (with one east-west section) two-lane highway between the towns of Sleepy Eye and St. James. It is a good representation of other snow problem corridors in the southwest, south-central, and west-central portions of the state.

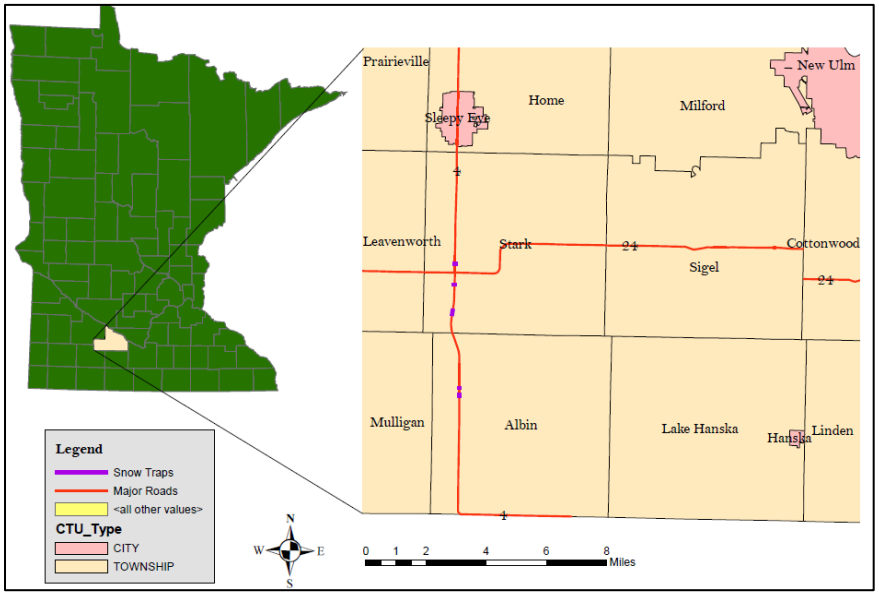


Figure 2-4: Map of TH 4 - District 7 (Brown Co) Snow Traps

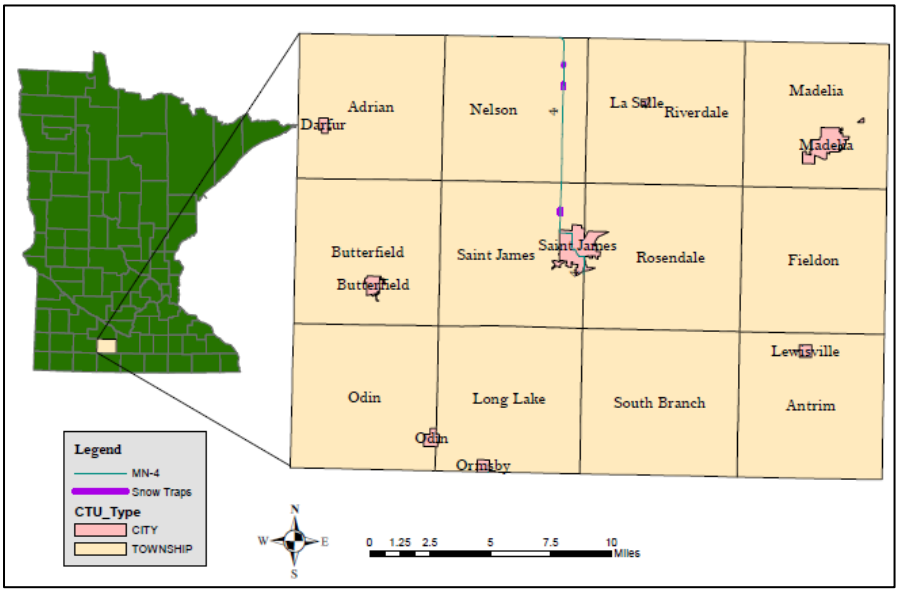


Figure 2-5: Map of TH 4 - District 7 (Watonwan Co) Snow Traps

CHAPTER 3: GAP EXERCISE AND LISTENING SESSIONS

3.1 INTRODUCTION AND METHODS

In the second step of the present study, a Gap exercise was completed in the Twin Cities with members of the MnDOT TAP and snow problem area MnDOT employees followed by, two listening sessions (one with MnDOT district staff members and another with key community stakeholders) conducted in each of the regions that contain the identified snow problem corridors. The findings from the Gap exercise and listening sessions helped inform the preparation of the pre and post-outreach KAP surveys by identifying essential questions and response options.

As its name implies, a Gap exercise is a guided brainstorming session that seeks to identify a group's gaps in knowledge about an audience or an activity. In this case, it enabled the TAP to discuss "what we don't know" about landowners' perceptions of and willingness to adopt snow control measures. The exercise involves writing questions on Post-Its and then organizing them into themes or constructs (Figure 3-1). The Gap exercise was facilitated by Dr. Karlyn Eckman of the University of Minnesota in mid-October 2018.

Figure 3-1: Categorization of comments from Gap Exercise

To supplement the findings from the Gap exercise and provide critical insight from local MnDOT staff and community members, listening sessions were carried out. A listening session, like a focus group, is a guided conversation or group interview, wherein a facilitator asks questions in an open, non-threatening manner to parse out participants' opinions towards and understanding of a topic. Both listening sessions were invitation-only. The MnDOT district listening sessions were comprised of engineers,

project managers, maintenance personnel, snowplow operators, roadway permitting employees, and public engagement staff. The hope was to curate a diverse group of MnDOT staff members that have distinct experiences with the Blowing Snow Control Program. The community listening sessions included farmers, local government officials, local business owners, law enforcement officers, EMS staff, city/county/township plow operators, and commuters. These community stakeholders were selected for their assumed familiarity with winter driving conditions in the area and relationships with local landowners.

UMN researchers facilitated the listening sessions by posing questions related to participants' experience and knowledge of snow problems and snow control measures (Figure 3-2). The questions focused on six main topics: 1) commentary on snow problems in the area 2) knowledge, attitudes, and practices related to snow control measures 3) constraints to adoption of snow control measures 4) incentives for adoption of snow control measures 5) promotion of snow control measures and 6) recommendations for MnDOT's Blowing Snow Control Program. The listening sessions were held in MnDOT offices and community centers in late-November and early-December 2018. See Appendix A for Community and MnDOT listening session scripts and questions. See Appendix B for listening session summaries.

Figure 3-2: Community listening session - St. James, MN; Photo credit: Gary Wyatt

3.2 GAP EXERCISE RESULTS

The Gap Exercise yielded five major gaps in the TAP's knowledge about landowners. These gaps later became the five primary sections of the pre-outreach KAP survey; thus, all questions directly related to at least one of the following gaps:

1. Knowledge, attitudes, and practices with respect to snow problems in the area
    - How do landowners perceive blowing and drifting snow problems on the road adjacent to their property?
2. Knowledge, attitudes, and practices with respect to MnDOT's Blowing Snow Control Program
    - What do landowners know and/or think about MnDOT's Blowing Snow Control Program?
3. Constraints to and incentives for adoption
    - What would encourage or prevent landowners from adopting a snow control measure on their property?
4. Personal involvement and sources of information
    - What sorts of activities are landowners involved in and where do they get their news and information?
5. Land use
    - How do landowners use and make decisions about their property?

3.3 LISTENING SESSION RESULTS

Although each listening session was unique, trends related to snow problems and snow control measures were evident. The findings were organized into the six main question categories: 1) commentary on snow problems in the area; 2) knowledge, attitudes, and practices related to snow control measures and the MnDOT snow control program; 3) constraints to adoption of snow control measures; 4) incentives for adoption of snow control measures; 5) promotion of snow control measures; and 6) recommendations for MnDOT's Blowing Snow Control Program. Transcription summaries of all listening sessions are included in Appendix B.

3.3.1 Commentary on snow problems in the area:

MnDOT District Listening Sessions: All MnDOT district listening sessions brought up the identified corridors as snow problem areas without prompt from the researchers. District 2 MnDOT staff were notably emphatic about issues and safety concerns on TH 2.

Community Listening Sessions: All community listening sessions mentioned the identified corridors when asked without prompting from the research team. District 2 and District 3 community members were especially passionate about the poor conditions of TH 210/169 and TH2, respectively. In District 3, one community member suggested invocation of eminent domain and condemnation. These findings

suggest that MnDOT's documented snow problem areas are also considered hazardous by local community members.

3.3.2 Knowledge, attitudes, and practices related to snow control measures:

MnDOT District Listening Sessions: As expected, all MnDOT district staff were familiar with snow control measures and MnDOT's Blowing Snow Control Program. District 7 and District 4 (a few D4 staff members attended the D2 listening session) seemed to have the most experience with the program and greatest number of successful installations.

Community Listening Sessions: With respect to community members, there seems to be a lack of knowledge about snow control measures and MnDOT's program, especially among community members that do not own large tracts of land (i.e. non-farmers).

MnDOT district staff and community members were unfamiliar with and/or confused by the term *snow control measures.* Initial use of the term would require a definition for clarification. Listening session participants were more familiar with and preferred the term *snow fences.*

3.3.3 Constraints to adoption of snow control measures

Many constraints were mentioned in all listening sessions. The following is a list of constraints mentioned by MnDOT District staff and community stakeholders, from those most frequently mentioned to least frequently mentioned. Constraints that were only mentioned once include an italicized reference to the specific listening session.

1. Inconvenience to farming operations (due to size and maneuverability of equipment, harvesting/tilling method, etc.)
2. Hassle of having to combine corn in the spring/increased workload
3. Increased soil moisture/delayed spring planting in snow catch area
4. Concerns that herbicides and pesticides applied to adjacent crops will kill living snow fences
5. High maintenance requirement
6. Loss of productive acres
7. Weed problems caused by living snow fences
8. Anti-government sentiment
9. Insufficient compensation
10. Registration process is too complicated
11. Concerns about snow control measures shading out crops
12. Concerns about living snow fences extracting nutrients from soil
13. Lack of education about snow control measures – *D3 community session*
14. Aesthetic concerns – *D2 MnDOT district session*
15. Perception of farm operations not being done; "It's not how a field should look" – *D6 community session*
16. Neighboring farms are not on the same crop cycle (one has corn, one has beans), thus complicating implementation of a corridor – *D6 MnDOT district session*

17. Impact on other farm programs (crop acre base, crop insurance, etc.) – *D6 community session*
18. Tile drainage issues – *D7 MnDOT district session*
19. "It's my land; I decide what to do with it" – *D7 community session*
20. Increase soil compaction and moving of topsoil (specific to snow berms) – *D7 community session*

MnDOT District Listening Sessions: The only abovementioned constraint to be mentioned in all MnDOT district listening sessions was – *Hassle of having to combine corn in the spring/increased workload.* The second most common constraint (discussed in all district listening sessions except D7) was *Increased soil moisture/delayed spring planting in snow catch area*. Other constraints that were mentioned in multiple district listening sessions were: *Inconvenience to farming operations* (D6 & D7), *Anti-government sentiment* (D6 & D7), *Weed problems caused by living snow fences* (D7 & D2), *High maintenance requirement* (D7 & D2), *Concerns that herbicides applied to adjacent crops will kill living snow fences* (D3 & D2).

Community Listening Sessions: The only abovementioned constraint to be mentioned in all community listening sessions was – *Inconvenience to farming operations (due to size and maneuverability of equipment, harvesting/tilling method, etc.). Increased soil moisture/delayed spring planting* was mentioned in all community listening sessions except D7. Similarly, *concerns that herbicides and pesticides will kill living snow fences applied to adjacent crops* was mentioned in all community listening sessions except D6. The following constraints were mentioned in at least two community listening sessions: *Loss of productive acres* (D3 & D2), *Hassle of having to combine corn in the spring…*(D6 & D7), *High maintenance requirement* (D7 & D2).

3.3.4 Incentives for adoption of snow control measures

Many incentives were mentioned in all listening sessions. Below is a complete list of those incentives, from most frequently mentioned to least frequently mentioned.

1. Adequate financial incentives
2. Examples and testimonials of successful installations
3. Knowledge of public safety benefits
4. Tax incentives instead of direct payment

MnDOT District Listening Sessions: Sufficient monetary compensation was a key incentive mentioned during all MnDOT district listening sessions. District 6 MnDOT staff proposed the *tax incentives instead of direct payment* and the *examples and testimonials of successful installations* incentive options. District 3 brought up the importance of educating prospective landowners about the public safety benefits.

Community Listening Sessions: Sufficient monetary compensation was a key incentive mentioned during all community listening sessions. District 6 community members recommended the use of testimonials, while District 7 community stakeholders iterated the importance of public safety benefits.

When asked about the value and utility of offering public recognition (e.g. road signs, announcements in papers) to participating landowners, listening session attitudes varied from group to group. Some

sessions ardently opposed the idea, saying “It’s a waste of time and money (D7 community session and D3 MnDOT district session); “It ain’t gonna make no difference” (D7 community session); and that farmers don’t want to broadcast information about which and how much land they own (D7 community session). Other sessions said that desire for recognition would vary from farmer to farmer (D7 MnDOT district session). The District 2 MnDOT district meeting was the most supportive of the idea, saying “It’s free advertising”; “Everybody’s looking for recognition”; and **“**Large farmers [relatively common in Red River Valley] would not do it for the money, it’d be for recognition or societal benefits”.

3.3.5 Promotion of snow control measures

- There was consensus among all groups that when choosing corridors to target, MnDOT ought to select areas that have severe problems and relatively high daily traffic, so that visibility of the benefits is clear. The hope is that a successful pilot project would promote itself and convince other area landowners to participate.
- There was also agreement that MnDOT should use group meetings (with all adjacent landowners) to promote snow control measures in corridors. This would enable collaboration, brainstorming, and natural peer influence. Listening session participants also recommended that MnDOT bring outputs from the Cost-Benefit Tool to these meetings and information about all types of snow control measures. These practices would include landowners in the design process, demonstrate MnDOT’s tailored approach to snow control measure implementation, and ultimately help “make it their [the landowners’] idea”.
- When asked who MnDOT should speak with (landowner, renter, etc.) when promoting the program, there was overwhelming consensus to begin the conversation with the landowner, as he or she would make the final decision about program enrollment.
- All listening sessions recommended that MnDOT establish strategic partnerships with agricultural organizations and local governments when promoting the program. Commonly mentioned partners included: SWCD/NRCS offices, crop consultants, agronomists, seed dealers, city, county, and township boards**,** BWSR.
- When asked about the value and utility of developing an online Farmer-to-Farmer Networking Tool, most listening session participants agreed that “it’s worth a try”. Many also said that the tool will be most impactful if it were advertised by community groups ((NRCS, SWCD, SFA, FFA, 4H, UMN, Rotary Club, Lions Club)
- All groups agreed that testimonials (i.e. case studies) from participating landowners will encourage others to adopt.
- All groups were emphatically opposed to the use of eminent domain and condemnation to establish snow control measures, as such forceful actions would damage the reputation of the program and discourage future participation.

3.3.6 Recommendations for MnDOT’s Blowing Snow Control Program.

This part of the listening session afforded participants the opportunity to brainstorm and contribute new, creative ideas to the program. The following ideas were only mentioned once during the listening sessions. Recommendations include an italicized reference to the specific listening session.

- MnDOT could offer compensation to landowners that allow plow drivers to windrow snow berms on their property – just as it does for other types of snow control measures (*D6 community session*).
- MnDOT could also offer compensation to farmers who windrow snow berms on their own property (*D7 community session*).
- To avoid concerns about increased soil moisture and delayed spring planting caused by lingering snow piles, MnDOT could offer to blow out or spread the piles evenly across the field. On a related note, MnDOT could also study the effect of snow control measures on springtime soil moisture (*D2 MnDOT district session*).
- MnDOT could develop a program/agreement wherein landowners would have ditch haying rights (waive permit requirement) in exchange for standing corn rows, etc. along their property (*D6 community session*).
- In high-priority areas, MnDOT could install a snow control measure within the Right-of-Way (assuming it's a larger Right-of-Way, ~75-80ft); The measure could be effective for a portion of the winter, then MnDOT could clear and/or blow out the snow catch area before the pile reaches the road (*D2 MnDOT district session*).

CHAPTER 4: PRE-OUTREACH KAP SURVEY

4.1 INTRODUCTION AND METHODS

In the third phase of the present study, a 34-question survey (Appendix C) was administered to landowners, those with and without problem areas adjacent to their property, along each of the snow problem corridors identified in Chapter 1. Landowner contact information was obtained from county websites. To maximize sample size, all landowners in each corridor were invited to participate in the survey. Because there is variation in the length and size of landholdings in each corridor, the size of each sampling frame was different (Table 3.1).

The survey questions and responses were developed based on the findings from the Gap exercise and the district and community listening sessions. The survey was mixed-mode; thus, landowners could complete the survey online (via Qualtrics) or in paper form. Before launching the survey, the questionnaire was revised and pre-tested by members of the TAP, qualitative methods consultants, graduate students, and local farmers. In mid-December 2018, landowners were mailed a prenotice letter which introduced the study. On December 22, 2018, landowners were mailed a cover letter (which included an information and consent form) and paper questionnaire. A reminder letter and additional questionnaire were mailed on December 31, 2018. The pre-outreach survey results are included in Appendix D.

4.1.1 Pre-outreach KAP survey response rates

Size of sampling frame and response rates varied by district.

Table 4-1: Pre-outreach KAP response rates, by corridor

TH 2 – District 2 (Polk County) **Response Rate: 20%** Size of sampling frame: 61 Number of respondents: 12	**TH 210/169 – District 3 (Aitkin County)** **Response Rate: 35%** Size of sampling frame: 51 Number of respondents: 18
TH 250 – District 6 (Fillmore County) **Response Rate: 44%** Size of sampling frame: 36 Number of respondents: 16	**TH 4 – District 7 (Brown and Watwonwan Counties)** **Response Rate: 44%** Size of sampling frame: 118 Number of respondents: 52

4.2 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations are divided into five sections (consistent with the questionnaire): Snow Problems, Snow Control Measures, Willingness to Adopt Snow Control Measures, Personal Involvement and Sources of Information, and Background Information and Your Property.

4.2.1 Snow Problems

Landowners perceive snow problems on the identified corridors – With the exception of District 2, where 50.00% of respondents reported a lack of awareness of snow problems along Highway 2, respondents in all other districts indicated that the identified corridors continually experience issues caused by blowing and/or drifting snow. This finding reinforces a concept observed during the listening sessions: MnDOT's documented snow problem areas are also often considered hazardous by local community members.

Clear roadways (those free of snow and ice) are important to landowners – Generally speaking, landowners along the identified corridors report that clear roadways are either very or moderately important. While this finding is useful in determining landowners' perceptions of clear roadways, it does not suggest compulsion or obligation to prevent and/or mitigate snow problems.

4.2.1.1 Recommendations

Though there is landowner consensus that snow problems exist along the identified corridors, MnDOT should not assume that all landowners are aware of these problems. Prior to promoting snow control measures to a landowner or group of landowners, MnDOT should determine if, in fact, landowners perceive snow problems along the targeted roadway. Historical anecdotes of MnDOT personnel suggest that landowners are more likely to seek a solution (i.e. implement a snow control measure) if they believe there is a problem. If a landowner is unaware of snow problems along the corridor, MnDOT could use metrics including crash data, fatality data, etc. as convincing evidence.

4.2.2 Snow Control Measures

Familiarity with snow control measures varies by district – Survey responses indicate that landowner knowledge of snow control measures is inconsistent throughout the state. Overall, District 3 was most unfamiliar with snow control measures, while District 7 was the most familiar. Furthermore, some types of snow control measures were more familiar than others, depending on the district. For example, District 6 and 7 landowners were the most likely to have seen windrowed snow berms and standing corn rows, while District 3 landowners were the most likely to have seen temporary snow fences.

Awareness of MnDOT's Blowing Snow Control Program is low, varies slightly by district – In Districts 2, 3, and 6, the majority of landowners were unaware of MnDOT's Blowing Snow Control Program. This perceived lack of knowledge is supported by the prevalence of the *Don't know* answer choice in

questions assessing landowners' familiarity with online MnDOT resources (e.g. Cost-Benefit Tool, Living Snow Fences website), preferences about incentive payments, contract types, and snow control measure types, and opinions about maintenance activities. In District 7, a slight majority (64.29%) of landowners were aware of the program. This is consistent with an observation from the listening sessions: District 7 MnDOT staff and community members appeared to have relatively high knowledge of and experience with snow control measures.

Landowner interest in MnDOT's Blowing Snow Control Program is moderate – With the exception of District 7, the highest proportion of respondents (in all other districts) indicated that they were only somewhat interested in adopting snow control measures and participating in the program. Another common answer choice to questions evaluating landowners' interest in the program was *Need more info,* which clearly suggests that additional information is required in order to consider adoption.

4.2.2.1 Recommendations

Due to a lack of knowledge of snow control measures and the program, MnDOT should prioritize efforts and resources that aim to increase public awareness. Responses to Q11, which asked about landowners' preferred way to learn more about the Blowing Snow Control Program, indicate that landowners either do not have a preferred way to learn more about the program or would prefer individual meetings with MnDOT staff, depending on the district.

4.2.3 Willingness to Adopt Snow Control Measures

Monetary compensation is an important incentive for adoption – When asked what would help them adopt a snow control measure on their property, landowners in all districts most often selected the *Monetary incentives* answer choice. This unambiguously demonstrates the importance of incenting landowner participation with money.

Prevalence of *Don't know* answer choice presents a promotional opportunity – After *Monetary incentives,* the second most commonly selected incentive to adoption was *Don't know*. This may suggest that landowners are either not sure what would help them a adopt snow control measure or have not thought about it. MnDOT's future promotional efforts could provide information about snow control measures' public safety benefits, environmental advantages, etc. in order to educate landowners and help them understand the suite of benefits associated with program participation.

There is no simple, singular constraint to adoption – Although *Inconvenience to farming operations* was the most commonly selected constraint (according to frequency average), many of the listed constraints were regarded with similar levels of importance. This finding suggests that many factors prevent a landowner from adopting a snow control measure; and thus, future outreach efforts should effectively address as many potential constraints as possible and work with landowners on their specific concerns. Individualized plans will be important.

Preferred snow control measure types vary by district – Not all districts prefer the same type of snow control measure. For example, when asked which snow control type they be most likely to adopt, landowners in District 3 indicated a preference for living snow fences, while landowners in District 7 expressed interest in standing corn rows.

4.2.3.1 Recommendations

Based on the above conclusion that landowners are motivated by monetary incentives, in future marketing efforts, MnDOT should emphasize that landowners receive payments for participating in the program. On a related note, it may be helpful for MnDOT to determine what level of compensation (i.e. payment size) would most effectively encourage landowners to participate. This could be achieved with a contingent valuation, or willingness-to-accept, survey question.

Furthermore, because of the lack of awareness about the program and the prevalence of the *Don't know* answer choice, MnDOT should promote snow control measures' public safety and environmental benefits. Lastly, since landowners are constrained by a variety of factors, it will be important for MnDOT to promote its collection of snow control measure types and tailored implementation approach – which aims to meet the unique needs of individual landowners, so as to dispel any constraint or concern that a landowner may have. MnDOT staff should be prepared to address all landowner constraints and concerns.

4.2.4 Personal Involvement and Sources of Information

***Church groups* and *Cooperatives* are relatively common among landowners –** When asked which groups, organizations, etc. landowners belong to, the highest proportion in all districts indicated involvement in *Church groups* and *Cooperatives* (agricultural, electric, etc.). This finding may shed light on potential avenues for future promotional efforts.

***TV* and *Radio* are the preferred information sources for winter driving conditions –** Most landowners in all districts selected *TV* and *Radio* when asked where they get information about winter driving conditions. This discovery reveals data about landowners' trusted information sources and a potential outreach channel for MnDOT.

***Individual Facebook pages* are relatively common among landowners who use social media –** Though a significant proportion of landowners indicated that they do not use social media, many landowners who do, stated that *Individual Facebook pages* were their preferred channel.

***Family members*, *Neighbors,* and *Crop consultants/Agronomists* are influential in land-use decision-making, varying slightly between districts –** Overall, when asked where they seek information when making land-use decisions, landowners most commonly indicated *Family*. In Districts 2 and 3, the other most common answer was *Neighbors*. In Districts 6 and 7, *Crop consultants/Agronomists* was another frequent selection. This finding offers insight into influential information sources related to land-use.

4.2.4.1 Recommendations

The abovementioned entities (church groups, cooperatives, TV, Facebook, etc.) should be prioritized when seeking effective promotional avenues for the Blowing Snow Control program. Furthermore, Q20 and Q24 (see Appendix D) provide lists of specific organizations, groups, agencies, etc. that landowners belong to and/or consult. Future outreach efforts in Districts 2, 3, 6, and 7 should incorporate these avenues.

Because of the apparent influence of family members and neighbors, MnDOT could attempt to establish a snow control measure in an area with severe snow problems (e.g. high number of crashes or fatalities) and high daily traffic. This will enable nearby landowners and local community members to observe the benefits and efficacy of snow control measures. Conversation, consideration, and peer influence would be natural consequences of snow control measure establishment in a high-need, high visibility area.

Moreover, MnDOT could identify a snow control advocate, or a landowner that has implemented a snow control measure on his or her property and is willing to publicly support the program. MnDOT could then leverage the influence of the advocate by writing a testimonial and/or referring other interested landowners to the advocate.

4.2.5 Background Information and Your Property

Property type and land-use vary by district – Given the agroecological diversity of the identified corridors, it is unsurprising that property type and land-use varied across districts. *Single family farm* was the most common response for landowners in Districts 6 and 7, while *Commercial* and *Residential* were the most frequent in Districts 2 and 3, respectively. As shown in Q28, there was also significant diversity in the types of farming operations in each of the districts.

Landowners (as opposed to renters, etc.) most often hold decision-making power – When asked who makes land-use decisions on their property, landowners in all districts most commonly answered *I make the decisions,* followed by *Family members and I make the decisions together.* This finding is consistent with an observation from the listening sessions.

Landowners prefer to be contacted by email, mail, and cell phone – There was strong consensus across districts that these contact methods are preferred.

4.2.5.1 Recommendations

Due to the evident diversity in land-use and property type of landowners across the districts, MnDOT should tailor marketing messages based on the district and/or individual landowner. For example, it would be unwise for MnDOT to promote standing corn rows in District 2, where few landowners farm corn.

Also, as recommended during the listening sessions, MnDOT should always begin the conversation about snow control measures and MnDOT's Blowing Snow Control Program with landowners, rather than renters, family members, etc.

Initial contact with landowners may be most effective via email, mail, and or cell phone. Due to data privacy challenges, however, it may be difficult to find email addresses and cell phone numbers of targeted landowners.

CHAPTER 5: OUTREACH AND PROMOTION WITH LANDOWNERS

5.1 INTRODUCTION AND METHODS

In the fourth phase of the present study, pre-outreach KAP survey results were used to design and implement an outreach and promotional program. To begin, the research team and TAP members identified a central goal and three objectives:

> **Goal:** Promote changes in knowledge, attitudes, and practices leading to greater adoption of blowing snow control measures in highway corridors through a combination of direct (meetings with landowners) and indirect (mixed media campaign – print, radio, television, and social media) outreach to problem area landowners, i.e. PALs (landowners with property that is adjacent to documented snow traps), local communities, and MnDOT district staff members.

- **Objective 1**: Obtain an increase in adoption of blowing snow control measures along highway corridors in D2, D3, D6, and D7 through a combination of direct and indirect outreach to PALs.
- **Objective 2**: Generate community knowledge of, and appreciation for, blowing snow control measures along highway corridors in D2, D3, D6, and D7 through indirect outreach to local communities near snow problem areas.
- **Objective 3:** Increase MnDOT district staff members' (in D2, D3, D6, and D7) knowledge of landowner constraints and advocacy for the Blowing Snow Control Program through participation in direct and indirect outreach efforts.

Once the goal and objectives were finalized, the research team, TAP members, and district staff initiated the indirect outreach activities. Posters, bulletins, and pamphlets for the Blowing Snow Control Program were reviewed, revised, and delivered to venues (e.g. implement dealers, agricultural organizations, co-ops, churches) that were mentioned in the pre-outreach KAP surveys and listening sessions. A press release was drafted and disseminated to local publications in each of the districts (Appendix F). Radio interviews were conducted in Districts 3 and 7 (KKIN and KNUJ, respectively); and a television interview was conducted in District 7 (KEYC). The Blowing Snow Control Program website content was reviewed and revised. Additionally, a month-long social media campaign was launched by sponsoring Facebook posts in areas surrounding the identified corridors. Implement dealers and electric cooperatives in District 7 were also contacted by the UMN research team and willingly agreed to make Facebook posts about MnDOT's Blowing Snow Control program.

In mid-March 2019, PALs along each corridor were identified and invited to attend an informational meeting (i.e. direct outreach activity) related to the Blowing Snow Control Program. The meetings were held in late March and early April. The meetings lasted approximately an hour and a half and included six primary activities: 1) an introduction and explanation of the research project from UMN principal investigator, Dr. Dean Current; 2) an overview of the STIP project timeline and objectives from the MnDOT district project managers; 3) a description of the blowing and drifting snow problems (i.e. purpose and need) along each of the identified corridors; 4) a presentation of all snow control measures

(offered through MnDOT's Blowing Snow Control Program) by Dan Gullickson; 5) an invitation for PALs to share and make note of snow control problems on the printed project layout 6) a period for discussion and questions. Key takeaways from the meetings are detailed in the next section.

An innovation in the meetings suggested by Dan Gullickson that has been used in other meetings was including a map of the snow control problem area corridors. Many participants stayed after the meeting and discussed the problem areas. This generated additional discussions and more informal conversations related to the snow control problem areas. This was an effective way to promote more informal conversations and could be used in future programming.

Figure 5-1: PALs Meeting - St. James, MN; Photo credit: Gary Wyatt

The effectiveness of the indirect outreach activities was assessed in the post-outreach KAP survey. The effectiveness of the direct outreach activity (i.e. informational meeting) was assessed using end-of-event evaluation in each meeting and was also be assessed in the post-outreach KAP survey.

5.2 RESULTS

5.2.1 D2 PALs Meeting – TH2 – Polk County

4-6pm, 4/1/2019
Crookston City Hall, Crookston
*Attendance Rate: **20%**, 8 out of 41 households invited*

- There was a general opposition to the concept of snow control measures, as illustrated by the following quotations:
  - "We're not going to grow corn in the middle of our beet fields"
  - "$1,400/acre does not cover the 'pain-in-the-butt' [hassle] factor"
  - "It [a snow control measure] will interfere [with our farming operations]; it just will"
  - "I like being a good citizen, but not when it costs me"
- Other concerns included:
  - Potential yield reductions caused by the shading from the fences
  - Delayed spring planting
  - Damage to living snow fences caused by aerial spraying
  - Soil compaction caused by stacked haybales
  - Potential changes in capital gains taxes if land were taken out of production
  - Weed control
  - Aesthetic concerns – the way a snow fence looks on the landscape
  - Land value impacts/future renter and landowner perceptions
- Relatively speaking, PALs were most interested in structural snow fence options due to negative perceptions of living snow fences and beet production which does not include a corn rotation
- When asked what MnDOT could do to make the program more attractive, the following items were mentioned:
  - Compensate landowners for maintenance activities (e.g. mowing, spot spraying)
  - Design a structural fence that can either be folded down or be removed and reinstalled each season
- One PAL mentioned that his beet fields gross approximately $1,400/acre
- **Meeting Evaluation Summary:**
  - Only 1 of 8 PALs completed an evaluation
  - The PAL who completed an evaluation indicated that the meeting was valuable
  - The PAL stated that he might be interested in learning more about the program and provided contact information

5.2.2 D3 PALs Meeting – TH210/169 – Aitkin County

4-6pm, 4/2/2019
Aitkin City Hall, Aitkin
*Attendance Rate: **21%**, 6 out of 28 households invited*

- One PAL expressed concerns about installing standing corn rows or living snow fences on the Aitkin Flats; he stated that peat farming is common, and that peat harvesting could strip nutrients from the soil, therefore potentially inhibiting establishment of corn, trees, or shrubs

- One PAL was also worried that establishment of standing corn rows might worsen already severe problems with deer-vehicle collisions
- An Aitkin County SWCD technician shared his experience working with Highway 210/169 landowners to install snow control measures; he offered to restart conversations with area landowners to promote adoption

- **Meeting Evaluation Summary:**
    - Only 1 of 6 PALs completed an evaluation
    - The PAL who completed an evaluation indicated that the meeting was informative and valuable
    - The PAL did not state if he would be interested in learning more about the program and did not provide any contact information

5.2.3 D6 PALs Meeting – TH 250 – Fillmore County

4-6pm, 3/25/2019
Lanesboro Community Center, Lanesboro
*Attendance Rate: **19%**, 3 out of 16 households invited*

- Meeting began with PALs sharing experiences related to severe blowing and drifting snow problems along Highway 250
    - In the winter of 2013-2014, a motorist was stranded in front of a PAL's property; the motorist intended to snowshoe nine miles back to town, but she instead spent the night at the PAL's house due to the severity of the storm
    - This February, a PAL (a dairy farmer) had to hire a private plow operator in order to deliver his milk, as Highway 250 was otherwise impassable; other area dairy farmers had to pour out (i.e. waste) their milk during February storms because deliveries were delayed or cancelled
- One PAL acknowledged that he leases his land; thus, he commented that the renter should be involved in the conversation about snow control measures
- One PAL said that his property taxes would change if he took land out of production; therefore, temporary snow control measures would be preferred
- One PAL stated that his property was situated atop limestone, thus potentially making establishment of living snow fences difficult
- One PAL was concerned about snow control measures (especially living snow fences) because his property contains a "deer super highway"; therefore, establishment of a barrier would either make the problem worse by encouraging deer congregation or divert the problem to neighboring properties.

- **Meeting Evaluation Summary:**
    - All PALs completed an evaluation
    - All PALs indicated that the meeting was informative and valuable
    - All PALs are interested in learning more about the program and provided their contact information

5.2.4 D7 PALs Meeting – TH4 – Brown and Watonwan Counties

4-6pm, 3/26/2019
Princess Theater Community Center, St. James
*Attendance Rate: **13%**, 10 out of 76 households invited*

- One PAL said she leases her property to another farmer and thus lamented that the renter was not in attendance at the meeting
- This meeting was notably quiet as compared to the other districts; commentary from PALs was limited
- MnDOT staff provided a map of the Hwy 4 corridor from Sleepy Eye to St. James and many if not all PALs went to the map and discussed their property and snow problem stories with others including MnDOT staff. Using the map was a great discussion tool.
- PALs marked snow problem areas on the map.
- The Parker brothers own farmland on the west side of Hwy 4 from the Watonwan County line north several miles. It seemed like they would be interested in testing standing corn rows.

- **Meeting Evaluation Summary:**
    - 7 of 10 PALs completed an evaluation
    - All those who completed an evaluation indicated that the meeting was informative and valuable
    - All PALs, except one, are interested in learning more about the program and provided their contact information

5.2.5 Effectiveness of social media campaign

The following statistics were provided by Kristine Loobeek, MnDOT's social media coordinator:

- Total people reached in the targeted areas: 49,325
- Total ad impressions (the same person can view the ad multiple times): 117,119
- Total budget: $300
- Link clicks: 566

Breakdown by district:

- D7; 11,612 people reached; 182 link clicks; 47 shares; 2 comments; 37 likes
- D6; 12,835 people reached; 144 link clicks; 31 shares; 3 comments; 48 likes
- D3; 7,096 people reached; 86 link clicks; 27 shares; 2 comments; 23 likes
- D2; 17,148 people reached; 154 link clicks; 31 shares; 13 comments; 39 likes

According to Ms. Loobeek: (personal communication)

"Each of the posts got a good handful of shares. Shares, to me, are one of the most telling and valuable actions on social media. Someone saw our post and thought it was valuable enough that they wanted to show it to their friends and family. While the ads didn't reach millions of people, they reached many people directly in the areas where we want to encourage snow fences. I consider reaching a small

amount of the right people far more valuable than reaching thousands of uninterested folks. I would call the campaign successful, not wildly so, but certainly not a dud either."

The following statistics were provided by the South Central Electric Association in St. James (District 7), regarding their Blowing Snow Control Program Facebook post:

- Total people reached: 1,704
- Total people who engaged with the post: 347
- Total shares: 11

The Association expressed interest in creating another Blowing Snow Control Program Facebook post in September 2019.

The following statistics were provided by the Miller-Sellner Implement Dealer in Redwood Falls, MN (They also have dealerships in Byngham Lake, Slayton and Fairmont, MN):

- People Reached: 1,088
- Engagements: 231
- Shares: 5
- Likes: 7

Additional implement dealers in District 7 not only posted about the program, they also encouraged other dealers in their network to post, thus expanding the reach of the message across the region and into Iowa. Specific statistics from these posts were not obtained.

5.3 CONCLUSIONS AND RECOMMENDATIONS

Meeting attendance was low (≤21% of those invited attended) across the state. However, the majority of those who attended the meetings found them to be informative and valuable. Furthermore, the meetings provided PALs with an opportunity to voice their concerns about the Blowing Snow Control Program and sketch out areas and features that cause notable snow problems along the identified corridors.

Three new snow fence and outreach related considerations emerged from meetings:

1) The importance of including renters in the decision-making process [and future informational meetings]
2) The potential impact of snow control measures on deer movement and deer-vehicle collisions
3) The low attendance at the meetings may also suggest that a combination of group meetings and in-person visits or contacts with PALs will be required to reach all PALs in a problem area

The District 2 meeting was the most remarkable. PALs in this district openly expressed their resistance to the program and willingly registered their concerns with snow control measures (see above). In order to increase familiarity with the technology and convince District 2 PALs of the efficacy of snow fences, it will be critical for MnDOT and the UMN to identify willing landowners and establish snow fences in areas with severe problems (e.g. crashes, road closures, and fatalities) and high traffic. Furthermore, it

may be best for MnDOT and the UMN to focus future District 2 outreach efforts on structural snow fences rather than living snow fences (due to an apparent opposition to living snow fences and the lack of corn plantings in the region). PALs suggested a snow control demonstration site on UMN Crookston managed property (located on Highway 2).

Another conclusion/consideration from the District 2 meeting was that the current payments might not be sufficient to incent farmers to adopt a snow fence given the nuisance involved in farming around a snow fence. Beet farming is profitable and most farmers farm large acreages. When considering a practice that might impact how they farm 5,000 acres or more, the payment for a snow fence may be insignificant to the operation so the compensation may need to be greater than what is currently offered. To address this incentive payment issue, a question was included in the post-outreach survey using the contingent valuation methodology asking landowners to provide an indication of the payment they would be willing to accept to install a snow fence on their properties.

There was an obvious difference in responses to snow fences in the different districts. Those differences suggest a need for flexibility in outreach efforts used to approach landowners, snow fence options, as well as incentives offered to landowners. A "one size fits all" approach would probably not produce good results. This tended to confirm our approach of working across different regions of the state with different land uses, land values and culture. An illustration of using different approaches were the discussions in Aitkin. There, participants recognized the need for snow control measures although the largest PAL was not at the meeting. The SWCD agent at the meeting that had also attended our fall meeting felt that he could be successful working with the landowner to promote snow fences. In that case, working through the SWCD office may be a recommended approach.

Social media outreach

The social media campaign was effective in reaching people and generating shares. Any outreach program will require a variety of media outlets to reach the diverse audience of landowners in problem areas. The social media option provides a useful strategy as part of an overall outreach program to educate landowners and communities and promote greater adoption of snow control measures.

CHAPTER 6: POST-OUTREACH AND PROMOTION SURVEY

6.1 INTRODUCTION AND METHODS

In the fifth phase of the present study, a 28-question survey (Appendix H) was administered to the landowners that received the pre-outreach survey (see Chapter 3). Importantly, landowners that requested no future contact were removed from the sampling frame, thus decreasing the sampling frame size in each of the four identified corridors. Most questions on the survey were repeated from the pre-outreach survey, thereby enabling evaluation of changes in landowner knowledge, attitudes, and practices as a result of the research team's outreach and promotional efforts. Per recommendations from TAP members and a qualitative methods consultant, two new sections were added to the post-outreach survey. The first new section, called Compensation, used a hypothetical scenario, a contingent valuation question, and an open-ended question to assess respondents' willingness to accept a $1,500/acre per year payment to adopt a snow control measure on their property. This section was developed and approved with the help of a UMN natural resource economist. The second new section, called Outreach and Promotion, utilizes four multiple choice questions to determine which outreach and promotional efforts the respondent saw, heard, and/or attended and to gauge the effectiveness of each effort.

The post-outreach survey was only administered in paper form, as so few respondents used the online version offered in the pre-outreach survey. In mid-May 2019, landowners were sent a pre-notice letter which explained our efforts and reasons for sending a questionnaire that was similar to that which they received in December 2018 and January 2019. On June 3, 2019, landowners were sent a cover letter and paper questionnaire (which was printed on blue paper in order to distinguish it from the pre-outreach survey, which was printed on white paper). A reminder letter and additional questionnaire were sent on June 17, 2019. The following report summarizes the survey results as of July 12, 2019. The post-outreach survey results are included in Appendix I.

6.1.1 Post-outreach KAP survey response rates

Size of sampling frame and response rates varied by district.

Table 6-1: Post-Outreach KAP response rates, by corridor

TH 2 – District 2 (Polk County)	TH 210/169 – District 3 (Aitkin County)
Response Rate: 23%	**Response Rate: 40%**
Size of sampling frame: 60	Size of sampling frame: 50
Number of respondents: 14	Number of respondents: 20

TH 250 – District 6 (Fillmore County)	TH 4 – District 7 (Brown and Watwonwan Counties)
Response Rate: 34% Size of sampling frame: 32 Number of respondents: 11	**Response Rate: 28%** Size of sampling frame: 114 Number of respondents: 32

6.2 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations were divided into six sections (consistent with the questionnaire): Snow Problems, Snow Control Measures, Willingness to Adopt Snow Control Measures, Compensation, Outreach and Promotion, and Background Information and Your Property.

As mentioned above, sample sizes for the post-outreach survey (*n*=77) and comparative analysis (varied by question, see Appendix I) were relatively small; thus, key takeaways from the survey cannot be generalized to all Minnesota landowners or all landowners within MnDOT Districts 2, 3, 6, and 7. Furthermore, the small sample size may inflate some changes in knowledge, attitudes, and practices.

6.2.1 Snow Problems

Consistent with pre-outreach survey, landowners are aware of snow problems along the identified corridors – the majority of respondents in all districts reported awareness of blowing and/or drifting snow problems on the highways in front of their property. Furthermore, based on the results from Q2, survey participants indicated that snow-related issues including *Whiteouts, Cars in ditches,* and *Spinouts* were the most common. There was little variation between districts. As mentioned above, these findings suggest that snow problem areas identified by MnDOT are also considered to be problematic by local community members.

Most landowners indicated that clear roadways (those free of snow and ice) are *Very important* – Also consistent with the pre-outreach survey, most landowners in all districts agree that clear and safe winter driving conditions are important (Q3). Despite this consensus, it is important not to assume that landowners feel responsible for and/or obligated to improve winter driving conditions.

There may have been an increase in respondents' knowledge of the environmental impacts of salt – Based on comparative analysis, a remarkably lower percentage (from 13.85% to 2.86%) of respondents selected the *None of the above* answer option in the post-outreach survey as compared to the pre-outreach survey when presented with a series of potential impacts of salt application (Q4). Interestingly, the research team's outreach efforts did not discuss the environmental consequences of deicing. Thus, the possible change in landowner knowledge could be credited to another intervention; or, the prompting of the question may have been sufficient to influence some respondents' answers.

6.2.1.1 Recommendations

According to these findings, it is likely that landowners along documented snow problem corridors are aware of the hazardous, snow-related issues adjacent to their property. Additionally, it is also probable that the landowners consider safe winter driving conditions to be important. That said, it is not advisable to assume that landowners feel responsible for the safety of the motoring public; i.e., it is incorrect to suppose that Minnesota landowners are predisposed or inclined to install a snow control measure on their property. Instead, it is recommendable to approach landowners with curiosity about their opinions and a willingness to accommodate their land-use needs.

6.2.2 Snow Control Measures

There was an increase in respondents' awareness of MnDOT's Blowing Snow Control Program and resources offered (e.g. incentive payments) by MnDOT – Unlike the pre-outreach survey where majorities of respondents in three of the four districts were unaware of the program, answers to Q5 in the post-outreach survey indicate that majorities in all districts are now aware of the program. Moreover, based on comparative analysis, there was an increase (from 12.63% to 21.19%) in the proportion of respondents who are aware of the *Incentive payments* that are offered as a part of the program. These two findings demonstrate an improvement in landowner's knowledge of the existence and fundamental structure of program.

Familiarity with MnDOT's snow control measure types appears to have increased – Based on comparative analysis of Q8, landowners reported increases in familiarity with all snow control measures types. Correspondingly, there were marked decreases in respondents' lack of awareness about most snow control measure types. This finding demonstrates an increase in landowner's knowledge about the various types of snow control measures.

Landowner interest in learning more about MnDOT's Blowing Snow Control Program has decreased while interest in participation has remained constant – As demonstrated in the comparative analysis of Q9, there was a decrease (from 47.50% to 39.17%) in the proportion of respondents who indicated that they wanted to learn more about the program. On a related note, a similar percentage of survey participants in the pre- and post-outreach surveys reported that they were either *Somewhat* or *Very interested* in adopting snow control measures (Q11).

***Don't know* and *Need more info* answer options are common throughout post-outreach survey results –** Also consistent with the pre-outreach survey, respondents demonstrated their relatively low awareness levels and desire for additional information by continually selecting these answer options in all sections of the survey.

6.2.2.1 Recommendations

Though there have been notable improvements in landowners' awareness of and knowledge about MnDOT's Blowing Snow Control Program, it is essential to continue promoting the program and increase public and landowner familiarity with the program. This would probably help address the prevalence of the *Don't know* and *Need more info* answer options.

6.2.3 Willingness to Adopt Snow Control Measures

Monetary compensation continues to be an important incentive for adoption, although *Help from a local SWCD* has emerged as a new common incentive – As was the case in the pre-outreach survey, *Monetary incentives* was the most commonly selected option in all districts (Q12). More uniquely, there was a mentionable jump in the proportion of respondents who selected the *Help from local SWCD* option. This finding may suggest that landowners are beginning to think about snow control measure implementation and local support mechanisms that could be leveraged for assistance.

Similar to the pre-outreach survey, there is no simple, singular constraint to adoption – According to frequency averages, the most commonly selected constraints were *Equipment, Maintenance, Take productive land,* and *Inconvenience.* Importantly, no single constraint garnered more than 16% of the total responses, which indicates that respondents tend to regard many constraints with a similar level of importance.

Preferred snow control measure types, contract type, and payment method vary by district – Not surprisingly, snow control measure preferences differed based on land-use type. As demonstrated in Q14, standing corn rows were most popular in D6 and D7 (where corn is a more common crop), while living snow fences were preferred in D2 and D3 (Q14). Similarly, with respect to landowners' preferred incentive payment method, D2 and D6 had the highest proportion of respondents that selected yearly installments, while the other districts' preferences were split across other answer options (Q15). A similar trend is demonstrated with respondents preferred contract types (Q16). Interestingly, according to comparative analysis, a smaller proportion of survey participants selected the *Don't know* and *Need more info* answer options for contract type, payment method, and maintenance questions in the post-outreach survey. This suggests that respondents became more decisive about their preferences after the pre-outreach survey.

6.2.3.1 Recommendations

These findings offer a variety of recommendable actions. First off, with respect to incentives, the frequency of the *Monetary incentives* answer option reinforces the importance of including landowner payment messaging in future promotional efforts. Secondly, the emerging preference for *Help from local SWCD* may suggest that future outreach initiatives should emphasize MnDOT's partnerships with other local entities (e.g. SWCD, NRCS, FSA). Thirdly, since there is no clear consensus on the most common barrier to implementing snow control measures, MnDOT should approach prospective

landowners with the assumption that they may be constrained by many factors. Therefore, outreach and promotion ought to address as many of landowners' potential concerns as possible, by clearly communicating MnDOT's tailored approach – which accommodates the unique needs of individual landowners. This differs significantly from a one-size-fits-all solution. Lastly, due to discrepancies in preferences based on district, it will be important to consider common land-use types in each district before devising an outreach plan. For example, agriculturally dominated regions of the state (D2, D6, and D7) may prefer short term contract options and temporary snow control measures, due to fluctuating commodity prices. Additionally, standing corn rows should only be promoted in regions of the state that actively grow corn (D2 and D3, for instance, do not commonly cultivate this crop).

6.2.4 Compensation

Landowner willingness to accept $1,500/acre per year payment varied slightly by district; *Don't know* was also a common answer – In D6, a strong majority of the respondents indicated that $1,500/acre per year would be adequate to encourage adoption of a snow control measure. In D2 and D7, an equal proportion of respondents selected the *Yes* and *Don't know* answer options. Most survey participants in D3 reported that they didn't know if $1,500/acre per year would be adequate.

6.2.4.1 Recommendations

Based on these findings, MnDOT should not assume that $1,500/acre per year is an adequate incentive to encourage adoption, except perhaps in D6. That said, however, the results do not indicate that the $1,500 payment is grossly inadequate (i.e. too low) for many Minnesota landowners. Most importantly, *Don't know* was a relatively common answer choice in all districts. This likely suggests that landowners don't know enough about the program to determine if the $1,500 payment is sufficient. Once overall awareness of the program increases, it may be more helpful to inquire about landowners' willingness to accept a particular compensation payment.

6.2.5 Outreach and Promotion

Most respondents did not see/hear outreach efforts or attend the PALs meeting; those who did found them to be Somewhat or Very Helpful – The majority of respondents in all districts, except D6, indicated that they did not see/hear outreach efforts. Similarly, most survey participants (by a significant margin) in all districts did not attend the PALs meetings. *Somewhat helpful* and *Very helpful* were common answers for those who interacted with the outreach efforts. A notable number of participants who selected the *Other (please specify)* option wrote in "mail", which likely was in reference to the pre and post-outreach survey questionnaires, as no other mailers pertaining to snow control measures were sent during this period.

Facebook, TV, and radio were least effective channels; print materials (publications and posters) were more effective – No respondents in any of the districts reported seeing the Facebook posts. Likewise,

only one respondent in D6 saw a related TV program, and one respondent in D3 heard a related radio program. Respondents in most districts reported seeing L*ocal print publications* and *Posters and/or pamphlets*.

Mail promotion presents an opportunity for the future – Interestingly, response rates for the pre and post-outreach surveys (which were delivered in the mail) exceeded the proportion of respondents who saw/heard other outreach efforts. This suggests that recorded changes from pre to post-outreach survey were most likely caused by the surveys themselves, rather than other outreach methods. Furthermore, Q26 indicates that, according to frequency average, mail is most landowners' preferred way to be contacted.

6.2.5.1 Recommendations

It is important to note that the outreach efforts in the present study began in mid-March and survey participants returned their responses by mid-July. This condensed timeline may explain the relatively low impact of the outreach efforts. It is recommended that MnDOT continue with the outreach efforts to continue to inform the public. Another advisable action would be to use mail as a primary promotional channel for problem area landowners. Evidently, more landowners saw and/or interacted with our questionnaires than any other outreach method.

CHAPTER 7: FARMER-TO-FARMER NETWORKING TOOL

The University has developed an online and on smartphone farmer-to-farmer networking tool which allows farmers to learn from each other and discuss conservation practices. We adapted the existing tool to include snow fence practices and gather and input data from existing cases of landowner adoption of snow control measures. As we have progressed, we have also adapted the tool to provide MnDOT and specifically the Blowing Snow Control Program team a way to maintain an inventory of past, present and continuing snow control measures and report on the snow control program. The program has an internet interface as well as a smartphone interface. The development of the original timing for the tool was extended to be able to meet with the MnDOT snow control team and add specific options requested by the team. The tool contains the following elements:

- A password controlled user interface which will allow MnDOT to restrict the use of the tool to the individuals who will be responsible for maintaining and updating the snow control inventory.
- A separate password controlled user interface that will allow farmers, and natural resource professionals (SWCD, NRCS, BWSR, etc.) to access information about existing snow fences and directions if they were interested in visiting the installation. If landowners are willing and agree, contact information will be provided so that landowners can be contacted by other landowners interested in installation snow control measures to learn more about the experience.
- The MnDOT interface will be available to correct existing data, enter new data and search the database for information and to prepare reports.

7.1 DATABASE

The database contains 16 tables. The UMN and project programmer worked with MnDOT to determine the tables to be included based on MnDOT needs. The database name is “cfans_sfmap”, the character set is “utf8”, and collation “utf8_unicode_ci”. The information is hosted on the ***oit.umn.edu server***:

- tbl_condition: List with all fences condition (default data).
- tbl_contract: List with contracts time (entered by user data).
- tbl_county: All Minnesota counties (default data).
- tbl_design: List with fences design (default data).
- tbl_district: List with MnDOT districts (default data).
- tbl_fence: List with all fences. The data is inserted by the user/visitor (entered by user data).
- tbl_gallery: Images storage (entered by user data).
- tbl_installed: List with the responsible for installing the fence (default data).
- tbl_landowner: List with fence/landowners (entered by user data).
- tbl_landowner_type: List with the owner type (default data).
- tbl_route: List with the route type (default data).
- tbl_snowcatch: List with snow catch type (default data).
- tbl_status: List with snow fence status (default data).
- tbl_structure: List to check if it is interior and exterior (default data).
- tbl_type: List with the fence type (default data).

- tbl_users: List with the users. They need to be approved by the administrator.

7.2 HOME PAGE:

Based on our discussions with MnDOT, in addition to providing access to the database by MnDOT staff, a home-page was created where the public could see videos and pictures of snow control measures and provide an information source demonstrating and educating the public on how the MnDOT is improving safety on the roads using snow control measures.

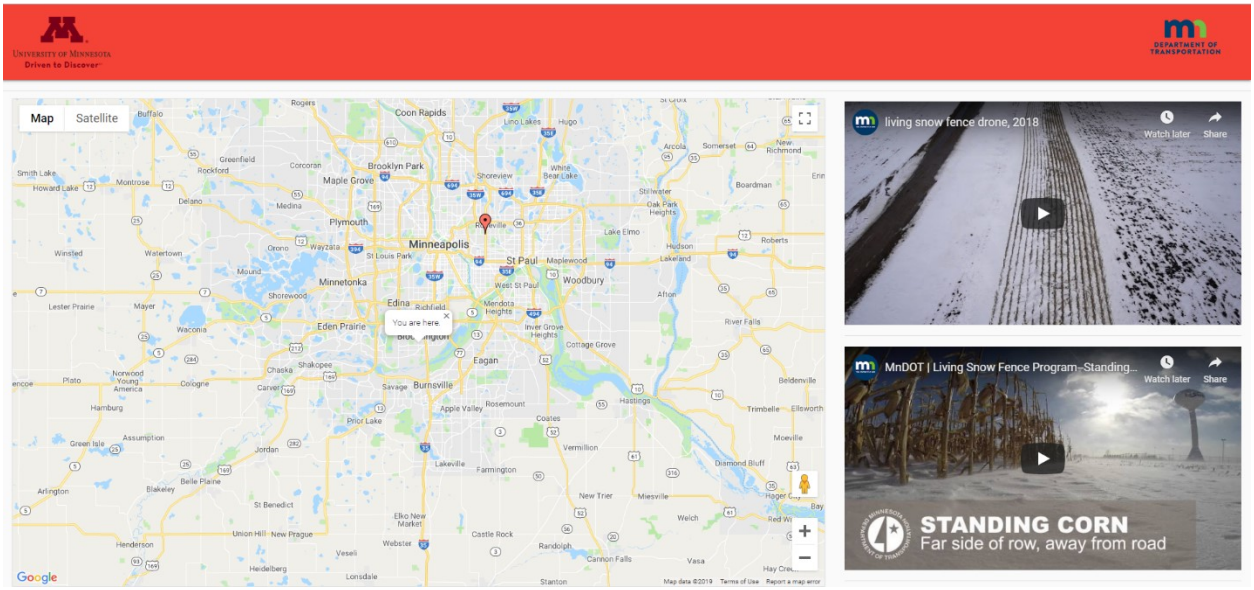


Figure 7-1: Farmer-to-Farmer Networking Tool home page map and videos

When the user enters in the home page, a map will load with a pin for each snow control measure and the user can zoom in and zoom out on the map. When the pin is clicked it will show a table with detailed data on that particular snow control measure. MnDOT will be able to select which data is available to the public and which data can only be accessed by MnDOT staff with authorization.

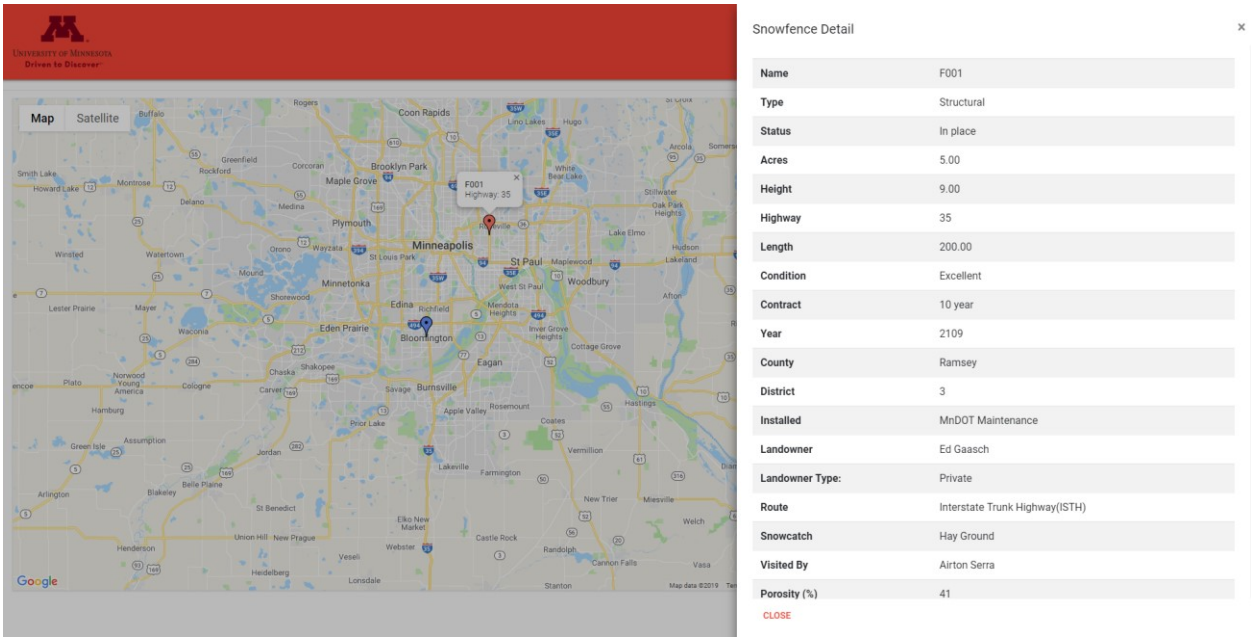


Figure 7-2: Snow control measure data table available at each pin

7.3 ADMIN PAGE:

As an extension of the home page, the tool will have the administrator area where is possible to add, edit, and remove data. The user authorized to use the admin area has a password protected (login) area. MnDOT will be able to decide who will have access to the admin page.

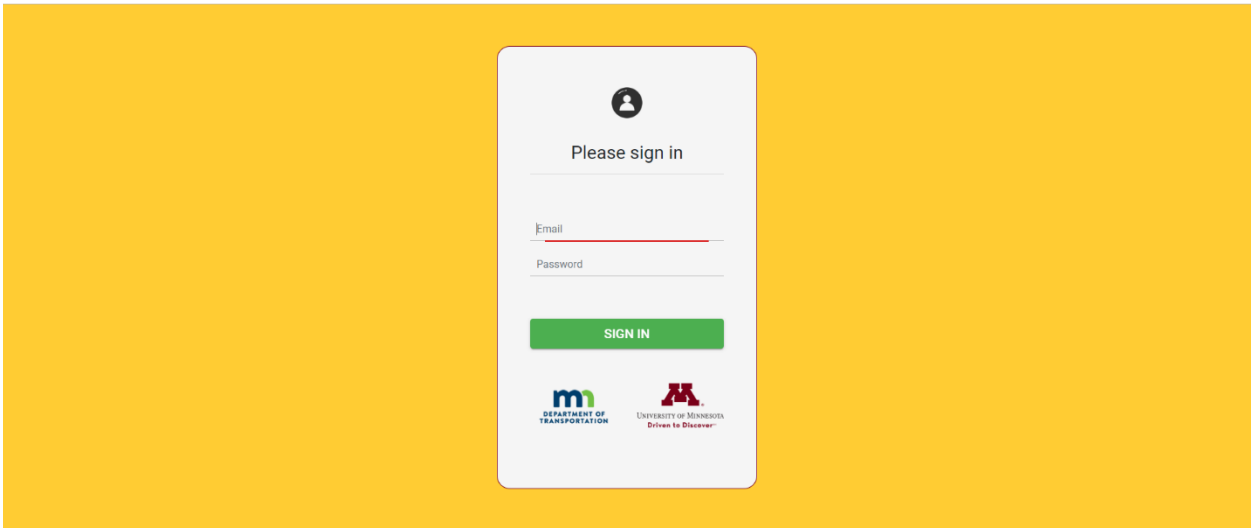


Figure 7-3: Admin page log-in

The login process has three tests.

1. If an email tries to access the tool and the email is not registered in the tool the message “E-mail is not registered.” will appear.
2. If an email is not active the tool will show the message “Your e-mail is not authorized to use the tool.”.
3. If the password was inserted wrong the tool will show the message “Username or password is invalid. Please check it.”.

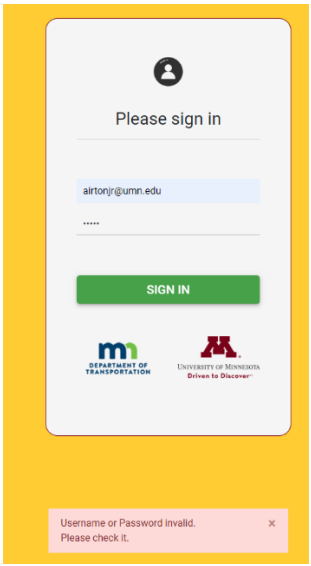


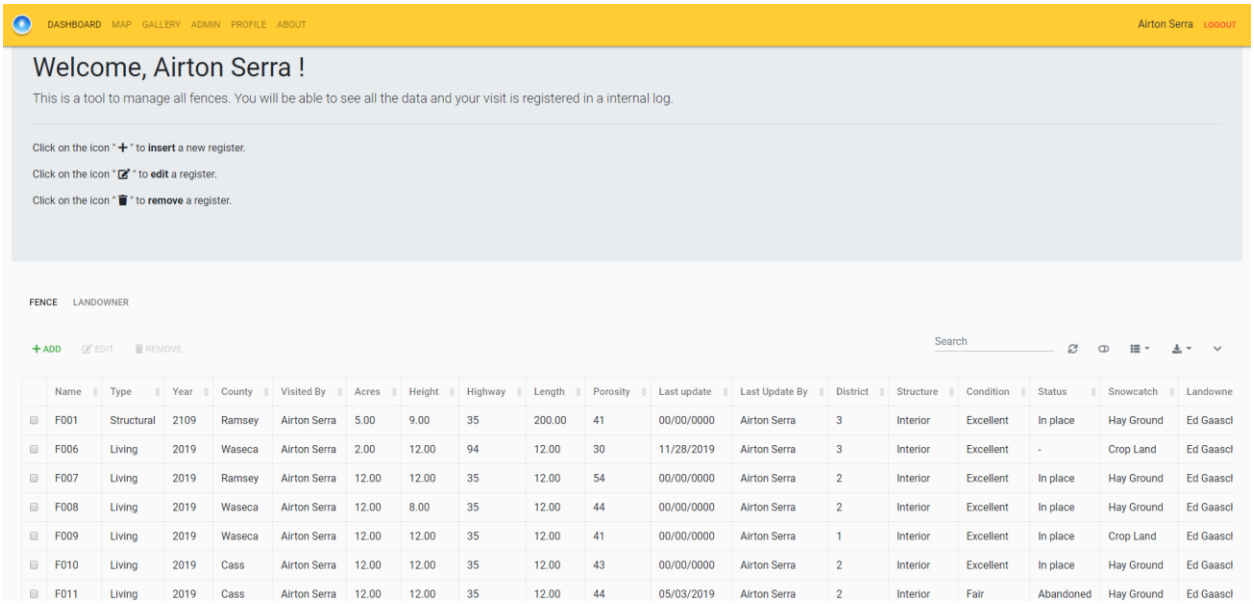
Figure 7-4: Invalid username or password error message

The tool has six menus.

1. Dashboard
2. Map
3. Gallery
4. Admin
5. Profile
6. About

7.4 DASHBOARD – MENU:

This area shows the snow control measure and landowners list. Each snow control measure has a tab (Fence and Landowner) and the data organization follows a table style where is possible to search, refresh, show and hide columns, download the table in pdf, excel, CSV, and toggle the data to see it as a list.



Name	Type	Year	County	Visited By	Acres	Height	Highway	Length	Porosity	Last update	Last Update By	District	Structure	Condition	Status	Snowcatch	Landowne
F001	Structural	2109	Ramsey	Airton Serra	5.00	9.00	35	200.00	41	00/00/0000	Airton Serra	3	Interior	Excellent	In place	Hay Ground	Ed Gaascl
F006	Living	2019	Waseca	Airton Serra	2.00	12.00	94	12.00	30	11/28/2019	Airton Serra	3	Interior	Excellent	-	Crop Land	Ed Gaascl
F007	Living	2019	Ramsey	Airton Serra	12.00	12.00	35	12.00	54	00/00/0000	Airton Serra	2	Interior	Excellent	In place	Hay Ground	Ed Gaascl
F008	Living	2019	Waseca	Airton Serra	12.00	8.00	35	12.00	44	00/00/0000	Airton Serra	2	Interior	Excellent	In place	Hay Ground	Ed Gaascl
F009	Living	2019	Waseca	Airton Serra	12.00	12.00	35	12.00	41	00/00/0000	Airton Serra	1	Interior	Excellent	In place	Crop Land	Ed Gaascl
F010	Living	2019	Cass	Airton Serra	12.00	12.00	35	12.00	43	00/00/0000	Airton Serra	2	Interior	Excellent	In place	Hay Ground	Ed Gaascl
F011	Living	2019	Cass	Airton Serra	12.00	12.00	35	12.00	44	05/03/2019	Airton Serra	2	Interior	Fair	Abandoned	Hay Ground	Ed Gaascl

Figure 7-5: Admin dashboard with snow control measure and landowner list

To keep the data safe and avoid inadvertently erasing data, the delete function does not delete the row. It hides it in the database and if any user wants to recover the row they would have to contact the administrator or person assigned to access and make permanent changes to the database.

7.5 MAP – MENU:

This menu was developed to share the information in PDF and/or printed form. The screen has a “PRINT” button and after being clicked it sends the information to print with the map on the left side, the information in the middle, and organizational logos on the right.

The administrator can decide whether or not to include owner information depending on privacy policies. This is an initial format for printing and additional protocols and formats can be developed to prepare specific reports that MnDOT may require for reporting on the snow control program.

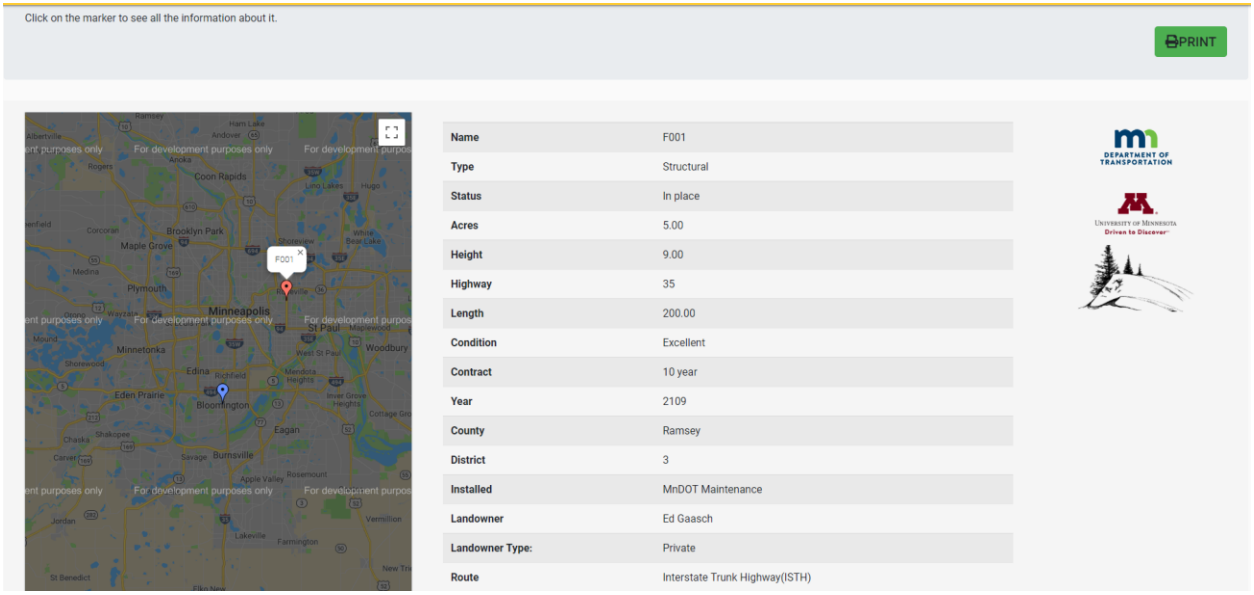


Figure 7-6: Admin page map and data table

7.6 GALLERY – MENU:

The MnDOT has more than text to share and therefore this function was developed to allow MnDOT to upload pictures and videos for each registered snow control measure site. The data has the format BLOB in the database and each image has a limit (2.5 MB). The limit can be increased.

For each fence is possible to load the images/videos already in the system and just the administrator will be able to delete.

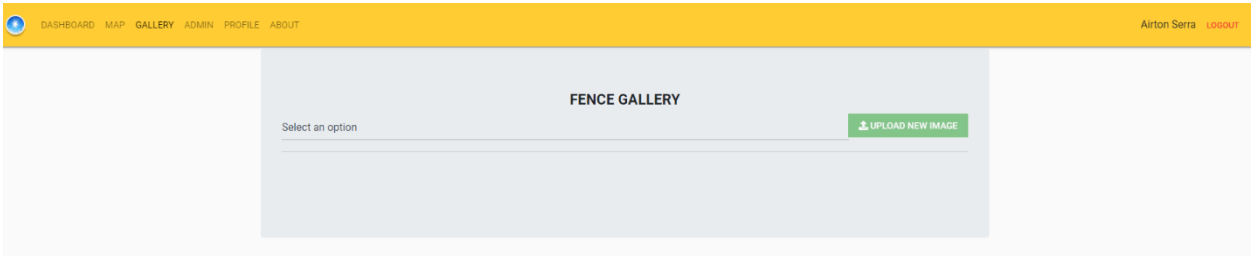


Figure 7-7: Admin page photo and video upload screen

7.7 ADMIN – MENU:

Any user who wants to access the tool needs to have its username registered in this area. They will receive an email with a temporary password and will be able to change the password in the “Profile” menu.

The tool keeps a log when the user was created, and it show in the column “Created”. The administrator can use this area to remove, edit, or activate/deactivate any user.

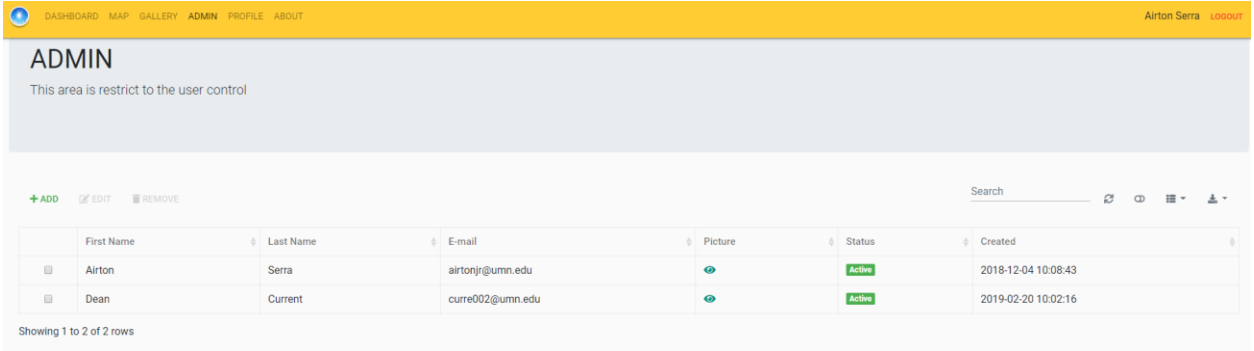


Figure 7-8: Admin page - user permission menu

7.8 UPDATES:

Based on a request from the MnDOT Snow control team, a map is included in the database tool that will load the shape file where it is possible to see the MnDOT assigned “Control Section” (image below). This is the shape file that provides guidance to see where snow fences are being installed.

Figure 7-9: Statewide snow control measure map (shape file)

Once the user clicks on the blue line it will open a text box and show the image below:

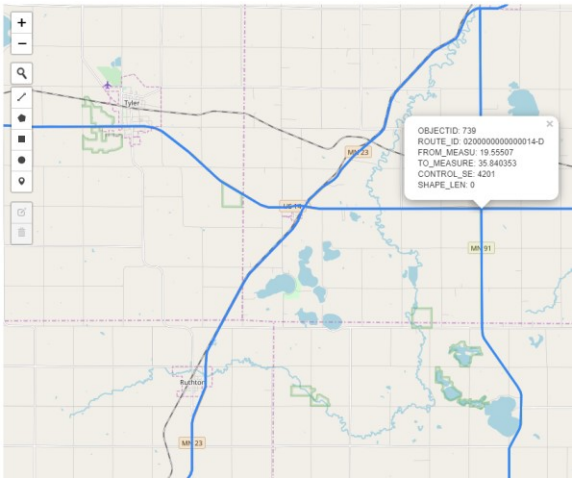


Figure 7-10: Zoomed in snow control measure map

The tool will have the power to draw shapes on the map to indicate the presence of a snow control measure and the line becomes part of the public data that the tool will show on the home-page.

The map has a menu to show or hide the MnDOT “Control Section” and if the map has satellite or street visuals. Data is loaded with the longitude and latitude and the pin (blue dot on the image below) will save the position but the drawing will save a color for each type of fence.

Initially the color of the snow control measure is pink but once the data is saved the color for that line will assume the color for living, structural, or temporary snow control measures. Each type of snow control measure will have a specific color assigned to it. On the location map, each type of snow control measure will also have a specific icon that will allow users to quickly differentiate between the different types of snow control measures.

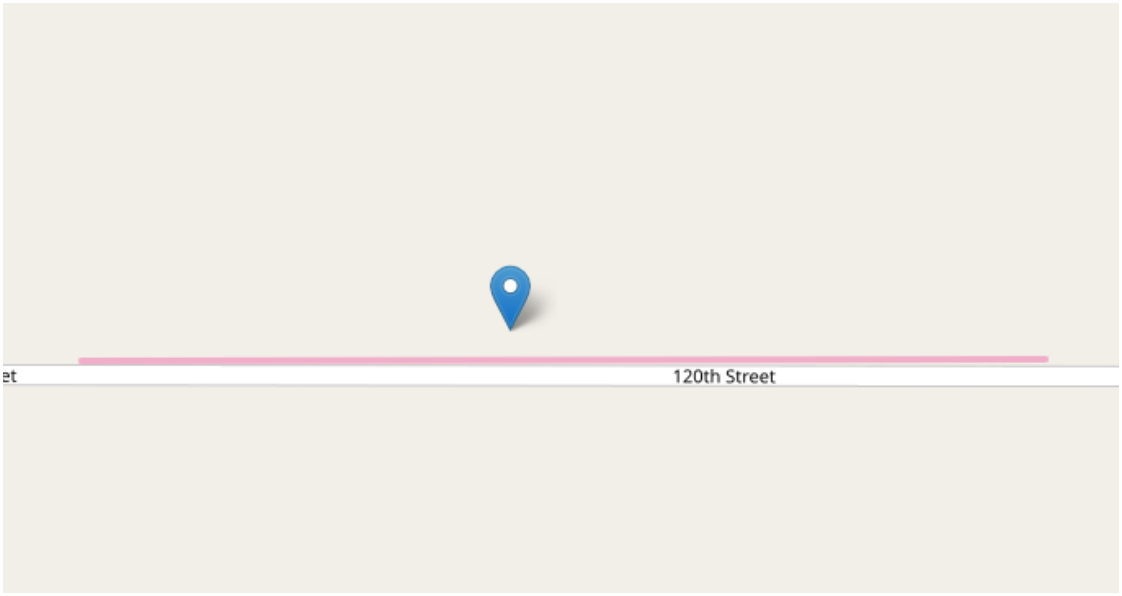


Figure 7-11: Snow control measure map drawing tool

Note: Additional information on the tool will be provided in the final version of this report. The tool is being revised to accommodate requests from the MnDOT snow control team.

7.9 RECOMMENDATIONS

The project and the UMN programmer worked closely with the snow control team under the guidance of Dan Gullickson to design and implement a tool that will be available online that will allow MnDOT to register and provide information on all of their snow control measures in the state. That will include information on location, dates of establishment, pictures and potentially videos of the measures. This will provide MnDOT a tool to monitor and report on the snow control program as well as a way to identify snow control measures that can be used for demonstrations and an opportunity to connect landowners interested in implementing a snow control measure with others who have already done so.

We recommend that, after the snow control team has had a chance to work with the tool that MnDOT consider revising the tool to make sure it is meeting the needs of the snow control team and the farmer-to-farmer networking function.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

There was near unanimous recognition among landowners that snow problems exist along the identified corridors. Furthermore, there was a general lack of landowner knowledge about snow control measures and MnDOT's Blowing Snow Control Program that improved with the outreach activities. However, it was evident that more work needs to be done on landowner outreach and education. Overall, it was evident that it is difficult to identify a discrete set of recommendations for addressing landowner constraints, preferred incentives, and an outreach approach. This was further evident in the differences we found between the four regions of the state. A flexible/tailored approach that can be adapted to address each region and each landowners' constraints and incentives will be required. This section provides recommendations for options to promote greater adoption of snow control measures in problem corridors.

While there are more detailed recommendations in each of the preceding chapters, this chapter provides a summary of some of the more important recommendations. However, the recommendations in each chapter should be referred to for greater detail.

8.1 CONSTRAINTS TO ADOPTION

(Click here to go to detailed information on constraints)

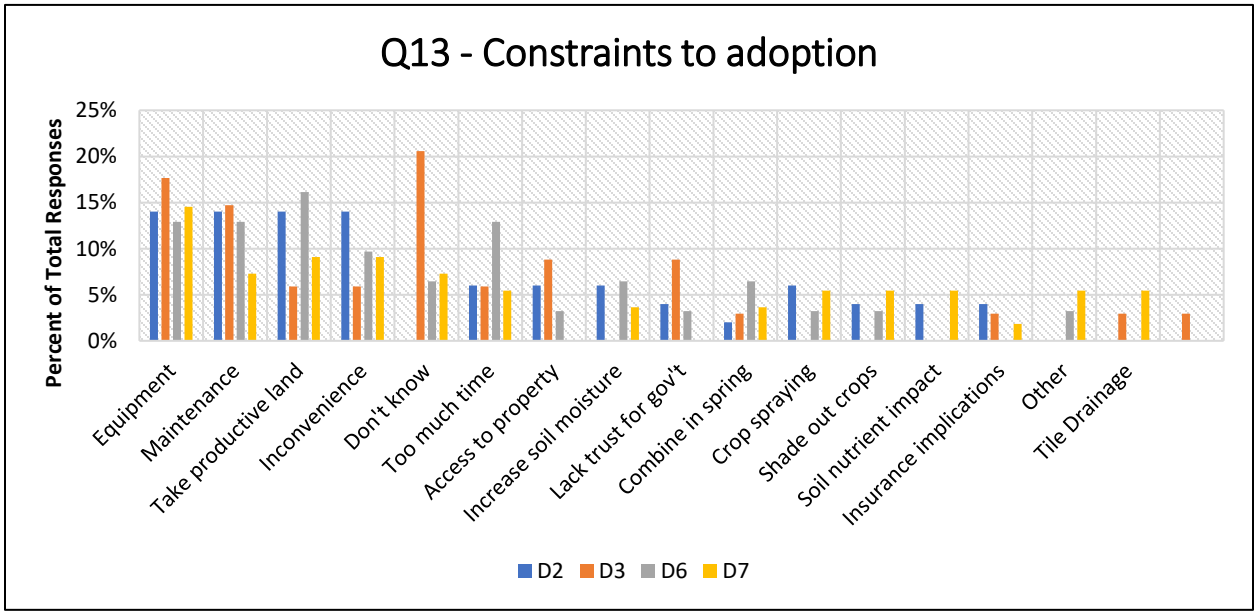


Figure 8-1: Q13 (Post-Outreach KAP Survey) descriptive statistics

As was evident from the post-outreach survey and the preceding pre-outreach survey and listening sessions, there is no simple, singular constraint to adoption. According to frequency averages from the post-outreach survey, the most commonly selected constraints were equipment, maintenance, take productive land, and inconvenience or hassle of farming around snow fences. Importantly, no single

constraint in the post-outreach survey garnered more than 16% of the total responses, which indicates that respondents tend to regard many constraints with a similar level of importance.

Using the range of constraints identified by landowners, MnDOT staff should be prepared to address the full range of constraints mentioned by landowners, and MnDOT personnel interacting with landowners should be trained to discuss constraints. A document could be developed listing and addressing constraints with illustrative cases for training MnDOT staff.

- Constraints to adoption may vary by region and a regional focus should be adopted when addressing the constraints.
- Some of the constraints might be addressed by providing additional information to farmers/landowners, but others (e.g., financial, maintenance) might be addressed by providing assistance with maintenance and also allowing landowners to visit existing snow control sites and discuss the measures with the landowner implementing the practice. Demonstration sites were also mentioned by landowners.

Specific recommendations for addressing the most commonly mentioned constraints:

- **It may require equipment I do not have**: This constraint is likely related to the inconvenience and maintenance constraints. Landowners may not have the equipment required to maintain a living snow fence or, in areas where corn is not a common crop, to cultivate and harvest corn. There are different ways to address this issue. There has been discussion about MnDOT personnel taking responsibility for maintenance and/or hiring private contractors to take on operations for which a landowner may not have the proper equipment.
- **It could require too much maintenance**: Most of the comments regarding maintenance were related to living snow fences and the need to ensure the trees and bushes survived. Specific issues mentioned were concern about the impact of herbicide spray drift that might kill the trees, bushes and grasses, the cost of weeding and replanting the snow fences if there were mortality, and watering if there were dry periods after planting. Maintenance is a common concern that has been expressed in our previous studies in landowner and group interviews. One of the options that has been brought up by MnDOT staff is the possibility of MnDOT maintenance staff taking care of maintenance as they are often engaged in similar activities along roadways.
- **It might take land out of production**: This was a common concern of many respondents in the surveys and during the listening sessions. Landowners want to maximize crop production on the acres they have and installing a snow fence would decrease the number of tillable acres both through the footprint of the snow fence and any additional reduction in tillable acreage due to less maneuverability of farm equipment. The most obvious way to address these constraints is through a financial payment that compensates the farmer for land taken out of production. It will likely be important to emphasize that the payment could generate more income than the crop it replaces, would be a source of continuous income, and would be less risky than crop production, which depends on weather and favorable markets.

- **It may be an inconvenience to farming operations**: Farmers discuss having to take equipment out in the spring to harvest standing corn rows, which requires preparing the equipment, harvesting the corn, and cleaning up the equipment once harvest is done. Spring is a busy time for farmers preparing for and planting crops, which adds to the inconvenience. This may also lead to volunteer corn in the following soybean crop. Providing snow fence options other than standing corn rows, providing opportunities for new farmers to talk to farmers who have already had to deal with the issue, or if enough farmers in a corridor have standing corn rows, hiring a custom operator to do the harvesting.

  This is also referred to as the "hassle" created by having to reconfigure a plowing and harvest pattern to accommodate a snow fence running parallel to a highway placed 150-250 feet into a field. It represents a change that could make cultivation more difficult, thus even though compensation more than covers lost production, it may not be worth the hassle of working around the fence, especially on large farms where the income from a couple of acres is dwarfed by the total income from crops. Based on results from MnDOT staff listening sessions, MnDOT personnel who promote snow fences in some districts are working closely with landowners to design snow fence footprints to minimize the impact of the fence on farming operations.

As previously mentioned, these four constraints were the constraints most often mentioned by landowners. There are a number of additional constraints that MnDOT should be prepared to address when approaching potential landowner cooperators (see here). There are good opportunities for MnDOT to engage with MnDOT staff who have experience working with landowners and with landowners who have implemented snow fences to identify innovative ways to address the constraints mentioned by landowners who have yet to adopt snow control measures. A good place to start when exploring options would be a discussion with farmers who have installed standing corn rows to learn how they have dealt with the issues and to solicit their recommendations.

8.2 INCENTIVES FOR ADOPTION:

(Click here to go to detailed information on Incentives)

As is the case with constraints to adoption, there are a number of different incentives that appeal to and motivate individual landowners. The most often mentioned incentive in both the pre- and post-outreach KAP surveys were monetary incentives, which is not surprising. The second most frequent response was "I don't know," which is indicative of the lack of knowledge of existing programs and landowners needing additional information about options to be able to make a decision. Based on the results of this study, MnDOT should review and revise the range of incentives it provides to landowners while taking into account location and individual landowner interests.

- **Monetary incentives** will be important going forward. Several of the questions refer to payments and how they are received and can provide insights on how best to provide incentives. In an effort to better understand the payment level that might be required to convince landowners to adopt a living snow fence, a contingent valuation question was asked

related to landowners' willingness to accept a specific payment per acre to implement a fence. The current average of $1,500 per acre payment was used. Most of those who responded indicated that the current payment was sufficient although there were also many "don't know" answers.

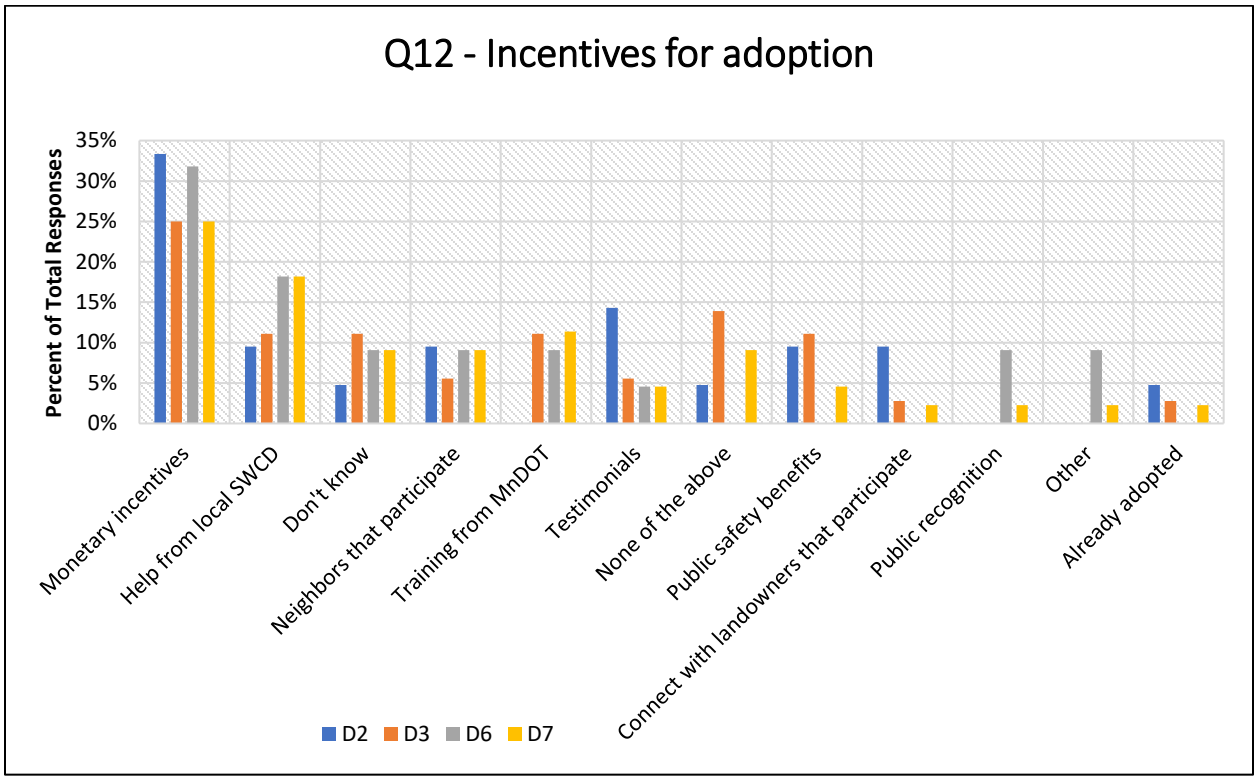


Figure 8-2: Q12 (Post-Outreach KAP survey) descriptive statistics Incentives for adoption

Based on these findings, MnDOT should not assume that $1,500 per acre per year is an adequate incentive to encourage adoption, except perhaps in D6. That said, however, the results do not indicate that the $1,500 payment is grossly inadequate (i.e., too low) for many Minnesota landowners. Most important, "don't know" was a relatively common answer choice in all districts. This likely suggests that landowners don't know enough about the program to determine if the $1,500 payment is sufficient. Once overall awareness of the program increases, it might be helpful to inquire about landowners' willingness to accept a particular compensation payment.

Additional questions on preferred length of contract and lump sum versus annual payments provided some guidance but were not conclusive since there continued to be many responses in the "don't know" and "need more information" categories. There were more conclusive results in D2, but the results still showed a mix between long- and short-term contacts and a need for options. Overall, results indicate a need for more education of landowners, maintaining options for contract length, and lump sum versus annual payments.

- **Assistance from the local SWCD** emerged in the post-outreach survey as an important incentive for adoption. This matches with the expressed concern for maintenance of snow control measures as a constraint to adoption. In our previous research conducted in southern Minnesota, SWCD's were often listed as a preferred source of assistance because they are locally based with boards that include local landowners and individual SWCD agents who are often active in local communities. Related was an interest in receiving training from MnDOT as an option.
- **Removing constraints**. MnDOT should review the responses from the incentives questions and consider how incentives might be provided as well as the extent to which incentives (financial, simplified contracting procedures, assistance with maintenance, etc.) might be used to remove constraints identified by landowners. It will be important to take an integrated approach to evaluating the responses and come up with options for landowners that best fit their particular farm conditions and resources. A role of incentives is to overcome constraints expressed by landowners. As has been mentioned, if maintenance is a constraint, maintenance provided by MnDOT could be an incentive used to overcome that constraint.
- "**Public recognition**" and "**public safety benefits**" were also mentioned, although less frequently, and indicate that public recognition and public safety benefits could be included in outreach options or as part of a media campaign.
- Another potential grouping of responses involved **providing landowners options to contact or learn from landowners who have already adopted snow fence options**. "Neighbors that participate," "testimonials," and "connect with landowners that have adopted" were all mentioned as potential incentives. As has been discussed, further developing the farmer-to-farmer networking tool will allow MnDOT to provide examples of landowners who have adopted snow control measures and coordinate potential site visits and conversations with the adopters as well as case studies of landowners who have adopted snow fences and who can provide testimonials.

8.3 OUTREACH PROGRAM: (CLICK HERE FOR MORE INFORMATION)

There continued to be a relatively high percentage of "don't know" or "need more information" responses to a number of the questions regarding MnDOT's programs and how they operate. For future promotion, MnDOT should develop a continuous and strategic media campaign to promote the importance and effectiveness of snow control measures to local communities affected by snow problems and a more targeted approach to address landowners who are adjacent to snow-problem areas. Outreach programs should be planned to provide information at times when the snow control problems are most evident, when landowners are planning their crops, especially where standing corn rows is an option, and when there may be opportunities to include MnDOT district personnel in the outreach efforts.

8.3.1 Indirect outreach

- Although the indirect outreach methods (posters, pamphlets, TV and radio spots, and social media) reached few of the landowners in problem areas who responded to the post-outreach survey, the data from hits and shares from social media indicate considerable interest in the postings. The low impact could have been due to the limited time the outreach program ran. Thus, we recommend a continuous, phased, and strategic program of indirect outreach to target both landowners and communities.
- MnDOT has an effective team that can prepare outreach materials as well as public engagement personnel who are very effective in setting up community meetings and identifying key stakeholders. They will be important partners as this effort moves forward to the extent that they are able to be involved and that involvement does not conflict with other duties.

8.3.2 Direct outreach:

- The results of the outreach program and answers provided to questionnaires indicate that a direct approach (letters, phone calls, landowner meetings) may be the best strategy to contact individual landowners with properties adjacent to problem areas. With the newly structured MnDOT Blowing Snow Control Program, that may be possible. Individuals from that program could also receive the training mentioned previously.
- Past work has demonstrated that MnDOT maintenance personnel are often well placed to promote snow control measures especially when they are members of the community, are familiar with farming practices, and have neighbors who have land adjacent to problem areas. They are an important resource when planning snow control outreach and promotion.

8.3.3 Engaging communities and local agencies:

- There was considerable interest and support demonstrated by local communities and agencies (e.g., community groups, law enforcement, SWCDs, NRCS). MnDOT should coordinate with these groups and agencies as MnDOT outreach programs are developed. We also noted a difference in interest demonstrated by agency representatives in the four different regions. The partners that MnDOT may be able to engage might vary by district and community, but this should be an activity taken on by the snow control team — identifying potential partners in the different districts and problem areas. This may also require some educational activities to inform agency representatives about the snow control program.
- NRCS is in the process of reviewing its standards and practice guides related to agroforestry in Minnesota. There is an opportunity for MnDOT to work with NRCS to review and improve the practice guide for living snow fences and explore opportunities for government funding for snow fences that meet those practice standards.

8.4 FARMER-TO-FARMER NETWORKING TOOL

(click here for detailed information)

The project and the UMN programmer worked closely with the snow control team under the guidance of Dan Gullickson to design and implement a tool that will be available online, allowing MnDOT to register and provide information on all of its snow control measures in the state. That will include information on location, dates of establishment, pictures, and potentially videos of the measures. This will provide MnDOT a tool to monitor and report on the snow control program as well as a way to identify snow control measures that can be used for demonstrations and an opportunity to connect landowners interested in implementing a snow control measure with others who have already done so.

8.4.1 Follow-up with the farmer-to-farmer networking tool

We recommend the following:

- After the snow control team has had a chance to work with the tool, MnDOT should consider revising the tool to make sure it is meeting the needs of the snow control team and the farmer-to-farmer networking function.
- Landowners in the listening sessions and who responded to the KAP survey identified testimonials and connecting with farmers who had participated and neighbors who participate as incentives for participation. MnDOT should be able to develop case studies and testimonials by working with farmers who have already implemented snow fences to foster farmer-to-farmer sharing. In developing the case studies/testimonials, it will be important to address the constraints and concerns identified by landowners in the listening sessions and KAP surveys.
- The farmer-to-farmer tool provides an important platform for registering existing snow fences and reporting on them as well as recruiting new landowners to install fences. MnDOT may be able to identify additional uses for the platform, which can be developed in the future.

8.5 FOLLOW-UP RESEARCH AND DEMONSTRATION:

Based on the results of this study, following are several recommendations for follow-up and implementation of the recommendations.

- Landowners expressed interest in seeing snow control measures demonstrated to help them make a decision and were concerned about moisture issues in the snow-catch areas of their fields. MnDOT should consider establishing snow control measures to act as demonstrations but also as a way to measure and better understand the impact of snow fences on soil moisture and cropping operations. There have been discussions about establishing demonstrations and monitoring soil moisture at University research stations across the state. Another way to get at soil-moisture impacts would be to interview landowners who have implemented snow fences to

get their impression of soil-moisture issues as well as potentially using those sites to monitor soil moisture.

- In listening sessions and the follow-up information sessions as well as in the responses to the KAP surveys, landowners in problem areas expressed an interest in learning from other landowners who had adopted snow fences and being able to see established snow fences. MnDOT should consider establishing "high-visibility" demonstrations of snow fences and monitoring their effectiveness during snowstorms. In some districts, such as D3, there may be an opportunity, working with the local SWCD, to establish a snow fence corridor using willows that could provide a demonstration site in a well-recognized snow-problem area.
- As previously mentioned in the section on the farmer-to-farmer networking tool, developing testimonials featuring landowners as well as MnDOT maintenance personnel attesting to the effectiveness of existing snow fences could provide a good outreach tool to present to landowners, local communities, and the general public. An existing site at the Waseca UMN Research and Outreach Center could provide a good case study. The fence established with research funding from MnDOT has been an effective snow fence. In the spring of 2019, the willows were harvested to construct a display at the UMN Arboretum. By the end of the summer, the willows had grown back to a height that would provide an effective snow fence for the coming winter.
- For additional recommendations, please see the individual sections for each survey. Chapter 5, in particular (click here for more information), presents the results from the post-outreach KAP survey and compares those results to the pre-outreach KAP survey and offers additional recommendations based on the listening sessions, information sessions, and pre and post-outreach KAP surveys.

CHAPTER 9: FINAL MEMORANDOM ON RESEARCH BENEFITS AND IMPLEMENTATION STEPS

9.1 SUMMARY

The methodology for reporting research benefits and implementation steps was laid out in Task 7a of the project. We provide an assessment of the potential benefits of an improved understanding of landowner knowledge, attitudes, and practices with respect to snow control measures. Previous research indicates that Minnesota taxpayers will profit from the implementation of snow control measures in snow problem areas in the following ways: reduced cost of snow drift removal and blow ice treatment, decreased travel costs related to blowing and drifting snow, moderated costs and damages attributed to snow-related car accidents, increased greenhouse gas (GHG) emission avoidance, and improved efficiency of landowner engagement and outreach by MnDOT (Wyatt, et.al., 2012). Expanded landowner adoption of snow control measures would boost and distribute the abovementioned benefits across the state of Minnesota.

9.2 BENEFIT ASSESSMENT METHODOLOGY

In 2012, as a part of MnDOT TRIG Project #99008, University of Minnesota researchers developed a Snow Control Cost-Benefit Web Tool to estimate the return on investment of implementing blowing and drifting snow control measures on private lands (Wyatt et al., 2012). The tool also approximates snow removal, travel, and safety costs, as well as carbon-related benefits linked to snow control measure establishment. Dan Gullickson, working with district staff, carried out the analysis using the tool. In general, the use of the tool in the problem areas identified by this project has demonstrated about a 1:1 benefit cost ratio. This indicates that the benefits from snow control measures would compensate for the cost of their installation. What is important to note is that the public benefits as described in section 8.3 below were often the determining factor in arriving at that benefit cost ratio. There are associated public benefits that are real but not necessarily reflected in the calculations – pollinator habitat, biodiversity and other environmental benefits are not necessarily measured but are additional benefits of the snow control measure installations.

9.3 BENEFITS

9.3.1 Reduction in costs to remove snow drifts and treat blow ice

Snow control measures offer quantifiable cost savings by decreasing expenses associated with snow removal equipment and sand and salt application. The equations developed by Wyatt et al. use input data including the number of snow and ice events, the average number of operational hours and costs for each type of equipment during snow and ice events, cost of sand and salt application mixture, application rate, and number of lane miles travelled during snow and ice events (Wyatt et al., 2012). The Snow Control Benefit Cost Web Tool was used to determine cost reductions associated with snow removal and blow ice treatment for problem site in each selected corridor.

9.3.2 Reduction in travel costs due to increased travel time related to blowing and drifting snow

Increased travel time is a common result of poor winter driving conditions. As previous research confirms, these delays incur economic costs. The Snow Control Cost-Benefit Web Tool calculates the costs of increased wintertime travel using variables including the average number of blowing and drifting snow events in each area, the amount of time required for MnDOT to clear the roadway, and the speed reduction associated with each blowing and drifting snow event (Wyatt et al., 2012). The estimated travel cost reductions for each selected corridor were calculated for those sites analyzed by MnDOT.

9.3.3 Reduction in costs and damages due to accidents attributable to blowing and drifting snow

Winter weather events create hazardous road conditions that lead to increased numbers of car accidents and associated damage. Using winter crash data from 1984-2009, MnDOT's Office of Traffic, Safety, and Technology estimated that snow control measures reduce snow and ice related accidents by 40% on super elevated curves and by 8% on non-super elevated curves (Wyatt et al., 2012). The Snow Control Cost-Benefit Web Tool calculates the number of avoided snow and ice related accidents, which, when multiplied by the U.S. Department of Transportation's accident values, will produce approximations of cost reductions.

9.3.4 Environmental benefits due to reduced use of chemicals to treat snow and ice and GHG emission avoidance

Snow control measures decrease the amount of snow and ice build-up, thus reducing the amount of salt, sand, and additional chemicals required to clear roadways. This reduction in or elimination of chlorides, abrasives, and other de-icers preserves ecosystem health that may have otherwise been compromised due to contamination from runoff (Fay and Shi, 2012). Quantification of this environmental benefit is possible but is not a focus of the present study. Unrelated to chemical runoff, snow control measures also deliver greenhouse gas (GHG) related advantages. GHG emission is avoided with the use of snow control measures, both living and structural, by reducing operational times of GHG-emitting equipment used for snow removal and ice treatment activities. Furthermore, because snow fences take land out of production, there are slight reductions in nitrous oxide emissions, as less nitrogen-based fertilizers are applied. On average, a 100ft snow fence is estimated to reduce CO_2 emissions by 10.4lbs/ft (Wyatt et al., 2012).

9.3.5 Improve MnDOT's efficiency at landowner engagement and outreach

The present study utilizes a KAP survey model, wherein participants (landowners) take near-identical pre and post surveys to measure change. In between the first and second surveys, MnDOT will carry out engagement and outreach activities with landowners. Therefore, the efficacy of these activities can be quantified by comparing results of the first and second surveys. The findings from this analysis should assist MnDOT employees in determining the most effective ways to introduce and promote novel concepts and worthwhile technologies to landowners. Those benefits will not be able to be measured until new promotional activities are initiated.

9.4 IMPLEMENTATION

Implementation of the present study's benefits is largely contingent upon landowner interest in and adoption of snow control measures. Thus, the findings of the KAP survey and effective landowner outreach activities are of critical importance. The research team provided recommendations based on the results of the landowner surveys, outreach efforts, and the KAP study to assist MnDOT in their outreach efforts to farmers to implement snow control measures. Due to past research and the active engagement of MnDOT colleagues, the research teams has a good understanding of the structure of the MnDOT Blowing Snow Control Program. This combined with involvement of MnDOT personnel in the project will help us identify where interventions are feasible to increase the effectiveness of the program. The actual implementation of the recommendations will depend on MnDOT's decision to adopt the recommendations or not.

We will work with the MnDOT Project Technical Liaison, Dan Gullickson and Thomas Johnson-Kaiser, MnDOT Project Coordinator to take our recommendations and develop them into an outreach plan for future promotion of snow control measures.

We understand that there may be recommendations contained in this report that may not be able to be implemented due to limitations related to existing resource or policy constraints within MnDOT. We do encourage MnDOT to consider providing the resources needed and potentially the policy support needed to implement the recommendations.

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Appendix A – LISTENING SESSION SCRIPTS

Community Listening Session – Introduction

Good evening, everyone, and welcome. Thanks a lot for taking the time to join us and to talk about a rather timely issue – snow problems and snow control measures in [Insert County]. For those of you who may not be familiar, snow control measures, including Living Snow Fences, are trees, shrubs, native grasses, cornstalks, fences or other structures located along roads that trap snow as it blows across fields. Also, if you're not familiar, MnDOT has a snow control program to promote these types of measures. My name is Collin Motschke and this is Dean Current and we are with the University of Minnesota. We are working with Dan Gullickson, the MnDOT Snow Control Program Coordinator and a MnDOT Technical Advisory Panel (TAP) to get some input from key community members in areas that have documented snow control problems.

Blowing and drifting snow on roadways cause accidents resulting in injury and sometimes death, increase expenses for road plowing and maintenance and salt application leads to environmental problems in water bodies in Minnesota.

We, along with MnDOT, will be using your comments to help develop a landowner survey in [Insert County] and to shape outreach efforts provided by MnDOT. We would like your input about existing snow problems in the area, the community's perceptions of snow control measures, and potential barriers that might prevent local landowners from adopting snow control measures. The hope is to make MnDOT's snow control program more beneficial to both participating landowners and the state of Minnesota.

You were invited here today because each of you plays a critical role in public safety and civic engagement in your community. Furthermore, because you live in the area, you are likely very familiar with winter road conditions and you've probably heard other community members talk about snow problems and snow control measures. We understand that this is an extremely busy time of year for you – so we can't thank you enough for attending.
First off, I wanted to point out that there will be no wrong answers during this discussion. We are just as interested in your negative feedback as we are about your positive feedback. As a matter of fact, sometimes the negative feedback is more helpful. So, you can certainly disagree with other folks in this conversation, but please be respectful of everyone's opinion.
As you can see, we will be recording our discussion, so that we don't miss any of your comments. Oftentimes, people say great things during these conversations, but we simply aren't fast enough to write everything down. We're on a first name basis tonight but will not be using any of your names in our reports. To reiterate, we will keep your comments completely confidential. If any of you would rather not have the session recorded, please let us know.

There are a few things that will make this conversation run smoother. First, it will work best if only one person talks at a time. I apologize in advance if I jump in, interrupt, or call on one of you. I just want to make sure that everyone has a chance to speak and that we can get through all the questions. Secondly, this will be more interesting if you treat this like a conversation. If someone says something, don't hesitate to follow up on it or share a different point of view. And

don't feel like you need to address your comments to me. Thirdly, let's be informal this evening. So, feel free to get up, grab some more food, or use the bathroom.

One last thing – please silence your cell phone. If you need to answer a call, we ask that you do so quietly and then return to the conversation as soon as you can. My role here is to guide the conversation by asking questions. But more than anything, my job is to listen to what you have to say.

Okay – let's start. We've asked you to place cards in front of you so that we're able to address each other by name during the conversation. Let's begin by going around the table. Starting with you, [Call on participant], tell us your name, your job title or role here in the community, and share the best part of living in [Insert County], as if you were sharing it with someone who has never been to [Insert County]…like me.

Community Listening Session – Questions

Introductory:

1. Tell me about snow problems in [Insert County].
    a. Considering each of you has a different role within the community, each of you likely has a different perspective of and experience with snow problems.
    b. Based on your role, what are the most severe snow problems in the area and where do they typically occur?
2. Now, I'd like to hear about the perspectives of people outside of this circle. Think back to a time when someone you know (perhaps a friend or family member) was complaining about snow problems on a state or county highway in this area.
    a. What were their complaints?
    b. In your view, how important are clear roadways to local community members?

Transition:

3. What do you think are the best ways to address snow problems in [Insert County]
4. What do you know about snow control measures and MnDOT's snow control program?
5. What do local community members know about snow control measures and MnDOT's snow control program?
    a. How do you think they originally found out about snow control measures?

Key Questions:

Now, let's talk about why or why not a landowner in your community would be interested in participating in MnDOT's snow control program. In other words, what would influence a landowner's decision to install a snow control measure on his or her property?

6. To begin, I'd like to hear what would prevent a landowner from joining the program.
    a. Using the [Insert Post-It color] Post-Its in front of you, I'd like you to write down what you think are the 3 biggest constraints to participating in the program.
    b. OK, let's go around the circle and provide a brief explanation of each constraint that you wrote down.

7. Now, using the [Insert Post-It color] Post-Its, I'd like you to jot down what you think would be the 3 most effective ways to encourage a landowner to participate in the program.
    a. Just like with the constraints, I now want to hear about each of the incentives you wrote down.
    b. Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?
8. As you know, it is common for landowners to rent or lease their land to neighbors, corporate famers, hunters, etc. Therefore, it's difficult to determine who makes land-use decisions on a given piece of property. How can MnDOT address this when trying to promote snow control measures?
    a. In other words, what are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land?
9. As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that? Why or why not?
    a. Can you think of a more effective way to enable communication between landowners to discuss snow control measures?
10. Can you think of ways that the community and community organizations might promote greater adoption of snow control measures?

End Questions:

11. If you had one minute to give advice to the MnDOT folks overseeing this project, what would you say?
    a. In other words, what would be the best way to improve landowner adoption of snow control measures in [Insert County]?
12. We've had a great discussion today, thanks a lot for that! Our notes from the conversation today include the following key points _____. How well does that capture what was said here? Have we missed anything?
13. Is there anything that you came wanting to say that you didn't get a chance to share?

Reserve Questions (if there's extra time remaining):

14. Is it confusing to call these roadside barriers "snow control measures"? Can you think of a better term that is more easily understood by MnDOT and the general public?

In your experience, how do landowners prefer to be contacted (phone, in-person, Facebook)? What time of year is best to contact landowners?

MnDOT District Listening Session – Introduction

Good afternoon, everyone, and welcome. Thanks a lot for taking the time to join us and to talk about a rather timely issue – snow problems and snow control measures in [Insert District #]. For those of you who may not be familiar, snow control measures, including Living Snow Fences, are trees, shrubs, native grasses, cornstalks, fences or other structures located along roads that trap snow as it blows across fields. Also, if you're not familiar, MnDOT has a snow control program to promote these types of measures. My name is Collin Motschke and this is Dean

Current and we are with the University of Minnesota. We are working with Dan Gullickson, the MnDOT Snow Control Program Coordinator and a MnDOT Technical Advisory Panel (TAP) to get some input from district staff members in areas that have documented snow control problems.

We, along with MnDOT, will be using your comments to help develop a landowner survey and to shape outreach efforts provided by MnDOT. We would like your input about existing snow problems in the area, community members' perceptions of snow control measures, and potential barriers that might prevent landowners from adopting snow control measures. The hope is to make MnDOT's snow control program more beneficial to both participating landowners and the state of Minnesota.

You were invited here today because you, as MnDOT district staff members, are very familiar with winter road conditions in the area; and, because you live in the community, you likely have had a chance to listen to what people say about snow problems and snow control measures. We understand that this is an extremely busy time of year for you – so we can't thank you enough for attending.

First off, I wanted to point out that there will be no wrong answers during this discussion. We are just as interested in your negative feedback as we are about your positive feedback. As a matter of fact, sometimes the negative feedback is more helpful. So, you can certainly disagree with other folks in this conversation, but please be respectful of everyone's opinion.

As you can see, we will be recording our discussion, so that we don't miss any of your comments. Oftentimes, people say great things during these conversations, but we simply aren't fast enough to write everything down. We're on a first name basis tonight, but will not be using any of your names in our reports. To reiterate, we will keep your comments completely confidential. If any of you would rather not have the session recorded, please let us know.

There are a few things that will make this conversation run smoother. First, it will work best if only one person talks at a time. I apologize in advance if I jump in, interrupt, or call on one of you. I just want to make sure that everyone has a chance to speak and that we can get through all the questions. Secondly, this will be more interesting if you treat this like a conversation. If someone says something, don't hesitate to follow up on it or share a different point of view. And don't feel like you need to address your comments to me. Thirdly, let's be informal this evening. So, feel free to get up, grab some more food, or use the bathroom.

One last thing – please silence your cell phone. If you need to answer a call, we ask that you do so quietly and then return to the conversation as soon as you can. My role here is to guide the conversation by asking questions. But more than anything, my job is to listen to what you have to say.

Okay – let's start. We've asked you to create name cards more for Dean and I's benefit, as I assume most of you already know each other, or are at least familiar with each other's role

within MnDOT. Let's begin by going around the table. Starting with you, [Call on participant], tell us your name, your job title, and share your favorite activity to do in your free time.

MnDOT District Listening Session – Questions

Introductory:

1. Tell me about snow problems in [Insert District #].
    a. Considering each of you has a different expertise within MnDOT, each of you likely has a different perspective on snow problems in the area.
    b. Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?
2. Now, I'd like to hear about the perspectives of people outside of MnDOT. Think back to a time when someone you know (outside of MnDOT) was complaining about snow problems on a state highway in your district.
    a. What were their complaints?
    b. How important are clear roadways to local community members?

Transition:

3. How much do you know about the MnDOT snow control program?
4. Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?
5. Think back to when you first heard about MnDOT's snow control program. What were your initial thoughts about it?

Key Questions:

Now, let's talk about why or why not a landowner in [Insert District #] would be interested in participating in MnDOT's snow control program. In other words, what would influence a landowner's decision to install a snow control measure on his or her property?

6. To begin, I'd like to hear what would prevent a landowner from joining the program.
    a. Using the [Insert Post-It color] Post-Its in front of you, I'd like you to write down what you think are the 3 biggest constraints to participating in the program.
    b. OK, let's go around the circle and provide a brief explanation of each constraint that you wrote down.
7. Now, using the [Insert Post-It color] Post-Its, I'd like you to jot down what you think would be the 3 most effective ways to encourage a landowner to participate in the program.
    a. Just like with the constraints, I now want to hear about each of the incentives you wrote down.
    b. Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?
8. As you know, it is common for landowners to rent or lease their land to neighbors, corporate famers, hunters, etc. Therefore, it's difficult to determine who makes land-use decisions on a given piece of property. How can MnDOT address this when trying to promote snow control measures?

    a. In other words, what are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land?
9. As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that? Why or why not?
    a. Can you think of a more effective way to enable communication between landowners to discuss snow control measures?

End Questions:

10. If you had one minute to give advice to Dan Gullickson and the TAP overseeing this project, what would you say?
    a. In other words, what would be the best way to improve landowner adoption of snow control measures in [Insert District #]?
11. We've had a great discussion today, thanks a lot for that! Our notes from the conversation today include the following key points _____. How well does that capture what was said here? Have we missed anything?
12. Is there anything that you came wanting to say that you didn't get a chance to share?

Reserve Questions (if there's extra time remaining):

13. Is it confusing to call these roadside barriers "snow control measures"? Can you think of a better term that is more easily understood by MnDOT and the general public?
14. In your experience, how do landowners prefer to be contacted (phone, in-person, Facebook)? What time of year is best to contact landowners?

Appendix B – LISTENING SESSION SUMMARIES

D6 – MnDOT District Listening Session

2:00-3:30pm, 11/13/18
MnDOT District 6 Headquarters, Rochester
Folder B_Recording 01

Attendees:
Mike Dougherty, Public Engagement & Communications Director
Cassie Goodnough, West TPS2 & Living Snow Fence Program District Coordinator
Drew Fischbach, East Maintenance Superintendent
Kong Douangdy, Stewartville Sub-Area Supervisor
Nathan Gregor, Environmental Coordinator
Aaron Breyfogle, Senior Project Manager
Chad Hanson, Traffic Engineer

Commentary on Snow Problems in District 6

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- West side of the district tends to have more blowing and drifting snow problems than east side
- Most common highways that are closed during large snow events: I-90 and I-I35
- Highway 52 (southbound) regrade south of Cannon Falls to south of Zumbrota; There's been discussion of structural snow fence or widening of ditches to catch snow
- On average, road closures happen about 1x/year in D6; closure typically lasts ~12hrs, but depends on size of snow event
- Worst areas (in terms of blow ice and drifting snow) are those where surrounding landscape is higher than the roadway; the tops of hills/hillcrests are often bad; accidents and rollovers are common
- Road between Byron and Kasson are notably bad
- Many roads around community of Hope

How important are clear roadways to local community members?

- Community members are typically complementary of road conditions and D6's ability to clear snow
- Community members expect roads to be cleared quickly; as D6 continues to deliver speedy and quality snow removal, community members develop higher expectations
- Expectations are lower in other places (e.g. South Dakota)
- "[MnDOT] is a victim of its own success"
- Increased awareness of salt's environmental impacts (both among MnDOT and the general public) has resulted in decreased usage of salt; decreased salt usage requires use of alternative deicers or other ways to achieve results with less impact on environment

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

- Community members (non-landowners) don't likely know much about snow control measures
- Landowners are likely familiar with snow control measures; they also probably understand the benefits
- It is common for landowners, many of which own large pieces of property, have large equipment and would prefer not to combine [corn rows] in the spring
- Most current Living Snow Fence participants in D6 average 1-2 acres of corn, some have 4-5 acres

"Examples of snow control projects?"

- D6 attempted to carry out a Living Snow Fences project along I-35; the location was identified with help of a tool designed by Wyoming DOT. Project abandoned due to a variety of reasons:
    - High projected costs
    - Need for too much right-of-way
    - Lack of correlation between crash data and comments from local snow local snow plow drivers, i.e. crashes weren't occurring in areas that were identified as "bad" by plow drivers
- D6 also attempted another snow control project on Albert Lea Lake along I-35; Dan Gullickson was involved; aerator was used to prevent lake from freezing; project was not successful; lake froze when temperature decreased below; area immediately after the lake became problematic

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Constraint for permanent participation in the program: landowners don't want to give up good agricultural land; they don't want to farm on either side of a permanent structure; they don't want the headache of driving around the structure
- "Many landowners would say it's not worth the headache for the amount of money they get paid"
- "It's not [a landowner's] problem to fix…it's MnDOT or the county's job to keep the road clear."
- The process of signing up (to become a vendor with the state of Minnesota) is not easy; it requires specific info (federal tax ID, etc.) and internet access
- MnDOT is not offering enough money
- On average, D6 pays around $900-$1200/acre; price used to be based on corn prices; one D6 landowners was grandfathered in and is paid $2,000/acre; there's a $5,000 limit
- Landowners are concerned that snowbanks around snow control measure increase soil moisture level and delay spring planting
- A general disruption to planting and harvesting operations
- Barrier to corridor approach: neighboring farmers are not on the same crop cycle; I.e, one farmer may have corn planted, while the neighbor has beans – and each year they will alternate
- Width of the Right-of-Way – it's not wide enough to include snow control measures
- General anti-government sentiment

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- Tax credits might be more attractive than direct payments;

    - Tax credits could be based on market value
    - Tax credit model could eliminate need to become of a vendor with the state
    - Tax credit idea would require legislative changes
    - Tax breaks, generally speaking, are very attractive to landowners
    - Payments are taxed and thus may be less attractive to landowners
- Larger landholdings likely would not be interested in abovementioned partnerships; they may see the payment as insignificant or not worthwhile

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

- "Some landowners love recognition, others don't"

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

- Always start with the landowner; then request renter contact information, if applicable
- Interested landowners aren't always eligible for program, according to Cost Benefit Tool

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- Yes and No – price per acre varies from landowner to landowner; discrepancy could cause issues, but farmers are accustomed to "locking in" rates

"What are some additional ideas to promote the snow control program in the future?"

- Partnerships with Pheasants Forever, Ducks Unlimited, SWCDs etc. for easements to promote habitat development on smaller landholdings
    - Although some landowners are concerned about partnerships with these types of organizations, because of access questions – Does my land become public? Etc.

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D6?"

- Improved partnerships with Extension Offices and SWCDs to promote snow control measures
- Make sure landowners know the registration process and make sure they know if they are eligible
- Increase public awareness; show success of the program (photos, videos in Extension/SWCD offices, etc.)
- Provide accessible examples of snow control measures and show how each works; each situation and each landowner is different
- Permanent structures might be more successful on pasture/grazing land because animals can graze around structure
- Negotiate with individual landowners, one-on-one meetings

Miscellaneous

- Design problems: Guardrails have worsened blowing and drifting snow issues in some areas
- Guardrails are be being removed in some areas due to new blow and drifting snow issues
- In an ideal world (with 200ft Right of Ways), more box culverts would be used
- Might be helpful for D6 to monitor salt usage to identify areas of high need and high cost

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D6 – Community Listening Session

5:00-6:30pm, 11/13/18
Lanesboro Community Center, Lanesboro
Folder B_Recording 02

Attendees:
Hal Cropp, Executive Director, Commonweal Theatre Company
Deane Benson, Director of Lanesboro Ambulance/Fire Department
Matt Schultz, Police Chief, Preston Police Department
Chad Wangen, Transportation Director, Lanesboro Schools
David Haugen, City of Lanesboro Public Works/Fire Department
Jerod Wagner, City of Lanesboro/Lanesboro Fire Chief
Brent Kohn, Maintenance Superintendent, Fillmore County Highway Department
Michele Peterson, Lanesboro City Administrator
Duane Bakke, Fillmore County Commissioner/Farmer

Commentary on Snow Problems in District 6

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- Worst blowing and drifting snow areas in Fillmore county: Highway 250 (wind is the major problem; snow event not required to cause issues here), CR 8, CR 16 (usually caused by river frost), Highway 52, Highway 30 ("If MnDOT doesn't regrade it…it'll never get any better")
- North-South roads, or those most exposed to NW prevailing winds tend to be the worst
- Blowing and drifting snow problems have remarkable impact on show attendance at theater; most tourists from Rochester, Winona, and Twin Cities
- As a general rule: worst areas are those where the fields are higher than the road
- West side of the county is worse – in terms of blowing and drifting snow issues
- Older roads tend to have the most issues – likely a result a narrower ditches
- Size of fetch area has an impact; even if tree line is 2mi from roadway, driving conditions are remarkably better
- On CR 14 (between Preston and Greenleafton) – with farmer consent, using a motor grader, will plow ridges of snow, which works well – although farmers don't really like, because the snow pile stays on the field for longer in the spring
- Complaints about Highway 250: no shoulder, narrow, poor design
- Guardrails worsen blowing and drifting snow issues; they create a snow traps on roadway
- Mowing ditches improves blowing and drifting snow issues, because it's less likely to catch the snow

How important are clear roadways to local community members?

- Winter road conditions are a common concern among many community members, because of the high numbers of commuters

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

- Have seen success of standing corn rows on Highway 80
- Windrowing snow fences (multiple barriers in succession) with motor grader has been successful for Fillmore County Highway Department
- Most attendees are familiar with snow control measures and MnDOT program
- If the community member is not a landowner, he or she is likely unfamiliar with MnDOT's program
- Most community members probably do not know how much of an impact these structures have on winter road conditions

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Registration process might be too complicated
- Anti-government sentiment
- Insufficient compensation
- "Stay off my land"
- "I pay taxes to have my roads cleared. Why should I be doing something to keep them clear?"
- Landowners aren't concerned about it; "They just don't care"
- Might interrupt desired tilling method
- Volunteer corn may appear in next year's crop because it stays in the field longer
- Perception of not being done; "It's not how a field should look";
- Increased workload; need to harvest and till in the spring
- It takes up acreage that could be in production; decreased yield
- Increased soil moisture level results in delayed spring planting; even if soil moisture is not affected, landowners may be stressed by the thought of delayed spring planting
- "Farmers are set in their ways. It's hard to make changes"
- Conservation security program, through NRCS – paid to leave row of crops for wildlife, often along the edge of forest
- Permanent/perpetual easements are unpopular among farmers; 10-15yr easements are more attractive
- Enrollment in snow control program may affect status of other farm programs (crop acre base, crop insurance, etc.)

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- Studies showing the success/benefits of snow control measures
    - Case study from perspective of school bus driver
- Develop a program/agreement wherein landowners would have ditch haying rights in exchange for standing corn rows, etc. along property

- Farmers could be paid to use their own equipment to windrow snow fences on their property

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

- Not likely to be an effective incentive; it would not make a difference for most landowners

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

- Landowner would make the ultimate decision; start with the landowner
- Landowner and renters would have to negotiate contract terms
- Recommendation: provide an example/model/structure of how a rental contract can be modified to compensate the renter for the loss of yield

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- "It's worth a try"
- It will only be effective if landowners are directed toward the resource
- Social networks are used by younger farmers in the area
    - Some farmers already use similar resources for conservation efforts

"What are some additional ideas to promote the snow control program in the future?"

- Education; get the word out among community members
- Associate living snow fences with other environmental benefits (pollinator habitat, etc.)
- In the future, lodging establishments could send thank you letter to participating landowners, as it will have a positive impact on wintertime tourism industry
- Continue to combine MnDOT snow control program with existing programs (CRP, etc.)
- Small talk "at the local café"
- Outdoor News – good information about what the state and FSA is doing
- It is important to let people know that the MnDOT snow control program and associated resources (e.g. farmer-to-farmer networking tool, etc.) exist
- Peer influence; it may be most effective to meet with a group of landowners along a section of roadway/corridor to discuss snow control efforts; "If you do it, I'll do it"
- Public meetings, similar to listening sessions, among landowners could be effective
- May be helpful to have support of City Council, County Boards, and Township Boards – to provide recommendation to local landowners
- MnDOT must be a part of promotional efforts; honesty and transparency are key
- MnDOT brochure in SWCD office
- Send press release to MN Department of Tourism (Explore Minnesota) so that "recognition permeates throughout the state"
- AG Day (TV program, 5am, KTTC)

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D6?"

- Increase public awareness
- Examples/case studies/testimonials are key selling points; include them in presentations to landowners
- Show prospective landowners the potential cost savings (for MnDOT) of installing a snow control measures

Miscellaneous

- Fillmore County Highway Department has limited resources: 16 trucks, only one shift of plow drivers
- Local government agencies may be opposed to tax credit incentive model
- Climate change may reduce future blowing and drifting snow problems

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D7 – MnDOT District Listening Session

2:00-3:30pm, 11/15/18
MnDOT St. James Truck Station
Folder C_Recording 01

Attendees:
Bryan Lillie, Maintenance Supervisor, Mapleton Sub Area
Mark Larson, Maintenance Supervisor, St. James Sub Area
Randy Illy, TGS-1, St. James
Randy Potts, Maintenance Supervisor, Worthington Sub Area
Peter Harff, Assistant District Engineer – Program Delivery
Anne Wolff, Public Engagement Coordinator
Matt Young, Project Manager
Glen Coudron, Project Manager
Chase Fester, Maintenance Superintendent
Gary Wyatt, UMN Extension
Diomy Zamora, UMN Extension

Commentary on Snow Problems in District 7

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- There are many problem areas throughout the district
- General characteristics of problem corridors
    - Long fetch areas
    - High backslopes
    - North-South roads
- 30-40mph winds create issues
- Key problem: funding is dedicated to improving quality and needs of pavement (i.e. resurfacing, mill and overlay etc.), not to preventative snow control measures; there is not a specific fund

(i.e. financial source) for snow control measures (Transportation Program Investment Committee allocates and distributes funds)
- East-West portion of Highway 4, southwest of Sherburn, is problematic during storms; requires constant plowing/blowing of ditch

How important are clear roadways to local community members?
- It is common for the D7 HQ to receive phone calls from community members, most often about areas in the SW portion of the district, complaining that some areas have not been plowed – even though they already have
- Maintenance staff sometimes windrow snow fences in fields; have received complaints from community members about areas that do not have windrows; some landowners have received pressure from public to allow MnDOT to windrow on their property
- Most community members assume that snow removal is limited to plowing and de-icing; they are generally unaware of snow control measures

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

"Examples of snow control projects?"
- Landowners tend to be more willing to allow the windrowing of snow berms, as compared to other snow control measures
    - It's very important that the ground is frozen before the snow berm is windrowed
- Notable success with Gap projects on Highway 60 (total reconstruction), between St. James and Windom; have been able to convince landowners to participate; Dan provided models for various solutions
    - They were supportive because they understand how poor the conditions can be on that section of roadway
    - With help of "Poncho" (Lonnie), called landowners; scheduled one-on-one meetings, brought in Google Maps or plat books and stenciled in areas for potential snow control measures, asked about landowners needs (space for equipment, what would make it for you, etc.); types of snow control measures installed: structural, living, ditch widening, grasses and trees in ditch
    - One landowner refused because he did not like MnDOT; He would not have wanted to participate in a group meeting, etc.
    - Common question from landowner: "What's my neighbor doing?" "What type of snow control measure are they using"
- Highway 111/22 Project, between Nicollet and Gaylord (resurfacing); attempted to use corridor approach; sought to only install snow control measures in areas with willing landowners
    - One-on-one meetings with 16 landowners; 4 agreed to participate
    - Meetings were held at location that was preferable for landowner
    - Helpful to be well-prepared for meetings, with portfolio of all possible options of snow control measures
    - Be willing to tailor the design to each landowner's farming operation
    - "Make it their (the landowners') idea"
    - Maps with fetch distances, etc.

    - "Help sell the problem to sell the solution"
    - Detailed information (crash data, snowplow hours, etc.) not used, but used output from Cost-Benefit Tool; compared output to other areas of roadway
    - Mix of structural snow fences, living snow fences, and standing corn rows
    - 15-yr temporary easement, with option for extension (temporary nature is more palatable to a farmer)
    - Gene Munsterman, the plow operator of the stretch of highway and a farmer, attended meetings with landowners and project manager
    - Matt has a folder of information
- Highway 60 Project, near Butterfield
    - Dan provided visual presentation, showing what snow fence would look like
    - Not always best to present complete models or visualizations of snow control measures on landowner's property; it should not look like the decision has already been made
    - The structural snow fence has had notable success, according to Maintenance
- Intersection of I-90 and Highway 22; two-fence system – tall fence on back side of property, short fence near the road, to avoid disruption of test plots

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Concerns about snow control measures shading out their crops
- Concerns about living snow fences leaching nutrients from the soil
- Weed control
- Inconvenience to farming operations
- Tile drainage issues
- Anti-MnDOT sentiments caused by culvert/drainage problems in the past
- Fences may be perpendicular to crop rows
- Hassle of having to combine in the spring
- It has been difficult to keep willows alive in some areas

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- Establishment of habitat for wildlife
- Adequate financial incentives

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

- Will vary from farmer to farmer
- It could be positive press for MnDOT

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

See examples of snow control project section

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

- Always start with the landowner; never talk to a renter before a landowner

- There have been instances when a landowner has compelled his or her renter to install a snow control measure
- Support for snow control measures may vary from generation to generation

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- This resource may be valuable, as long as it's advertised

"What are some additional ideas to promote the snow control program in the future?"

- Venues to promote snow control program:
    - Farm Fest
    - County Fair
    - Farm Bureau Magazine
    - Corn Growers/Soybean Growers Association
    - SWCD Office
    - Testimonials
    - Ag Expo (in Mankato) – January
- *"Where do landowners get their information when making land-use decisions?"*
    - The Implement
    - The Elevator
    - Seed Dealer
    - Agronomists
    - Crop Consultants

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D7?"

- "Get some more funding for it (the snow control program)"
- Increase (double) the payments for standing corn rows
- "Breaking even isn't enough"

Miscellaneous

- Over the last 20 years, D7 maintenance staff have developed a snow trap inventory; it is not currently updated;
- Supervisors use an app for snow trap/drift tracking; D7 is the piloting the app
- Snow control is a part of the pre-construction, project scoping phase
- Maintenance staff sometimes windrow snow fences in fields; "It's our #1 tool;" have received complaints from community members about areas that do not have windrows
- District staff members were confused by the terms: "snow control measures" and "snow control program;" They understand term the term: "Living Snow Fences"
- FFA and 4H used to harvest corn from standing rows, but participation in program grew so much that groups did not have capacity to harvest for all participating landowners
- MnDOT requires landowners to file for a ditch-haying permit; permit cannot be waived if landowner installs a snow control measure
- Farmers understand that compensation may vary between parcels of land, depending on variables including amount of traffic and severity of blowing and drifting snow problems
- Landowner interest in the program is directly linked to the severity of the winter

- It has been difficult to keep willows alive in some areas

D7 – Community Listening Session

5:00-6:30pm, 11/15/18
Princess Theater Community Center, St. James
Folder C_Recording 02

Attendees:
Trevor Dalhoff, Manager, Sleepy Eye Bus Service, Inc.
John Cselovszki, Superintendent, Sleepy Eye Public Schools
Larry Green, Farmer/Township Snowplow Driver
Wayne Stevens, Brown County Engineer
Chad Strautman, Farmer/St. James Snowplow Driver
Norma Reed, Community Member/Farmer
Teal Spellman, Watonwan County Engineer/Former MnDOT employee
Doug Storbeck, Principal, St. James Public Schools
Keith Brekken, Watonwan County Commissioner/Farmer
Jason Seidl, Brown County Sheriff
Vonnie Gratz, Commuter/Nurse
Dan Gratz, Community Member
Glenn Coudron, MnDOT Project Manager

Commentary on Snow Problems in District 7

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- Characteristics of roadways with worst snow problems:
  - "The higher the road, the better"; older roads (those that have not be remodeled recently) tend to be lower and more problematic
  - Township roads are the worst
  - Where there are curves in low areas
  - Near groves
  - Ditches that quickly fill up with snow
- Watonwan County tends to be worse than Martin and Blue Earth counties
- Interchange near Highway 60 and Highway 15 is nicknamed "Malfunction Junction"
- Highway 4, curve on the northwest side of St. James is remarkably bad
  - Most of the northwest side of the city is bad
- Highway 4, 1mi south of Godahl, trees on both sides of the road creates "a tunnel of snow"
- Guardrails and bridges create snow traps
- Box culverts are preferable to span bridges from a snow control standpoint
- Highway 15, near Fairmont – Vonnie Gratz, Nurse, takes care of many patients that are injured in car accidents on Highway 15; for that reason, she avoids Highway 15 at all costs

How important are clear roadways to local community members?

- County Commissioner occasionally receives phone calls from community members, complaining about roads that have not been plowed or do not look like they have been plowed
- Visibility is the most common issue and most common complaint

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

- Family members have installed living snow fences, which have proven to be successful
    - No evidence of increased soil moisture or delayed spring planting

"Examples of snow control projects?"

- Highway 30, west of Darfur – rolling topography, have installed snow control measures for the last couple decades
    - Utilizing strip cropping system – alternating rows of corn and soybeans
    - It works well, but is likely inconvenient for the farmer
    - It is probably expensive due to increased spraying to eliminate volunteer corn in the soybean strips

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Many farmers view it as a hassle to farming operations
- Delayed spring planting
- "It's their land; they should decide what they're going to do with it"
- Constraints for snow berms: increased soil compaction and moving of topsoil
- Constraints for living snow fences: concerns about branches growing into or over crops, concerns that crop herbicides and pesticides will killing fences
- MnDOT has refused to install snow control measures in some areas where landowners have been willing to adopt, likely because they were not priority areas identified by MnDOT
- D7 has a long history with snow control measures (due to disbursement of FEMA funds in the 90s); because of that fact landowners know how much time it takes to install and remove them, which may be a barrier to adoption; also, sometimes old snow control measures were installed in areas where they were not needed

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- More money; "It must be worth their while"
- Provide incentives for windrowing snow berms
    - It would be a good way of addressing point that winter severity varies from year to year
    - It would likely be cheaper than other snow control measures
    - It is not permanent

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

- "It's a waste of time and money"; "It ain't gonna make any difference"

- Larger farmers don't want the public to know where they are farming
- For farmers, acreage is a proxy for salary – thus, the signs may seem like a privacy infringement

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

- Always start with the landowner

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- Younger farmers would be most likely to use the tool
- Many farmers do not have access to internet or do not have smartphones
- Farmers will be more apt to contact a neighbor who is participating in the program, rather than go online to seek out landowners they do not know

"What are some additional ideas to promote the snow control program in the future?"

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D7?"

- Advocate for snow berms
- Provide proof to the landowner, taxpayer, and legislature that snow control measures are worthy of increased funding

Miscellaneous

- With landowner consent, snow plow drivers occasionally windrow snow berms in fields
- MnDOT has refused to install snow control measures in some areas where landowners have been willing to adopt, likely because they were not priority areas identified by MnDOT
- Public safety must be the emphasis
- Removal of farmsteads and increasing size of farms has worsened blowing and drifting snow problems
- Snow problem areas vary from year to year; "There's a surprise ever year"

D3 – MnDOT District Listening Session

1:00-2:30pm, 11/20/18
MnDOT District 3 Headquarters, Baxter
Folder D_Recording 01

Attendees:
Kevin Schmidt, Right of Way Engineer
Todd Fussy, Sub Area Supervisor, TOS 2
Rich Munsch, Road Regulations

Jeremy Mollner, Road Regulations/Permits
Matthew Indihar, Project Manager
Jenny Seelen, Communications/Public Affairs
Stephanie Castellano, Public Engagement Coordinator

Commentary on Snow Problems in District 3

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- Characteristics of the worst sections of roadway
    - Those with open fields on the west side
    - North-South roads tend
    - Areas with mature trees near the road
- Highway 210, between Pillager and Motley
- Highway 371, between Royalton and Little Falls
- Highway 371, south of Nisswa, where roadway is adjacent to Gull Lake

How important are clear roadways to local community members?

- Blowing and drifting snow problems are not top-of-mind for most community members
- Commonly held belief: side streets, county, and township roads are usually in the worst condition; state highways are the best

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

- Snow control measures are always considered during the project scoping process
    - Actually integrating snow control into the project is relatively uncommon
    - Because negotiating a land acquisition settlement can take a long time (sometimes 2-3yrs), including a snow control measure in a project could slow down and hamper progress of a project, particularly those on short timelines
    - For that reason, some project managers actively avoid snow control measures

"Examples of snow control projects?"

- Highway 169, near Aitkin, MnDOT is paying a landowner ~$5,000/acre for standing corn rows
- D3 landowners are more likely to adopt temporary snow control measures as compared to permanent options, primarily because it would be easier to subdivide the property for sale in the future
- Patti Waline Johnson (sp?), former MnDOT employee, would visit the farmers to promote Living Snow Fence program; Amy Staudinger
- The snow trap inventory is used to target priority areas
- Maintenance staff have seen success windrowing snow berms
- Standing corn rows are not common in D3

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Constraints for living snow fences: concerns about crop pesticides and herbicides stunting growth of plants in the snow fence
- Increased soil moisture resulting in delayed spring planting
- Corn prices are inversely related to program participation; when corn prices are up, landowner participation is down
- Hassle of having to combine in the spring

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- Safety or money

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

- No – farmers don't care about marketing and advertising; they care about their bottom line
- Many high-need areas for snow fences are on roads with little traffic and low visibility, making public recognition moot

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

- Always start with the landowner, as they are the ultimate decisionmaker

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- Corporate farmers may be more apt to use the tool
- D3 is home to Amish populations that would not have access to the internet and the tool

"What are some additional ideas to promote the snow control program in the future?"

- Present output from Cost-Benefit Tool to farmers
- When meeting with landowners, it has been most effective to promote the safety benefits of snow control measures, especially if friends and families often drive that section of roadway
    - "Do it for the family, more than for the money"
- It could be helpful to promote the benefits of having a windbreak: reduced soil erosion, etc.
- It could be helpful to market the ancillary benefits of snow control measures: noise barrier, site barrier, salt reduction, water quality improvements
- Use the following venues for promotion:
    - SWCDs
    - Extension Office
    - DNR

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D3?"

- Dedicate more MnDOT resources/personnel to the program
- Make it worthwhile for the farmer: focus on money and safety
- Develop a snow fence design that can be installed within the Right-of-Way
- Determine how a) the program can better integrated into standard highway project or b) launch a separate, statewide snow control project

Miscellaneous

- Problems would be solved if MnDOT could design a snow fences that is effective 75ft (or less) from the roadway

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D3 – Community Listening Session

5:00-6:30pm, 11/20/18
Aitkin City Hall, Aitkin
Folder D_Recording 02

Attendees:
Bob Nicko, Street Commissioner, City of Aitkin/Farmer
Monte Fronk, Emergency Management, Mille Lacs Tribal Police Department
Jessica Seibert, Aitkin County Administrator
Stephanie Castellanos, MnDOT Public Engagement Coordinator
Diomy Zamora, UMN Extension
Lon Nicko, Street Maintenance, City of Aitkin/Farmer
Charles Rick, Interim Superintendent, Aitkin Public Schools
Tom Bruss, Transportation Supervisor, Aitkin Public Schools
Mike Quale, Assistant County Engineer
Steve Hughes, District Manager, Aitkin Co SWCD
Terry Neff, Environmental Services Director, Aitkin Co
Allison Rian, Board of Directors, Sustainable Farming Association/Farmer
Scott Rian, South Aitkin First Responders
Leeann Moriarty, VP, Aitkin Area Chamber of Commerce/City Council Member
Kathleen Rian, City of Aitkin Administrator
Karla White, Aitkin Co Jail Administrator
Patrice Erickson, 911 Supervisor, Aitkin Co Sheriff's Office
Tim Catlin, Aitkin Police Chief

Commentary on Snow Problems in District 3

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- Highway 169/210, 3mi section of roadway northeast of Aitkin; there was a strong consensus that the "Aitkin Flats" area is a highly problematic in terms of blowing and drifting snow; it was mentioned throughout the session
    - The Aitkin Flats have notably narrow shoulders

    - During the last couple years, standing corn rows that have been planted on the Aitkin Flats; they have worked well
- Characteristics of the worst roads:
    - All open areas – it does not matter if roads are North-South or East-West
    - Where the roadway is higher than the surrounding ground – deicers tend to blow off the road
    - Hillcrests
    - Areas with tall trees that are close to the roadway cause shading and increased ice
- Highway 65, south of McGregor
- Highway 47, south of Clear Lake
- Highway 200, between Hill City and Jacobson
- Highway 169, south of Aitkin

How important are clear roadways to local community members?

- Locals, because they are accustomed to the road conditions, do not often complain; Out-of-town drivers tend to complain more
- "Locals are not educated about methods for mitigating blowing and drifting snow problems," i.e. snow control measures

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

- The Aitkin Co SWCD currently has posters in its office

"Examples of snow control projects?"

- 15 years ago, in collaboration with MnDOT (an employee from the Duluth office), the Aitkin County SWCD approached landowners to install a living snow fence; project ultimately failed because landowners, "at the last moment," decided not to participate
    - Landowners did not participate because financial incentive was inadequate, and they did not want to permanently lose the productive acreage to a living snow fence
    - "That [a snow control project on the flats] might be something to try to resurrect"
    - The leadership has changed; the landowner's son now has more influence on farming operations
    - The Aitkin SWCD (Steve Hughes) has a "reasonably good relationship" with the landowner, and therefore could reintroduce the project

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Lack of education about snow control measures; this is unique to D3 because trees are so common
- Desire to maximize crop yields
- Inconvenience to farming operations; it's an obstacle for the equipment
- Fields stay wetter for longer
- Aerial spraying of herbicides and pesticides can kill living snow fences

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- "Money…that's everybody's incentive"

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- It may not immediately catch on, but it could be a good resource to be used and promoted by SWCD, NRCS, SFA, FFA, 4H, etc.
    - Once landowners have been introduced to it – they may continue to use it on their own, if they have internet

"What are some additional ideas to promote the snow control program in the future?"

- Apply the benefits of a windbreak (improved soil health, decreased soil erosion, etc.) to a living snow fence
- Leverage local connections, resources and organizations: SWCD, County Zoning and Planning Committee, County Land Department, County GIS Department, Farm Bureau, FSA are often familiar or have personal relationships with local landowners, farmers, renters, etc.
- Open forums (similar to the listening session) for landowners would be helpful and increase awareness
- Present at the annual Towards Zero Deaths (MN TZD) conference, as snow control measures advance the goal of reducing fatalities on roads
- Attend and present at the Aitkin Commerce and Outdoor show
- Attend and present at County Fair
- Attend and present at Association of Minnesota Township Meeting
- Attend and present at Forest and Grassland Council Meetings
- Videos that can be shared on community/city/county Facebook pages
- Present to and educate 4H groups, as they will be future landowners
- At a minimum, focus on educating landowners in highest priority areas
- Other venues for promoting the program:
    - SWCDs
    - NRCS
    - Popular radio show among farmers – "Community Connections," 8-9am, KKIN (94.3FM)
    - Local newspapers

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D3?"

- Education – especially in prioritized problem areas
- Eminent Domain may need to be used
- Data (crash data, snowplow costs, cost savings from a snow control measure, etc.) will help convince landowners

Miscellaneous

- Taxpayer money is often allocated to projects that do not benefit the locals
    - "We have a chip on our shoulder"
    - Money
- In some areas along Highway 169, conifers have been killed by salt runoff from the roads
- It is important that species selected for living snow fences are climate-adapted to ensure future survival
- Standing corn rows would likely be more attractive than a living snow fence or permanent structure
    - "Ancestors spent a lot of time and money clearing the land" – therefore, reforesting the property might not be as attractive to landowners
- ATV, UTV, and snowmobile ruts may impact the health and survival of living snow fences

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D2 – MnDOT District Listening Session

1:00-2:30pm, 11/27/18
Crookston City Hall, Crookston
Folder E_Recording 01

Attendees:
Jim Curran, Assistant District Engineer – Project Development
TJ Melcher, Public Engagement Director
Bill Pirkl, Assistant District Engineer – Maintenance Operations
Matt Swedberg, TGS – Class I Supervisor
Todd Davis, TGS – Northwest Sub Area
Nate Overgaard, TOS 2 – Southwest Sub Area Supervisor
Delmar Peterson, East Grand Forks Truck Station
Mark Larson, Transportation Generalist, East Grand Forks
Nancy Graham, Project Manager
Michelle Rognerud, Traffic Engineer
Don Nosbisch, Maintenance Superintendent
Randy Proulx, TOS – Southwest Sub Area
Bryan Lebeda, TGS – Southwest Sub Area
Tim Wavra, TGS – Southwest Sub Area
Jeff Perkins, Area Operations Manager – D4
Kohl Skalin, Maintenance Superintendent – D4

Commentary on Snow Problems in District 2

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- Highway 2, between Crookston and East Grand Forks (particularly the section between Crookston and Fischer) – There was notable consensus among group members that this section of roadway is bad
    - Very poor visibility – problematic during snow events or when wind is blowing (20+mph)
    - "I grew up in East Grand Forks and we have some of the worst roads in the state in terms of snow problems and none of ours are even close to that chunk of Highway 2…around Fischer area. It's just horrible."
    - State patrol would like to install a gate to prevent cars from driving on this section of roadway during snow events
- Characteristics of worst sections of roadway
    - Large fetch areas
    - Lack of trees
    - East-west roads
    - Areas where a highway railroad grade parallels the side of the highway and creates a snow trap
- The increase in Round-Up ready crops has killed many trees in windbreaks
- Many windbreaks and tree rows have reached the end of their lifespan and are therefore being removed

How important are clear roadways to local community members?

- Winter road conditions are a common area of concern, as many local residents are commuters
- Local community members "value clear roads, but they don't understand how snow fences work"

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

"Examples of snow control projects?"

- D4 staff recently (fall '18) had a meeting promoting snow control measures to local SWCDs (staff members and board members)
    - Some SWCDs were previously unaware of the program
    - Meeting and presentation was well-received by SWCDs
    - Local senator was in attendance at the meeting
- D4 staff recently (fall '18) had a meeting promoting snow control measures to local SWCDs (staff members and board members)
    - Some SWCDs were previously unaware of the program
    - Meeting and presentation was well-received by SWCDs
    - Local senator was in attendance at the meeting
- There seems to be more interest in structural snow fence, because of it requires less land and less impact on operations
- Highway 34, west of Dunvilla
    - Landowner approached SWCD for compensation to install a noise and visual break
    - SWCD notified MnDOT
    - Living snow fence was installed, summer '18

    - 15-yr lease
- Highway 72, north of Blackduck, 1.5 of 4ft snow fence installed
    - Installed 75ft from road, in Right-of-Way
    - MnDOT received many compliments on its effectiveness
- Pembina, north of Hallock, 400ft of snow fence
    - Height of snow fence is increased by windrowing snow berms
- Highway 171, 10ft permanent snow fence ("predator snow fence") installed
- Highway 11, between Donaldson and Karlstad, 4ft snow fence installed
- Truck Highway 336 and I-94 Interchange, 3,000ft of 10ft permanent snow fence installed
    - Installed within MnDOT and County Right-of-Way
    - Partnered with county; will have to plow/blow the county road
    - 20% porosity
    - 130ft from the highway

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Increased soil moisture; delayed spring planting – especially among Red River Valley farmers
- "Right now, it's not [a question of] economics because our standing corn rows are making them more money than them combining it. They're making a killing on standing corn rows, but they still won't do it."
- The inconvenience of having to return to the fields and pick the corn in the spring
- Living snow fences may introduce weeds and unwanted branches
- Concerns about crop pesticides and herbicides and killing the living snow fence
- Concerns about accidentally cutting and killing the living snow fence
- Aesthetic concerns of structural snow fences
- Pollinator mixes require a lot of maintenance

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- Public recognition or a sign promoting the program and signaling participation
    - "It's free advertising"
    - "Everybody's looking for recognition"
- Large farmers (those with thousands of acres) would not do it for the money
    - "It'd be for recognition or societal benefits"
    - "I did something good for my fellow neighbor"

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- It will be valuable if promoted by community groups
    - SWCD
    - Rotary Club
    - Lions Club

"What are some additional ideas to promote the snow control program in the future?"

- "Approach landowners with the problem, not the solution"
- Helpful to use output from Cost-Benefit tool when meeting with landowners
- Install snow control measures in high-traffic, high visibility areas so that local landowners can see how they work and how beneficial they are
    - "The more of these [snow fences] we get out there, the easier it will be to sell the concept [to landowners]"
- Install snow control measures in highest priority areas
    - A complaint from a landowner: "Don't ask me to install a snow fence until you've fixed Highway 10, where it's really bad!"
- Group meeting with all landowners in a corridor
    - "They all receive the same message"
    - "They call all ask questions; They can hear answers to the questions that their friends and neighbors ask"
    - "They know that they're getting paid the same amount"
    - "When one person is convinced, it's easier for others to get on board"
    - This may allow landowners to discuss and cooperate on how to harvest corn in spring, etc.
- If a landowner complains about a discrepancy in payment from one area to another, explain that the compensation is linked to ADT, or the overall benefit to society
- Press releases about snow control measures
    - Press release should identify the priority areas/corridors
    - Explain the concept of snow control measures and societal benefits
    - Practical and successful examples/testimonials
    - There is a helpful video with a positive testimonial of a participating landowner on Highway 169
- Attend and present at county fair
- Influence future farming community
    - UMN Crookston
- Promote on FSA website
- Promote on NRCS website
- Collaborate with BWSR

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D2?"

- A dedicated fund for blowing and drifting snow projects
- In high-priority areas, install a snow control measure within the Right-of-Way (assuming it's a larger Right-of-Way, ~75-80ft); it could be effective for a portion of the winter, then MnDOT could clear/blow out the snow trap area before it reaches the road
- Obtain data or run studies on increased soil moisture levels caused by snow control measures; this could be helpful when approaching landowners and allaying concerns about delayed spring planting
- If landowners are concerned about increased soil moisture and delayed spring planting, MnDOT could offer to blow out and spread snow berm throughout field, before the ground thaws in the spring
- Snow trap inventory should be public information; helpful in identifying the problem – before proposing the solution
- Findings and testimonials from Highway 12 corridor should be used to promote snow control measures throughout the state
- Include complaints and interviews with trucking companies and other companies affected by snow problems in promotional materials
- To the extent possible, avoid use of eminent domain/condemnation, except for corridor projects where additional problems could be created by non-participating landowners
    - "We do not want to sour the flavor of this"
- Highway 2, around Fischer, is a good area to promote snow control measures
    - "If you start getting people driving that road (Hwy 2) to see the difference caused by the [snow] fence, they're going to be your best sales people"

Miscellaneous

- D2 has a list of Top 10 priority areas for blowing and drifting snow problems

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D2 – Community Listening Session

5:00-6:30pm, 11/27/18
Crookston City Hall, Crookston
Folder E_Recording 02

Attendees:
Pat Kelly, Public Works Director, City of Crookston
Bobby Baird, Service Manager/Councilman, City of Crookston
Ben Fall, Chief Deputy, Norman County Sheriff's Department
Morgan Torkelson, Technician, West Polk County SWCD
Troy Schroeder, Transportation Director, Northwest Regional Dev. Commission
Wayne Melby, Mayor, City of Crookston
Rick Niemela, Transportation Director, Crookston Public Schools
Kyle Olson, Deputy Sheriff, Polk County Sheriff's Department

Commentary on Snow Problems in District 2

"Based on your role within the department, what are the most severe snow problems in the area and where do they typically occur?"

- Characteristics of worst roadways
    - Open areas
    - Primarily East-West roads, but some North-South roads
    - Farmsteads near the highway cause drifting problems
- Areas around Warren are very open
- Highway 200, between Ada and Truck Highway 75
- Highway 2 – "The corner by Fischer is notoriously bad…even if we haven't had [new] snow for weeks;" "It's one they (local community members) warn you about when you first move here;" "We're always pulling cars out [of the ditch] right there"
    - Some employers allow employees to work from home if they have to drive this section of highway on their commute

How important are clear roadways to local community members?

- Snow problems affect everyone when wind is 25+mph

Knowledge, Attitudes, and Practices Related to Snow Control Measures

"Generally speaking, what do local community members know about snow control measures and MnDOT's snow control program?"

- General public probably does not know much about snow control measures
- Problem with standing corn rows: they fill up after a few sizeable storms and sometimes make the problem worse if the trap area extends onto the roadway
- "Snow fences are good early in the season…[but] once they fill up…it's like they're not there."
- Best scenario: trees ~1/2mi from the highway
- Highway 2, northwest of Crookston – some sections have standing corn rows; they have had a noticeable impact; they have been working well
- Taller trees (cottonwoods) in windbreaks do a better job of evenly distributing snow in the trap area, thus avoiding soil moisture issues

"Examples of snow control projects?"

Constraints to Adoption of Snow Control Measures

"What are the primary constraints to participating in the program?"

- Increased soil moisture; delayed spring planting
- Structural snow fences are labor-intensive to install
- Maintenance concerns
- Taking land out of production
- An inconvenience to farming operations (equipment size, equipment changes every few years, etc.)
- Concerns about weeds from living snow fences creeping into crops
- Concerns about herbicides (particularly dicamba) killing living snow fences
- Living snow fences may take water and nutrients from the crops

    - A study indicates that tree rows in sugar beet fields tend to decrease the sugar content of surrounding beets
- It is an additional concern for farmers, who already have a lot to think and worry about
- Many of the landowners in this area are corporate farms or individuals with very large landholdings; thus, their equipment is bigger and perhaps incompatible with snow control measures

Incentives for Adoption of Snow Control Measures

"What would be effective incentives to participate in the program?"

- Adequate financial compensation: "It must be lucrative enough to overcome the inconvenience;" "If it's not going to make me money…I'm not into [it]"

"Do you think landowners would appreciate public recognition (road signs, announcements in newspapers on the news, etc.) for participation in the program?"

Promotion of Snow Control Measures

"What are some effective promotional methods that have previously been employed by MnDOT?"

"What are ways MnDOT can promote snow control measures when we don't know who makes land-use decisions on a piece of land? I.e., how do we address unclear land tenure issues?"

"As a part of this project, we are developing an online networking tool that allows landowners to learn from each other and discuss their experience with snow control measures. Do you think landowners would use a resource like that?"

- "Young farmers would use it; they would check to see if they're (the snow control measures) are working"

"What are some additional ideas to promote the snow control program in the future?"

- Enlist help of SWCD
- Attend and present at community organization meetings (most of which happen during the winter):
    - Ag chemical organizations
    - Grain organizations
    - Sugar beet organizations

Recommendations for MnDOT's Snow Control Program

"What would be the best way to improve landowner adoption of snow control measures in D2?"

- The land is very valuable in the Red River Valley; it must make economic sense for the famer to adopt
- Zero in on the problem areas
- Parked train cars worked well as snow control measures

Miscellaneous

- During the last 10 years, many area farmers have been ripping out tree rows and windbreaks, which has increased the amount of open areas and has elevated windspeeds; tree removal is the result of a couple factors:
    - Trees in rows and windbreaks have reached the end of their lifespan
    - Farmers want to maximize productive acres
- Commuting is more common than in the past
- Concerns about increased soil moisture and delayed spring planting are more intense in this region, as the growing season is shorter, and it stays colder for longer
- Low visibility issues have been improved by rumble strips in the center and on the side of the road; “you can feel your way down the road”
- Many of the region’s snow problems would not be resolved by snow control measures; visibility is the major issue, which likely would not be fixed by a snow fence

Appendix C – PRE-OUTREACH SURVEY INSTRUMENT

Access Code:

Snow Control Measures:

A Survey of Landowners Along Highway [Insert Highway #]

CINRAM

DEPARTMENT OF TRANSPORTATION

UNIVERSITY OF MINNESOTA EXTENSION

Before you begin:

We are conducting this survey **to better understand landowners' knowledge and perceptions of snow control measures along [Insert Highway #]**. This is an effort to improve public safety and reduce costs associated with blowing and drifting snow. **The survey is voluntary and confidential.** It should take **about 15-20 minutes to complete** this questionnaire. Please answer the questions as completely as possible.

Once you've completed the survey:

Please fold it in half and mail it back in the enclosed self-addressed stamped envelope.

Thank you for your help!

I. Snow Problems

We would like to begin by asking you about your perceptions of snow problems along [Insert Highway #]

MnDOT characterizes a snow problem area as a section of roadway that continually experiences issues caused by blowing and/or drifting snow.

1. Are you aware of snow problem areas along [Insert Highway #]? *(Choose one)*

   [ ] Yes [ ] No [ ] Don't know Other (please specify)_____

2. Are you aware of the following snow-related problems occurring along [Insert Highway #]? *(Please check all that apply)*

   [ ] Whiteouts (blizzard conditions that reduce visibility to near zero)
   [ ] Spinouts
   [ ] Cars in ditches
   [ ] Car accidents
   [ ] Fatalities
   [ ] I am unaware of snow-related problems
   [ ] Don't know
   Other (please specify) _____

3. How important to you are clear roadways (those free of snow and ice) in the wintertime? *(Choose one)*

   [ ] Not important
   [ ] Slightly important
   [ ] Moderately important
   [ ] Very important
   [ ] Don't know
   Other (please specify) _____

4. In your opinion, which of following are potential environmental impacts of salt application on Minnesota roadways? *(Please check all that apply)*

   [ ] Decreased health of aquatic ecosystems
   [ ] Decreased water quality
   [ ] Salinization of soils
   [ ] Fish kill
   [ ] Delayed freezing of lakes
   [ ] None of the above
   [ ] Don't know
   Other (please specify) _____

[ ] Earlier ice-outs

II. Snow Control Measures

Next, we would like to ask about your knowledge of snow control measures and MnDOT's snow control program. Snow control measures are structures along roads that trap snow as it blows across fields before landing on the roadway. These measures, sometimes referred to as snow fences, include trees, shrubs, native grasses, cornstalks, fences and earthwork (the raising of the road grade or flattening of the backslope). MnDOT's snow control program aims to promote these types of snow control measures by paying landowners to install snow control measures on their property.

5. Are you aware of MnDOT's snow control program? *(Choose one)*

   [ ] Yes [ ] No [ ] Don't know Other (please specify) _____

6. Do you currently use any snow control measures on your property along [Insert Highway #]? *(Choose one)*

   [ ] Yes
   [ ] No
   If Yes, please specify the type of snow control measure
   _____

   [ ] Don't know
   Other (please specify) _____

Please indicate your familiarity with each of the listed snow control measures. (*Select only one box for each snow control measure)*

Type of Snow Control Measure	*I am aware of this measure*	*I have seen this measure*	*I know someone who has implemented this measure*	*I am **not** aware of this measure*
a. Standing corn rows	☐	☐	☐	☐
b. Living snow fences (using trees, grasses, and wildflowers)	☐	☐	☐	☐
c. Stacked corn and/or hay bales	☐	☐	☐	☐
d. Windrowed snow berms	☐	☐	☐	☐
e. Temporary snow fences (4ft tall orange fences)	☐	☐	☐	☐
f. Permanent structural snow fences	☐	☐	☐	☐

g. Earthwork (raising road grade or flattening backslope)	☐	☐	☐	☐

7. Are you aware of the following resources offered through MnDOT's snow control program? *(Please check all that apply)*

[ ] Living Snow Fences website
[ ] Incentive payments
[ ] Web-Based Cost-Benefit Tool
[ ] Vendor registration process
[ ] Don't know
Other (please specify) _____

8. Are you interested in learning more about MnDOT's snow control program? *(Choose one)*

[ ] Yes
[ ] No
[ ] Need more information
[ ] Don't know
Other (please specify) _____

9. If the highway in front of your property were identified as a snow problem area and you were paid to install a snow control measure, how interested would you be in participating in MnDOT's snow control program? *(Choose one)*

[ ] Not at all interested
[ ] Somewhat interested
[ ] Very interested
[ ] Need more information
[ ] Don't know
Other (please specify) _____
[ ] I currently use a snow control measure on my property

10. Which of the following would you prefer as ways to learn more about MnDOT's snow control program? *(Please check all that apply)*

[ ] Community outreach meetings, led by MnDOT staff
[ ] Group meetings with your neighbors, led by MnDOT staff
[ ] Individual visits to your property by MnDOT staff
[ ] I have no preference
[ ] Need more information
[ ] Don't know
Other (please specify) _____
[ ] I do not want to learn more about the program

11. How would you rate your experience with MnDOT employees? *(Choose one)*

[ ] Very negative
[ ] Somewhat negative
[ ] Somewhat positive
[ ] Very positive
[ ] Don't know
Other (please specify) _____
[ ] I have no prior experience with MnDOT employees

III. Willingness to Adopt Snow Control Measures

In this section, we would like to learn about your willingness to adopt a snow control measure on your property along [Insert Highway #]. We would appreciate your input, even if you are currently not interested in participating in the program.

12. Which of the following would help you adopt a snow control measure on your property? *(Please check all that apply)*

[ ] Monetary incentives
[ ] Knowing that my neighbors are participating in the program
[ ] Testimonials from landowners that have already adopted a snow control measure
[ ] Opportunities to connect with landowners that have already adopted a snow control measure
[ ] Public recognition (roadside signs, announcements, articles in newspaper, etc.)
[ ] Training from MnDOT on snow control measures
[ ] Gaining knowledge of the public safety benefits
[ ] Help from local SWCD with maintenance and equipment
[ ] None of the above
[ ] Don't know
Other (please specify) _____

[ ] I have already adopted a snow control measure on my property

13. Which of the following would prevent you from adopting a snow control measure on your property? (*Please check all that apply)*

[ ] It may take too much time
[ ] It might take land out of production
[ ] It could require too much maintenance
[ ] It may be an inconvenience to farming operations (equipment maneuverability, tillage, etc.)
[ ] It may require equipment I don't have
[ ] It could have impacts on tile drainage
[ ] It could increase soil moisture and delay spring planting
[ ] It may require me to combine in the spring
[ ] It might affect my herbicide and pesticide spraying
[ ] It could take away soil nutrients from my crops
[ ] It may shade out my crops
[ ] It could have insurance implications
[ ] It could affect access to my property
[ ] I don't trust government agencies
[ ] None of the above
[ ] Don't know
Other (please specify) _____

[ ] I have already adopted a snow control measure on my property

14. Which of the following snow control measures would you be most interested in adopting on your property? *(Please check all that apply)*

[ ] Standing corn rows
[ ] Structural snow fences
[ ] Windrowed snow berms
[ ] Living snow fences (using trees, native grasses, and wildflowers)
[ ] Stacked corn and/or hay bales

[ ] Don't know

Other (please specify) _____

[ ] I have already adopted a snow control measure on my property

[ ] Food and/or nut bearing plants

[ ] None of the above

[ ] Need more information

15. As mentioned above, MnDOT's snow control program offers incentive payments for landowners that adopt snow control measures on their property. If you were to implement a snow control measure, how would you prefer to receive your incentive payment? *(Choose one)*
    - [ ] One-time lumpsum
    - [ ] Yearly installments
    - [ ] I have no preference
    - [ ] Need more information
    - [ ] Don't know
    - Other (please specify) _____
    - [ ] I am already enrolled in the program

16. In order to participate in MnDOT's snow control program, landowners must sign a contract confirming the duration for which they will implement a snow control measure. If you were to adopt a snow control measure, what type of contract would you prefer? (*Choose one)*
    - [ ] Short-term (one-year)
    - [ ] Long-Term (multi-year)
    - [ ] I have no preference
    - [ ] Need more information
    - [ ] Don't know
    - Other (please specify) _____
    - [ ] I have already adopted a snow control measure on my property

17. The incentive payments offered by MnDOT's snow control program aim to encourage landowner participation and offset costs of maintenance activities. If you were to adopt a snow control measure, would you be willing to perform the following maintenance activities? *(Please check all that apply)*
    - [ ] Watering
    - [ ] Weeding
    - [ ] Pruning
    - [ ] Planting
    - [ ] Replanting
    - [ ] Harvesting
    - [ ] Need more information
    - [ ] Don't know
    - Other (please specify) _____
    - [ ] I am not willing to perform any maintenance activities

---

IV. Personal Involvement and Sources of Information

Now, we would like to find out what sorts of activities you're involved in and where you get your news and information. Your answers are voluntary and confidential.

19. Which of the following groups, organizations, etc. do you belong to? *(Please check all that apply)*

[ ] Clubs (Rotary, Kiwanis, etc.)
[ ] Associations (community development, conservation, labor unions, etc.)
[ ] Farming associations (Corn/Soybean Growers, etc.)
[ ] Charities
[ ] Church groups
[ ] Cooperatives
Other (please specify) _____

20. If you are willing, please write in the names of the groups, organizations, etc. to which you belong.

21. Which of the following social media channels do you use? *(Please check all that apply)*

[ ] Individual Facebook pages
[ ] Community Facebook groups
[ ] Company/agency/organization Facebook pages
[ ] Commodity group (Corn/Soybean Growers, etc.) email lists
[ ] Farm organization (Farm Bureau, etc.) email lists
[ ] Twitter
[ ] Instagram
[ ] YouTube
[ ] LinkedIn
[ ] Don't know
Other (please specify) _____
[ ] I don't use social media

22. Where do you get information about winter driving conditions? *(Please check all that apply)*

[ ] TV
[ ] Radio
[ ] Newspaper
[ ] Facebook
[ ] Family
[ ] Neighbors
[ ] Internet
[ ] Social media
[ ] Snowplow drivers
[ ] MnDOT website
[ ] 511 phone app
[ ] Don't know
Other (please specify) _____

23. Where do you seek information when making land-use decisions about your property? *(Please check all that apply)*

[ ] Neighbors
[ ] Family
[ ] Crop consultants/Agronomists
[ ] Farm equipment suppliers/Seed dealers
[ ] Farming associations (Corn/Soybean Growers, etc.)
[ ] Local grain elevator
[ ] My banker
[ ] SWCD/NRCS
[ ] USDA Farm Service Agency (FSA)
[ ] UMN Extension Services
[ ] Minnesota Department of Agriculture (MDA)
[ ] MnDOT
[ ] Don't know
Other (please specify) _____

24. What organizations or publications are your trusted source of information regarding farming practices and farming industry news?

V. Background Information and Your Property

Lastly, we would like to gather some background information about you and your property along [ ]. We would also like to reiterate that your answers are voluntary and confidential.

25. Which of the following best describes the nature of your property? *(Choose one)*

[ ] Single family farm (a farm owned by one nuclear family)
[ ] Multi-family farm (a farm owned by extended family members)
[ ] Corporate farm
[ ] Land trust
[ ] Commercial
[ ] Residential (not farmed)
[ ] Recreational
[ ] Leased to others
[ ] Don't know
Other (please specify) _____

26. Which of the following statements best describes how you use your property? *(Please check all that apply)*

[ ] I live there, but I do not farm
[ ] I am actively farming the property
[ ] I am actively farming, and I also rent land that I farm
[ ] A family member is actively farming the property
[ ] I rent the property to another farmer
[ ] I rent the property to a corporate farm
[ ] I use the property for recreational purposes
[ ] I lease the land to others for recreational purposes
[ ] I keep the land out of production for a conservation easement
[ ] Don't know
Other (please specify) _____

27. Who makes decisions about how to use your property? *(Choose one)*

[ ] I make the decisions
[ ] Family members and I make the decisions together

[ ] Family members make the decisions
[ ] The renter makes the decisions
[ ] The renter and I make the decisions together
[ ] It is a joint effort between various entities (agricultural consultants, bankers, corporations,etc.)
[ ] Don't know
Other (please specify) _____

28. What makes up your farming operation? *(Please check all that apply)*
[ ] Corn
[ ] Soybeans
[ ] Beets
[ ] Potatoes
[ ] Wheat
[ ] Commercial canning crops
[ ] Dairy
[ ] Beef (feedlot)
[ ] Beef (pasture)
[ ] Hogs
[ ] Don't know
Other (please specify) _____
[ ] I don't farm on my property

29. What is your age in years?
[ ] years

30. What is the highest degree or level of education that you have completed? *(Choose one)*
[ ] Some high school completed, no diploma
[ ] High school graduate, or equivalent (ex. GED)
[ ] Some college credit, no degree
[ ] Trade/technical/vocational training
[ ] College degree
[ ] Graduate degree
Other (please specify) _____

31. If MnDOT were to contact you, how would you prefer to be contacted? *(Please check all that apply)*
[ ] Home phone
[ ] Cell phone
[ ] Mail
[ ] Email
[ ] Text message
[ ] Facebook
[ ] In person
[ ] I have no preference
[ ] Don't know
Other (please specify) _____
[ ] I don't want to be contacted

32. If you are willing, please share your contact information (phone number, email, etc.) here:

33. What time of year is the best time to reach you? *(Please check all that apply)*
[ ] Jan-Mar
[ ] Apr-Jun
[ ] Jul-Sep
[ ] Oct-Dec
[ ] I have no preference

34. Do you have any questions, concerns, or comments for us about any of the topics mentioned in this survey?

Thank you for your help!

Please complete the survey, fold it in half, and mail it back in the enclosed self-addressed stamped envelope.
If you are interested in learning more, please visit MnDOT's Living Snow Fences website:
www.dot.state.mn.us/environment/livingsnowfence

Appendix D - PRE-OUTREACH KAP SURVEY RESULTS

D.1 PRE-OUTREACH KAP SURVEY RESULTS

Below are the results of the pre-outreach KAP survey. The results are divided into five sections (consistent with the questionnaire): I. Snow Problems, II. Snow Control Measures, III. Willingness to Adopt Snow Control Measures, IV. Personal Involvement and Sources of Information, and V. Background Information and Your Property. Furthermore, since sample size in each district is different, response frequencies were converted to percentages. This enables comparison across districts. Another common metric in this analysis is the frequency average, calculated by averaging the response frequencies of all districts. The answer choices with the highest frequency averages are highlighted in yellow. Due to the small sample size of respondents (98 total respondents), analysis is limited to descriptive statistics and content analysis. A histogram, a chart including frequency percentages for each answer choice and district, and a chart including all open-ended comments are included for each question.

D.1.1 - Snow Problems

D.1.1.1 Q1 - Are you aware of snow problem areas along Highways 2, 210/169, 250, and 4? (Choose one)

81 individuals answered this question; 17 skipped it. Descriptive statistics and write-in responses are given in Figure D-1 and Tables D-1 and D-2.

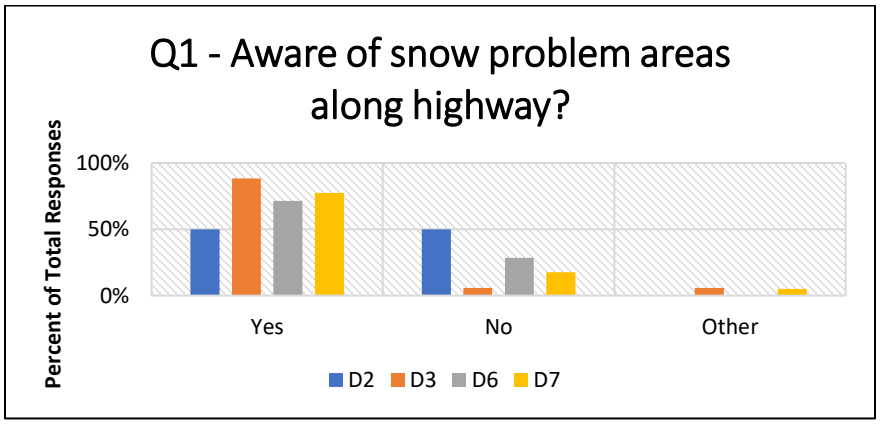

Figure D-1: Q1 (Pre-Outreach KAP survey) descriptive statistics - Aware of snow related problems?

Table D-1: Q1 (Pre-Outreach KAP survey) write-in responses

Answer	D2 *n=10*	D3 *n=17*	D6 *n=14*	D7 *n=40*	Frequency Average (all districts)
Yes	50.00%	88.24%	71.43%	77.50%	71.79%
No	50.00%	5.88%	28.57%	17.50%	25.49%
Other	0.00%	5.88%	0.00%	5.00%	2.72%

Table D-2: Q2 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"I live in Indiana and have never been or seen Highway 210-169 in the winter"		"1) Bridge guard rails 2) Trees growing within or adjacent to right of way" "Bridges and some low areas near Sleepy Eye"

The majority of District 3 (D3), District 6 (D6) and District 7 (D6) respondents reported awareness of blowing and/or drifting snow issues along Highways 210/169, 250, and 4, respectively. Half of the respondents from District 2 (D2) were not aware of blowing and/or drifting snow issues along Highway 2. One respondent that selected the *Other (please specify)* option in D3 reported that he or she was an absentee landowner and was therefore unfamiliar with winter driving conditions on the identified corridor. Other respondents that selected the *Other (please specify)* option wrote-in specific areas or roadway characteristics have notable blowing and/or drifting snow issues

D.1.1.2 Q2 – Are you aware of the following snow-related problems occurring along Highways 2, 210/169, 250, and 4? (Please check all that apply)

84 individuals answered this question; 14 skipped it. Descriptive statistics and write-in responses are given in Figure D.2 and Table D.3 and D.4.

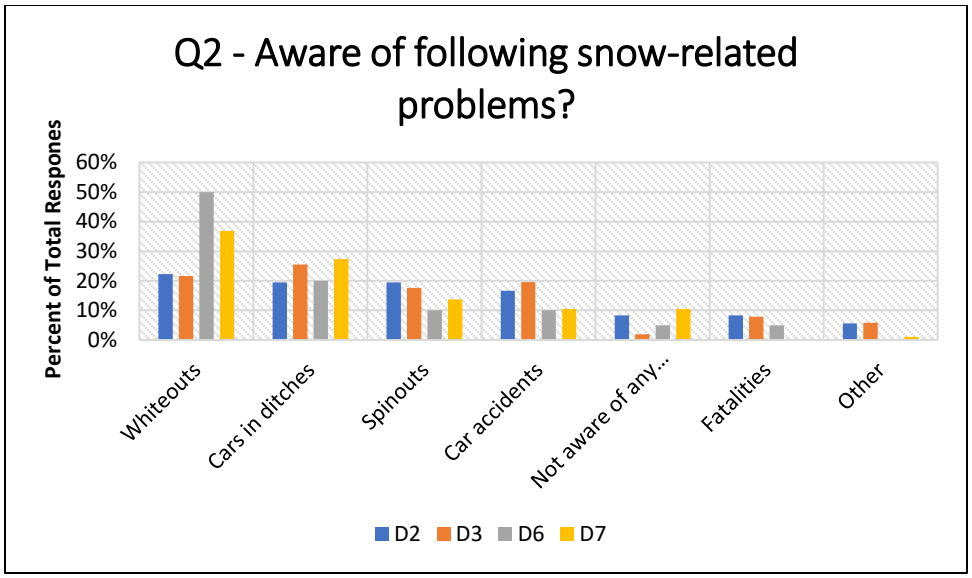

Figure D-2: Q2 (Pre-Outreach KAP survey) descriptive statistics – Aware of snow related problems?

Table D-1: Q2 (Pre-Outreach KAP survey) descriptive statistics

Answer	D2 *n=11*	D3 *n=18*	D6 *n=11*	D7 *n=44*	Frequency Average (all districts)
Whiteouts	22.22%	21.57%	50.00%	36.84%	32.66%
Cars in ditches	19.44%	25.49%	20.00%	27.37%	23.08%
Spinouts	19.44%	17.65%	10.00%	13.68%	15.19%
Car accidents	16.67%	19.61%	10.00%	10.53%	14.20%
Not aware of any snow-related problems	8.33%	1.96%	5.00%	10.53%	6.46%
Fatalities	8.33%	7.84%	5.00%	0.00%	5.29%
Other	5.56%	5.88%	0.00%	1.05%	3.12%

Table D-2: Q2 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"It is Minnesota in winter. These events happen statewide." "Never had a problem"	"Normal...[illegible] winter everywhere" "No"		"We live in Minnesota, its gonna snow and blow"

All districts, except District 3 (D3), reported *Whiteouts* as the most common and *Cars in ditches* as the second most common snow-related problem on the identified corridors. District 3 respondents indicated that *Cars in ditches* was the most common snow-related problem and that *Whiteouts* were the second most common snow-related problem. A few respondents who selected the *Other (please specify)* option suggested that the listed snow-related problems are common and a part of life in Minnesota. A couple other respondents who selected the *Other (please specify)* option indicated a lack of awareness of the listed snow-related problems on the identified corridors.

D.1.1.3 Q3 - How important to you are clear roadways (those free of snow and ice) in the wintertime? (Choose one)

95 individuals answered this question; 3 skipped it. Descriptive statistics and write-in responses are given in Figure D-3 and Tables D-5 and D-66.

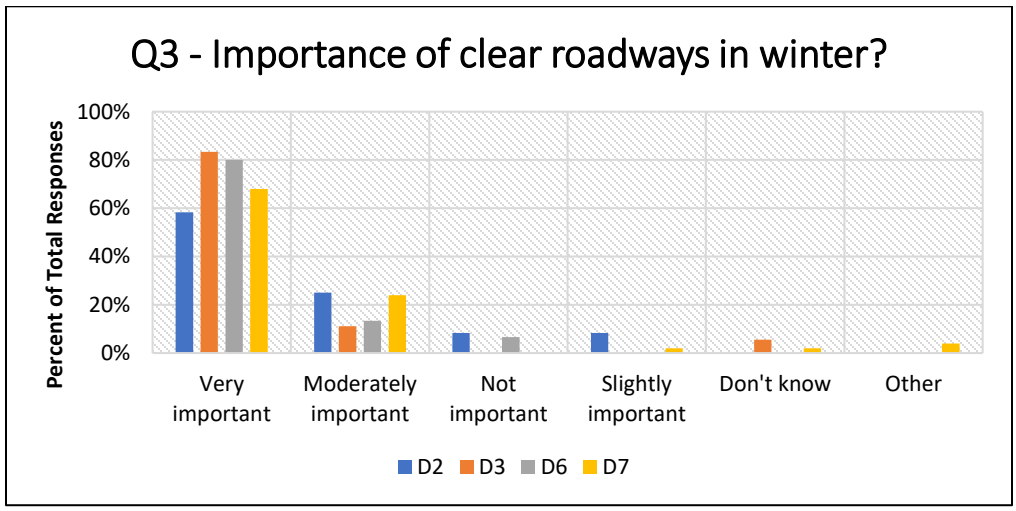

Figure D-3: Q3 (Pre-Outreach KAP survey) descriptive statistics- Importance of clear roadways

Table D-3: Q3 (Pre-Outreach KAP survey) descriptive statistics - Importance of clear roadways

Answer	D2 *n=12*	D3 *n=18*	D6 *n=15*	D7 *n=50*	Frequency Average (all districts)
Very important	58.33%	83.33%	80.00%	68.00%	72.42%
Moderately important	25.00%	11.11%	13.33%	24.00%	18.36%
Not important	8.33%	0.00%	6.67%	0.00%	3.75%
Slightly important	8.33%	0.00%	0.00%	2.00%	2.58%
Don't know	0.00%	5.56%	0.00%	2.00%	1.89%
Other	0.00%	0.00%	0.00%	4.00%	1.00%

Table D-4: Q3 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"Our snow removal and salting of roadway is excellent"		"Winter in AL"

The highest proportion (by a significant margin) of respondents in all districts reported that clear roadways in the wintertime are *Very Important*. The second highest proportion of respondents in all districts reported that clear roadways in the wintertime are *Moderately Important.* One respondent that selected the *Other (please specify)* option praised the snow removal and salting operations on the identified corridor. Another respondent that selected the *Other (please specify)* option reported that he or she spends winters in the southern US.

D.1.1.4 Q4 – in your opinion, which of the following are potential environmental impacts of salt application on Minnesota highways? (please check all that apply)

94 individuals answered this question; 4 skipped it. Descriptive statistics and write-in responses are given in Figure D-4 and Tables D-7 and D-8.

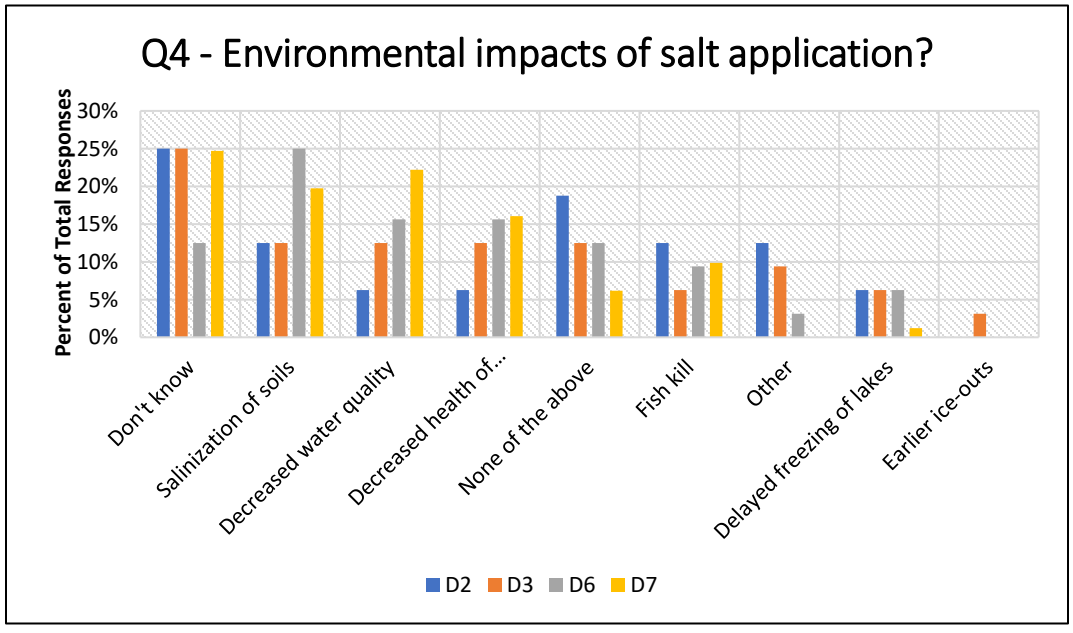

Figure D-4: Q4 (Pre-Outreach KAP survey) descriptive statistics – Env. Impacts of salt

Table D-5: Q4 (Pre-Outreach KAP survey) descriptive statistics – Env. Impacts of salt

Answer	D2 *n=12*	D3 *n=18*	D6 *n=16*	D7 *n=48*	Frequency Average (all districts)
Don't know	25.00%	25.00%	12.50%	24.69%	21.80%
Salinization of soils	12.50%	12.50%	25.00%	19.75%	17.44%
Decreased water quality	6.25%	12.50%	15.63%	22.22%	14.15%
Decreased health of aquatic ecosystems	6.25%	12.50%	15.63%	16.05%	12.61%
None of the above	18.75%	12.50%	12.50%	6.17%	12.48%
Fish kill	12.50%	6.25%	9.38%	9.88%	9.50%
Other	12.50%	9.38%	3.13%	0.00%	6.25%
Delayed freezing of lakes	6.25%	6.25%	6.25%	1.23%	5.00%
Earlier ice-outs	0.00%	3.13%	0.00%	0.00%	0.78%

Table D-6: Q4 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"I notice that the lower branches on evergreens turn brown" "Potential environmental impacts? Cows pissing along the roadway also have POTENTIAL environmental impacts"	"Don't live there" "Rust on vehicles" "Very good application and cleaning of roads on 169/210"	"Rust on car/fenders"	

The highest proportion of respondents in all districts, except District 6 (D6), selected *Don't know*, suggesting a general lack of knowledge about the environmental impacts of salt application on Minnesota highways. The highest proportion of respondents in District 6 (D6) selected *Salinization of soils* as a potential impact. Some respondents who selected the *Other (please specify)* option wrote in other observed impacts of salt application including the corrosion of vehicles and the killing of nearby vegetation, while other respondents commended MnDOT's salt application of the identified corridor.

D.1.2 - Snow Control Measures

D.1.2.1 Q5 - Are you aware of MnDOT's snow control program? (Choose one)

84 individuals answered this question; 14 skipped it. Descriptive statistics are given in Figure D-5 and Table D-9.

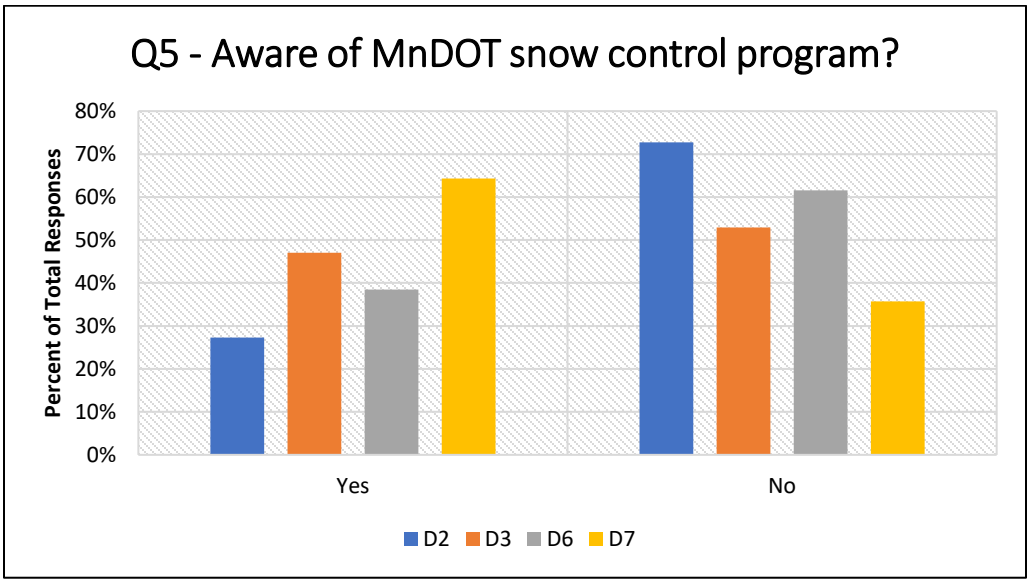

Figure D-5: Q5 (Pre-Outreach KAP survey) descriptive statistics – Aware of MnDOT program

Table D-7: Q5 (Pre-Outreach KAP survey) descriptive statistics – Aware of MnDOT program

Answer	D2 *n=11*	D3 *n=18*	D6 *n=13*	D7 *n=42*	Frequency Average (all districts)
No	72.73%	52.94%	61.54%	35.71%	55.73%
Yes	27.27%	47.06%	38.46%	64.29%	44.27%

Awareness of MnDOT's snow control program varied across districts. District 7 (D7) had the highest proportion of respondents (64.29%) that reported awareness of the program. District 2 (D2) had the lowest proportion of respondents (27.27%) that reported awareness of the program. District 3 (D3) was split; 52.94% of respondents reported awareness of the program, while the 47.06% were unaware of the program. District 6 (D6) was also split, with a slight majority of respondents (61.54%) reporting unawareness of the program.

D.1.2.2 Q6 – Do you currently use any snow control measures on your property along highway 2, 210/169, 250, and 4? (Choose one)

89 individuals answered this question; 9 skipped it. Descriptive statistics and write-in responses are given in Figure D-6 and Tables D-10 and D-11.

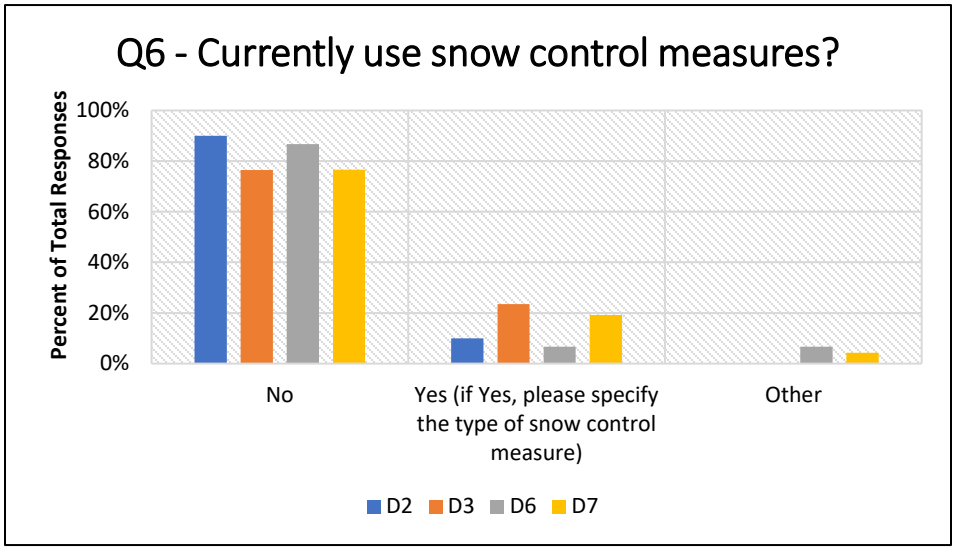

Figure D-6: Q6 (Pre-Outreach KAP survey) descriptive statistics – Use snow control measures?

Table D-8: Q6 (Pre-Outreach KAP survey) descriptive statistics – Use snow control measures?

Answer	D2 *n=10*	D3 *n=17*	D6 *n=15*	D7 *n=47*	Frequency Average (all districts)
No	90.00%	76.47%	86.67%	76.60%	82.44%
Yes	10.00%	23.53%	6.67%	19.15%	14.84%
Other	0.00%	0.00%	6.67%	4.26%	2.73%

Table D-9: Q6 (Pre-Outreach KAP survey) write-in responses

If Yes, please specify…Responses			
D2	**D3**	**D6**	**D7**
	"Trees and...[illegible] ditches" "Snow fence" "I have planted trees and planted and perennial plants along entire Right of Way on highway side of my property"		"Corn stalks and wheat regrowth for day care on east side of Hwy 4" "Trees planted by MNDOT on the North side of the Watonwan River in Section 11 of Nelson Township. Temporary windrows of snow built up by MNDOT to act as snow fence."

			"Snow fence" "Trees & grasses" "Snow fence" "Snow fence"
Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"Not on 250"	"My property isn't next to the hwy it is my neighbor's land"

The majority of respondents in all districts have not yet installed snow control measures on their property along the identified corridors. District 3 (D3) had the highest proportion (23.53%) of respondents who have already installed snow control measures, most of which are trees based on the write-in responses. In District 7 (D7), 19.15% of respondents have already installed a variety snow control measures including trees, corn rows, and "snow fences". Respondents who selected the *Other (please specify)* option indicated that they do not have property along the identified corridor, which means that some respondents were accidentally included in the sampling frame and will be removed from the Post-outreach KAP survey.

D.1.2.3 Q7 - Please indicate your familiarity with each of the listed snow control measures. (Choose one circle for each snow control measure)

96 individuals answered this question; 2 skipped it. Descriptive statistics and are given in Table D-12.

Table D-10: Q7 (Pre-Outreach KAP survey) descriptive statistics – Familiarity with snow control methods

I am aware of this measure					
Answer	D2 n=12	D3 n=18	D6 n=16	D7 n=50	Frequency Average (all districts)
LSF	36.36%	38.89%	35.71%	44.00%	38.74%
Temp snow fence	33.33%	18.75%	43.75%	42.00%	34.46%
Earthwork	41.67%	23.53%	25.00%	26.00%	29.05%
Standing corn	25.00%	23.53%	31.25%	32.00%	27.95%
Permanent snow fence	30.00%	17.65%	31.25%	30.61%	27.38%
Snow berms	36.36%	5.88%	18.75%	29.17%	22.54%
Stacked corn/hay	16.67%	11.76%	13.33%	37.50%	19.82%
I have seen this measure					
Answer	D2 n=12	D3 n=18	D6 n=16	D7 n=50	Frequency Average (all districts)
Standing corn	41.67%	41.18%	56.25%	56.00%	48.78%
LSF	36.36%	38.89%	35.71%	36.00%	36.74%
Stacked corn/hay	33.33%	23.53%	20.00%	20.83%	24.42%
Snow berms	27.27%	23.53%	43.75%	47.92%	35.62%
Temp snow fence	25.00%	50.00%	25.00%	42.00%	35.50%
Permanent snow fence	10.00%	17.65%	18.75%	32.65%	19.76%
Earthwork	8.33%	29.41%	25.00%	24.00%	21.69%
I know someone who has implemented this measure					
Answer	D2 n=12	D3 n=18	D6 n=16	D7 n=50	Frequency Average (all districts)
Standing corn	0.00%	17.65%	0.00%	8.00%	6.41%
Temp snow fence	0.00%	0.00%	12.50%	6.00%	4.63%
LSF	0.00%	0.00%	7.14%	8.00%	3.79%
Permanent snow fence	10.00%	0.00%	0.00%	2.04%	3.01%
Snow berms	0.00%	0.00%	0.00%	8.33%	2.08%
Earthwork	0.00%	0.00%	0.00%	2.00%	0.50%
Stacked corn/hay	0.00%	0.00%	0.00%	2.08%	0.52%
I am not aware of this measure					
Answer	D2 n=12	D3 n=18	D6 n=16	D7 n=50	Frequency Average (all districts)
Stacked corn/hay	50.00%	64.71%	66.67%	39.58%	55.24%
Permanent snow fence	50.00%	64.71%	50.00%	34.69%	49.85%
Earthwork	50.00%	47.06%	50.00%	48.00%	48.77%
Snow berms	36.36%	70.59%	37.50%	14.58%	39.76%
Temp snow fence	41.67%	31.25%	18.75%	10.00%	25.42%
LSF	27.27%	22.22%	21.43%	12.00%	20.73%

Standing corn	33.33%	17.65%	12.50%	4.00%	16.87%

According to frequency averages, all districts were least familiar with the following snow control measures: *Stacked corn and/or hay bales* (55.24%), *Permanent structural snow fences* (49.85%), *Earthwork (raising road grade or flattening backslope)* (48.77%). According to frequency averages, districts were most familiar with *Living snow fences* (38.74%); most respondents had seen *Standing corn rows* (48.78%); and, of those that knew someone who had implemented a snow control measure, most mentioned *Standing corn rows* (6.41%). Awareness of snow control measures varied across districts: District 3 (D3) was least familiar with most snow control measure types than any other district.

D.1.2.4 Q8 – are you aware of the following resources offered through MnDOT's snow control program? (please check all that apply)

93 individuals answered this question; 5 skipped it. Descriptive statistics and write-in responses are given in Figure D-7 and Tables D-13 and D-14.

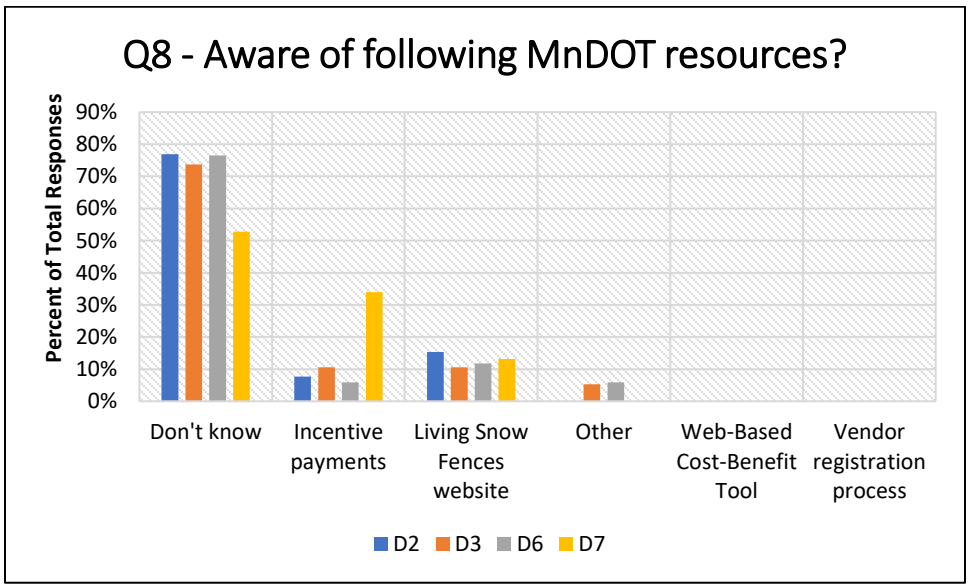

Figure D-7: Q8 (Pre-Outreach KAP survey) descriptive statistics – Aware of MnDOT resources?

Table D-11: Q8 (Pre-Outreach KAP survey) descriptive statistics – Aware of MnDOT resources?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=16*	D7 *n=47*	Frequency Average (all districts)
Don't know	76.92%	73.68%	76.47%	52.83%	69.98%
Incentive payments	7.69%	10.53%	5.88%	33.96%	14.52%

Living Snow Fences website	15.38%	10.53%	11.76%	13.21%	12.72%
Other	0.00%	5.26%	5.88%	0.00%	2.79%
Web-Based Cost-Benefit Tool	0.00%	0.00%	0.00%	0.00%	0.00%
Vendor registration process	0.00%	0.00%	0.00%	0.00%	0.00%

Table D-12: Q8 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"Didn't realize program offerings"	"Haven't used"	

The highest proportion of respondents in all districts selected *Don't know* for this question, suggesting a general lack of awareness of MnDOT's Blowing Snow Control Program resources. District 7 (D7) reported relatively high awareness of MnDOT resources: *Incentive payments* (33.96%) and *Living Snow Fences website* (13.21%). No respondents were aware of the *Web-Based Cost-Benefit Tool* or *Vendor registration process.* Those respondents who selected the *Other (please specify)* option reiterated their lack of knowledge of MnDOT resources.

D.1.2.5 Q9 - Are you interested in learning more about MnDOT's snow control program? (Choose one)

94 individuals answered this question; 4 skipped it. Descriptive statistics are given in Figure D-8 and Table D-15.

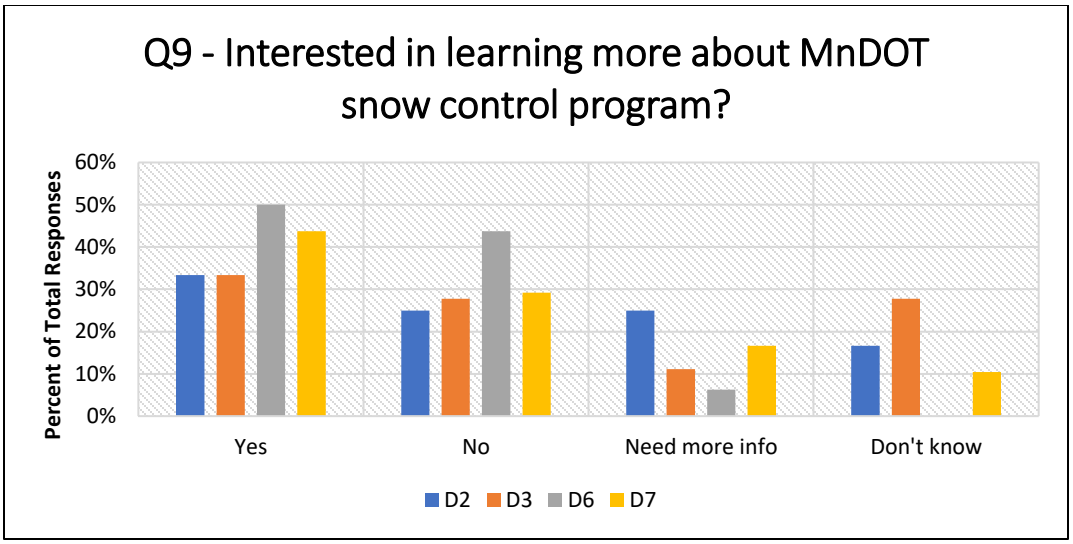

Figure D-8: Q9 (Pre-Outreach KAP survey) descriptive statistics – Interested in MnDOT program?

Table D-13: Q9 (Pre-Outreach KAP survey) descriptive statistics – Interested in MnDOT program

Answer	D2 *n=12*	D3 *n=18*	D6 *n=16*	D7 *n=48*	Frequency Average (all districts)
Yes	33.33%	33.33%	50.00%	43.75%	40.10%
No	25.00%	27.78%	43.75%	29.17%	31.43%
Need more info	25.00%	11.11%	6.25%	16.67%	14.76%
Don't know	16.67%	27.78%	0.00%	10.42%	13.72%

Slight majorities in all districts reported they were interested in learning more about MnDOT's Blowing Snow Control Program. A notable number of respondents in all districts selected either the *Need more information* or *Don't know* options, suggesting a general lack of knowledge about the program and/or a possible desire to learn more.

D.1.2.6 Q10 - If the highway in front of your property were identified as a snow problem area and you were paid to install a snow control measure, how interested would you be in participating in MnDOT's snow control program? (Choose one)

96 individuals answered this question; 2 skipped it. Descriptive statistics and write-in responses are given in Figure D-9 and Tables D-16 and D-17.

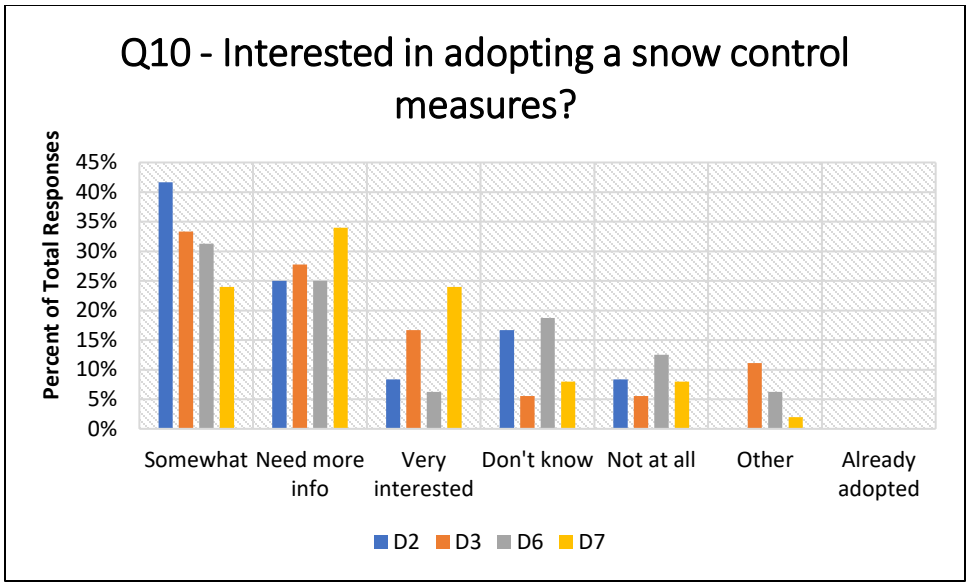

Figure D-9: Q10 (Pre-Outreach KAP survey) descriptive responses – Interested in adopting?

Table D-14: Q10 (Pre-Outreach KAP survey) descriptive responses – Interested in adopting?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=16*	D7 *n=50*	Frequency Average (all districts)
Somewhat	41.67%	33.33%	31.25%	24.00%	32.56%
Need more info	25.00%	27.78%	25.00%	34.00%	27.95%
Very interested	8.33%	16.67%	6.25%	24.00%	13.81%
Don't know	16.67%	5.56%	18.75%	8.00%	12.25%
Not at all	8.33%	5.56%	12.50%	8.00%	8.60%
Other	0.00%	11.11%	6.25%	2.00%	4.84%
Already adopted	0.00%	0.00%	0.00%	0.00%	0.00%

Table D-15: Q10 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"No problem" "My property has no snow problem"	"Not on 250"	"I have lived in town for over 20yr"

According to frequency averages, the most common responses were the following (from most common to least common): *Somewhat interested* (32.56%), *Need more information* (27.95%), *Very interested*

(13.81%). Respondents that selected the *Other (please specify)* option reported that there was no blowing and/or drifting snow problems on the section of highway in front of their property or that they do not live along the identified corridor. District 7 (D7) had the highest proportion (24.00%) of respondents that selected *Very interested*.

D.1.2.7 Q11 - Which of the following would you prefer as ways to learn more about MnDOT's snow control program? (Please check all that apply)

91 individuals answered this question; 7 skipped it. Descriptive statistics and write-in responses are given in Figure D-10 and Tables D-18 and D-19.

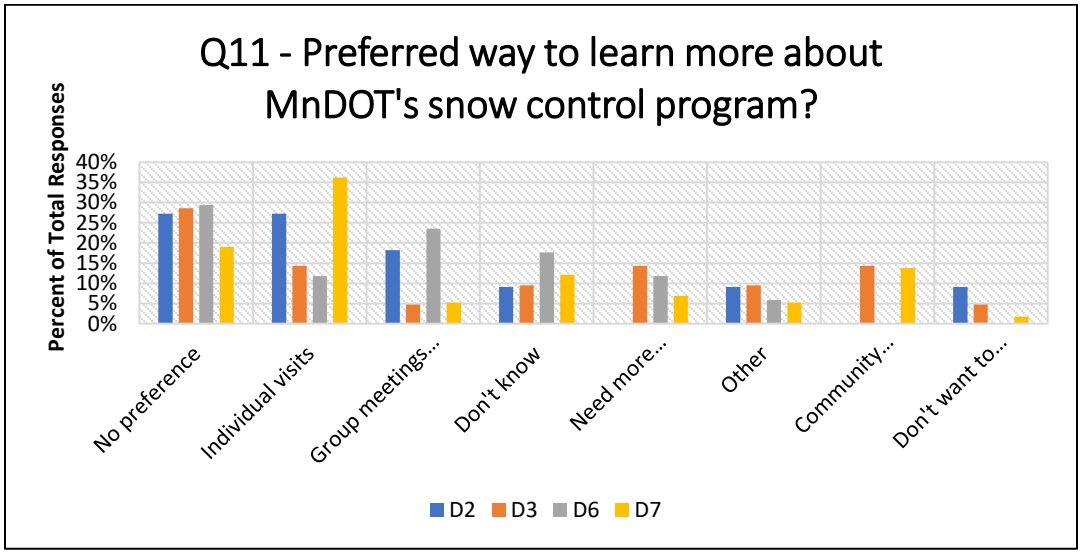

Figure D-10: Q11 (Pre-Outreach KAP survey) descriptive statistics – Preferred way to learn about program?

Table D-16: Q11 (Pre-Outreach KAP survey) descriptive statistics – Preferred way to learn about program?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=15*	D7 *n=47*	Frequency Average (all districts)
No preference	27.27%	28.57%	29.41%	18.97%	26.06%
Individual visits	27.27%	14.29%	11.76%	36.21%	22.38%
Group meetings with neighbors	18.18%	4.76%	23.53%	5.17%	12.91%
Don't know	9.09%	9.52%	17.65%	12.07%	12.08%
Need more information	0.00%	14.29%	11.76%	6.90%	8.24%
Other	9.09%	9.52%	5.88%	5.17%	7.42%
Community outreach meetings	0.00%	14.29%	0.00%	13.79%	7.02%
Don't want to learn more	9.09%	4.76%	0.00%	1.72%	3.89%

Table D-17: Q11 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"Email and internet"	"Town Hall Meeting" "Radio ads"	"Not at all, none of them"	"Phone call" "Mail letter" "By mail"

According to frequency averages, the preferred ways to learn more about MnDOT's snow control program were the following (from most common to least common): *I have no preference* (26.06%), *Individual visits to your property by MnDOT staff* (22.38%), *Group meetings with neighbors, led by MnDOT staff* (12.91%), *Don't know* (12.08%). In District 7 (D7), there was a relatively strong preference (36.21%) for *Individual visits to your property*. Respondents that selected the *Other (please specify)* option reported other preferred methods for learning more about the program including email, internet, townhall meetings, radio ads, mail etc.

D.1.2.8 Q12 – How would you rate your experience with MnDOT employees? (choose one)

93 individuals answered this question; 5 skipped it. Descriptive statistics and write-in responses are given in Figure D-11 and Tables D-20 and D-21.

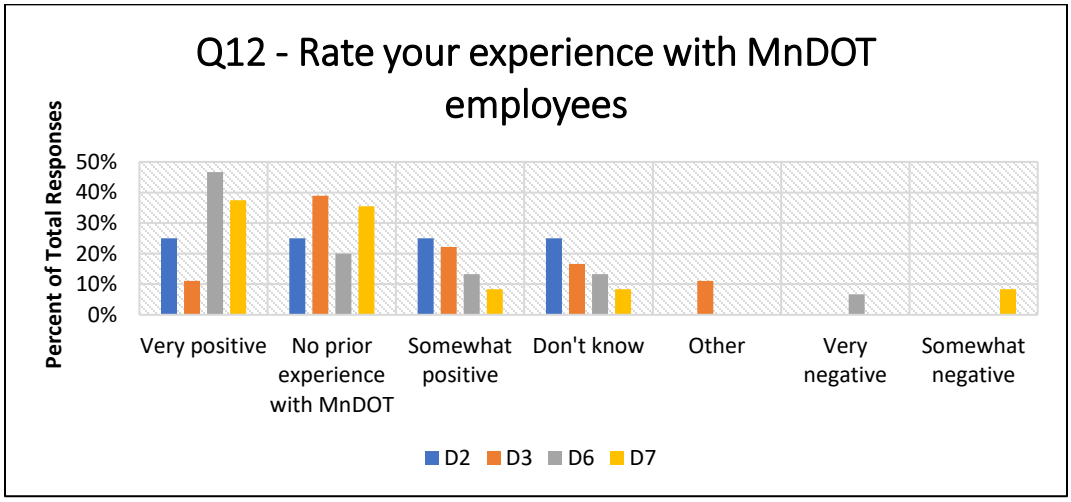

Figure D-11: Q12 (Pre-Outreach KAP survey) descriptive statistics – Experience with MnDOT employees?

Table D-18: Q12 (Pre-Outreach KAP survey) descriptive statistics – Experience with MnDOT employees?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=15*	D7 *n=48*	Frequency Average (all districts)
Very positive	25.00%	11.11%	46.67%	37.50%	30.07%
No prior experience with MnDOT	25.00%	38.89%	20.00%	35.42%	29.83%
Somewhat positive	25.00%	22.22%	13.33%	8.33%	17.22%
Don't know	25.00%	16.67%	13.33%	8.33%	15.83%
Other	0.00%	11.11%	0.00%	0.00%	2.78%
Very negative	0.00%	0.00%	6.67%	0.00%	1.67%
Somewhat negative	0.00%	0.00%	0.00%	8.33%	2.08%

Table D-19: Q12 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"Some good, some not good" "Somewhat positive - They mowed down all my trees in about 2005 then drove away"		

According to frequency average, most respondents rated their experience with MnDOT employees as *Very Positive.* The second most common answer, according to frequency average, was *No prior experience with MnDOT*. *Somewhat positive* and *Don't know* were also notably common answers in all districts. A couple respondents in District 3 (D3) and District 7 (D7) rated their experience as either somewhat negative or very negative. One respondent who selected the *Other (please specify)* option shared a story about how, in 2005, a MnDOT employee had mowed down his or her trees and then drove away.

D.1.3 - Willingness to Adopt Snow Control Measures

D.1.3.1 Q13 - Which of the following would help you adopt a snow control measure on your property? (Please check all that apply

91 individuals answered this question; 7 skipped it. Descriptive statistics and write-in responses are given in Figure D-12 and Tables D-22 and D-23.

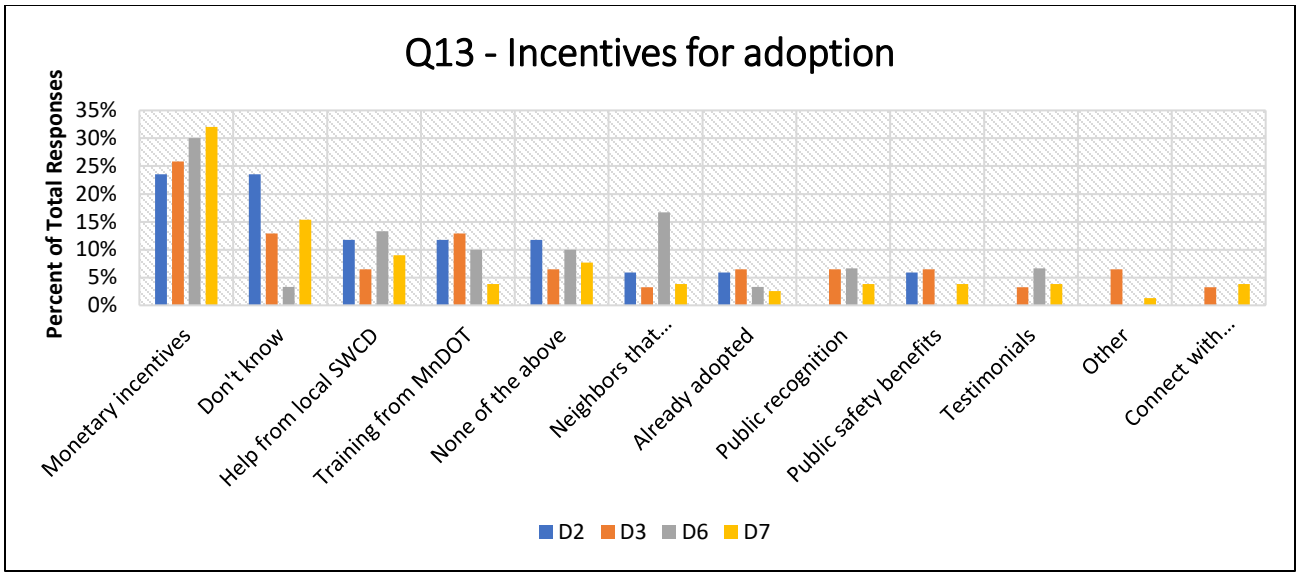

Figure D-12: Q13 (Pre-Outreach KAP survey) descriptive statistics – Incentives for adoption?

Table D-20: Q13 (Pre-Outreach KAP survey) descriptive statistics – Incentives for adoption?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=13*	D7 *n=48*	Frequency Average (all districts)
Monetary incentives	23.53%	25.81%	30.00%	32.05%	27.85%
Don't know	23.53%	12.90%	3.33%	15.38%	13.79%
Help from local SWCD	11.76%	6.45%	13.33%	8.97%	10.13%
Training from MnDOT	11.76%	12.90%	10.00%	3.85%	9.63%
None of the above	11.76%	6.45%	10.00%	7.69%	8.98%
Neighbors that participate	5.88%	3.23%	16.67%	3.85%	7.41%
Already adopted	5.88%	6.45%	3.33%	2.56%	4.56%
Public recognition	0.00%	6.45%	6.67%	3.85%	4.24%
Public safety benefits	5.88%	6.45%	0.00%	3.85%	4.05%
Testimonials	0.00%	3.23%	6.67%	3.85%	3.44%
Other	0.00%	6.45%	0.00%	1.28%	1.93%
Connect with landowners that participate	0.00%	3.23%	0.00%	3.85%	1.77%

Table D-21: Q13 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"I am too old to participate "snow don't blow on my property (woods)"		"Not needed"

According to frequency averages, the following incentives were the most common responses across all districts (from most common to least common): *Monetary incentives* (27.85%), *Don't know* (13.79%), *Help from local SWCD with maintenance and equipment* (10.13%), *Knowing that my neighbors are participating in the program* (10.13%), *Training from MnDOT on snow control measures* (9.63%), *Monetary Incentives* ranked significantly higher than other incentives on the list. *Don't know* ranked relatively high on the list (#2), suggesting that respondents may not know much about snow control measures or have not thought much about them. Importantly, 23.53% of District 2 (D2) respondents selected the *Don't know* option, which pulled up the frequency average. Neither *Testimonials from landowners that have already adopted…* nor *Opportunities to connect with landowners that have already adopted…* ranked highly on the list, while *Knowing that my neighbors are participating* ranks notably high on the list (#6). Respondents that selected the *Other (please specify)* option reported a variety of perspectives; some reiterated that snow control measures are not necessary on their property, while another reported that he or she was too old to participate

D.1.3.2 Q14 - Which of the following would prevent you from adopting a snow control measure on your property? (Please check all that apply)

81 individuals answered this question; 17 skipped it. Descriptive statistics and write-in responses are given in Figure D-13 and Tables D-24 and D-25.

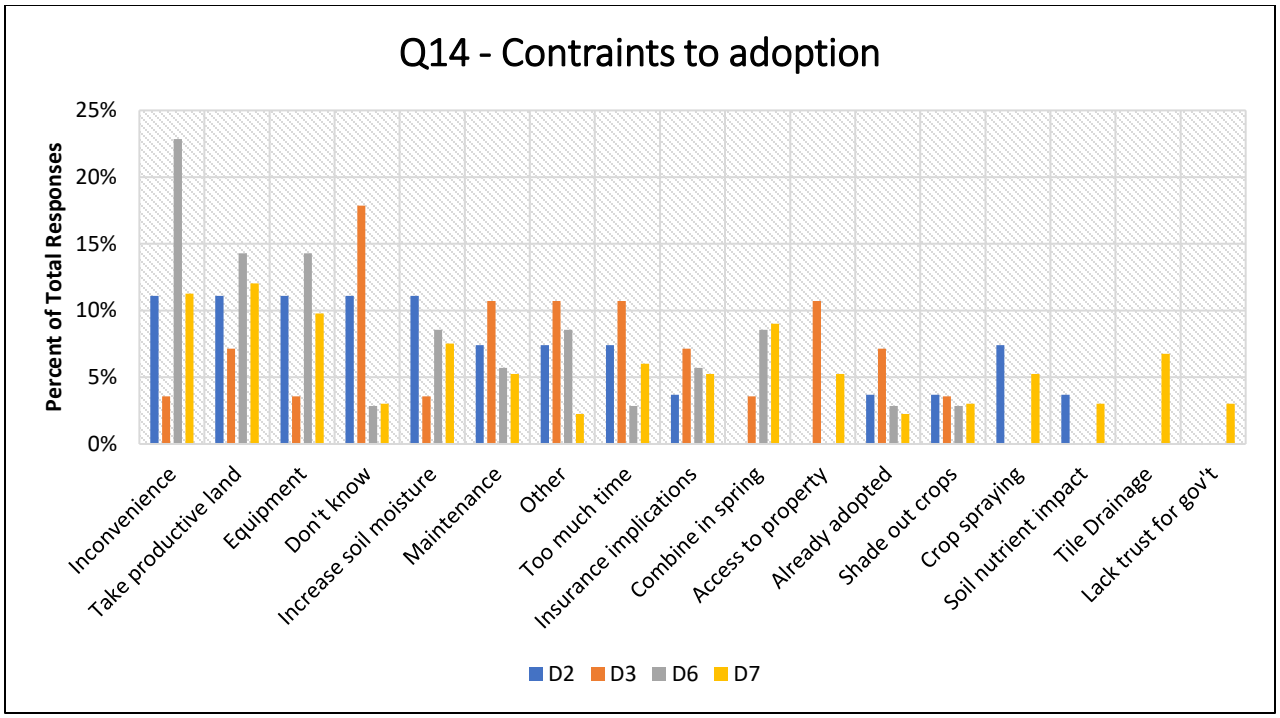

Figure D-13: Q14 (Pre-Outreach KAP survey) descriptive statistics – Constraints to adoption?

Table D-22: Q14 (Pre-Outreach KAP survey) descriptive statistics – Constraints to adoption?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=12*	D7 *n=39*	Frequency Average (all districts)
Inconvenience	11.11%	3.57%	22.86%	11.28%	12.21%
Take productive land	11.11%	7.14%	14.29%	12.03%	11.14%
Equipment	11.11%	3.57%	14.29%	9.77%	9.69%
Don't know	11.11%	17.86%	2.86%	3.01%	8.71%
Increase soil moisture	11.11%	3.57%	8.57%	7.52%	7.69%
Maintenance	7.41%	10.71%	5.71%	5.26%	7.27%
Other	7.41%	10.71%	8.57%	2.26%	7.24%
Too much time	7.41%	10.71%	2.86%	6.02%	6.75%
Insurance implications	3.70%	7.14%	5.71%	5.26%	5.45%
Combine in spring	0.00%	3.57%	8.57%	9.02%	5.29%
Access to property	0.00%	10.71%	0.00%	5.26%	3.99%
Already adopted	3.70%	7.14%	2.86%	2.26%	3.99%
Shade out crops	3.70%	3.57%	2.86%	3.01%	3.29%
Crop spraying	7.41%	0.00%	0.00%	5.26%	3.17%
Soil nutrient impact	3.70%	0.00%	0.00%	3.01%	1.68%
Tile Drainage	0.00%	0.00%	0.00%	6.77%	1.69%
Lack trust for gov't	0.00%	0.00%	0.00%	3.01%	0.75%

Table D-23: Q14 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"May be selling property" "Right of Way don't know"	"No need" "I am too old to participate" "Woods don't blow bad on highway"	"Not on 250" "Husband's attitude" "I won't plant shrubs, they're ineffective along other roads I travel. I won't build permanent fences they are a mess in a few short years. In the 1960's the hwy department put up and took down snow fences that seemed to work. Recently I chose to not chop my corn stalks, that does not work for everyone because of farming pressures"	"If I need to combine in spring, it takes a lot to re-clean combine out all corn out or the mice get in and chew the electrical wire off. The corn that falls over winter will grow next year in bean field. Don't like that. Maybe those rows need different spray next year." "No problems" "I rent this ground to another person - not messing with it. I don't live anywhere near this property"

According to frequency averages, the following incentives were the most common responses across all districts (from most common to least common): *It may be an inconvenience to farming operations…*(12.21%), *It might take land out of production* (11.14%), *It may require equipment I don't have* (9.69%), *Don't know* (8.71%), *It could increase soil moisture and delay spring planting* (7.69%), *It could require too much maintenance* (7.27%), *Other* (7.24%), *It may take too much time* (6.75%), *It may require me to combine in the spring* (5.29%). Importantly, 22.86% of District 6 (D6) respondents selected the *…inconvenience to farming operations…*, which pulled up the frequency average. *Don't know* ranked relatively high on the list (#3), suggesting that respondents may not know much about snow control measures or have not thought much about them. No constraint garnered more than 13% of the total, which suggests a relatively even distribution. In other words, with the exceptions of …*inconvenience to farming operation…* (#1) and …*take land out of production* (#2), respondents appear to regard many constraints with a similar level of importance. Respondents that selected the *Other (please specify)* option reported a variety of perspectives; some reiterated that snow control measures are not necessary on their property, while others offered detailed remarks about why they are not interested in adopting snow control measures.

D.1.3.3 Q15- Which of the following snow control measures would you be most interested in adopting on your property? (Please check all that apply)

75 individuals answered this question; 23 skipped it. Descriptive statistics and write-in responses are given in Figure D-14 and Tables D-26 and D-27.

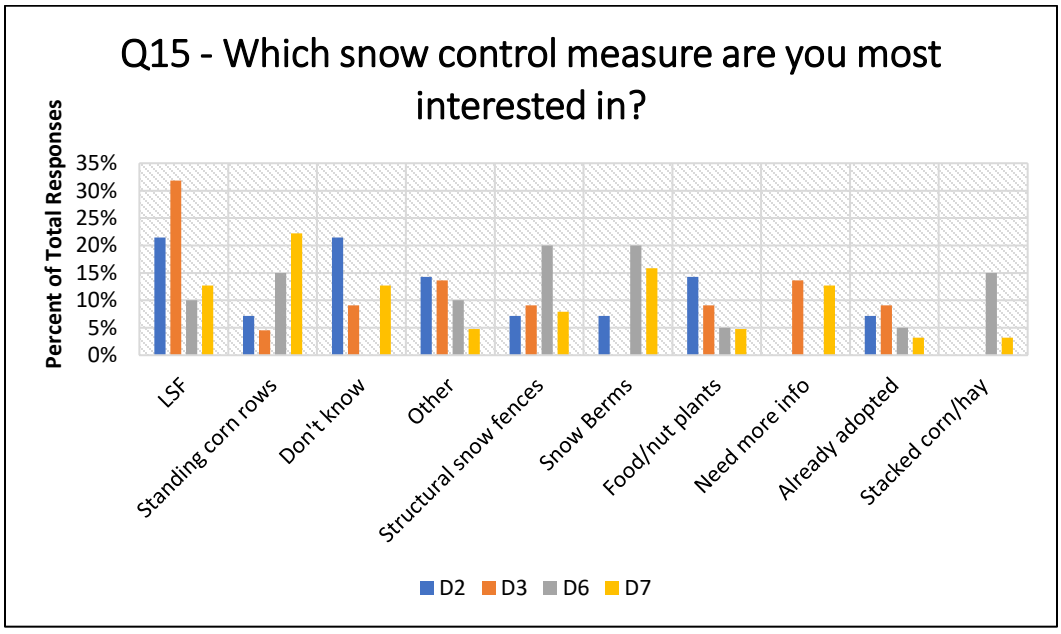

Figure D-14: Q15 (Pre-Outreach KAP survey) descriptive statistics – Interested in which snow control measures?

Table D-24: Q15 (Pre-Outreach KAP survey) descriptive statistics – Interested in which snow control measures?

Answer	D2 *n=10*	D3 *n=15*	D6 *n=10*	D7 *n=40*	Frequency Average (all districts)
LSF	21.43%	31.82%	10.00%	12.70%	18.99%
Standing corn rows	7.14%	4.55%	15.00%	22.22%	12.23%
Don't know	21.43%	9.09%	0.00%	12.70%	10.81%
Other	14.29%	13.64%	10.00%	4.76%	10.67%
Structural snow fences	7.14%	9.09%	20.00%	7.94%	11.04%
Snow Berms	7.14%	0.00%	20.00%	15.87%	10.75%
Food/nut plants	14.29%	9.09%	5.00%	4.76%	8.29%
Need more info	0.00%	13.64%	0.00%	12.70%	6.59%
Already adopted	7.14%	9.09%	5.00%	3.17%	6.10%
Stacked corn/hay	0.00%	0.00%	15.00%	3.17%	4.54%

Table D-25: Q15 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"May be selling" "Lease open Blows Away"	"I am too old to participate" "Not needed on my property"	"NA to our property" "I don't chop my corn stalks"	"Do not need any" "No snow problem" "Line east of highway"

According to frequency averages, the following were the preferred snow control measures across all districts (from most common to least common): *Living snow fences* (18.99%), *Don't know* (12.23%), *Standing corn rows* (10.81%), *Other (please specify)* (10.67%), *Structural snow fences* (11.07%), *Windrowed snow berms* (10.75%). Preferred snow control measures varied across districts; thus, it may be most useful to consider the preferred snow control measure in each district. *Don't know* was a notably common answer in District 2 (D2). *Living snow fences* are highly preferable in District 3 (D3). *Permanent snow fences* are highly preferable in District 6 (D6). *Standing corn rows* are highly preferable in District 7 (D7). *Windrowed snow berms* are relatively preferable in D6 and D7, while there is relatively low interest/preference in D2 and no interest in D3. Most of the respondents that selected the *Other (please specify*) option explained that they will not participate or adopt a snow control measure because they are not necessary on the section of roadway that is front of their property.

D.1.3.4 Q16 – As mentioned above, MnDOT's snow control program offers incentive payments for landowners that adopt snow control measures on their property. if you were to

implement a snow control measure, how would you prefer to receive your incentive payment? (Choose one)

89 individuals answered this question; 9 skipped it. Descriptive statistics and write-in responses are given in Figure D-15 and Tables D-28 and D-29.

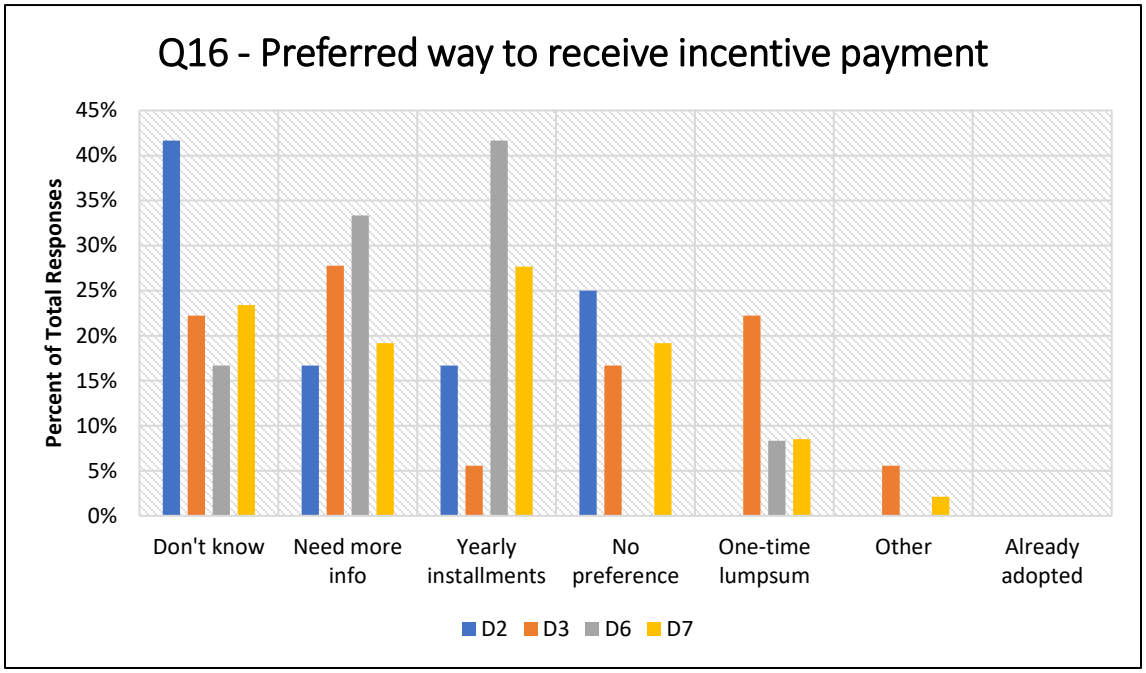

Figure D-15: Q16 (Pre-Outreach KAP survey) descriptive statistics – Preferred way to receive payment?

Table D-26: Q16 (Pre-Outreach KAP survey) descriptive statistics – Preferred way to receive payment?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=12*	D7 *n=47*	Frequency Average (all districts)
Don't know	41.67%	22.22%	16.67%	23.40%	25.99%
Need more info	16.67%	27.78%	33.33%	19.15%	24.23%
Yearly installments	16.67%	5.56%	41.67%	27.66%	22.89%
No preference	25.00%	16.67%	0.00%	19.15%	15.21%
One-time lumpsum	0.00%	22.22%	8.33%	8.51%	9.77%
Other	0.00%	5.56%	0.00%	2.13%	1.92%
Already adopted	0.00%	0.00%	0.00%	0.00%	0.00%

Table D-27: Q16 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"No need"		"No control needed"

Don't know and *Need more info* were relatively common in all districts, suggesting that many respondents are unaware of how the program works and/or have not thought much about it. In Districts 6 (D6) and 7 (D7), the most common response was *Yearly installments,* indicating either a higher level of knowledge about the program and/or a stronger preference for annual payments due to land-use or other factors. Respondents who selected the *Other (please specify)* option noted that snow control measures are not necessary on his or her property.

D.1.3.5 Q17 – In order to participate in MnDOT's snow control program, landowners must sign a contract confirming the duration for which they will implement a snow control measure. if you were to adopt a snow control measure, what type of contract would you prefer? (choose one)

89 individuals answered this question; 9 skipped it. Descriptive statistics and write-in responses are given in Figure D-16 and Tables D-30 and D-31.

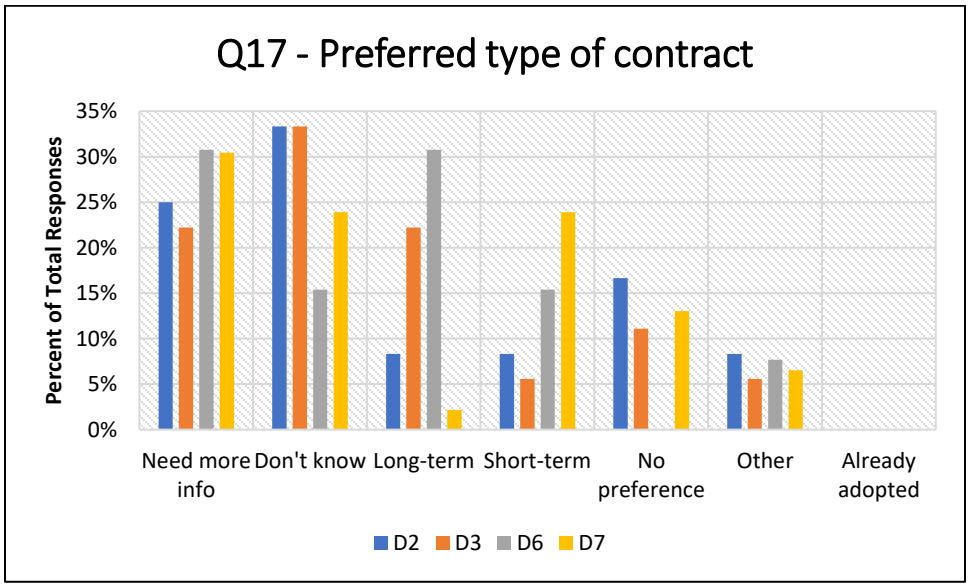

Figure D-16: Q17 (Pre-Outreach KAP survey) descriptive statistics – Preferred type of contract?

Table D-28: Q17 (Pre-Outreach KAP survey) descriptive statistics – Preferred type of contract?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=13*	D7 *n=46*	Frequency Average (all districts)
Need more info	25.00%	22.22%	30.77%	30.43%	27.11%
Don't know	33.33%	33.33%	15.38%	23.91%	26.49%
Long-term	8.33%	22.22%	30.77%	2.17%	15.87%
Short-term	8.33%	5.56%	15.38%	23.91%	13.30%
No preference	16.67%	11.11%	0.00%	13.04%	10.21%
Other	8.33%	5.56%	7.69%	6.52%	7.03%
Already adopted	0.00%	0.00%	0.00%	0.00%	0.00%

Table D-29: Q17 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"None"	"None of the above"	"N/A" "Short term: 2-3yrs" "Ability to add on years to contract"

According to frequency averages, *Need more info* and *Don't know* were the most common answer choices, suggesting that respondents either have low awareness about the program or have not thought much about it. Districts 3 (D3) and 6 (D6) seemed to show relative support for long-term contracts, while District 7 (D7) demonstrated a comparative preference for short-term contracts. Most respondents who selected the *Other (please specify)* option indicated that the question was either not applicable or that they did not prefer any of the listed answer choices.

D.1.3.6 Q18 – the incentive payments offered by MnDOT's snow control program aim to encourage landowner participation and offset costs of maintenance activities. the types of maintenance activities vary by snow fence type. some fence types, like structural fences, require little to no maintenance by the landowner. if you were to adopt a snow control measure, would you be willing to perform the following maintenance activities? (please check all that apply)

90 individuals answered this question; 8 skipped it. Descriptive statistics and write-in responses are given in Figure D-17 and Tables D-32 and D-33.

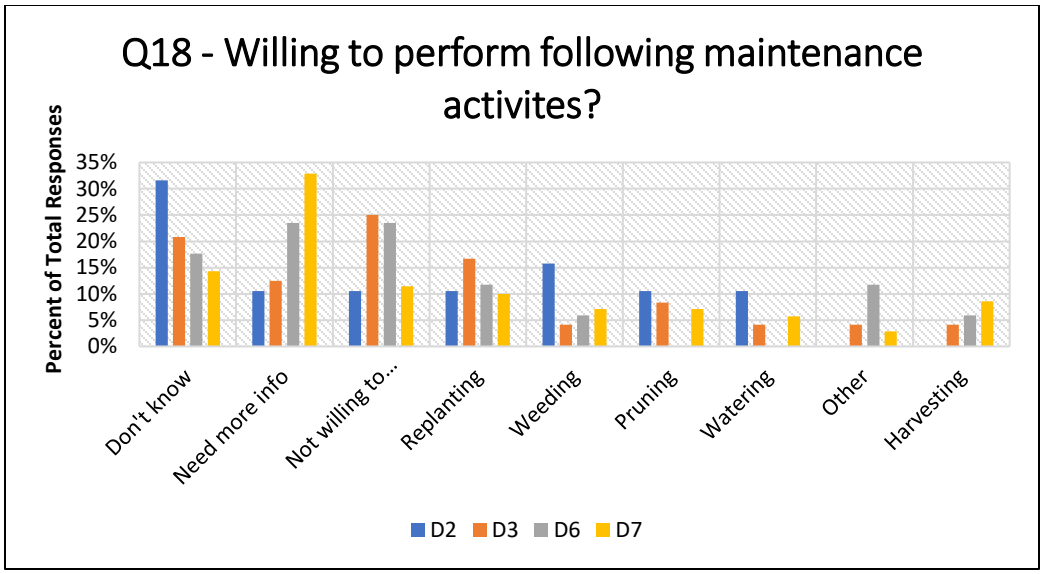

Figure D-17: Q18 (Pre-Outreach KAP survey) descriptive statistics – Willing to perform maintenance?

Table D-30: Q18 (Pre-Outreach KAP survey) descriptive statistics – Willing to perform maintenance?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=13*	D7 *n=47*	Frequency Average (all districts)
Don't know	31.58%	20.83%	17.65%	14.29%	21.09%
Need more info	10.53%	12.50%	23.53%	32.86%	19.86%
Not willing to perform any	10.53%	25.00%	23.53%	11.43%	17.62%
Replanting	10.53%	16.67%	11.76%	10.00%	12.24%
Weeding	15.79%	4.17%	5.88%	7.14%	8.25%
Pruning	10.53%	8.33%	0.00%	7.14%	6.50%
Watering	10.53%	4.17%	0.00%	5.71%	5.10%
Other	0.00%	4.17%	11.76%	2.86%	4.70%
Harvesting	0.00%	4.17%	5.88%	8.57%	4.66%

Table D-31: Q18 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"None - property is gas station - not farming"	"I will not plant shrubs" None of the above"	"N/A" "No live fence"

According to frequency averages, *Don't know* (21.09%), *Need more info* (19.86%), and *Not willing to perform any maintenance activities* (17.62%) were the most common answer choices. Importantly, there was variation between districts, thus slightly skewing the results. For example, *Don't know* was especially common in District 2 (D2), therefore pulling the frequency average up. *Need more info* was markedly common in District 7, which impacted the frequency average. The majority of respondents who chose the *Other (please specify)* option stated that the question was not applicable.

D.1.4 - Personal Involvement and Sources of Information

D.1.4.1 Q19 - Which of the following groups, organizations, etc. do you belong to? (Please check all that apply)

77 individuals answered this question; 21 skipped it. Descriptive statistics and write-in responses are given in Figure D-18 and Tables D-34 and D-35.

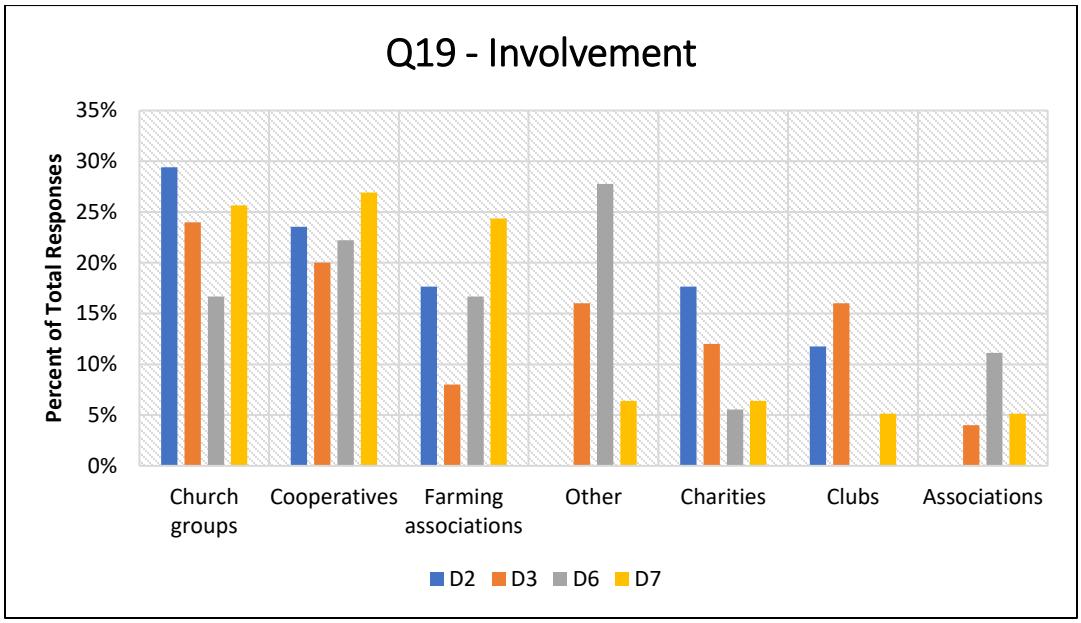

Figure D-18: Q19 (Pre-Outreach KAP survey) descriptive statistics – Involvement in local organizations?

Table D-32: Q19 (Pre-Outreach KAP survey) descriptive statistics – Involvement in local organizations?

Answer	D2 *n=11*	D3 *n=15*	D6 *n=11*	D7 *n=40*	Frequency Average (all districts)
Church groups	29.41%	24.00%	16.67%	25.64%	23.93%
Cooperatives	23.53%	20.00%	22.22%	26.92%	23.17%
Farming associations	17.65%	8.00%	16.67%	24.36%	16.67%
Other	0.00%	16.00%	27.78%	6.41%	12.55%
Charities	17.65%	12.00%	5.56%	6.41%	10.41%
Clubs	11.76%	16.00%	0.00%	5.13%	8.22%
Other	0.00%	17.39%	41.67%	7.69%	16.69%

Table D-33: Q19 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"None" "None" "None - too busy working/school sports" "N/A"	"None" "None" "Not interested" "NONE" "None of the above"	"None of the above" "None" "Corn/Soybean Growers, Township supervisor" "None" "None"

According to frequency averages, the most common groups, organizations, etc. across all districts were the following (from most common to least common): *Church groups* (23.93%), *Cooperatives* (23.17%), *Farming associations (Corn/Soybean Growers, etc.)* (16.67%), *Other* (12.55%). A large majority of respondents that selected the *Other (please specify)* option wrote in "None," indicating that they were not involved with any of the listed groups, organizations, etc.

D.1.4.2 Q20 – If you are willing, please write in the names of the groups, organizations, etc. to which you belong.

17 individuals answered this question; 81 skipped it. Write-in responses are given in Table 8.36.

Table D-34: Q20 (Pre-Outreach KAP survey) write-in responses- Membership in organizations

Involvement-Related Responses			
D2	**D3**	**D6**	**D7**
"Crookston Lions MN Assoc. of Wheat Growers Thompson Farmers Coop Elevator" "Morris Animal Foundation - research organization" "GF Optimists" "N/A" "Chamber of Commerce"	"New Life Church Mille Lacs Energy Co Op"	"Brighter Tomorrow's of Rochester Bluff Country Co-Op in Winona" "Discovery Church" "Farm Bureau"	"No" "Stark Township (chairman)" "Spirit of United Methodist Church, Golden Valley, MN" "K-C" "East Sveadahl Lutheran Church" "Farm Bureau Soybean Growers Corn Growers" "Crystal Valley Coop CFS Coop" "CFS Co Op Corn/Soybean Growers East Sveadahl Church"

Respondents offered a variety of groups, organizations, etc. to which they belong. The entities primarily consisted of religious organizations, community development groups, and agricultural cooperatives. There was limited repetition and/or trends in the write-in responses.

D.1.4.3 Q21 – Which of the following social media channels do you use (please check all that apply)

91 individuals answered this question; 7 skipped it. Descriptive statistics and write-in responses are given in Figure D-19 and Tables D-37 and D-38.

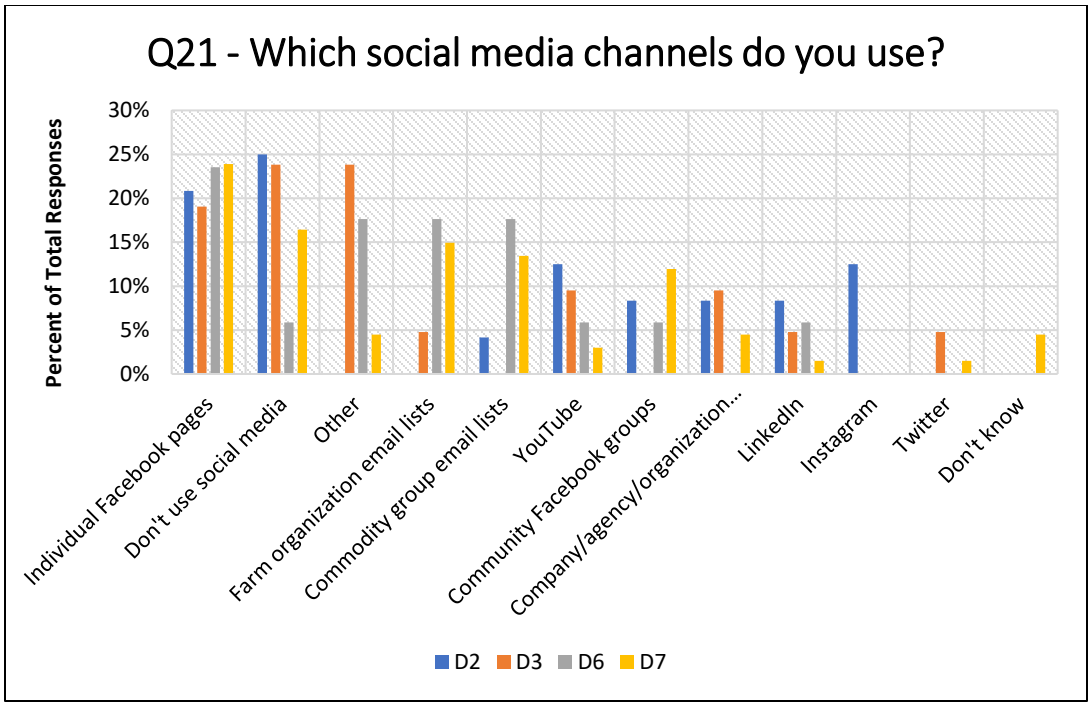

Figure D-19: Q21 (Pre-Outreach KAP survey) descriptive statistics – Social media channels

Table D-35: Q21 (Pre-Outreach KAP survey) descriptive statistics – Social media channels

Answer	D2 *n=12*	D3 *n=17*	D6 *n=13*	D7 *n=49*	Frequency Average (all districts)
Individual Facebook pages	20.83%	19.05%	23.53%	23.88%	21.82%
Don't use social media	25.00%	23.81%	5.88%	16.42%	17.78%
Other	0.00%	23.81%	17.65%	4.48%	11.49%
Farm organization email lists	0.00%	4.76%	17.65%	14.93%	9.34%
Commodity group email lists	4.17%	0.00%	17.65%	13.43%	8.81%
YouTube	12.50%	9.52%	5.88%	2.99%	7.72%
Community Facebook groups	8.33%	0.00%	5.88%	11.94%	6.54%
Company/agency/organization Facebook pages	8.33%	9.52%	0.00%	4.48%	5.58%
LinkedIn	8.33%	4.76%	5.88%	1.49%	5.12%
Instagram	12.50%	0.00%	0.00%	0.00%	3.13%
Twitter	0.00%	4.76%	0.00%	1.49%	1.56%
Don't know	0.00%	0.00%	0.00%	4.48%	1.12%

Table D-36: Q21 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"None" "None" "Radio, paper, TV" "Radio" "N/A"	"None" "None" "Not interest in social media"	"None above" "U.S. Mail" "None"

According to frequency averages, the most common answers across all districts were *Individual Facebook pages* (21.82%), *Don't use social media* (17.78%), and *Other* (11.49%). Importantly, most respondents who selected the *Other (please specify)* option stated that they do not use any social media. Other relatively common social media channels included farm organization email lists (9.34%), commodity group email lists (8.81%), and YouTube (7.72%), based on frequency averages.

D.1.4.4. Q22 – where do you get information about winter driving conditions? (Please check all that apply)

92 individuals answered this question; 6 skipped it. Descriptive statistics and write-in responses are given in Figure D-20 and Tables D-39 and D-40.

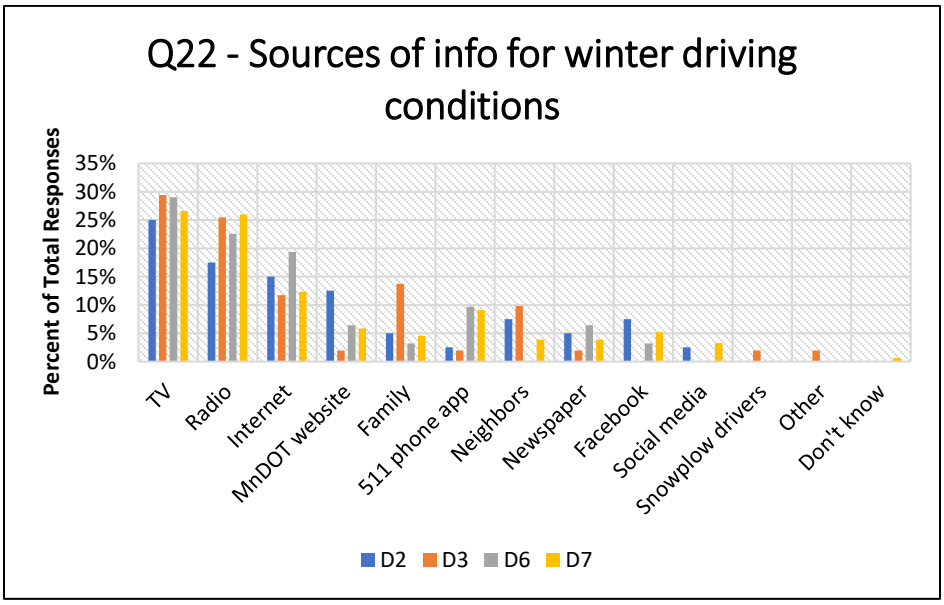

Figure D-20: Q22 (Pre-Outreach KAP survey) descriptive statistics – Sources of info for driving conditions?

Table D-37: Q22 (Pre-Outreach KAP survey) descriptive statistics – Sources of info for driving conditions?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=14*	D7 *n=49*	Frequency Average (all districts)
TV	25.00%	29.41%	29.03%	26.62%	27.52%
Radio	17.50%	25.49%	22.58%	25.97%	22.89%
Internet	15.00%	11.76%	19.35%	12.34%	14.61%
MnDOT website	12.50%	1.96%	6.45%	5.84%	6.69%
Family	5.00%	13.73%	3.23%	4.55%	6.63%
511 phone app	2.50%	1.96%	9.68%	9.09%	5.81%
Neighbors	7.50%	9.80%	0.00%	3.90%	5.30%
Newspaper	5.00%	1.96%	6.45%	3.90%	4.33%
Facebook	7.50%	0.00%	3.23%	5.19%	3.98%
Social media	2.50%	0.00%	0.00%	3.25%	1.44%
Snowplow drivers	0.00%	1.96%	0.00%	0.00%	0.49%
Other	0.00%	1.96%	0.00%	0.00%	0.49%
Don't know	0.00%	0.00%	0.00%	0.65%	0.16%

Table D-38: Q22 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"WCCO"		

Respondents in all districts indicated that *TV, Radio,* and *Internet* are common sources of information for winter driving conditions. There was little variability between districts. One respondent who selected the *Other (please specify)* option indicated that he or she gets information about winter driving conditions from WCCO, a news station.

D.1.4.5 Q23 - Where do you seek information when making land-use decisions about your property? (Please check all that apply)

88 individuals answered this question; 10 skipped it. Descriptive statistics and write-in responses are given in Figure D-21 and Tables D-41 and D-42.

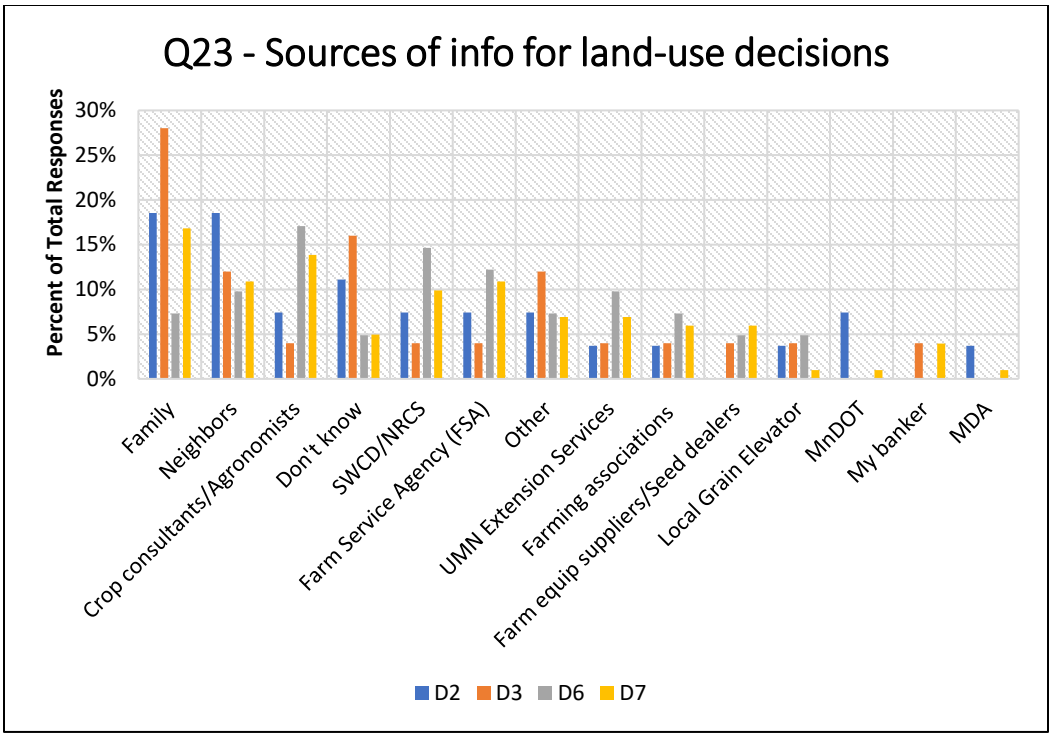

Figure D-21: Q23 (Pre-Outreach KAP survey) descriptive statistics – Sources of info for land-use decisions?

Table D-39: Q23 (Pre-Outreach KAP survey) descriptive statistics – Sources of info for land-use decisions?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=14*	D7 *n=45*	Frequency Average (all districts)
Family	18.52%	28.00%	7.32%	16.83%	17.67%
Neighbors	18.52%	12.00%	9.76%	10.89%	12.79%
Crop consultants/Agronomists	7.41%	4.00%	17.07%	13.86%	10.59%
Don't know	11.11%	16.00%	4.88%	4.95%	9.24%
SWCD/NRCS	7.41%	4.00%	14.63%	9.90%	8.99%
Farm Service Agency (FSA)	7.41%	4.00%	12.20%	10.89%	8.63%
Other	7.41%	12.00%	7.32%	6.93%	8.42%
UMN Extension Services	3.70%	4.00%	9.76%	6.93%	6.10%
Farming associations	3.70%	4.00%	7.32%	5.94%	5.24%
Farm equip suppliers/Seed dealers	0.00%	4.00%	4.88%	5.94%	3.71%
Local Grain Elevator	3.70%	4.00%	4.88%	0.99%	3.39%
MnDOT	7.41%	0.00%	0.00%	0.99%	2.10%
My banker	0.00%	4.00%	0.00%	3.96%	1.99%
MDA	3.70%	0.00%	0.00%	0.99%	1.17%

Table D-40: Q23 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"EDA of East Grand Forks and Attorney" "None"	"Property is leased" "None" "I make my own decisions"	"Land Stewardship Program" "Farmers who have common sense practices" "None of them"	"Do not farm" "I am retired" "Myself" "None. I'm a CPA with significant knowledge of collecting cash rent" "My own" "None"

According to frequency averages, the most common sources of information across all districts were the following (from most common to least common): *Family* (17.67%), *Neighbors* (12.79%), *Crop consultants/Agronomists* (10.59%), *Don't know* (9.24%), *SWCD/NRCS* (8.99%), *Farm Service Agency* (8.63%), *Other (please specify)* (8.42%). There was variability between districts. Agricultural entities like SWCD/NRCS and the Farm Service Agency were not as common in District 3 (D3), which is less ag-dominated than the other districts. *Family* was substantially more common in D3 as compared to the other districts. Respondents that selected the *Other (please specify)* option offered a variety of other

sources of information for land-use decision-making including local companies, attorneys, Land Stewardship Program, etc.

D.1.4.6 Q24 – what organizations or publications are your trusted source of information regarding farming practices and farming industry news?

14 individuals answered this question; 84 skipped it. Write-in responses are given in Table D-43.

Table D-41: Q24 (Pre-Outreach KAP survey) write-in responses

Trusted Organizations or Publications Responses			
D2	**D3**	**D6**	**D7**
"Agweek"	"MN Dept of Agriculture" "Don't know any" "Corn and Soybean Growers Local radio"	"None" "Land Stewardship Program" "Local Newspapers" "Farm Journal, Progressive Farmer, Successful Farming Extension Service NRCS FSA"	"T.V." "Can't think of any" "Beef mag farm journal tri state neighbor" "No longer running the farm. Retired." "The Farmer Successful Farming The Land" "CFS Co Op FSA Office"

Respondents offered a variety of public (e.g. Minnesota Department of Agriculture) and private (e.g. Agweek) farm-related news sources. There was no repetition or trends in the write-in responses.

D.1.5 - Background Information and Your Property

D.1.5.1 Q25 - Which of the following best describes the nature of your property? (Choose one)

92 individuals answered this question; 6 skipped it. Descriptive statistics and write-in responses are given in Figure D-22 and Tables D-44 and D-45.

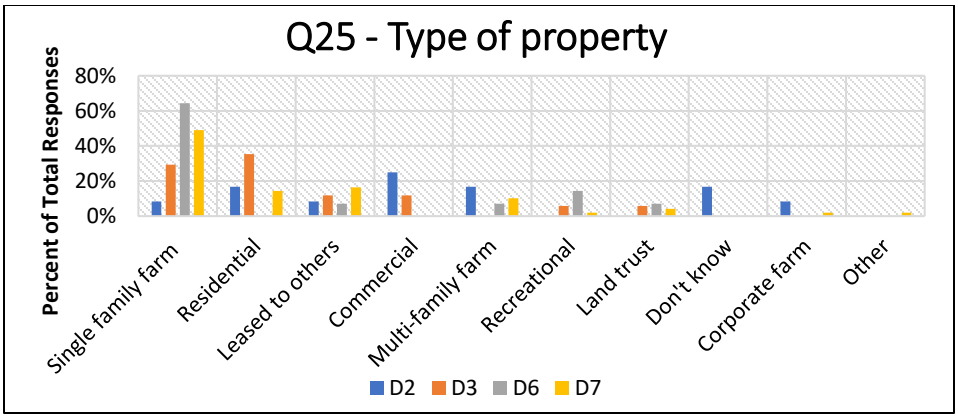

Figure D-22: Q25 (Pre-Outreach KAP survey) descriptive statistics – Type of property?

Table D-42: Q25 (Pre-Outreach KAP survey) descriptive statistics – Type of property?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=14*	D7 *n=49*	Frequency Average (all districts)
Single family farm	8.33%	29.41%	64.29%	48.98%	37.75%
Residential	16.67%	35.29%	0.00%	14.29%	16.56%
Leased to others	8.33%	11.76%	7.14%	16.33%	10.89%
Commercial	25.00%	11.76%	0.00%	0.00%	9.19%
Multi-family farm	16.67%	0.00%	7.14%	10.20%	8.50%
Recreational	0.00%	5.88%	14.29%	2.04%	5.55%
Land trust	0.00%	5.88%	7.14%	4.08%	4.28%
Don't know	16.67%	0.00%	0.00%	0.00%	4.17%
Corporate farm	8.33%	0.00%	0.00%	2.04%	2.59%
Other	0.00%	0.00%	0.00%	2.04%	0.51%

Table D-43: Q25 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
			"My land is not on Hwy 4 it is Paul Torkelson's land"

According to frequency averages, the most common types of property across all districts were the following (from most common to least common): *Single family farm* (37.75%), *Residential* (16.56%), *Leased to others* (10.89%), *Commercial* (9.19%), *Multi-family farm* (8.50%). *Single family farms* were relatively common in all districts except District 2 (D2). Property type varied across districts. *Commercial* properties were notably common in D2 and District 3 (D3). *Residential* properties were notably common in D3 and District 7 (D7). *Corporate farm* was only selected in D2 and D7. *Leased to others* has been selected in all districts.

D.1.5.2 Q26 - Which of the following statements best describes how you use your property? (Please check all that apply)

93 individuals answered this question; 5 skipped it. Descriptive statistics and write-in responses are given in Figure D-23 and Tables D-46 and D-47.

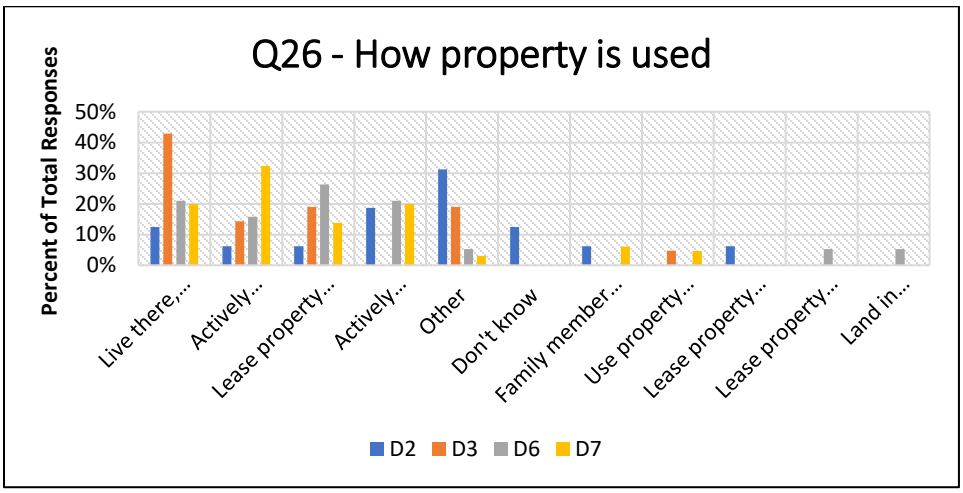

Figure D-23: Q26 (Pre-Outreach KAP survey) descriptive statistics – How property is used?

Table D-44: Q26 (Pre-Outreach KAP survey) descriptive statistics – How property is used?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=14*	D7 *n=50*	Frequency Average (all districts)
Live there, don't farm	12.50%	42.86%	21.05%	20.00%	24.10%
Actively farming the property	6.25%	14.29%	15.79%	32.31%	17.16%
Lease property to another farmer	6.25%	19.05%	26.32%	13.85%	16.37%
Actively farming and rent land	18.75%	0.00%	21.05%	20.00%	14.95%
Other	31.25%	19.05%	5.26%	3.08%	14.66%
Don't know	12.50%	0.00%	0.00%	0.00%	3.13%
Family member actively farming	6.25%	0.00%	0.00%	6.15%	3.10%

Use property for rec. purposes	0.00%	4.76%	0.00%	4.62%	2.35%
Lease property to a corporate farm	6.25%	0.00%	0.00%	0.00%	1.56%
Lease property to others for rec. purposes	0.00%	0.00%	5.26%	0.00%	1.32%
Land in conservation easement	0.00%	0.00%	5.26%	0.00%	1.32%

Table D-45: Q26 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"Commercial Business" "Rented for commercial use" "Don't own any land along HWY 2" "Some CRP / 10 acres total" "Business"	"Business & Rental" "Live there and raise livestock" "Land is used for pasture; Let a farmer pasture the land free to keep brush down" "Gas station"	"tillable land is rented out"	"As trustee, I rent the property to another farmer" "2.5 acre farm site"

According to frequency averages, the most common forms of land-use were the following (from most common to least common): *Live there, don't farm* (24.10%), *Actively farming the property* (17.16%), *Lease the property to another farmer* (16.37%), *Actively farming and rent land* (14.95%), and *Other* (14.66%). Land-use varied across districts. *Live there, don't farm* was a significantly common response in District 3 (D3). *Actively farming the property* was an especially frequent response in District 7 (D7). The highest proportion of District 2 (D2) respondents selected the *Other (please specify)* option and offered a variety of land uses including commercial business, conservation easements, and leasing to other farmers.

D.1.5.3 Q27 – who makes decisions about how to use your property (choose one)

91 individuals answered this question; 7 skipped it. Descriptive statistics and write-in responses are given in Figure D-24 and Tables D-48 and D-49.

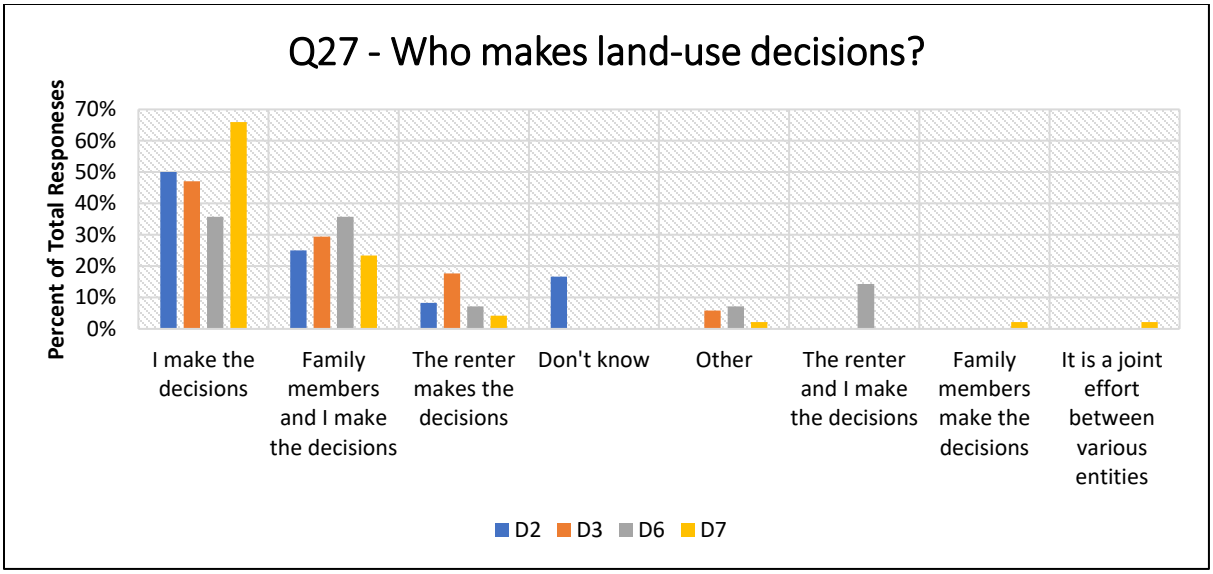

Figure D-24: Q27 (Pre-Outreach KAP survey) descriptive statistics – Who makes land-use decisions?

Table D-46: Q27 (Pre-Outreach KAP survey) descriptive statistics – Who makes land-use decisions?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=14*	D7 *n=48*	Frequency Average (all districts)
I make the decisions	50.00%	47.06%	35.71%	65.96%	49.68%
Family members and I make the decisions	25.00%	29.41%	35.71%	23.40%	28.38%
The renter makes the decisions	8.33%	17.65%	7.14%	4.26%	9.35%
Don't know	16.67%	0.00%	0.00%	0.00%	4.17%
Other	0.00%	5.88%	7.14%	2.13%	3.79%
The renter and I make the decisions	0.00%	0.00%	14.29%	0.00%	3.57%
Family members make the decisions	0.00%	0.00%	0.00%	2.13%	0.53%
It is a joint effort between various entities	0.00%	0.00%	0.00%	2.13%	0.53%

Table D-47: Q27 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"Gas station"	"Husband"	"Trustee and trust beneficiaries - none of them live on this property"

Respondents in all districts most commonly chose the following answer choices: *I make the decisions* and *Family members and I make the decisions*. There was little variability between districts. According to frequency average, the third most common answer choice was *The renter makes the decisions.* In District 6 (D6), *The renter and I make the decisions* was a relatively common answer choice.

D.1.5.4 Q28 – what makes up your farming operation? (please check all that apply)

93 individuals answered this question; 5 skipped it. Descriptive statistics and write-in responses are given in Figure D-25 and Tables D-50 and D-51.

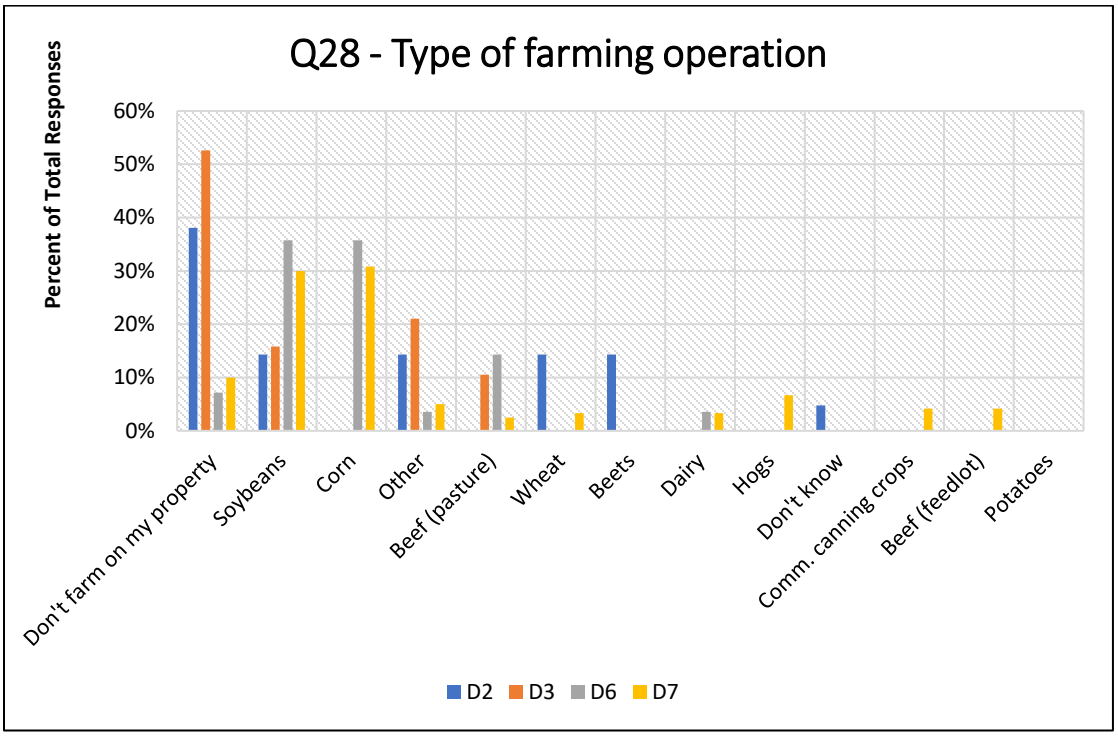

Figure D-25: Q28 (Pre-Outreach KAP survey) descriptive statistics – Type of farming operation?

Table D-48: Q28 (Pre-Outreach KAP survey) descriptive statistics – Type of farming operation?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=14*	D7 *n=50*	Frequency Average (all districts)
Don't farm on my property	38.10%	52.63%	7.14%	10.00%	26.97%
Soybeans	14.29%	15.79%	35.71%	30.00%	23.95%
Corn	0.00%	0.00%	35.71%	30.83%	16.64%
Other	14.29%	21.05%	3.57%	5.00%	10.98%
Beef (pasture)	0.00%	10.53%	14.29%	2.50%	6.83%
Wheat	14.29%	0.00%	0.00%	3.33%	4.41%
Beets	14.29%	0.00%	0.00%	0.00%	3.57%
Dairy	0.00%	0.00%	3.57%	3.33%	1.73%
Hogs	0.00%	0.00%	0.00%	6.67%	1.67%
Don't know	4.76%	0.00%	0.00%	0.00%	1.19%
Comm. canning crops	0.00%	0.00%	0.00%	4.17%	1.04%
Beef (feedlot)	0.00%	0.00%	0.00%	4.17%	1.04%
Potatoes	0.00%	0.00%	0.00%	0.00%	0.00%

Table D-49: Q28 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"Not a farming operation" "None" "Commercial Business"	"Hay" "Hay" "Hay" "N/A"	"Herbal products we raise"	"Alfalfa" "Horses" "Rent income crops" "Sheep" "Oats" "Big Dog"

Type of farming operation varied significantly across districts. *Don't farm on my property* was a notably common answer choice in Districts 2 (D2) and 3 (D3), while *Soybeans* and *Corn* were relatively frequent in Districts 6 and 7. The *Other (please specify)* option was selected in all districts and various crop types, livestock, and non-farming land-use types were offered as answers. *Beets* was only selected in D2. Overall, District 7 (D7) had the greatest diversity of crop types and livestock.

D.1.5.5 Q29 – What is your age in years?

82 individuals answered this question; 16 skipped it. Descriptive statistics and write-in responses are given in Table D-52.

Table D-50: Q29 (Pre-Outreach KAP survey) write-in responses

Age By District				
	D2	**D3**	**D6**	**D7**
Mean Age	58	65	64	62
Median Age	57	66	67	64

There was little variation in mean and median ages across districts. Mean ages varied from 58 to 65 years. Median ages varied from 57 to 67 years. District 2 was the youngest district.

D.1.5.6 Q30 – What is the highest degree or level of education that you have completed? (Choose One)

90 individuals answered this question; 8 skipped it. Descriptive statistics and write-in responses are given in Figure D-26 and Tables D-53 and D-54.

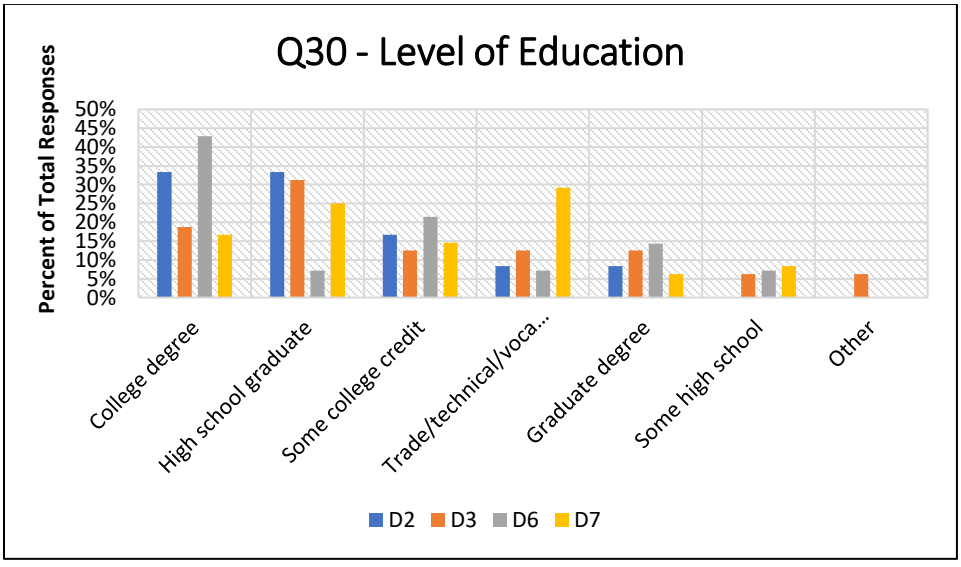

Figure D-26: Q30 (Pre-Outreach KAP survey) descriptive statistics – Level of education?

Table D-51: Q30 (Pre-Outreach KAP survey) descriptive statistics – Level of education?

Answer	D2 *n=12*	D3 *n=16*	D6 *n=14*	D7 *n=48*	Frequency Average (all districts)
College degree	33.33%	18.75%	42.86%	16.67%	27.90%
High school graduate	33.33%	31.25%	7.14%	25.00%	24.18%
Some college credit	16.67%	12.50%	21.43%	14.58%	16.30%
Trade/technical/vocational training	8.33%	12.50%	7.14%	29.17%	14.29%
Graduate degree	8.33%	12.50%	14.29%	6.25%	10.34%
Some high school	0.00%	6.25%	7.14%	8.33%	5.43%
Other	0.00%	6.25%	0.00%	0.00%	1.56%

Table D-52: Q30 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"Airline Transport Pilot"		

According to frequency averages, the most common education levels are the following (from most common to least common): *College degree* (27.90%), *High school graduate* (24.18%), *Some college credit* (16.30%), and *Trade/technical/vocational training* (14.29%). Education levels varied by district. The *College degree* answer choice was more common in Districts 2 (D2) and 6 (D6) than in Districts 3 (D3) and 7 (D7).

D.1.5.7 Q31 – If MnDOT were to contact you, how would you prefer to be contacted? (please check all that apply)

87 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figure D-27 and Tables D-55 and D-56.

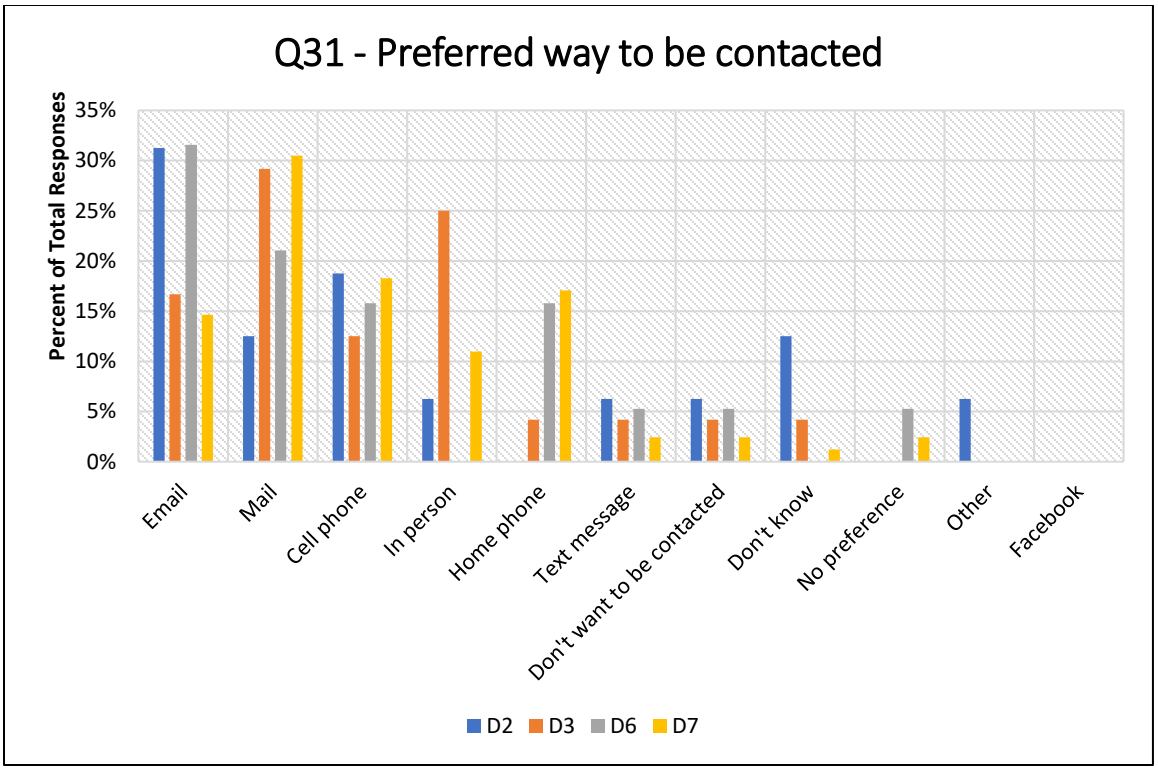

Figure D-27: Q31 (Pre-Outreach KAP survey) descriptive statistics – Preferred contact method?

Table D-53: Q31 (Pre-Outreach KAP survey) descriptive statistics – Preferred contact method?

Answer	D2 *n=11*	D3 *n=16*	D6 *n=14*	D7 *n=46*	Frequency Average (all districts)
Email	31.25%	16.67%	31.58%	14.63%	23.53%
Mail	12.50%	29.17%	21.05%	30.49%	23.30%
Cell phone	18.75%	12.50%	15.79%	18.29%	16.33%
In person	6.25%	25.00%	0.00%	10.98%	10.56%
Home phone	0.00%	4.17%	15.79%	17.07%	9.26%
Text message	6.25%	4.17%	5.26%	2.44%	4.53%
Don't want to be contacted	6.25%	4.17%	5.26%	2.44%	4.53%
Don't know	12.50%	4.17%	0.00%	1.22%	4.47%
No preference	0.00%	0.00%	5.26%	2.44%	1.93%
Other	6.25%	0.00%	0.00%	0.00%	1.56%
Facebook	0.00%	0.00%	0.00%	0.00%	0.00%

Table D-54: Q31 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"Business Phone"			

According to frequency averages, the most common preferred contact methods were the following (from most common to least common): *Emails* (23.53%), *Mail* (23.30%), *Cell phone* (16.33%), *In person* (10.56%), *Home phone* (9.26%). Preferred contact method varied slightly between districts. *Email* was the most common contact method in Districts 2 (D2) and 6 (D6), while *Mail* was the most common method in Districts 3 (D3) and 7 (D7). The *Cell phone* option was consistently frequent across all districts. The *Don't want to be contacted* option never garnered more than 7% of a district's total responses.

D.1.5.8 Q32 – If you are willing, please share your contact information (phone number, email, etc.) here:

All contact information received will be privately shared with MnDOT TAP members in a separate file.

D.1.5.9 Q33 – What time of year is the best time to reach you? (Please check all that apply)

82 individuals answered this question; 16 skipped it. Descriptive statistics are given in Figure D-28 and Table D-57.

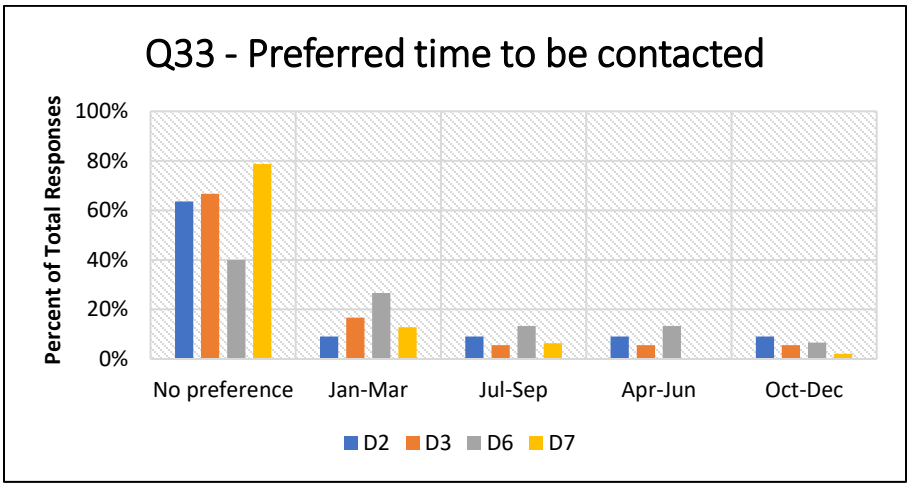

Figure D-28: Q33 (Pre-Outreach KAP survey) descriptive statistics – Preferred time to be contacted?

Table D-55: Q33 (Pre-Outreach KAP survey) descriptive statistics – Preferred time to be contacted?

Answer	D2 *n=9*	D3 *n=15*	D6 *n=12*	D7 *n=46*	Frequency Average (all districts)
No preference	63.64%	66.67%	40.00%	78.72%	62.26%
Jan-Mar	9.09%	16.67%	26.67%	12.77%	16.30%
Jul-Sep	9.09%	5.56%	13.33%	6.38%	8.59%
Apr-Jun	9.09%	5.56%	13.33%	0.00%	7.00%
Oct-Dec	9.09%	5.56%	6.67%	2.13%	5.86%

A strong majority of respondents in all districts selected the *No preference* option when asked about their preferred time to be contacted. The second most common answer choice in all districts was *Jan-Mar,* which corresponds with most farmers' off-season. According to frequency average, the least common preferred time to be contacted was *Oct-Dec*, which corresponds with the harvesting of many Minnesota crops.

D.1.5.10 Q34 – Do you have any questions, concerns, or comments for us about any of the topics mentioned in this survey?

20 individuals answered this question; 78 skipped it. Descriptive statistics are given in Table D-58.

Table D-56: Q34 (Pre-Outreach KAP survey) write-in responses - comments

Additional Questions, Concerns, or Comments			
D2	**D3**	**D6**	**D7**
"After all these years, why change now?"	"Leave roadwork and engineer and repair crews and consult with landowners!" "I do not live in Minnesota so I don't know about the snow conditions" "My property is north side of highway east of rice river. I am planning to move myself and family to a bigger tract of land. I would strongly consider a total buyout of my four connected parcels along highway which could be used for truck turnaround and machinery storage during project. Please contact me for a further conversation. Charles Teal" "No. I don't see any problem with snow drifting on my land but they are other on 210-169 where snow blows bad. I have woods." "No"	"'Re-grade' the road and most if not all problems w/ snow would go away" Note related to Q10: "We live up on the bluffs and all woods so prob not a...[last word illegible]" "No property on Hwy 250"	"Water and snow water floods end of our field and drive way approach needs repair" "I don't know" "In order to regularly address snow control on farmed lands adjacent to the highway it would be important to be able to easily accommodate cropping and crop rotations." "We do have 8a crp planted along Hwy 4 and neighbor also planted 50a in south east part sec. 11 Nelson township. May help road north Co Road #1. Call if can help." "My land is not on Hwy 4 Paul Torkelson property is not mine!" "Re: Hwy 4 in St. James, MN. We own the property, but have not been in the area for over 20 years so cannot supply feedback on this survey." "My neighbors use bales, snow fences, and corn stalks" "My property is on the east side of TH 4. I worked for MnDOT so understand the problem areas" "We plant trees - shrubs on our farm Plant sorghum - sunflowers - wildflowers & corn - food for pheasants " "None" "I will look into this. We placed some of the land along Hwy 4 into CRP this last year but there is still some land with the potential for snow control. I also work with another farmer with land along Hwy 4 which would be a good candidate for these efforts" Comment written on front page of survey:

			"Hello, I am an absentee landlord and am in MN much more in the summer. Almost 20 yrs ago, I planted an "L" of trees to prevent soil erosion and expect it helps with snow as well. It was done privately because of the need."

A few respondents indicated that there are no snow problems adjacent to their property or that they are absentee landowners and are therefore unaware of snow problems on the identified corridors. Other respondents emphasized the importance of 1) consulting with landowners about this topic rather than civil engineers and road crews and 2) developing the Blowing Snow Control Program so that it accommodates landowners' farming operations and crop rotations. Some survey respondents shared their experience with snow control measures and offered information about where snow controls may be most effective near their property. Unrelated to snow control measures, some respondents described other issues that occur along the identified corridor (e.g. flooding).

Appendix E - INVITATION LETTER TO PALS MEETING

[Insert Date]

[Insert Landowner Address]

Dear [Insert Landowner Name],

I would like to invite you to an informational meeting about blowing and drifting snow control hosted by the Minnesota Department of Transportation and the University of Minnesota on [Insert Date and Time] at [Insert Location and Address].

MnDOT snow plow drivers have identified and documented snow problem areas on many sections along [Insert Highway #]. Research has found an effective way to address blowing and drifting snow problems on Minnesota highways is through the establishment of snow control measures (i.e. snow fences), that trap snow as it blows across open areas before reaching the roadway.

This meeting will bring together landowners like you along [Insert Highway #] to discuss incorporating snow fences for blowing and drifting snow control in the upcoming road construction project (SP number and highway) scheduled to be constructed in (date)

Please note, MnDOT's Blowing Snow Control Program compensates you for installing snow control measures on your property. The program offers a variety of blowing snow control options including long-term solutions (trees, shrubs, native grasses, structural snow fences, etc.) and short-term solutions (standing corn rows, haybales, etc.). These options will enable MnDOT to work with you to develop a tailored solution that is convenient for you and your unique property needs.

I hope you will attend to start this discussion on the various snow fencing and compensation options available to use on your property that provide safer winter driving conditions for family, friends and other community members who drive on Highway [Insert Highway #].

If you have any questions regarding this meeting, feel free to contact me at [Insert Proj Mgr phone and email address].

Thank you for your time and I look forward to meeting you on [Insert date].

Sincerely,

[Insert Proj Mgr signature, name, and title]

Appendix F - **PALS MEETING PRESS RELEASE**

MnDOT public meeting to discuss using blowing snow control on upcoming road project

(District Office Location) – Nowhere are winter driving conditions worse than on rural highways surrounded by open landscapes, where winds create white out conditions and form drifts that make travel difficult. To combat these hazardous conditions, the Minnesota Department of Transportation is exploring the use of snow fencing in an upcoming road project on Highway (# of highway) to be constructed in (year).

A public information meeting is scheduled for (date) at (time) at (location) to review the blowing snow control program that pays private landowners for installing snow control measures on their property. The program offers a variety of blowing snow control options including long-term solutions such as trees, shrubs, native grasses or structural snow fences and short-term solutions such as standing corn rows or stacked hay bales. These options enable MnDOT to work with landowners to develop a tailored solution for their unique property needs.

Currently, MnDOT is seeking landowners along the Highway (number) corridor willing to install snow fences in blowing snow problem areas.

Dan Gullickson, blowing snow fence program coordinator, said farmers who participate in the program get compliments from people who use the road to get to their destinations.

"People who drive those roads to get to work, take their children to school or do other daily trips appreciate those roads being clear and they often thank the landowner for this public service," Gullickson said.

Snow fences also save taxpayer dollars, as MnDOT snowplow operators make fewer trips, resulting in less fuel consumption, and reduce the usage of deicers such as salt, sand and chemicals, for smaller impacts on the environment.

Research by MnDOT, the University of Minnesota Extension and the University of Minnesota Center for Transportation Studies shows that snow fences can reduce the severity of injuries on road curves by 40 percent.

"Participation in the blowing snow control program is a public service for family, friends, and local community members who drive on Minnesota's roads in the winter," said (district snow control coordinator name).

For more information about the blowing snow control program or to find out if a property is eligible for the program, contact (district snow control coordinator) at (phone #) or go online at www.dot.state.mn.us/environment/livingsnowfence/

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www.MnDOT.gov

Appendix G – LINKS TO MEDIA COVERAGE

- Rochester (D6): https://kttc.com/news/2018/11/13/MnDOT-u-of-m-researchers-look-to-add-snow control-measures-around-state/
- Mankato (D7): http://www.keyc.com/story/39492407/MnDOT-and-university-of-minnesota-focus-on-keeping-snow-off-roads (link no longer active)
- Crookston (D2): http://www.crookstontimes.com/news/20181128/u-of-m-and-MnDOT-project-focuses-on-peoples-knowledge-of-snow control-measures-along-highways
- Twin Cities (Minnesota Daily): http://www.mndaily.com/article/2018/11/n-umn-extension-and-MnDOT-collaborate-to-make-rural-highways-safer
- Twin Cities (Star Tribune): http://www.startribune.com/minnesota-department-of-transportation-program-uses-living-fences-to-combat-icy-crashes/502971071/

Appendix H - **POST-OUTREACH SURVEY INSTRUMENT**

Access Code:

Snow Control Measures:

A Second Survey of Landowners Along Highway [ ]

CINRAM

DEPARTMENT OF TRANSPORTATION

UNIVERSITY OF MINNESOTA EXTENSION

Before you begin:

We are conducting this survey **to measure changes in landowners' knowledge and perceptions of snow control measures along [Insert Highway #]**. This is an effort to improve public safety and reduce costs associated with blowing and drifting snow. **The survey is voluntary and confidential.** It should take **about 15-20 minutes to complete** this questionnaire. Please answer the questions as completely as possible.

Once you've completed the survey:

Please fold it in half and mail it back in the enclosed self-addressed stamped envelope.

Thank you for your help!

I. Snow Problems

Similar to the previous questionnaire, we would like to begin by asking you about your perceptions of snow problems along [Insert Highway #]

MnDOT characterizes a snow problem area as a section of roadway that continually experiences issues caused by blowing and/or drifting snow.

1. Are you aware of snow problem areas along [Insert Highway #]? *(Choose one)*

   [ ] Yes [ ] No [ ] Don't know Other (please specify)_____

2. Are you aware of the following snow-related problems occurring along [Insert Highway #]? *(Please check all that apply)*

   [ ] Whiteouts (blizzard conditions that reduce visibility to near zero)
   [ ] Spinouts
   [ ] Cars in ditches
   [ ] Car accidents
   [ ] Fatalities
   [ ] I am unaware of snow-related problems
   [ ] Don't know
   Other (please specify) _____

3. How important to you are clear roadways (those free of snow and ice) in the wintertime? *(Choose one)*

   [ ] Not important
   [ ] Slightly important
   [ ] Moderately important
   [ ] Very important
   [ ] Don't know
   Other (please specify) _____

4. In your opinion, which of following are potential environmental impacts of salt application on Minnesota roadways? *(Please check all that apply)*

   [ ] Decreased health of aquatic ecosystems
   [ ] Decreased water quality
   [ ] Salinization of soils
   [ ] Fish kill
   [ ] Delayed freezing of lakes
   [ ] Earlier ice-outs
   [ ] None of the above
   [ ] Don't know
   Other (please specify) _____

II. Snow Control Measures

Secondly, we would once again like to ask about your knowledge of snow control measures and MnDOT's snow control program.
A snow control measure is a barrier along a road that catches snow as it blows across an open area and piles it up in the ditch before it gets to the road. These measures, sometimes referred to as snow fences, include trees, shrubs, native grasses, cornstalks, fences and earthwork (the raising of the road grade or flattening of the backslope). MnDOT's snow control program aims to promote these types of snow control measures by paying landowners to install snow control measures on their property.

5. Are you aware of MnDOT's snow control program? *(Choose one)*

   [ ] Yes [ ] No [ ] Don't know Other (please specify) _____

6. Are you aware of the following resources offered through MnDOT's snow control program? *(Please check all that apply)*

   [ ] Living Snow Fences website
   [ ] Incentive payments
   [ ] Web-Based Cost-Benefit Tool
   [ ] Vendor registration process
   [ ] Don't know
   Other (please specify) _____

7. How would you rate your experience with MnDOT employees? *(Choose one)*

   [ ] Very negative
   [ ] Somewhat negative
   [ ] Somewhat positive
   [ ] Very positive
   [ ] Don't know
   Other (please specify) _____
   [ ] I have no prior experience with MnDOT employees

8. Please indicate your familiarity with each of the listed snow control measures. (*Select only one box for each snow control measure)*

Type of Snow Control Measure	*I am aware of this measure*	*I have seen this measure*	*I know someone who has implemented this measure*	*I am **not** aware of this measure*
h. Standing corn rows	☐	☐	☐	☐
i. Living snow fences (using shrubs, grasses, etc.)	☐	☐	☐	☐
j. Stacked corn and/or hay bales	☐	☐	☐	☐

k. Windrowed snow berms	☐	☐	☐	☐
l. Temporary snow fences (4ft tall orange fences)	☐	☐	☐	☐
m. Permanent structural snow fences	☐	☐	☐	☐
n. Earthwork (raising road grade or flattening backslope)	☐	☐	☐	☐

9. Are you interested in learning more about MnDOT's snow control program? *(Choose one)*

[ ] Yes
[ ] No
[ ] Need more information
[ ] Don't know

Other (please specify) _____

10. Which of the following would you prefer as ways to learn more about MnDOT's snow control program? *(Please check all that apply)*

[ ] Community outreach meetings, led by MnDOT staff

[ ] Group meetings with your neighbors, led by MnDOT staff

[ ] Individual visits to your property by MnDOT staff
[ ] I have no preference
[ ] Need more information
[ ] Don't know

Other (please specify) _____

[ ] I do not want to learn more about the program

11. If the highway in front of your property were identified as a snow problem area and you were paid to install a snow control measure, how interested would you be in participating in MnDOT's snow control program? *(Choose one)*

[ ] Not at all interested
[ ] Somewhat interested
[ ] Very interested
[ ] Need more information
[ ] Don't know

Other (please specify) _____

[ ] I currently use a snow control measure on my property

III. Willingness to Adopt Snow Control Measures

In this section, we would like to learn more about your willingness to adopt a snow control measure on your property along [ ]. We would appreciate your input, even if you are currently not interested in participating in the program.

12. Which of the following would help you adopt a snow control measure on your property? *(Please check all that apply)*

[ ] Monetary incentives
[ ] Knowing that my neighbors are participating in the program
[ ] Testimonials from landowners that have already adopted a snow control measure
[ ] Opportunities to connect with landowners that have already adopted a snow control measure
[ ] Public recognition (roadside signs, announcements, articles in newspaper, etc.)
[ ] Training from MnDOT on snow control measures
[ ] Gaining knowledge of the public safety benefits
[ ] Help from local SWCD with maintenance and equipment
[ ] None of the above
[ ] Don't know
Other (please specify) _____

[ ] I have already adopted a snow control measure on my property

13. Which of the following would prevent you from adopting a snow control measure on your property? (*Please check all that apply)*

[ ] It may take too much time
[ ] It might take land out of production
[ ] It could require too much maintenance
[ ] It may be an inconvenience to farming operations (equipment maneuverability, tillage, etc.)
[ ] It may require equipment I don't have
[ ] It could have impacts on tile drainage
[ ] It could increase soil moisture and delay spring planting
[ ] It may require me to combine in the spring
[ ] It might affect my herbicide and pesticide spraying
[ ] It could take away soil nutrients from my crops
[ ] It may shade out my crops
[ ] It could have insurance implications
[ ] It could affect access to my property
[ ] I don't trust government agencies
[ ] None of the above
[ ] Don't know
Other (please specify) _____

[ ] I have already adopted a snow control measure on my property

14. Which of the following snow control measures would you be most interested in adopting on your property? *(Please check all that apply)*

[ ] Standing corn rows
[ ] Structural snow fences
[ ] Windrowed snow berms
[ ] Living snow fences (using trees, native grasses, and wildflowers)
[ ] Stacked corn and/or hay bales

[ ] Need more information

[ ] Don't know

Other (please specify) _____

[ ] Food and/or nut bearing plants

[ ] I have already adopted a snow control measure on my property

[ ] None of the above

15. As stated above, MnDOT's snow control program offers incentive payments for landowners that adopt snow control measures on their property. If you were to implement a snow control measure, how would you prefer to receive your incentive payment? *(Choose one)*
    - [ ] One-time lumpsum
    - [ ] Yearly installments
    - [ ] I have no preference
    - [ ] Need more information
    - [ ] Don't know
    - Other (please specify) _____
    - [ ] I am already enrolled in the program

16. In order to participate in MnDOT's snow control program, landowners must sign a contract confirming the duration for which they will implement a snow control measure. If you were to adopt a snow control measure, what type of contract would you prefer? (*Choose one)*
    - [ ] Short-term (one-year)
    - [ ] Long-Term (multi-year)
    - [ ] I have no preference
    - [ ] Need more information
    - [ ] Don't know
    - [ ] I have already adopted a snow control measure on my property

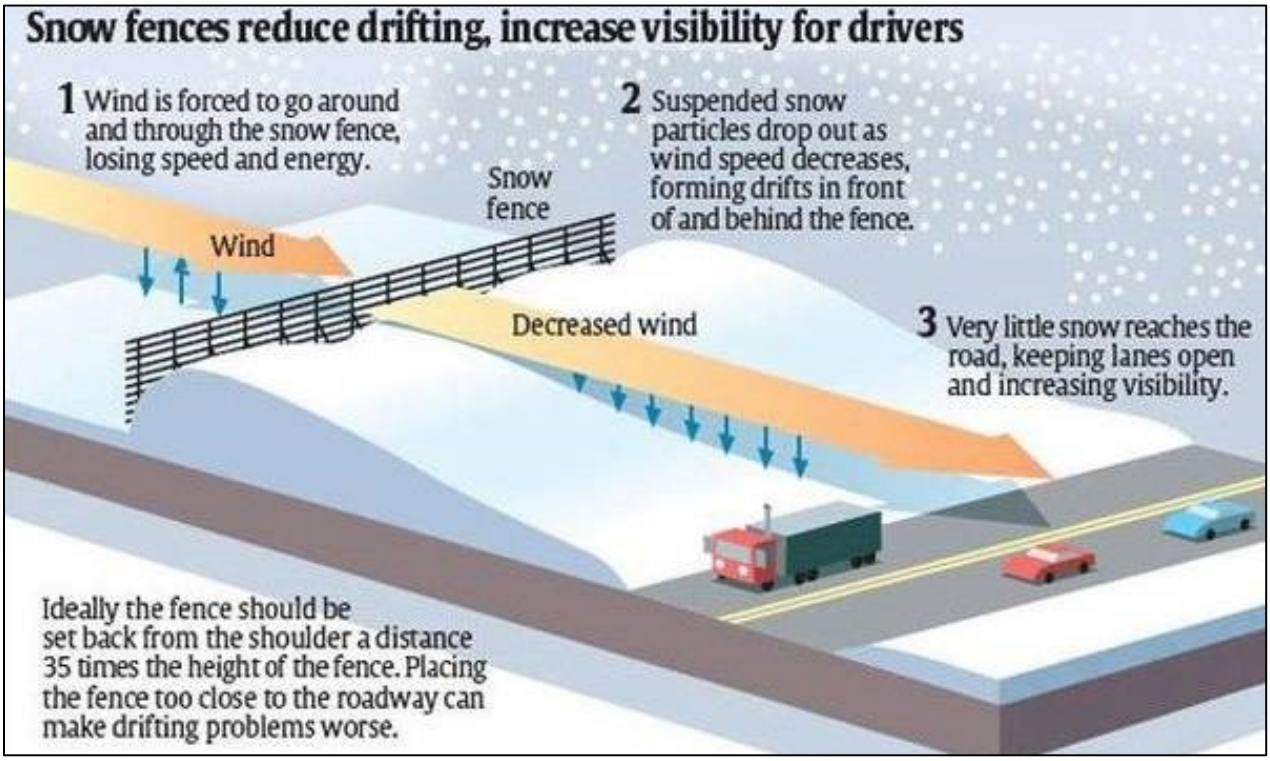
Other (please specify) _____

17. The incentive payments offered by MnDOT's snow control program aim to encourage landowner participation and offset costs of maintenance activities. If you were to adopt a snow control measure, would you be willing to perform the following maintenance activities? *(Please check all that apply)*
    - [ ] Watering
    - [ ] Weeding
    - [ ] Pruning
    - [ ] Planting
    - [ ] Replanting
    - [ ] Harvesting
    - [ ] Need more information
    - [ ] Don't know
    - Other (please specify) _____
    - [ ] I am not willing to perform any maintenance activities

---

IV. Compensation

In order to be effective, a snow control measure must be installed about **120-240 feet** from the roadway (depending on topographic conditions). If it is too close to the road, the snow drifts on the road rather than in the ditch. For that reason, snow control measures are usually installed on private property instead of in the Right-of-Way, which is the public land that immediately surrounds highways. See diagram on following page.



Source: http://www.hackettstownlife.com/forum/668255

MnDOT pays landowners to participate in the snow control program on a per-acre basis. The footprint size (i.e. the total area of land required to establish the snow control measure) varies by snow control measure type. See below chart for examples.

Type of Snow Control Measure	Required Width	Length of a one-acre fence
Standing corn rows	15 feet (~6 rows)	2,904 feet (0.55 mile)
Living snow fences	50 feet	871 feet (0.17 mile)
Permanent structural snow fences	25 feet	1,742 feet (0.33 mile)

18. Suppose MnDOT's snow control program paid you $1,500/acre per year to participate in the program. Would this payment convince you to participate?

[ ] Yes

[ ] No

If no, please specify an amount that

would convince you to participate:

$_____/acre per year

[ ] Don't know

Other (please specify)

_____

19. Please share your questions, concerns, or comments regarding compensation here:

V. Outreach and Promotion

Now, we would like to find out if you recently learned about MnDOT's snow control program through meetings and/or local marketing channels.

20. A few months ago, MnDOT and the UMN launched a campaign in [insert city] to increase awareness about MnDOT's snow control program. Which of the following outreach efforts did you see and/or hear? *(Please check all that apply)*

[ ] Posters and/or pamphlets
Please specify location:
_____
[ ]TV programs
[ ] Radio programs
[ ] Local print publications
(newspaper, magazines, etc.)
Please specify publication:
_____

[ ] Individual Facebook page posts
[ ] Community Facebook page posts
[ ] Advertisements in email lists
Please specify email list: _____
[ ] Don't know
Other (please specify) _____

[ ] I did not see and/or hear any outreach efforts

21. How helpful were the outreach efforts in improving your understanding of MnDOT's snow control program?

[ ] Not at all helpful
[ ] Somewhat helpful
[ ] Very helpful

[ ] Don't know

[ ] I did not see and/or hear any outreach efforts

Other (please specify) _____

22. Did you attend an invitation-only informational meeting hosted by MnDOT and the UMN?
    [ ] Yes [ ] No [ ] Don't know Other (please specify) _____

23. How helpful was the informational meeting in improving your understanding of MnDOT's snow control program?
    [ ] Not at all helpful
    [ ] Somewhat helpful
    [ ] Very helpful
    [ ] Don't know
    Other (please specify) _____
    [ ] I did not attend the informational meeting

VI. Background Information and Your Property

Lastly, we would like to gather some background information about you and your property along [ ]. We would also like to reiterate that your answers are voluntary and confidential.

24. Which of the following best describes the nature of your property? *(Choose one)*
    [ ] Single family farm (a farm owned by one nuclear family)
    [ ] Multi-family farm (a farm owned by extended family members)
    [ ] Corporate farm
    [ ] Land trust
    [ ] Commercial
    [ ] Residential (not farmed)
    [ ] Recreational
    [ ] Leased to others
    [ ] Don't know
    Other (please specify) _____

25. Which of the following statements best describes how you use your property? *(Please check all that apply)*
    [ ] I live there, but I do not farm
    [ ] I am actively farming the property
    [ ] I am actively farming the property, and I also rent other land that I farm
    [ ] A family member is actively farming the property
    [ ] I rent the property to another farmer
    [ ] I rent the property to a corporate farm
    [ ] I use the property for recreational purposes
    [ ] I lease the land to others for recreational purposes
    [ ] I keep the land out of production for a conservation easement
    [ ] Don't know
    Other (please specify) _____

26. If MnDOT were to contact you, how would you prefer to be contacted? *(Please check all that apply)*
    [ ] Home phone
    [ ] Cell phone

[ ] Mail
[ ] Email
[ ] Text message
[ ] Facebook

[ ] In person
[ ] I have no preference
[ ] Don't know
Other (please specify) _____

[ ] I don't want to be contacted

27. If you are willing, please share your contact information (phone number, email, etc.) here:

28. Do you have any questions, concerns, or comments for us about any of the topics mentioned in this survey?

Thank you for your help!

Please complete the survey, fold it in half, and mail it back in the enclosed self-addressed stamped envelope.
If you are interested in learning more, please visit MnDOT's Living Snow Fences website:
www.dot.state.mn.us/environment/livingsnowfence

Appendix I - POST-OUTREACH SURVEY RESULTS

Below are the results of the post-outreach and promotion KAP survey. The results are divided into six subsections (consistent with the questionnaire): I. Snow Problems, II. Snow Control Measures, III. Willingness to Adopt Snow Control Measures, IV. Compensation, V. Outreach and Promotion, VI. Background Information and Your Property.

Analysis of the post-outreach survey was nearly identical to that of the pre-outreach survey in Chapter 3. I.e., since sample size in each district was different, response frequencies were converted to percentages. This enabled comparison across districts. Another common metric in this analysis was the frequency average, calculated by averaging the response frequencies of all districts. The answer choices with the highest frequency averages are highlighted in yellow. Due to the small sample size of respondents (77 total respondents), analysis was limited to descriptive statistics and content analysis. Notably, nine blank (or near-blank) questionnaires were returned and still included in this analysis, thereby increasing the number of skipped questions. A histogram, a chart including frequency percentages for each answer choice and district, and a chart including all open-ended comments were included for each question. In an effort to maximize sample size, all completed surveys were incorporated into these charts and tables. This means that some respondents only completed the post-outreach survey.

Questions that were included in both the pre and post-outreach KAP surveys also contain a comparative analysis section comprised of a histogram and a chart with frequency averages (from pre- and post-outreach surveys) in order to illustrate potential changes in knowledge, attitudes, and practices. Dissimilar from the charts and tables included for all questions, the comparative histograms and charts only show results from respondents that completed the question in the pre and post-outreach surveys.

I.1 RESULTS

I.1.1 Snow Problems

I.1.1.1 Q1 - Are you aware of snow problem areas along Highways 2, 210/169, 250, and 4? *(Choose one)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figures I-1 and I-2 and Tables I-1, I-2, and I-3.

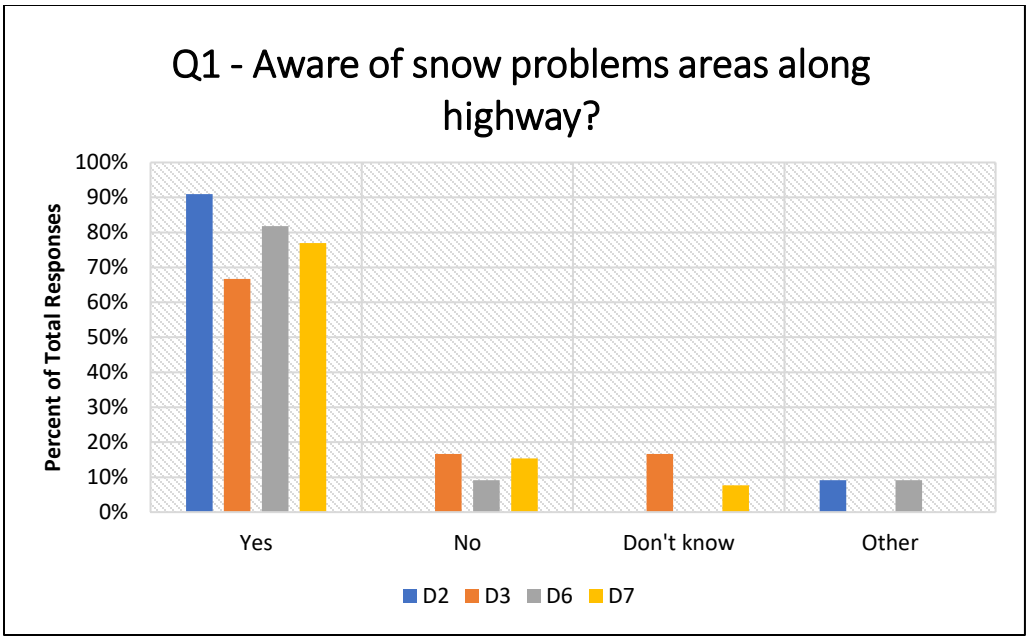


Figure I-1: Q1(Post-Outreach KAP survey) descriptive statistics – Aware of snow problems?

Table I-1: Q1 (Post-Outreach KAP survey) descriptive statistics – Aware of snow problems?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=11*	D7 *n=26*	Frequency Average (all districts)
Yes	90.91%	66.67%	81.82%	76.92%	79.08%
No	0.00%	16.67%	9.09%	15.38%	10.29%
Don't know	0.00%	16.67%	0.00%	7.69%	6.09%
Other	9.09%	0.00%	9.09%	0.00%	4.55%

Table I-2: Q1 (Post-Outreach KAP survey) descriptive statistics and write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"It's MN, it snows"		"We are retired and go south for most of winter"	

A strong majority of respondents in all districts reported awareness of blowing and/or drifting snow issues along the highways in front of their property. District 3 (D3) had the highest proportion of respondents who either selected the *No* answer option (16.67%) or *Don't know* (16.67%). One respondent that selected the *Other (please specify)* option in District 2 (D2) stated that it snows in Minnesota. Another respondent that selected the *Other (please specify)* in District 6 (D6) noted that he or she is retired and goes south for the winter, thus implying a lack of knowledge of blowing and/or drifting snow problems along the identified corridor.

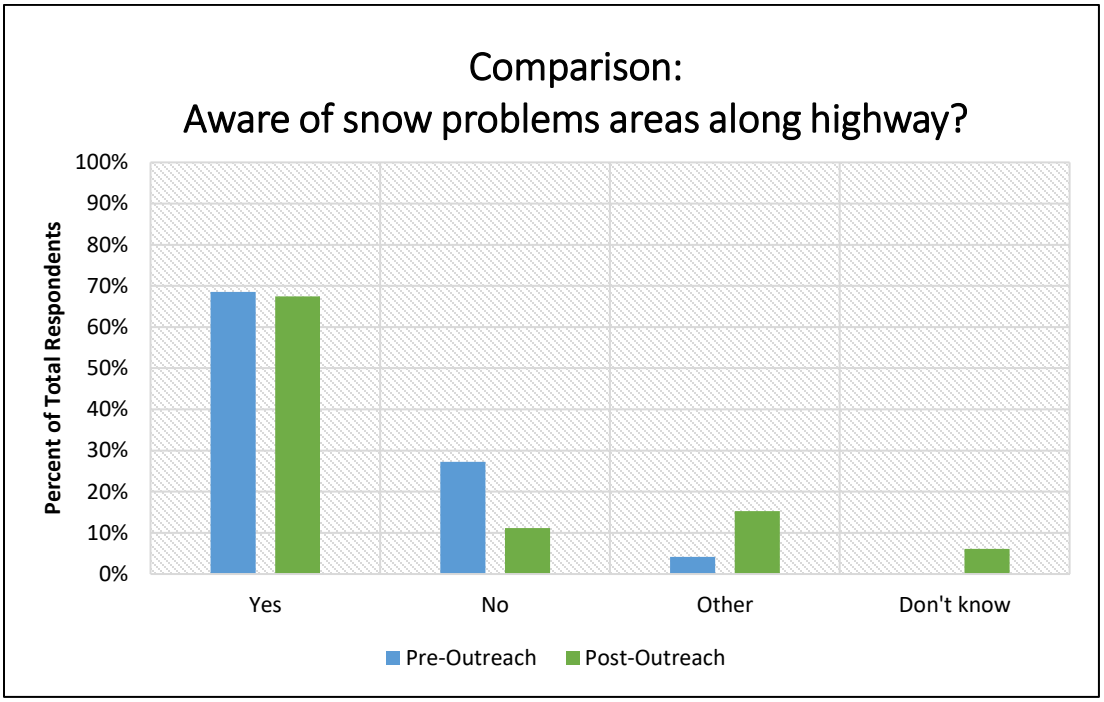


Figure I-2: (Pre- vs Post-Outreach KAP survey) descriptive statistics – Snow Problem Awareness

Table I-3: (Pre vs Post-Outreach KAP Survey) descriptive statistics – Snow Problem Awareness

Answer	Frequency Average (all districts) Pre-Outreach *n=36*	Frequency Average (all districts) Post-Outreach *n=36*
Yes	68.56%	67.44%
No	27.27%	11.17%
Other	4.17%	15.28%
Don't know	0.00%	6.12%

There was a notable decrease (from 27.27% to 11.177%) in the percentage of participants who reported that they were unaware of snow problems along the identified corridor. There was also an increase in the portion of respondents who selected the *Other* answer option.

I.1.1.2 Q2 – Are you aware of the following snow-related problems occurring along Highways 2, 210/169, 250, and 4? *(Please Check All That Apply)*

67 individuals answered this question; 10 skipped it. Descriptive statistics and write-in responses are given in Figures I-3 and I-4 and Tables I-4, I-5 and I-6.

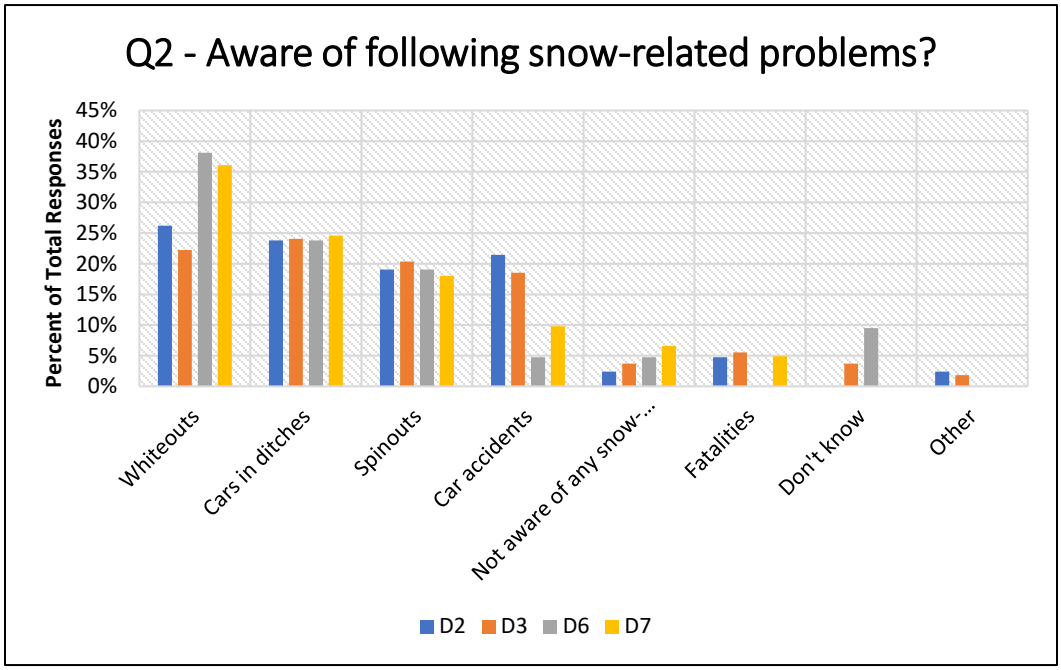


Figure I-3: Q2 (Post-Outreach KAP survey) descriptive statistics – Aware of snow related problems?

Table I-4: Q2 (Post-Outreach KAP survey) descriptive statistics – Aware of snow related problems?

Answer	D2 *n=12*	D3 *n=18*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Whiteouts	26.19%	22.22%	38.10%	36.07%	30.65%
Cars in ditches	23.81%	24.07%	23.81%	24.59%	24.07%
Spinouts	19.05%	20.37%	19.05%	18.03%	19.13%
Car accidents	21.43%	18.52%	4.76%	9.84%	13.64%
Not aware of any snow-related problems	2.38%	3.70%	4.76%	6.56%	4.35%
Fatalities	4.76%	5.56%	0.00%	4.92%	3.81%
Don't know	0.00%	3.70%	9.52%	0.00%	3.31%

Table I-5: Q2 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"It's MN, it snows here"	"Lack of plan"		

Similar to the pre-outreach survey, all districts, except D3, reported *Whiteouts* as the most common and *Cars in ditches* as the second most common snow-related problem on the identified corridors. Conversely, D3 respondents indicated that *Cars in ditches* was the most common snow-related problem and that *Whiteouts* were the second most common snow-related problem. One D2 respondent who selected the *Other (please specify)* option offered an answer similar to that which was included in the previous question, indicating that it snows in Minnesota. A D3 respondent who selected the *Other (please specify)* option wrote "lack of plan," presumably suggesting that motorists affected by snow-related problems do not have a plan before driving.

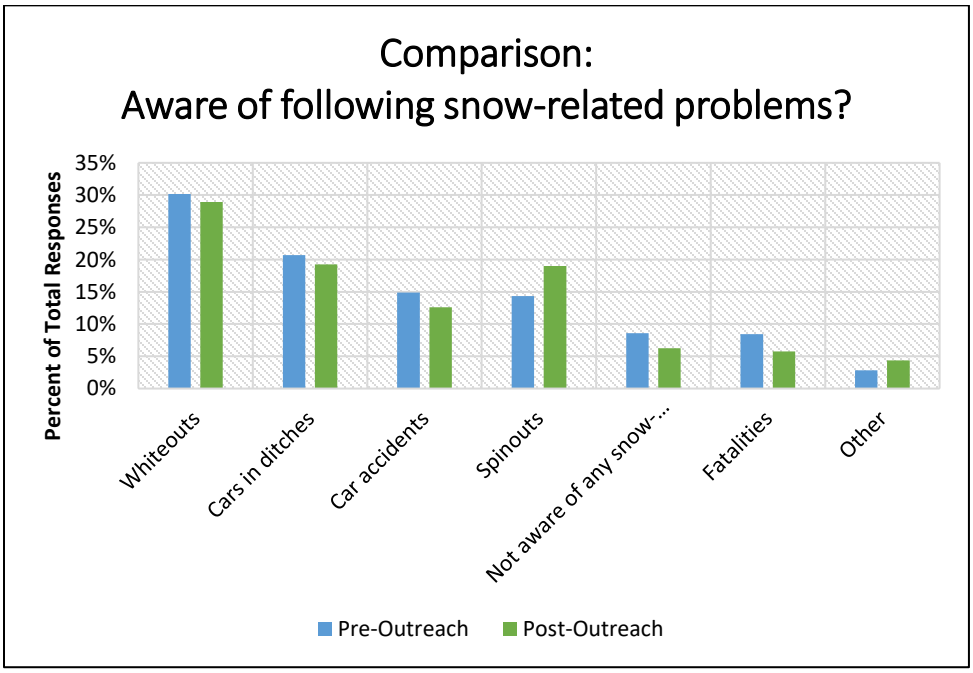


Figure I-4: Types of Snow Problems (Pre vs Post-Outreach KAP survey) descriptive statistics

Table I-6: Types of Snow Problems - (Pre- vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=34*	Frequency Average (all districts) Post-Outreach *n=34*
Whiteouts	30.15%	28.91%
Cars in ditches	20.70%	19.26%
Car accidents	14.91%	12.60%
Spinouts	14.37%	19.01%
Not aware of any snow-related problems	8.60%	6.27%
Fatalities	8.46%	5.77%
Other	2.82%	4.38%

The two most common responses, *Whiteouts* and *Cars in ditches*, remained remarkably consistent from the pre to the post-outreach survey. There was a slight increase (from 14.37% to 19.01%) in the proportion of respondents who selected the *Spinouts* answer option.

I.1.1.3 Q3 – How important to you are clear roadways (those free of snow and ice) in the wintertime? *(Choose one)*

67 individuals answered this question; 10 skipped it. Descriptive statistics and write-in responses are given in Figure I-5 and I-6 and Tables I-7 and I-8.

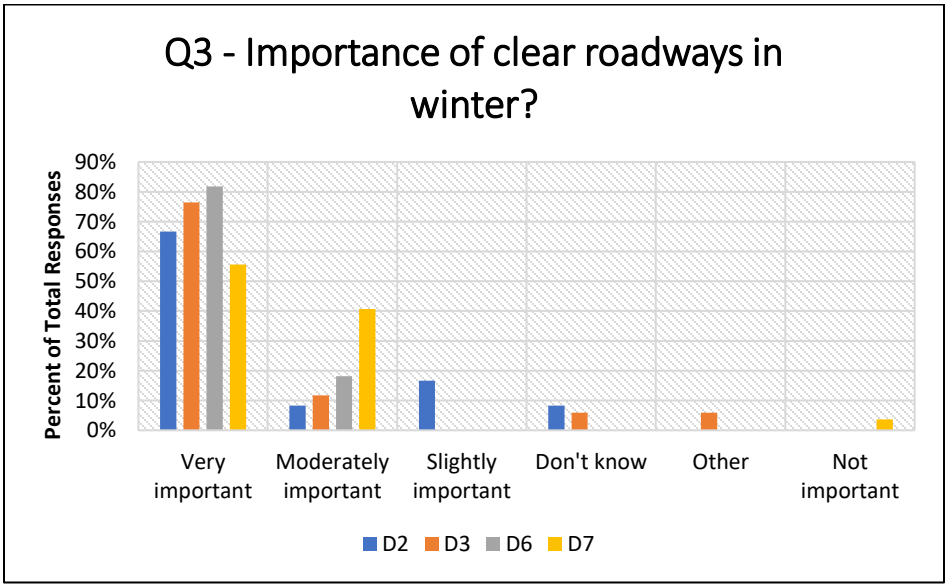


Figure I-5: Q3 (Post-Outreach KAP survey) descriptive statistics – Importance of clear roadways?

Table I-7: Q3 (Post-Outreach KAP survey) descriptive statistics – Importance of clear roadways?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Very important	66.67%	76.47%	81.82%	55.56%	70.13%
Moderately important	8.33%	11.76%	18.18%	40.74%	19.75%
Slightly important	16.67%	0.00%	0.00%	0.00%	4.17%
Don't know	8.33%	5.88%	0.00%	0.00%	3.55%
Other	0.00%	5.88%	0.00%	0.00%	1.47%
Not important	0.00%	0.00%	0.00%	3.70%	0.93%

Most respondents in all districts reported that clear roadways in the wintertime are *Very important*. The lowest proportion of respondents who selected the *Very important* answer option was in District 7 (D7). The second highest proportion of respondents in D3, D6, and D7 reported that clear roadways in the wintertime are *Moderately Important.* The second most commonly report answer in D2 was *Slightly important.* Only one respondent in D7 selected the *Other (please specify)* option.

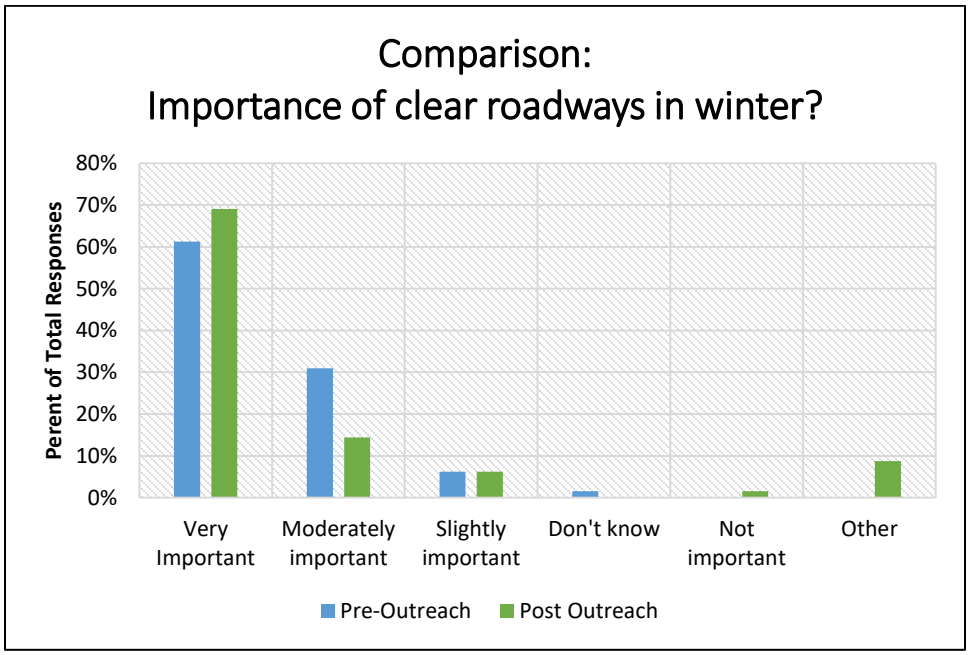


Figure I-6: Importance of Clear Roads (Pre vs Post-Outreach KAP survey) descriptive statistics

Table I-8: Importance of Clear Roads - (Pre- vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=40*	Frequency Average (all districts) Post-Outreach *n=40*
Very Important	61.25%	69.06%
Moderately important	30.94%	14.38%
Slightly important	6.25%	6.25%
Don't know	1.56%	0.00%
Not important	0.00%	1.56%
Other	0.00%	8.75%

There was a small increase (from 61.25% to 69.06%) in the proportion of respondents who indicated that clear roadways are *Very important* between the pre and post-outreach surveys. There was a more significant decrease (from 30.94% to 14.38%) in the percentage of respondents who selected the *Moderately important* answer option.

I.1.1.4 Q4 – In your opinion, which of following are potential environmental impacts of salt application on Minnesota roadways? *(Please check all that apply)*

67 individuals answered this question; 10 skipped it. Descriptive statistics and write-in responses are given in Figure I-7 and I-8 Tables I-9, I-10 and I-11.

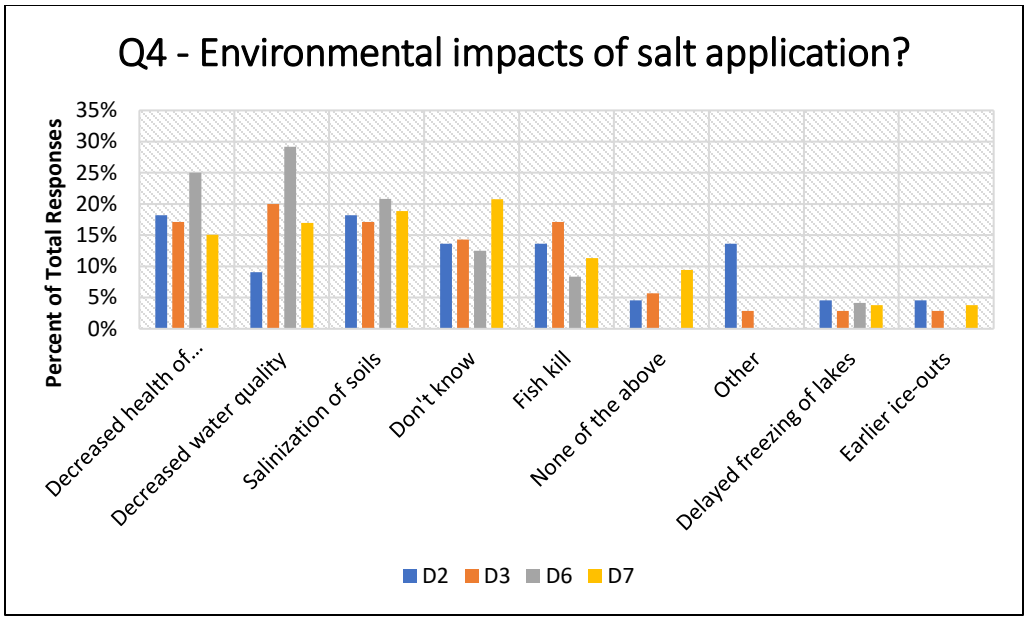


Figure I-7: Q4 (Post-Outreach KAP survey) descriptive statistics – Environmental impacts of salt?

Table I-9: Q4 (Post-Outreach KAP survey) descriptive statistics – Environmental impacts of salt?

Answer	D2 *n=12*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Decreased health of aquatic ecosystems	18.18%	17.14%	25.00%	15.09%	18.85%
Decreased water quality	9.09%	20.00%	29.17%	16.98%	18.81%
Salinization of soils	18.18%	17.14%	20.83%	18.87%	18.76%
Don't know	13.64%	14.29%	12.50%	20.75%	15.30%
Fish kill	13.64%	17.14%	8.33%	11.32%	12.61%
None of the above	4.55%	5.71%	0.00%	9.43%	4.92%
Other	13.64%	2.86%	0.00%	0.00%	4.13%
Delayed freezing of lakes	4.55%	2.86%	4.17%	3.77%	3.84%
Earlier ice-outs	4.55%	2.86%	0.00%	3.77%	2.80%

Table I-10: Q4 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"It's MN, it snows here" "Are these things proven?"	"These could happen in concentrated areas. Dilution is the key which can be aided with good design."		

Unlike the pre-outreach survey where the highest proportion of respondents in most districts selected *Don't know*, respondents in the post-outreach survey most commonly selected the *Decreased health of aquatic ecosystems* (18.85%) and *Decreased water quality* (18.81%) answer options, according to frequency average. In D2 and D6, the most commonly reported answer was *Decreased health of aquatic ecosystems;* in D3, the most frequently selected answer option was *Decreased water quality*; in D7, *Don't know* was the most commonly reported answer, thereby suggesting that preferences varied slightly by district. One D2 respondent who selected the *Other (please specify)* option wrote that it snows in Minnesota, while another inquired if the environmental impacts of salt listed in the question (i.e., answer options) were proven. A D3 respondent who chose the *Other (please specify)* option indicated that the environmental impacts are caused by a high concentration of road salt and that "dilution is the key…".

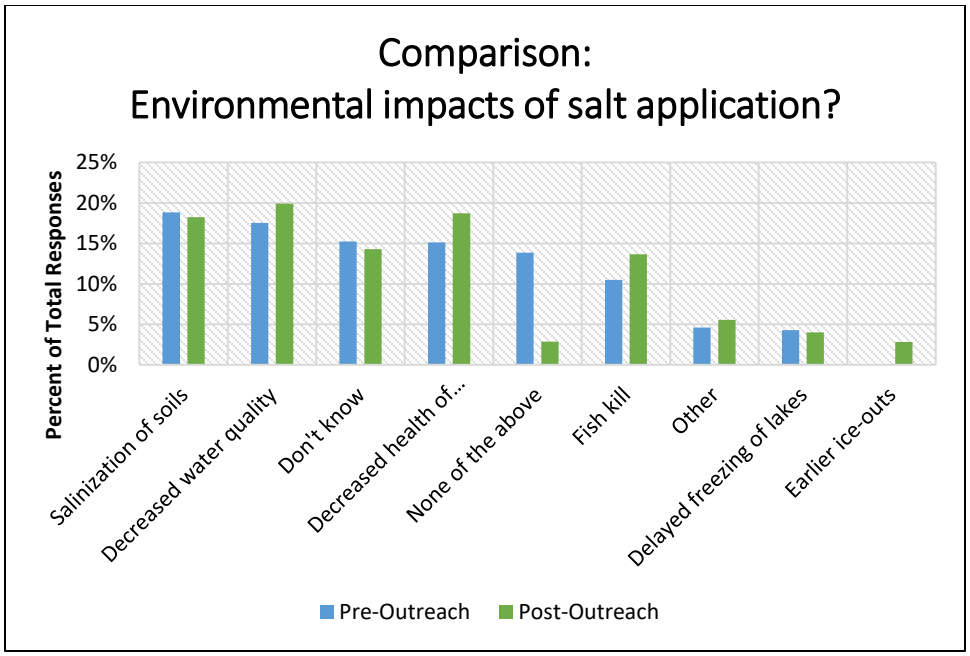


Figure I-8: Impacts of Salt - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-11: Impacts of Salt - (Pre- vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=40*	Frequency Average (all districts) Post-Outreach *n=40*
Salinization of soils	18.83%	18.25%
Decreased water quality	17.55%	19.89%
Don't know	15.25%	14.28%
Decreased health of aquatic ecosystems	15.13%	18.70%
None of the above	13.85%	2.86%
Fish kill	10.51%	13.66%
Other	4.62%	5.56%
Delayed freezing of lakes	4.28%	4.01%
Earlier ice-outs	0.00%	2.82%

Overall, respondents reported impacts of salt application remained consistent from the pre to the Post-Outreach survey. There were slight increases in the proportion of respondents who selected *Decreased water quality* (from 17.55% to 19.89%) and *Decreased health of aquatic ecosystems* (from 15.13% to

18.70%). Most notably, however, there was a large decrease (from 13.85% to 2.85%) in the percentage of respondents who selected the *None of the above option*. This may suggest a change in respondents' view of salt application's environmental impacts.

I.1.2 Snow Control Measures

I.1.2.1 Q5 – Are you aware of MnDOT's snow control program? *(Choose one)*

66 individuals answered this question; 11 skipped it. Descriptive statistics are given in Figures I-9 and I-10 and Tables I-12 and I-13.

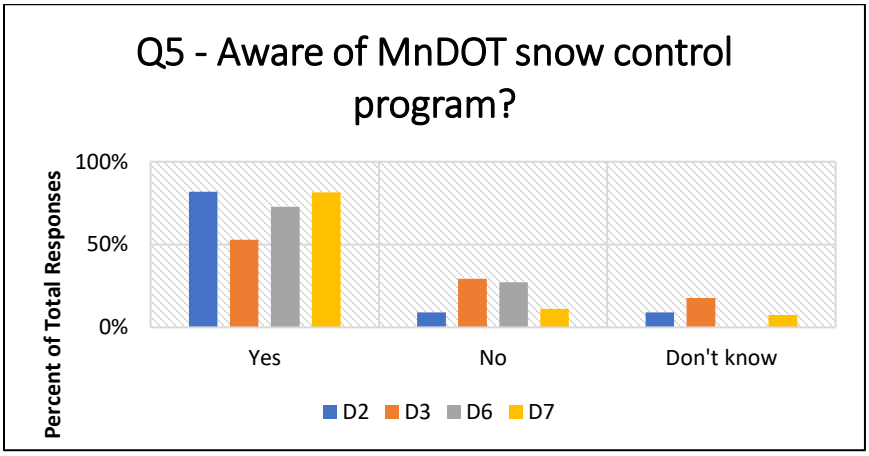


Figure I-9: Q5 (Post-Outreach KAP Survey) descriptive statistics – Aware of MnDOT program?

Table I-12: Q5 (Post-Outreach KAP Survey) descriptive statistics – Aware of MnDOT program?

Answer	D2 *n=11*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Yes	81.82%	52.94%	72.73%	81.48%	72.24%
No	9.09%	29.41%	27.27%	11.11%	19.22%
Don't know	9.09%	17.65%	0.00%	7.41%	8.54%

Unlike the pre-outreach survey where awareness of MnDOT's Blowing Snow Control program varied across districts, results of the post-outreach survey indicate that the majority of respondents in all districts were aware of the program. The highest proportion of respondents that reported awareness of the program were in D2 (81.82%) and D7 (81.48%), while D3 reported the lowest awareness percentage (52.94%). D3 also reported the highest proportion of *No* (27.27%) and *Don't know* (17.65%) responses.

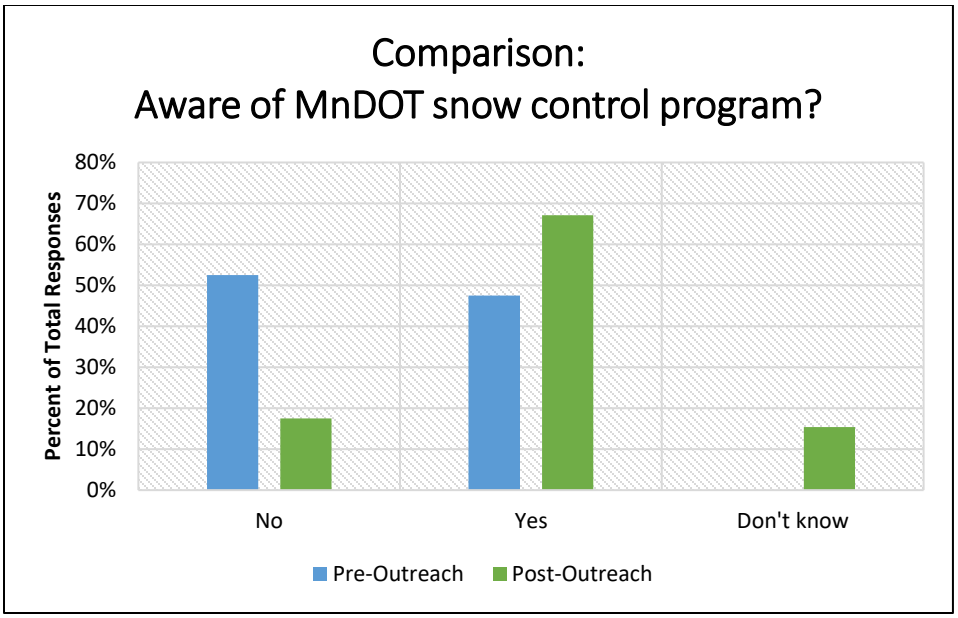


Figure I-10: Awareness of Program - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-13: Awareness of Program - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=34*	Frequency Average (all districts) Post-Outreach *n=34*
No	52.50%	17.50%
Yes	47.50%	67.09%
Don't know	0.00%	15.42%

There was an increase (from 47.50% to 67.09%) in the proportion of responses that reported awareness of MnDOT's Blowing Snow Control Program from pre to post survey. There also was a corresponding decrease (from 52.50% to 17.50%) in the percentage of respondents that reported a lack of awareness of the program. Interestingly, 15.42% more respondents selected the *Don't know* answer option in the post-outreach survey as compared to the pre-outreach survey.

I.1.2.2 Q6 – are you aware of the following resources offered through MnDOT's snow control program? (please check all that apply)

65 individuals answered this question; 12 skipped it. Descriptive statistics and write-in responses are given in Figures I-11 and I-12 and Tables I-14 and I-15.

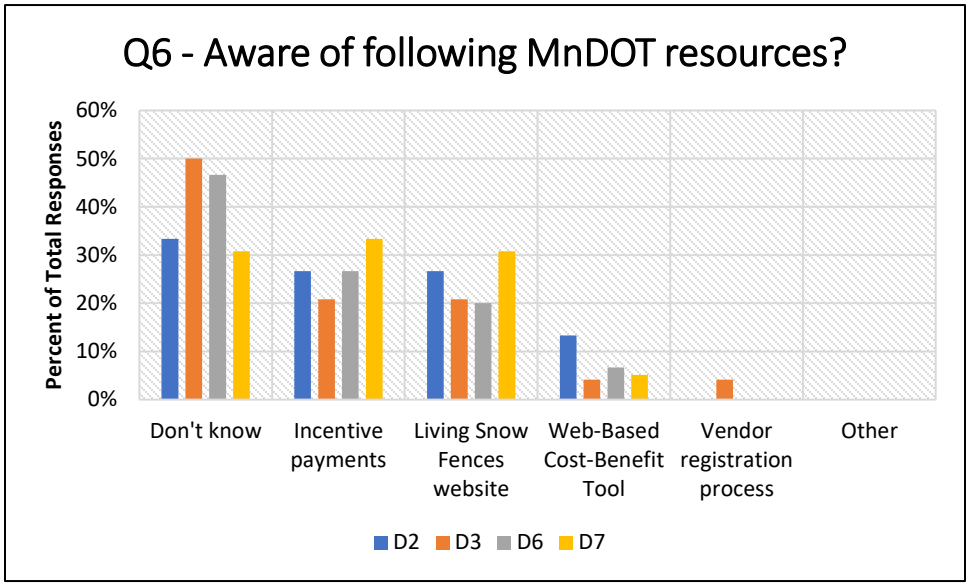


Figure I-11: Q6 (Post-Outreach KAP survey) descriptive statistics – Aware of available MnDOT resources?

Table I-14: Q6 (Post-Outreach KAP survey) descriptive statistics – Aware of available MnDOT resources?

Answer	D2 *n=10*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Don't know	33.33%	50.00%	46.67%	30.77%	40.19%
Incentive payments	26.67%	20.83%	26.67%	33.33%	26.88%
Living Snow Fences website	26.67%	20.83%	20.00%	30.77%	24.57%
Web-Based Cost-Benefit Tool	13.33%	4.17%	6.67%	5.13%	7.33%
Vendor registration process	0.00%	4.17%	0.00%	0.00%	1.04%
Other	0.00%	0.00%	0.00%	0.00%	0.00%

The highest proportion of respondents in all districts, except D7 – which reported highest awareness of *Incentive payments* – selected *Don't know* for this question, suggesting a general lack of awareness of MnDOT's Blowing Snow Control Program resources. All districts reported comparatively high awareness of the following MnDOT resources: *Incentive payments* (26.88%) and *Living Snow Fences website*

(24.57%), according to frequency average. Very few respondents (4.17% in D3) were aware of the *Vendor registration process.*

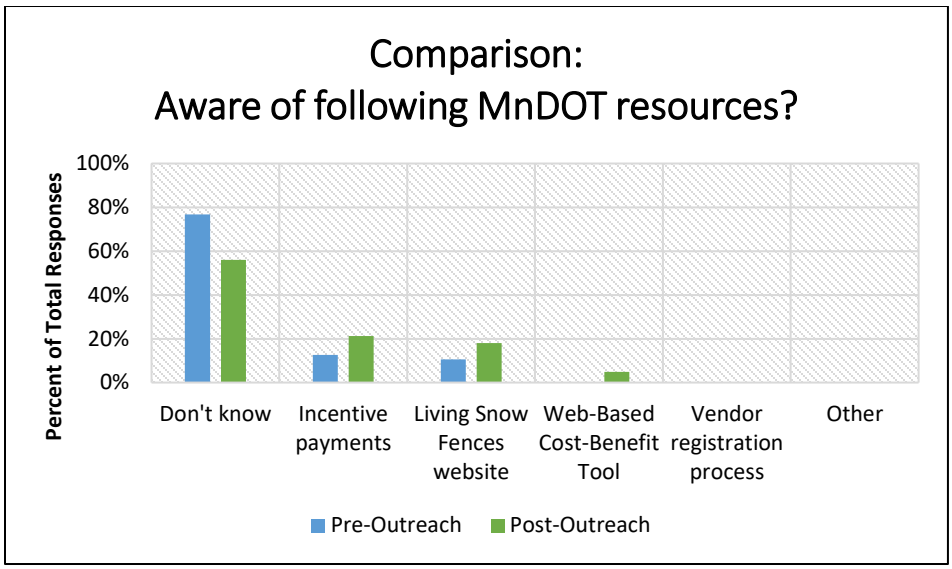


Figure I-12: Awareness of MnDOT Resources - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-15: Awareness of MnDOT Resources - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=35*	Frequency Average (all districts) Post-Outreach *n=35*
Don't know	76.76%	55.96%
Incentive payments	12.63%	21.19%
Living Snow Fences website	10.62%	18.01%
Web-Based Cost-Benefit Tool	0.00%	4.84%
Vendor registration process	0.00%	0.00%
Other	0.00%	0.00%

Although the *Don't know* answer option remained the most frequently selected answer choice, there was a marked decrease (from 76.76% to 55.96%) from the pre to the Post-Outreach survey. Furthermore, there was a notable increase (from 12.63% to 21.19%) in respondents reported awareness of *Incentive payments.*

I.1.2.3 Q7 – How would you rate your experience with MnDOT employees? *(Choose one)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figures I-13 and I-14 and Tables I-16, I-17 and I-18.

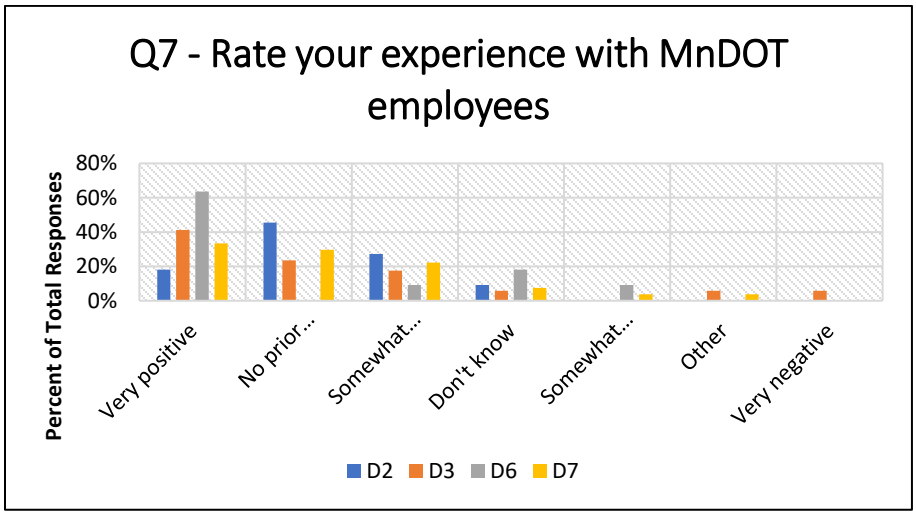


Figure I-13: Q7 (Post-Outreach KAP Survey) descriptive statistics – Experience with MnDOT employees?

Table I-16: Q7 (Post-Outreach KAP Survey) descriptive statistics – Experience with MnDOT employees?

Answer	D2 *n=11*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Very positive	18.18%	41.18%	63.64%	33.33%	39.08%
No prior experience with MnDOT	45.45%	23.53%	0.00%	29.63%	24.65%
Somewhat positive	27.27%	17.65%	9.09%	22.22%	19.06%
Don't know	9.09%	5.88%	18.18%	7.41%	10.14%
Somewhat negative	0.00%	0.00%	9.09%	3.70%	3.20%
Other	0.00%	5.88%	0.00%	3.70%	2.40%
Very negative	0.00%	5.88%	0.00%	0.00%	1.47%

Table I-17: Q7 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"They took down my fence when replacing a bridge and didn't put it back up after"		"Broken mailboxes last winter"

Similar to the pre-outreach survey, most respondents (39.08%) rated their experience with MnDOT employees as *Very Positive,* according to frequency average. The second most common answer was *No prior experience with MnDOT* (24.65%), according to frequency average. There was slight variation between districts; D2 reported the highest percentage of *No prior experience with MnDOT,* while all other districts' most commonly selected answer was *Very positive.* Respondents (two total) who selected the *Other (please specify)* option shared stories about property including fences and mailboxes that may have been damaged by MnDOT.

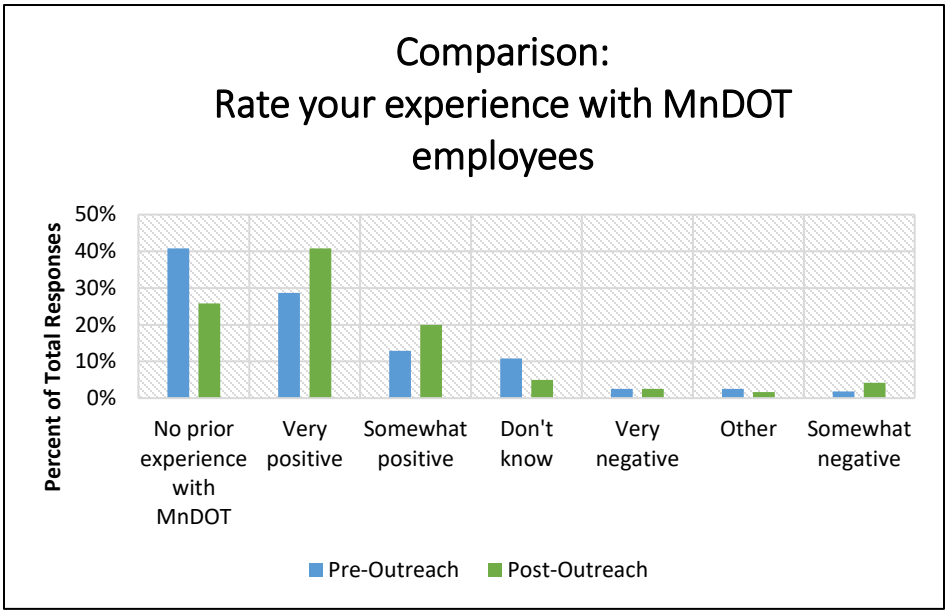


Figure I-14: Experience with MnDOT - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-18: Experience with MnDOT - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=38*	Frequency Average (all districts) Post-Outreach *n=38*
No prior experience with MnDOT	40.83%	25.83%
Very positive	28.69%	40.83%
Somewhat positive	12.86%	20.00%
Don't know	10.83%	5.00%
Very negative	2.50%	2.50%
Other	2.50%	1.67%
Somewhat negative	1.79%	4.17%

From the pre to the Post-Outreach survey, there was a decrease (from 40.83% to 25.83%) in the proportion of respondents who selected *No prior experience with MnDOT* and an increase (from 28.69% to 40.83%) in the percentage of survey participants who chose the *Very positive* answer option. Most other answer options remained relatively consistent.

I.1.2.4 Q8 – Please indicate your familiarity with each of the listed snow control measures. (*Select only one box for each snow control measure)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and are given in Tables I-19 and I-20.

Table I-19: Q8 (Post-Outreach KAP survey) descriptive statistics – Familiar with snow control measures?

I am aware of this measure					
Answer	**D2** *n=11*	**D3** *n=17*	**D6** *n=11*	**D7** *n=27*	**Frequency Average (all districts)**
LSF	63.64%	40.00%	45.45%	42.31%	47.85%
Temp snow fence	54.55%	33.33%	45.45%	42.31%	43.91%
Standing corn	27.27%	33.33%	54.55%	46.15%	40.33%
Earthwork	36.36%	26.67%	63.64%	23.08%	37.44%
Stacked corn/hay	36.36%	33.33%	36.36%	38.46%	36.13%
Permanent snow fence	45.45%	20.00%	36.36%	42.31%	36.03%
Snow berms	27.27%	6.67%	27.27%	30.77%	23.00%
I have seen this measure					
Answer	**D2** *n=11*	**D3** *n=17*	**D6** *n=11*	**D7** *n=27*	**Frequency Average (all districts)**
LSF	27.27%	60.00%	54.55%	46.15%	46.99%
Temp snow fence	36.36%	60.00%	36.36%	46.15%	44.72%
Standing corn	54.55%	20.00%	45.45%	34.62%	38.65%
Snow berms	27.27%	33.33%	36.36%	50.00%	36.74%
Stacked corn/hay	27.27%	33.33%	36.36%	30.77%	31.93%
Permanent snow fence	9.09%	13.33%	36.36%	23.08%	20.47%
Earthwork	9.09%	26.67%	9.09%	30.77%	18.90%
I know someone who has implemented this measure					
Answer	**D2** *n=11*	**D3** *n=17*	**D6** *n=11*	**D7** *n=27*	**Frequency Average (all districts)**
Standing corn	0.00%	26.67%	0.00%	11.54%	9.55%
Temp snow fence	0.00%	6.67%	9.09%	3.85%	4.90%
Stacked corn/hay	9.09%	0.00%	0.00%	7.69%	4.20%
Snow berms	0.00%	0.00%	9.09%	3.85%	3.23%
Permanent snow fence	0.00%	0.00%	9.09%	3.85%	3.23%
LSF	9.09%	0.00%	0.00%	0.00%	2.27%
Earthwork	0.00%	0.00%	0.00%	0.00%	0.00%
I am not aware of this measure					
Answer	**D2** *n=11*	**D3** *n=17*	**D6** *n=11*	**D7** *n=27*	**Frequency Average (all districts)**
Permanent snow fence	45.45%	73.33%	18.18%	30.77%	41.93%
Earthwork	36.36%	53.33%	27.27%	46.15%	40.78%
Snow berms	45.45%	60.00%	27.27%	15.38%	37.03%
Stacked corn/hay	27.27%	46.67%	27.27%	23.08%	31.07%
Standing corn	18.18%	26.67%	0.00%	7.69%	13.14%
Temp snow fence	9.09%	13.33%	0.00%	7.69%	7.53%
LSF	0.00%	6.67%	0.00%	11.54%	4.55%

According to frequency averages, all districts were most unfamiliar with the following snow control measures: *Permanent structural snow fences* (41.93%), *Earthwork* (40.78%), *Stacked corn and/or hay bales* (31.07%). According to frequency averages, districts were most familiar with *Living snow fences* (38.74%); most respondents had seen *Standing corn rows* (47.85%); and most knew someone who had implemented *Standing corn rows* (9.55%). Awareness of snow control measures varied across districts. D3 was more unfamiliar with most snow control measure types than other districts. Expectedly, corn-dominated regions of the state (i.e. D6 and D7) were most familiar with *Standing corn rows.*

Table I-20: Familiarity with Snow Control Measures - (Pre vs Post-Outreach KAP Survey) descriptive statistics

I am aware of this measure		
Answer	**Frequency Average (all districts) Pre-Outreach** *n=33*	**Frequency Average (all districts) Post-Outreach** *n=33*
Temp snow fence	35.00%	37.50%
Permanent snow fence	32.59%	42.50%
Earthwork	30.21%	37.92%
LSF	22.17%	45.42%
Standing corn	16.04%	41.88%
Stacked corn/hay	13.13%	24.27%
Snow berms	12.92%	26.04%
I have seen this measure		
Answer	**Frequency Average (all districts) Pre-Outreach** *n=33*	**Frequency Average (all districts) Post-Outreach** *n=33*
Standing corn	63.33%	32.29%
LSF	57.77%	46.46%
Temp snow fence	47.71%	49.79%
Stacked corn/hay	41.04%	35.42%
Snow berms	36.67%	43.33%
Earthwork	33.13%	19.17%
Permanent snow fence	16.52%	18.96%
I know someone who has implemented this measure		
Answer	**Frequency Average (all districts) Pre-Outreach** *n=33*	**Frequency Average (all districts) Post-Outreach** *n=33*
Standing corn	11.04%	14.42%
LSF	5.24%	0.00%
Temp snow fence	3.13%	6.25%
Stacked corn/hay	0.00%	1.92%

Snow berms	0.00%	1.92%
Permanent snow fence	0.00%	3.13%
Earthwork	0.00%	0.00%
I am not aware of this measure		
Answer	**Frequency Average (all districts) Pre-Outreach** *n=33*	**Frequency Average (all districts) Post-Outreach** *n=33*
Permanent snow fence	50.89%	35.42%
Snow berms	50.42%	28.96%
Stacked corn/hay	45.83%	38.54%
Earthwork	36.67%	42.92%
LSF	14.82%	8.13%
Temp snow fence	14.17%	6.46%
Standing corn	9.58%	11.67%

Overall, respondents' familiarity with snow control measures appeared to change significantly from the pre to the Post-Outreach survey. Survey participants reported at least 7.71% higher familiarity with snow control measures. Correspondingly, fewer respondents indicated that they were not aware of most snow control measures (*Permanent snow fence, Earthwork, Snow berms, Stacked corn/hay, LSF, etc.*) in the post-outreach survey as compared to the pre-outreach survey.

I.1.2.5 Q9 – Are you interested in learning more about MnDOT's snow control program? *(Choose one)*

65 individuals answered this question; 12 skipped it. Descriptive statistics are given in Figures I-15 and I-16 and Tables I-21 and I-22.

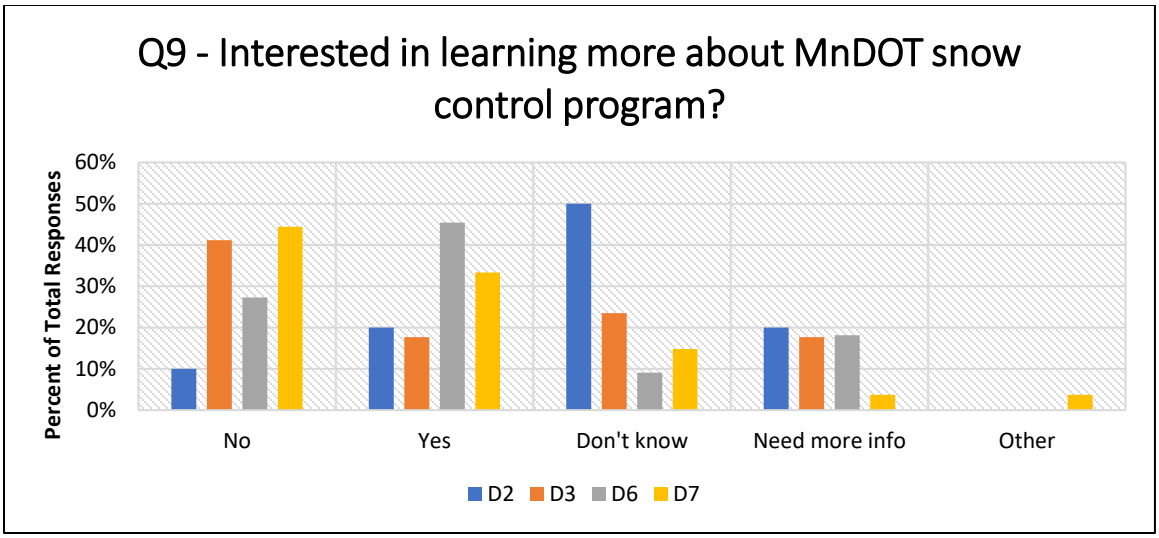


Figure I-15: Q9 (Post-Outreach KAP Survey) descriptive statistics – Interest in learning more about program?

Table I-21: Q9 (Post-Outreach KAP Survey) descriptive statistics – Interest in learning more about program?

Answer	D2 *n=10*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
No	10.00%	41.18%	27.27%	44.44%	30.72%
Yes	20.00%	17.65%	45.45%	33.33%	29.11%
Don't know	50.00%	23.53%	9.09%	14.81%	24.36%
Need more info	20.00%	17.65%	18.18%	3.70%	14.88%
Other	0.00%	0.00%	0.00%	3.70%	0.93%

Majorities in D6 and D7 reported they were interested in learning more about MnDOT's Blowing Snow Control Program, while a majority in D3 was not interested in learning more. The most frequently selected answer option in D2 was *Don't know*. A notable number of respondents in all districts selected either the *Don't know or Need more information* options, suggesting a general lack of knowledge about the program and/or a possible desire to learn more.

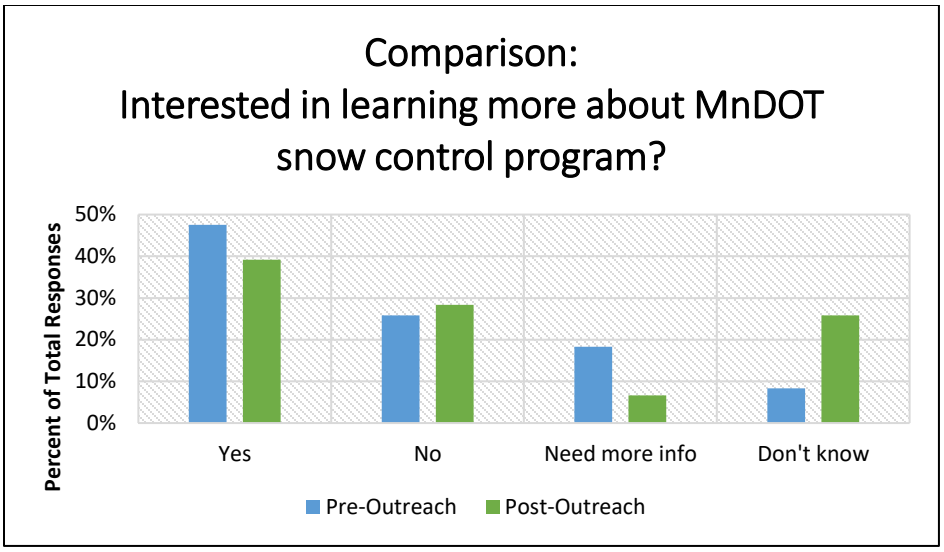


Figure I-16: Interest in Learning More About Program - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-22: Interest in Learning More About Program - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=37*	Frequency Average (all districts) Post-Outreach *n=37*
Yes	47.50%	39.17%
No	25.83%	28.33%
Need more info	18.33%	6.67%
Don't know	8.33%	25.83%

There was a notable decrease (from 47.50% to 39.17%) in the proportion of respondents who indicated they were interested in learning more about the program from the pre to the Post-Outreach survey. There also was a decrease (from 18.33% to 6.67%) in the percentage of respondents who selected the *Need more info* answer option and an increase (from 8.33% to 25.83%) in the frequency of respondents who selected *Don't know.*

I.1.2.6 Q10 – Which of the following would you prefer as ways to learn more about MnDOT's snow control program? *(Please check all that apply)*

63 individuals answered this question; 14 skipped it. Descriptive statistics and write-in responses are given in Figures I-17 and I-18 and Tables I-23, I-24, and I-25.

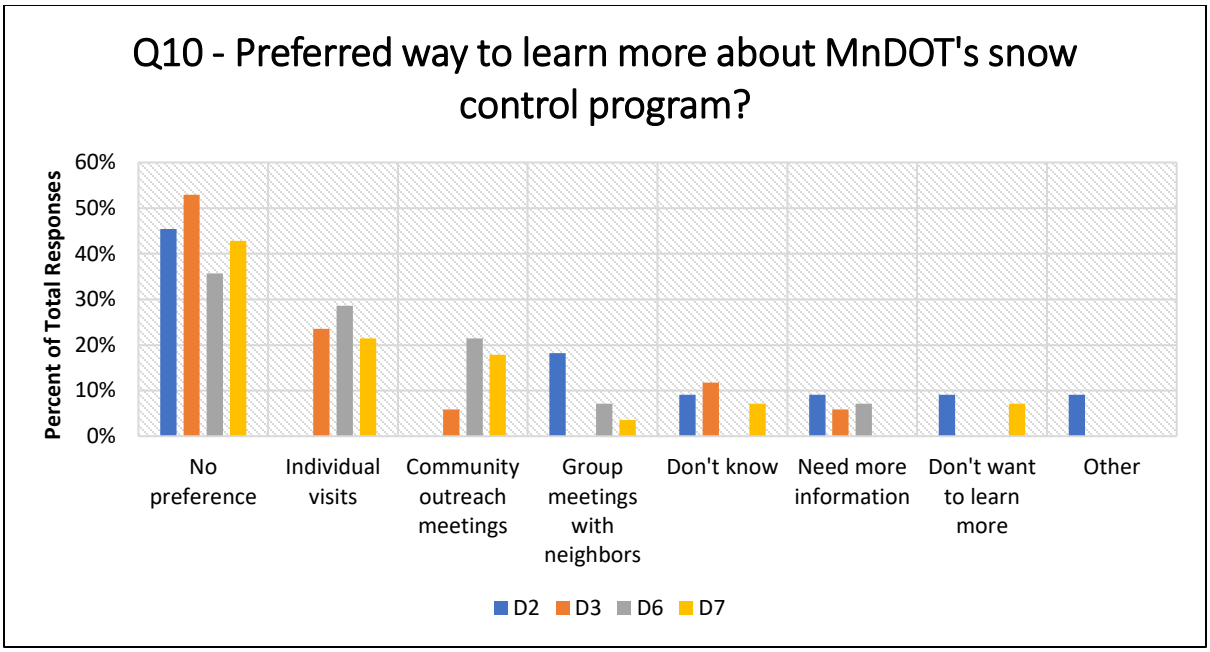


Figure I-17: Q10 (Post-Outreach KAP Survey) descriptive statistics – Preferred way to learn about program?

Table I-23: Q10 (Post-Outreach KAP Survey) descriptive statistics – Preferred way to learn about program?

Answer	D2 *n=11*	D3 *n=16*	D6 *n=11*	D7 *n=25*	Frequency Average (all districts)
No preference	45.45%	52.94%	35.71%	42.86%	44.24%
Individual visits	0.00%	23.53%	28.57%	21.43%	18.38%
Community outreach meetings	0.00%	5.88%	21.43%	17.86%	11.29%
Group meetings with neighbors	18.18%	0.00%	7.14%	3.57%	7.22%
Don't know	9.09%	11.76%	0.00%	7.14%	7.00%
Need more information	9.09%	5.88%	7.14%	0.00%	5.53%
Don't want to learn more	9.09%	0.00%	0.00%	7.14%	4.06%
Other	9.09%	0.00%	0.00%	0.00%	2.27%

Table I-24: Q10 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"email/radio"			

According to frequency averages, the preferred ways to learn more about MnDOT's snow control program were the following (from most common to least common): *I have no preference* (44.24%), *Individual visits to your property by MnDOT staff* (18.38%), and *Community outreach meetings* (11.29%). A D2 respondent who selected the *Other (please specify)* option reported he or she would prefer to learn more about the program via email and/or radio.

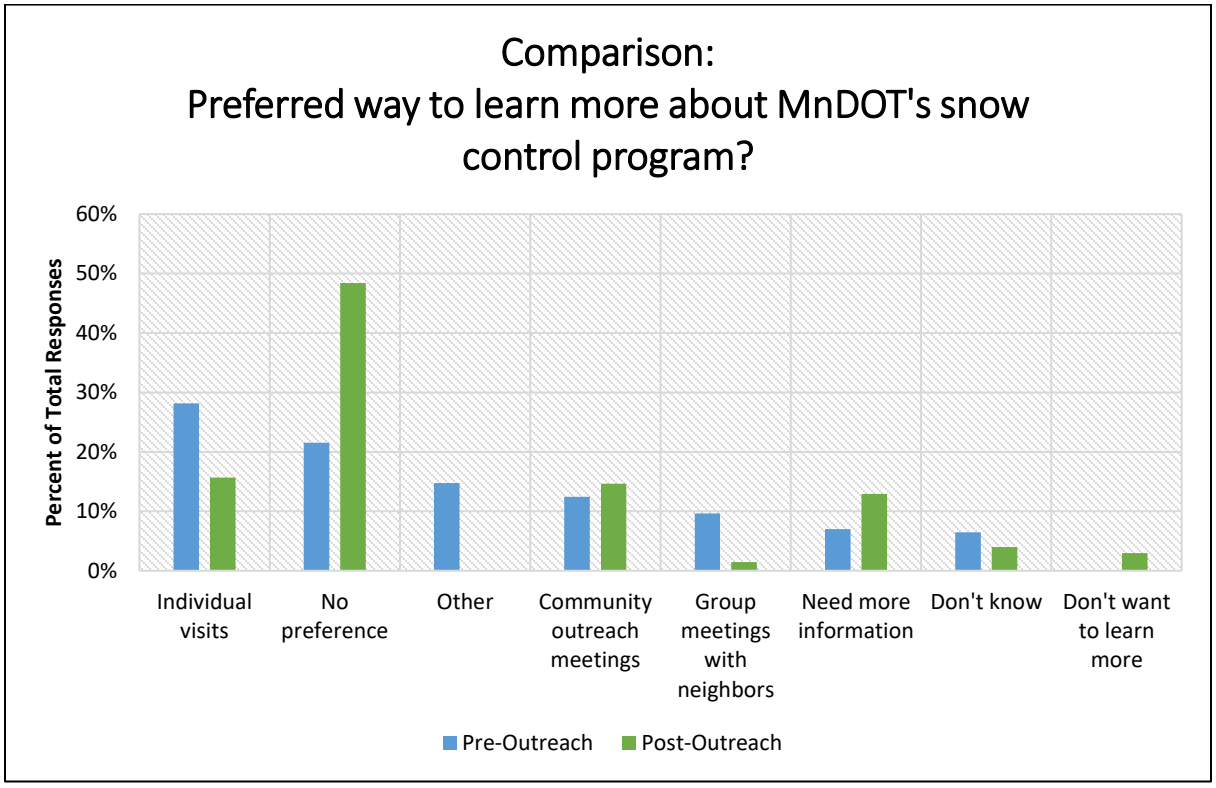


Figure I-18: Preferred Way to Learn More (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-25: Preferred Way to Learn More - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=36*	Frequency Average (all districts) Post-Outreach *n=36*
Individual visits	28.15%	15.66%
No preference	21.56%	48.41%
Other	14.77%	0.00%
Community outreach meetings	12.44%	14.63%
Group meetings with neighbors	9.65%	1.47%
Need more information	6.99%	12.92%
Don't know	6.44%	3.97%
Don't want to learn more	0.00%	2.94%

There was a decrease (from 28.15% to 15.66%) in the percentage of survey respondents who selected the *Individual visits* answer option. There was also an increase (from 21.56% to 48.41%) from the pre to the Post-Outreach survey. There also was a relatively large decrease (from 9.65% to 1.47%) in the frequency of the *Group meetings with neighbors* answer choice.

I.1.2.7 Q11 – If the highway in front of your property were identified as a snow problem area and you were paid to install a snow control measure, how interested would you be in participating in MnDOT's snow control program? *(Choose one)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figures I-19 and I-20 and Tables I-26, I-27 and I-28.

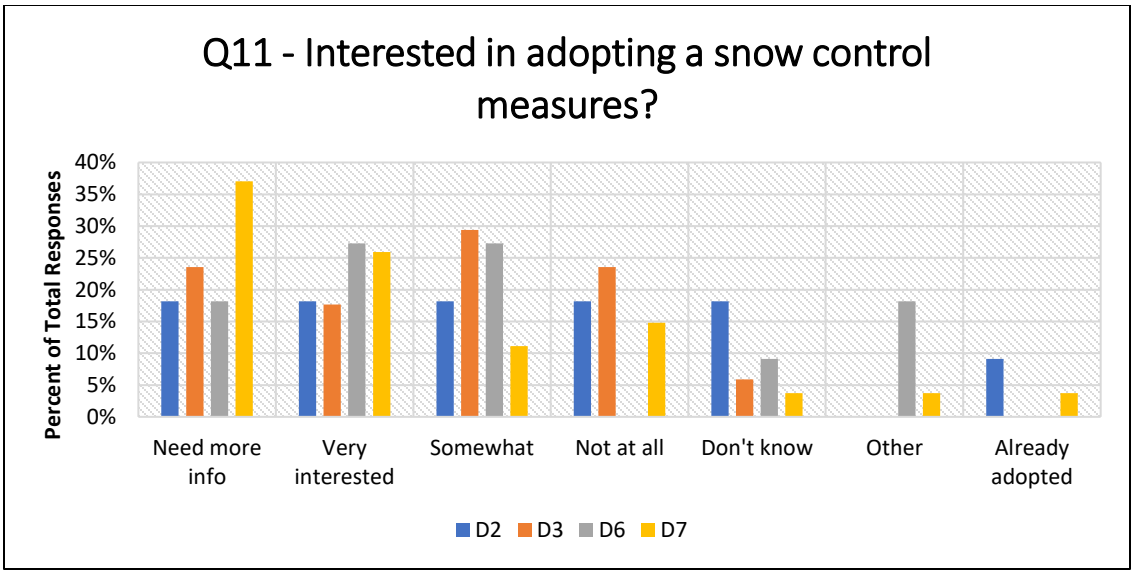


Figure I-19: Q11 (Post-Outreach KAP survey) descriptive statistics – Interest in adopting snow control?

Table I-26: Q11 (Post-Outreach KAP survey) descriptive statistics – Interest in adopting snow control?

Answer	D2 *n=11*	D3 *n=17*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Need more info	18.18%	23.53%	18.18%	37.04%	24.23%
Very interested	18.18%	17.65%	27.27%	25.93%	22.26%
Somewhat	18.18%	29.41%	27.27%	11.11%	21.49%
Not at all	18.18%	23.53%	0.00%	14.81%	14.13%
Don't know	18.18%	5.88%	9.09%	3.70%	9.21%
Other	0.00%	0.00%	18.18%	3.70%	5.47%
Already adopted	9.09%	0.00%	0.00%	3.70%	3.20%

Table I-27: Q11 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"Our property does not abutt land on hwy"	"No snow problem"

According to frequency averages, the most common responses were the following (from most common to least common): *Need more information* (24.23%), *Very interested* (22.26%), *Somewhat interested*

(21.49%). Importantly, interest varied by district. A strong majority of D7 respondents reported *Need more information,* thus pulling up the frequency average. The highest proportion of respondents that selected the *Very interested* answer option were in D6 and D7. Of the survey participants that selected the *Other (please specify)* option, one reported that his or her property is not adjacent to the identified corridor and another indicated there was no blowing and/or drifting snow problems on the section of highway in front of their property.

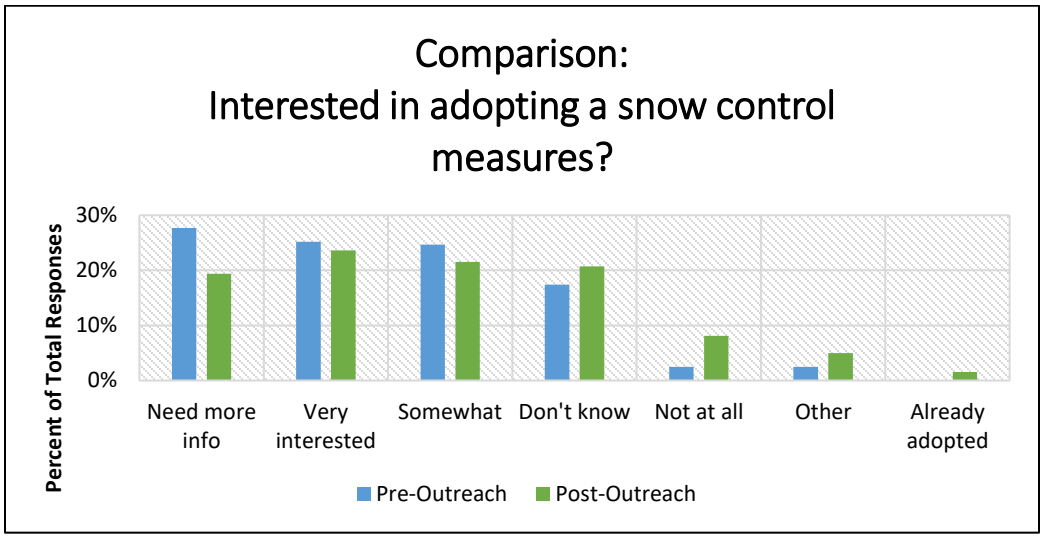


Figure I-20: Interest in Adoption - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-28: Interest in Adoption - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=37*	Frequency Average (all districts) Post-Outreach *n=37*
Need more info	27.71%	19.38%
Very interested	25.21%	23.65%
Somewhat	24.69%	21.56%
Don't know	17.40%	20.73%
Not at all	2.50%	8.13%
Other	2.50%	5.00%
Already adopted	0.00%	1.56%

There was a marked decrease (from 27.71% to 19.38%) in the proportion of respondents who selected the *Need more info* option from the pre to the Post-Outreach survey. There was also a noteworthy increase (from 2.50% to 8.13%) in the proportion of respondents who selected the *Not at all* answer option, which was solely caused by increases in D3 and D7. There were no comments or additional information to explain why a greater percentage of survey participants selected the *Not at all* answer option. Besides the previously mentioned answer options, survey participants' responses remained quite consistent from pre to Post-Outreach survey.

I.1.3 Willingness To Adopt Snow Control Measures

I.1.3.1 Q12 – Which of the following would help you adopt a snow control measure on your property? *(Please check all that apply)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figure I-21 and I-22 and Tables I-29, I-30 and I-31.

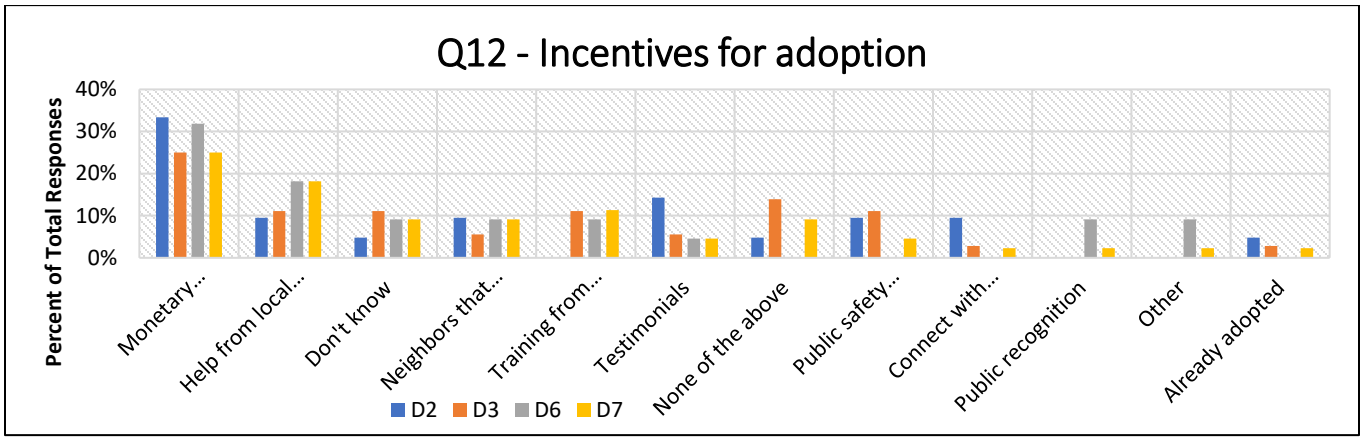


Figure I-21: Q12 (Post-Outreach KAP survey) descriptive statistics – Incentives for adoption?

Table I-29: Q12 (Post-Outreach KAP survey) descriptive statistics – Incentives for adoption?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=11*	D7 *n=26*	Frequency Average (all districts)
Monetary incentives	33.33%	25.00%	31.82%	25.00%	28.79%
Help from local SWCD	9.52%	11.11%	18.18%	18.18%	14.25%
Don't know	4.76%	11.11%	9.09%	9.09%	8.51%
Neighbors that participate	9.52%	5.56%	9.09%	9.09%	8.32%
Training from MnDOT	0.00%	11.11%	9.09%	11.36%	7.89%
Testimonials	14.29%	5.56%	4.55%	4.55%	7.24%
None of the above	4.76%	13.89%	0.00%	9.09%	6.94%
Public safety benefits	9.52%	11.11%	0.00%	4.55%	6.30%
Connect with landowners that participate	9.52%	2.78%	0.00%	2.27%	3.64%
Public recognition	0.00%	0.00%	9.09%	2.27%	2.84%
Other	0.00%	0.00%	9.09%	2.27%	2.84%
Already adopted	4.76%	2.78%	0.00%	2.27%	2.45%

Table I-30: Q12 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"I don't chop corn stalks and they catch snow" "Not needed"	"My land does not have an issue"

According to frequency averages, the following incentives were the most common responses across all districts (from most common to least common): *Monetary incentives* (28.79%), *Help from local SWCD with maintenance and equipment* (14.25%) *Don't know* (8.51%), *Knowing that my neighbors are participating in the program* (8.32%). *Monetary Incentives* ranked significantly higher than other incentives on the list, as the majority of respondents in all districts selected it. *Help from local SWCD* was most common in D6 and D7, which likely pulled up the frequency average. *Don't know* remains a relatively common answer, suggesting the survey respondents either don't know much about the program and/or what would convinve them participate. Of the respondents that selected the *Other (please specify)* option, some reiterated that snow control measures are not necessary on their property, while another reported that he or she does not chop his or her corn stalks which effectively catches the snow.

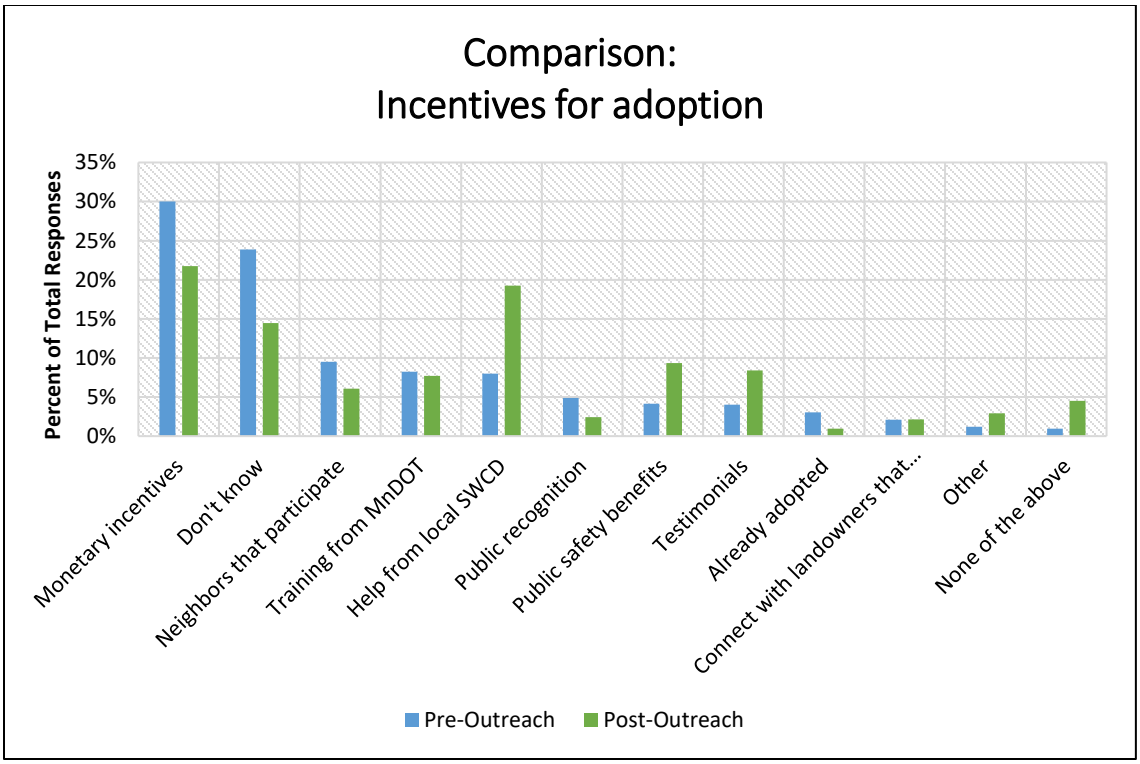


Figure I-22: Incentives for Adoption - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-31: Incentives for Adoption - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=39*	Frequency Average (all districts) Post-Outreach *n=39*
Monetary incentives	30.01%	21.74%
Don't know	23.88%	14.46%
Neighbors that participate	9.50%	6.05%
Training from MnDOT	8.24%	7.70%
Help from local SWCD	8.01%	19.27%
Public recognition	4.90%	2.43%
Public safety benefits	4.17%	9.36%
Testimonials	4.01%	8.40%
Already adopted	3.05%	0.96%
Connect with landowners that participate	2.08%	2.15%
Other	1.19%	2.94%

None of the above	0.96%	4.54%

Monetary incentives was the most commonly selected answer for the pre- and post-outreach surveys, although there was a decrease (from 30.01% to 21.74%) in the percentage of respondents from the pre to the post. There also was a slight decrease (from 23.88% to 14.46%) in the proportion of respondents who selected the *Don't know answer* option. Also of note, there was a significant increase (from 8.01% to 19.27%) in the percentage of survey participants who chose *Help from local SWCD.*

I.1.3.2 Q13 – Which of the following would prevent you from adopting a snow control measure on your property? (*Please check all that apply)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figures I-23 and I-24 and Tables I-32, I-33 and I-34.

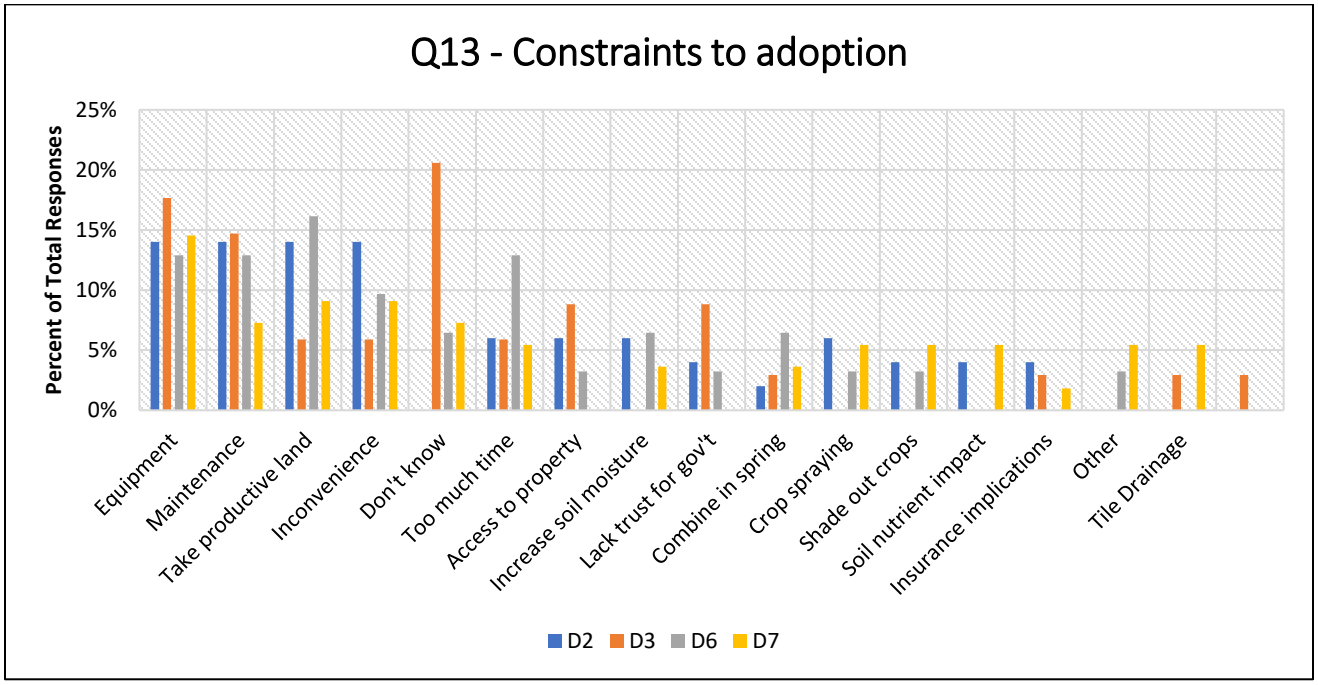


Figure I-23: Q13 (Post-Outreach KAP Survey) descriptive statistics – Constraints to adoption?

Table I-32: Q13 (Post-Outreach KAP Survey) descriptive statistics – Constraints to adoption?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Equipment	14.00%	17.65%	12.90%	14.55%	14.78%
Maintenance	14.00%	14.71%	12.90%	7.27%	12.22%
Take productive land	14.00%	5.88%	16.13%	9.09%	11.28%
Inconvenience	14.00%	5.88%	9.68%	9.09%	9.66%
Don't know	0.00%	20.59%	6.45%	7.27%	8.58%
Too much time	6.00%	5.88%	12.90%	5.45%	7.56%
Access to property	6.00%	8.82%	3.23%	0.00%	4.51%
Increase soil moisture	6.00%	0.00%	6.45%	3.64%	4.02%
Lack trust for gov't	4.00%	8.82%	3.23%	0.00%	4.01%
Combine in spring	2.00%	2.94%	6.45%	3.64%	3.76%
Crop spraying	6.00%	0.00%	3.23%	5.45%	3.67%
Shade out crops	4.00%	0.00%	3.23%	5.45%	3.17%
Soil nutrient impact	4.00%	0.00%	0.00%	5.45%	2.36%
Insurance implications	4.00%	2.94%	0.00%	1.82%	2.19%
Other	0.00%	0.00%	3.23%	5.45%	2.17%
Tile Drainage	0.00%	2.94%	0.00%	5.45%	2.10%
Already adopted	2.00%	2.94%	0.00%	1.82%	1.69%

Table I-33: Q13 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"Not needed"	"We don't have land that qualifies" "Don't have a snow problem on my portion of the Hwy" "No snow problem on my land"

According to frequency averages, the following incentives were the most common responses across all districts (from most common to least common): *It may require equipment I don't have* (14.78%), *It could require too much maintenance* (12.22%), *It might take land out of production* (11.28%), *It may be an inconvenience to farming operations…*(9.66%), and *Don't know* (8.58%). Importantly, there was some variation between districts. D2, D6, and D7 (all of which are agriculturally dominated regions of the

state) were more concerned about the potential loss of productive land and inconvenience to farming operations than D3 (which is less ag-dominated). Similar to the pre-outreach survey, *Don't know* ranked relatively high on the list, suggesting that respondents may not know much about snow control measures or have not thought much about them. Also like the pre-outreach survey, no constraint garnered more than 15% of the total. This suggests that respondents regard many constraints with a similar level of importance. Most respondents that selected the *Other (please specify)* option reported a that snow control measures are not necessary on their property due to a lack of snow problems. Another respondent that selected *Other (please specify)* indicated that his or her property did not qualify for the program.

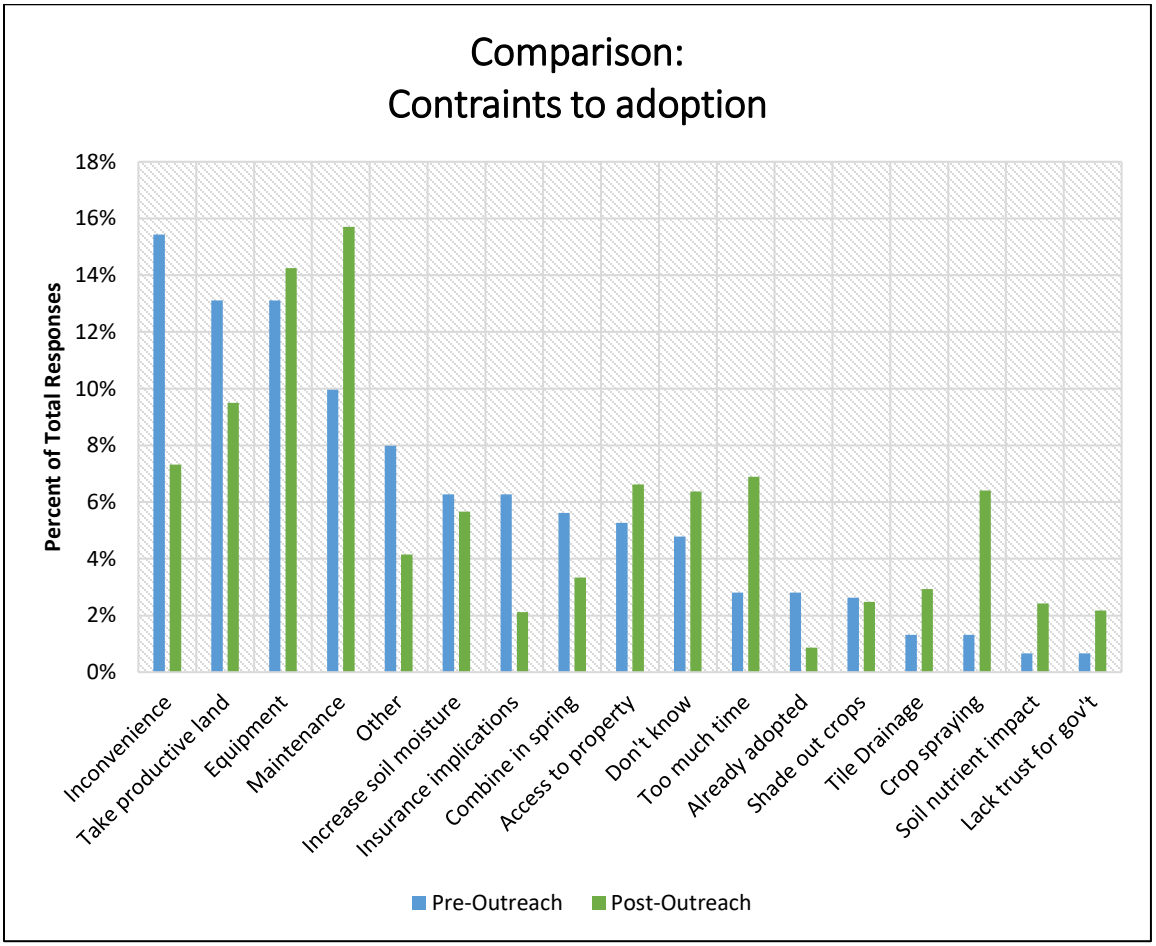


Figure I-24: Constraints to Adoption (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-34: Constraints to Adoption - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=38*	Frequency Average (all districts) Post-Outreach *n=38*
Inconvenience	15.44%	7.32%
Take productive land	13.12%	9.50%
Equipment	13.12%	14.26%
Maintenance	9.96%	15.71%
Other	7.98%	4.15%
Increase soil moisture	6.27%	5.66%
Insurance implications	6.27%	2.12%
Combine in spring	5.62%	3.34%
Access to property	5.26%	6.62%
Don't know	4.78%	6.37%
Too much time	2.81%	6.89%
Already adopted	2.81%	0.86%
Shade out crops	2.63%	2.48%
Tile Drainage	1.32%	2.93%
Crop spraying	1.32%	6.41%
Soil nutrient impact	0.66%	2.42%
Lack trust for gov't	0.66%	2.18%

There were a few mentionable changes in landowner constraints to adoption from the pre to the Post-Outreach survey. The proportion of respondents who selected *Inconvenience to farming operations* decreased from 15.44% to 7.32%. Moreover, the percentage of survey participants that chose *Maintenance* increased by 5.75%. That said, these changes are relatively small. Like the pre-outreach survey, no single constraint garnered more than 16.00% of the responses. This suggests that respondents appeared to regard constraints with relatively similar levels of importance.

I.1.3.3 Q14- Which of the following snow control measures would you be most interested in adopting on your property? (Please check all that apply)

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in I-25 and I-26 and Tables I-35, I-36 and I-37.

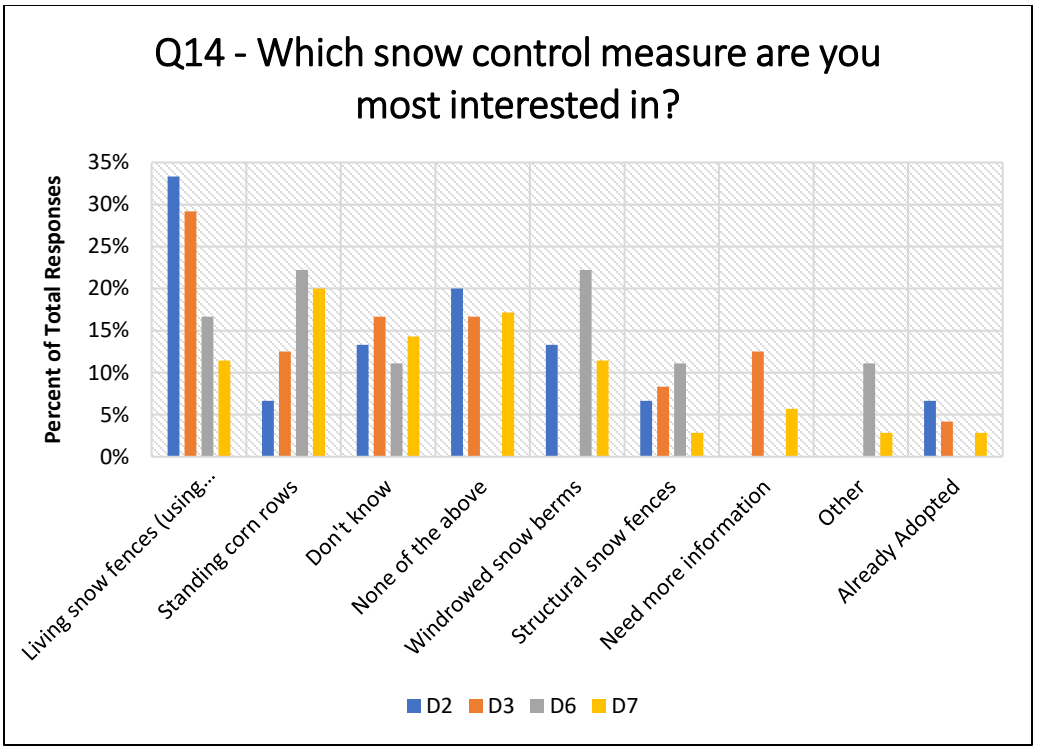


Figure I-25: Q14 (Post-Outreach KAP survey) descriptive statistics – Which measures are you interested in?

Table I-35: Q14 (Post-Outreach KAP survey) descriptive statistics – Which measures are you interested in?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=11*	D7 *n=27*	Frequency Average (all districts)
Living snow fences	33.33%	29.17%	16.67%	11.43%	22.65%
Standing corn rows	6.67%	12.50%	22.22%	20.00%	15.35%
Don't know	13.33%	16.67%	11.11%	14.29%	13.85%
None of the above	20.00%	16.67%	0.00%	17.14%	13.45%
Windrowed snow berms	13.33%	0.00%	22.22%	11.43%	11.75%
Structural snow fences	6.67%	8.33%	11.11%	2.86%	7.24%
Need more information	0.00%	12.50%	0.00%	5.71%	4.55%
Other	0.00%	0.00%	11.11%	2.86%	3.49%
Already Adopted	6.67%	4.17%	0.00%	2.86%	3.43%
Food and/or nut bearing plants	0.00%	0.00%	0.00%	8.57%	2.14%

Table I-36: Q14 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"removable snow fence" "Not needed"	"I live on east side of Hwy"

According to frequency averages, the following were the preferred snow control measures across all districts (from most common to least common): *Living snow fences* (22.65%), *Standing corn rows* (15.35%), *Don't know* (13.85%), *None of the above* (13.45%), *Windrowed snow berms* (11.75%). Like the pre-outreach survey, preferred snow control measures varied across districts. *Living snow fences* were the most commonly selected answer option in D2 and D3, while *Standing corn* rows were most often selected in D6 and D7. The *Windrowed snow berms* answer option was most often selected in D6. *Don't know*, however, was a notably common answer in all districts. Two of the respondents that selected the *Other (please specify*) option explained that they will not participate or adopt a snow control measure because they are not necessary on the section of roadway that is in front of their property. Another survey participant who selected the *Other (please specify)* option, indicated that he or she would prefer a "removable snow fence".

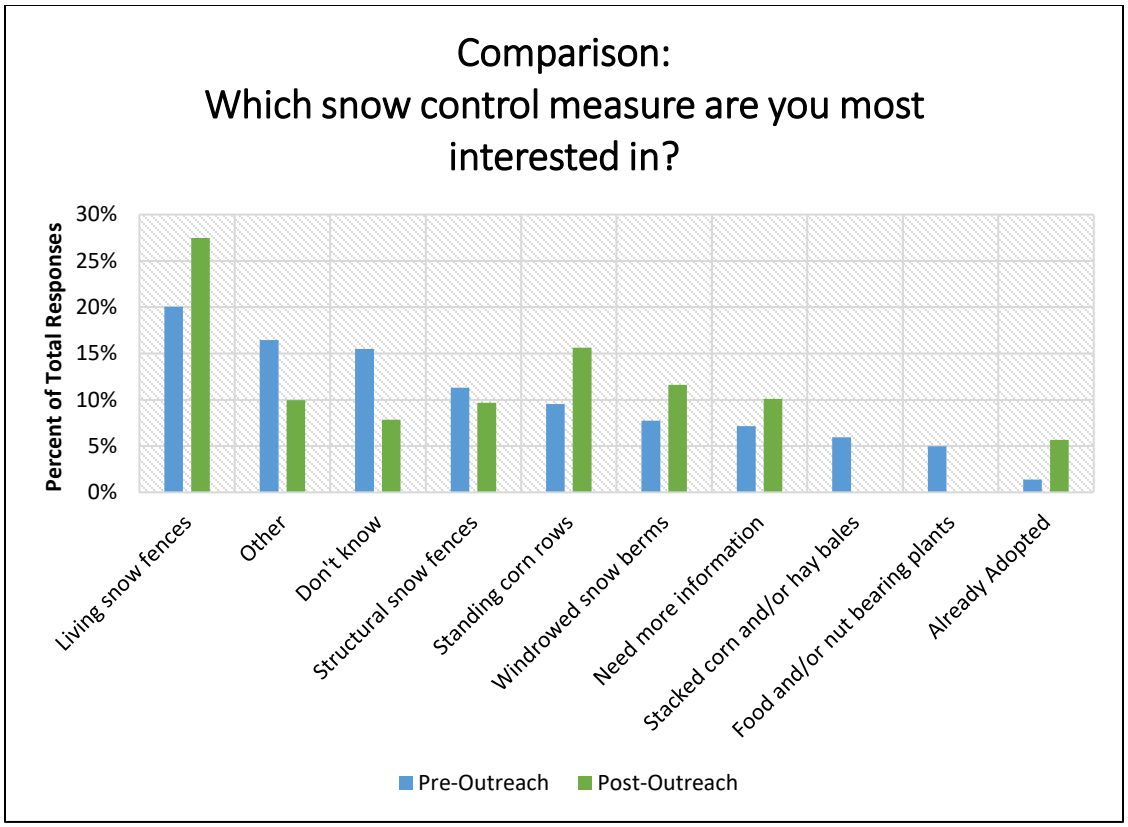


Figure I-26: Type of Snow Control Measures Most Interested In - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-37: Type of Snow Control Measures Most Interested In - (Pre vs Post-Outreach KAP) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=33*	Frequency Average (all districts) Post-Outreach *n=33*
Living snow fences	20.04%	27.47%
Other	16.47%	9.96%
Don't know	15.48%	7.85%
Structural snow fences	11.31%	9.66%
Standing corn rows	9.53%	15.62%
Windrowed snow berms	7.74%	11.61%
Need more information	7.15%	10.10%
Stacked corn and/or hay bales	5.95%	0.00%
Food and/or nut bearing plants	4.96%	0.00%
Already Adopted	1.39%	5.66%

There was an increase (from 20.04% to 27.47%) in the proportion of respondents who selected the *Living snow fences* answer option from the pre to the Post-Outreach survey. There also was a decrease (from 15.48% to 7.85%) in the percentage of survey respondents who selected *Don't know* and an increase (from 9.53% to 15.62%) in the proportion of respondents who selected *Standing corn rows*. Other increases included the *Need more information* and *Windrowed snow berms* answer options.

I.1.3.4 Q15 – As stated above, MnDOT's snow control program offers incentive payments for landowners that adopt snow control measures on their property. If you were to implement a snow control measure, how would you prefer to receive your incentive payment? *(Choose one)*

64 individuals answered this question; 13 skipped it. Descriptive statistics and write-in responses are given in Figure I-27 and I-28 and Tables I-38, I-39 and I-40.

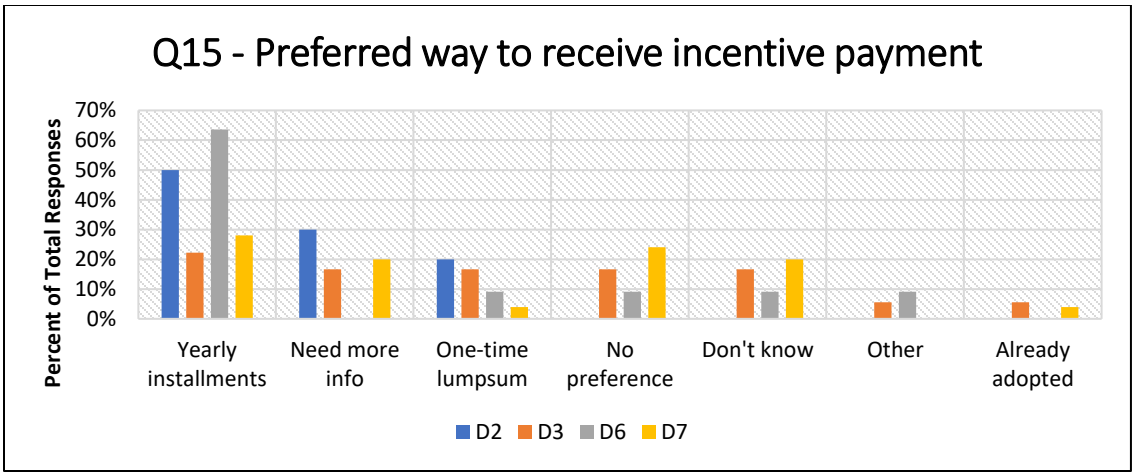


Figure I-27: Q15 (Post KAP survey) descriptive statistics – Preferred way to receive incentive?

Table I-38: Q15 (Post KAP survey) descriptive statistics – Preferred way to receive incentive?

Answer	D2 *n=10*	D3 *n=18*	D6 *n=11*	D7 *n=25*	Frequency Average (all districts)
Yearly installments	50.00%	22.22%	63.64%	28.00%	40.97%
Need more info	30.00%	16.67%	0.00%	20.00%	16.67%
One-time lumpsum	20.00%	16.67%	9.09%	4.00%	12.44%
No preference	0.00%	16.67%	9.09%	24.00%	12.44%
Don't know	0.00%	16.67%	9.09%	20.00%	11.44%
Other	0.00%	5.56%	9.09%	0.00%	3.66%
Already adopted	0.00%	5.56%	0.00%	4.00%	2.39%

Table I-39: Q15 (Post KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"No"	"Yearly – if snow control installment needed"	

According to frequency average, *Yearly installments* (40.97%) was the most commonly chosen answer option across all districts. Notably, D2 and D6 had the highest proportions (50.00% and 63.54%, respectively) of respondents that selected *Yearly installments,* thus pulling up the frequency average.

Need more info was the second most common answer across all districts, according to frequency average, although 0% of D6 respondents selected it. *No preference* and *Don't know* were relatively common in all districts except D2. One D3 respondent who selected the *Other (please specify)* option simply answered "No" while a D6 survey participant indicated that he or she would prefer yearly installments if a snow control measure were necessary.

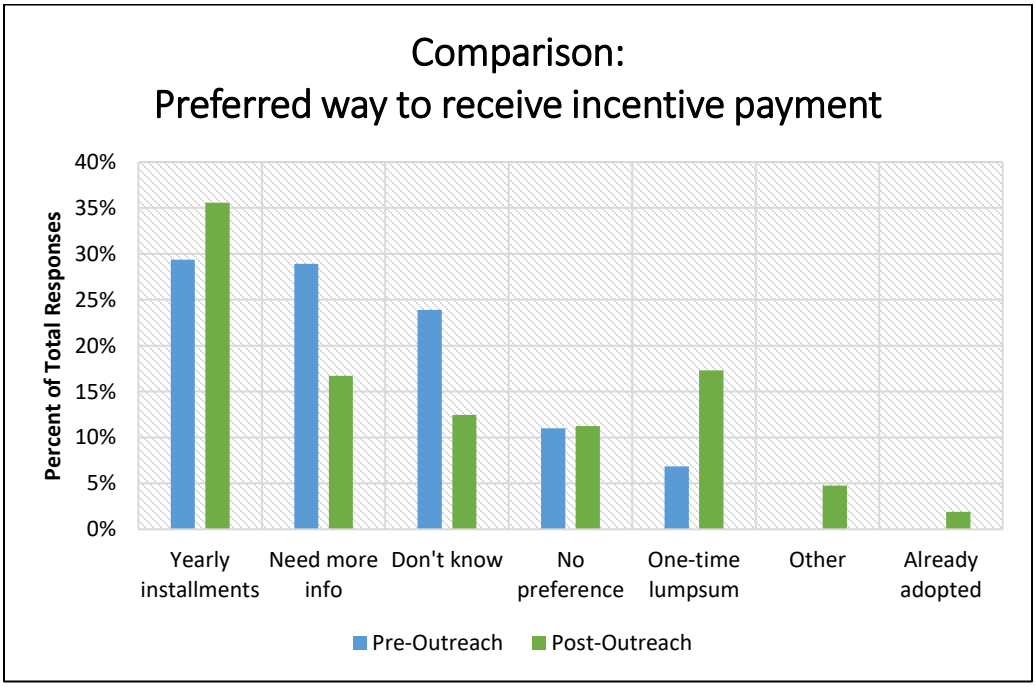


Figure I-28: Preferred Way to Receive Incentive Payment - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-40: Preferred Way to Receive Incentive Payment - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=37*	Frequency Average (all districts) Post-Outreach *n=37*
Yearly installments	29.36%	35.57%
Need more info	28.90%	16.72%
Don't know	23.90%	12.47%
No preference	10.99%	11.24%
One-time lumpsum	6.86%	17.30%
Other	0.00%	4.77%

Already adopted	0.00%	1.92%

There were considerable decreases (from 28.90% to 16.72% and 28.90% to 16.72%) in the percentages of respondents who selected *Need more info* and *Don't know,* respectively. There were also corresponding increases (from 29.36% to 35.57% and 6.86% to 17.30%) in the proportion of survey participants who chose *Yearly installments* and *One-time lumpsum*, respectively.

I.1.3.5 Q16 – In order to participate in MnDOT's snow control program, landowners must sign a contract confirming the duration for which they will implement a snow control measure. if you were to adopt a snow control measure, what type of contract would you prefer? (choose one)

64 individuals answered this question; 13 skipped it. Descriptive statistics and write-in responses are given in Figures I-29 and I-30 and Tables I-41, I-42 and I-43.

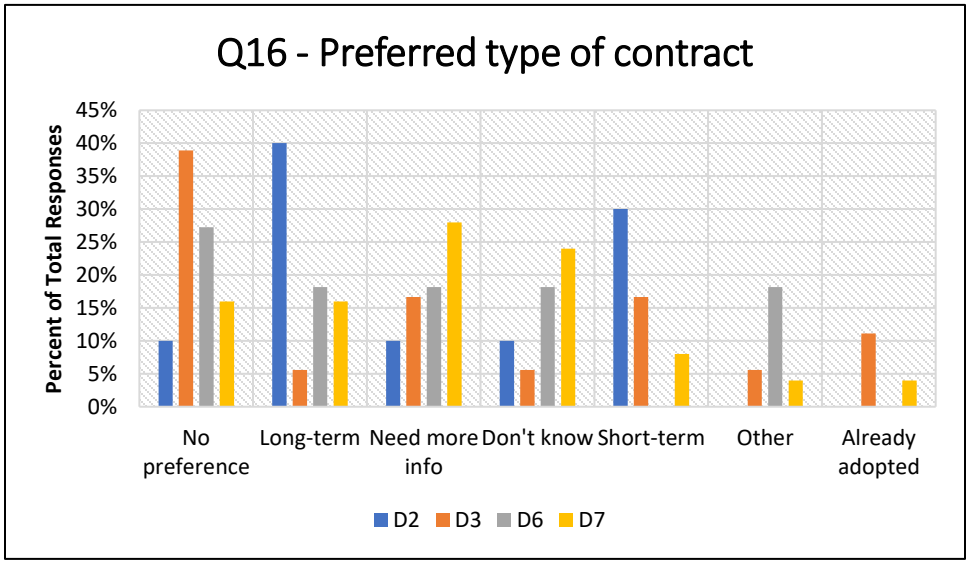


Figure I-29: Q16 (Pre-Outreach KAP survey) descriptive statistics – Preferred type of contract?

Table I-41: Q16 (Pre-Outreach KAP survey) descriptive statistics – Preferred type of contract

Answer	D2 *n=10*	D3 *n=18*	D6 *n=11*	D7 *n=25*	Frequency Average (all districts)
No preference	10.00%	38.89%	27.27%	16.00%	23.04%
Long-term	40.00%	5.56%	18.18%	16.00%	19.94%
Need more info	10.00%	16.67%	18.18%	28.00%	18.21%
Don't know	10.00%	5.56%	18.18%	24.00%	14.44%

Short-term	30.00%	16.67%	0.00%	8.00%	13.67%
Other	0.00%	5.56%	18.18%	4.00%	6.94%
Already adopted	0.00%	11.11%	0.00%	4.00%	3.78%

Table I-42: Q16 (Pre-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"No"	"I would like to read a long term contract, if needed"	"none"

Preferred contract type varied by district. *No preference* was the most commonly selected answer in D3 and D6; *Long-term* was the most frequently selected answer in D2; and *Need more info* garnered the highest proportion of responses in D7. 0.00% of respondents in D6 selected the *Short-term* answer option. Two respondents who chose the *Other (please specify)* option indicated that they would not like any contract, while another respondent stated that he or she would like to read a long-term contract if it were necessary.

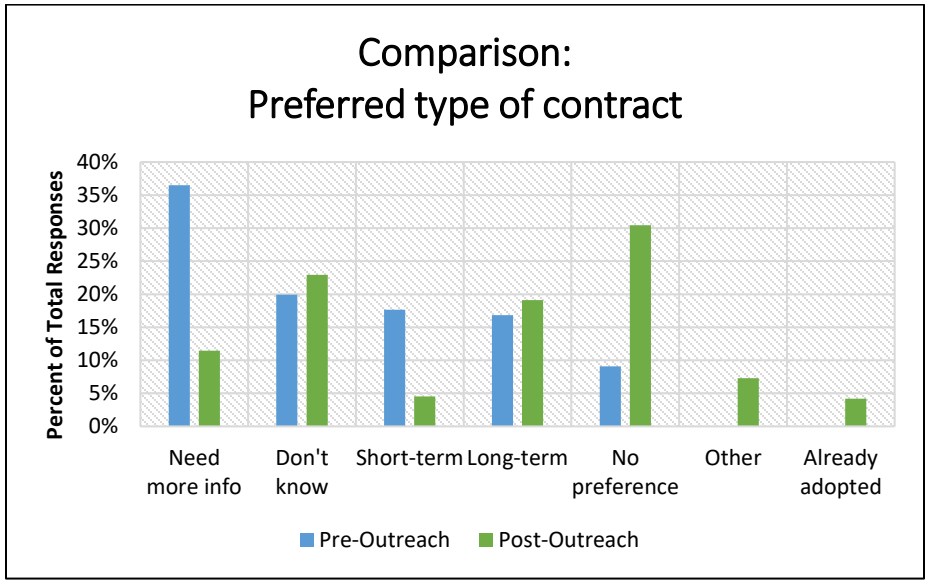


Figure I-30: Preferred Type of Contract - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-43: Preferred Type of Contract - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=38*	Frequency Average (all districts) Post-Outreach *n=38*
Need more info	36.52%	11.47%
Don't know	19.92%	22.95%
Short-term	17.65%	4.55%
Long-term	16.82%	19.10%
No preference	9.09%	30.47%
Other	0.00%	7.27%
Already adopted	0.00%	4.20%

There were marked decreases (from 36.52% to 11.47% and from 17.65% to 4.55%) in the proportion of respondents who selected the *Need more info* and *Short-term* answer options, respectively – from the pre to the Post-Outreach survey. There also was a notable increase (from 9.09% to 30.47%) in the percentage of survey participants who selected *No preference.*

I.1.3.6 Q17 – The incentive payments offered by MnDOT's snow control program aim to encourage landowner participation and offset costs of maintenance activities. The types of maintenance activities vary by snow fence type. Some fence types, like structural fences, require little to no maintenance by the landowner. If you were to adopt a snow control measure, would you be willing to perform the following maintenance activities? *(Please check all that apply)*

63 individuals answered this question; 14 skipped it. Descriptive statistics and write-in responses are given in Figures I-31 and I-32 and Tables I-44, I-45 and I-46.

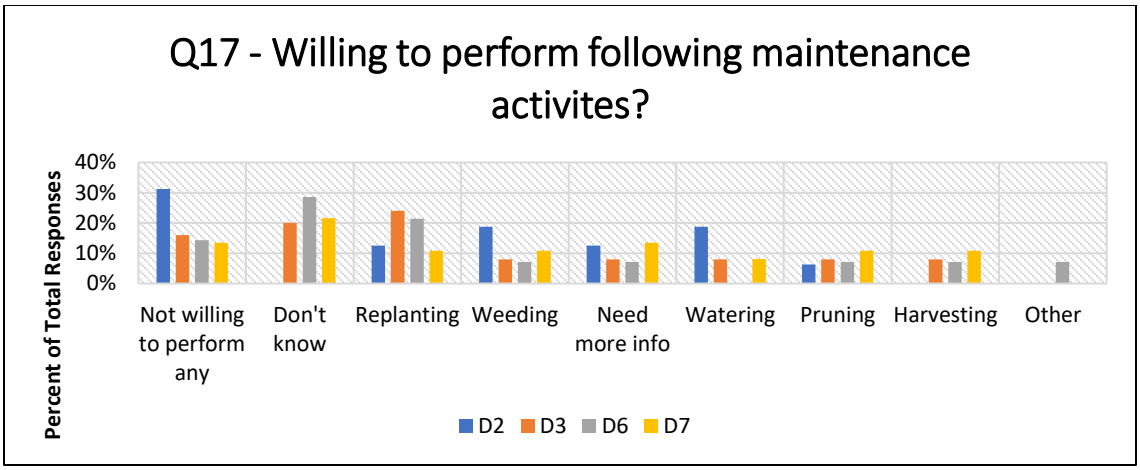


Figure I-31: Q17 (Post-Outreach KAP survey) descriptive statistics – Willing to perform maintenance?

Table I-44: Q17 (Post-Outreach KAP survey) descriptive statistics – Willing to perform maintenance?

Answer	D2 *n=10*	D3 *n=18*	D6 *n=10*	D7 *n=25*	Frequency Average (all districts)
Not willing to perform any	31.25%	16.00%	14.29%	13.51%	18.76%
Don't know	0.00%	20.00%	28.57%	21.62%	17.55%
Replanting	12.50%	24.00%	21.43%	10.81%	17.19%
Weeding	18.75%	8.00%	7.14%	10.81%	11.18%
Need more info	12.50%	8.00%	7.14%	13.51%	10.29%
Watering	18.75%	8.00%	0.00%	8.11%	8.72%
Pruning	6.25%	8.00%	7.14%	10.81%	8.05%
Harvesting	0.00%	8.00%	7.14%	10.81%	6.49%
Other	0.00%	0.00%	7.14%	0.00%	1.79%

Table I-45: Q17 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"not need in view of location"	

According to frequency averages, *Not willing to perform any maintenance activities* (18.76%), *Don't know* (17.55%), and *Replanting* (17.19%) were the most common answer choices. Importantly, there was variation between districts, thus slightly skewing the results. For example, *Not willing to perform any maintenance activities* was especially common in D2, therefore pulling the frequency average up. The *Don't know* answer option was frequently selected in all districts except D2. *Replanting* was

particularly common in D3 and D6. The D6 respondent who chose the *Other (please specify)* option indicated that a snow control measure was not necessary on his or her property.

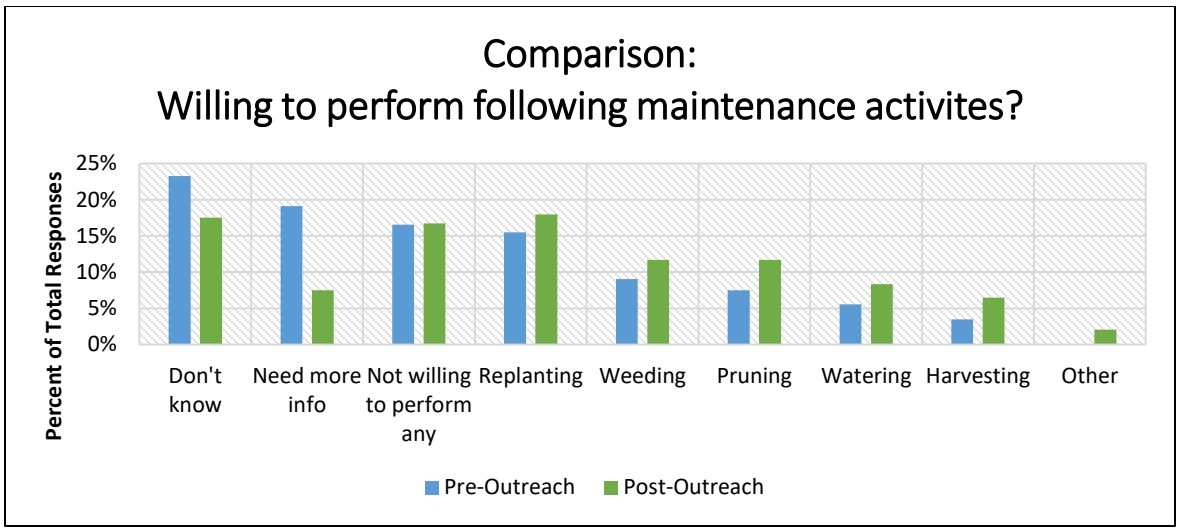


Figure I-32: Maintenance Activities - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-46: Maintenance Activities - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=36*	Frequency Average (all districts) Post-Outreach *n=36*
Don't know	23.29%	17.52%
Need more info	19.12%	7.50%
Not willing to perform any	16.56%	16.72%
Replanting	15.50%	17.97%
Weeding	9.03%	11.69%
Pruning	7.48%	11.69%
Watering	5.56%	8.36%
Harvesting	3.47%	6.47%
Other	0.00%	2.08%

The most remarkable change between pre and post survey results occurred within the *Need more info* answer option, wherein the frequency average decreased from 19.12% to 7.50%. There also was a mentionable decrease in the proportion of respondents who chose the *Don't know* answer option.

I.1.4 Compensation

I.1.4.1 Q18 – Suppose MnDOT's snow control program paid you $1,500/acre per year to participate in the program. Would this payment convince you to participate?

63 individuals answered this question; 14 skipped it. Descriptive statistics and write-in responses are given in Figure I-33 and Tables I-47 and I-48.

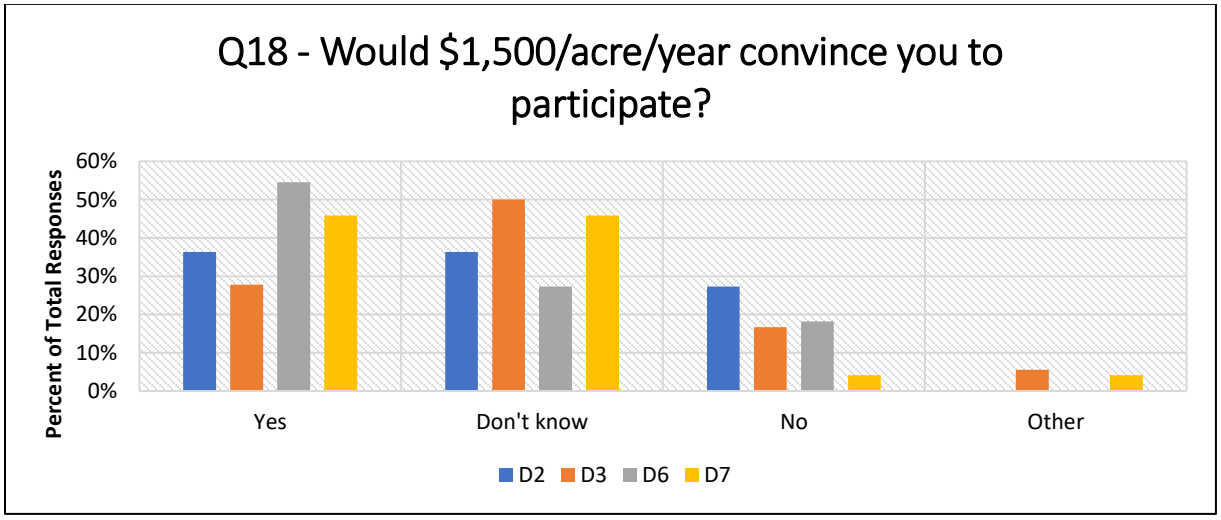


Figure I-33: Q18 (Post-Outreach KAP survey) descriptive statistics – Compensation amount?

Table I-47: Q18 (Post-Outreach KAP survey) descriptive statistics – Compensation amount?

Answer	D2 *n=10*	D3 *n=18*	D6 *n=11*	D7 *n=24*	Frequency Average (all districts)
Yes	36.36%	27.78%	54.55%	45.83%	41.13%
Don't know	36.36%	50.00%	27.27%	45.83%	39.87%
No	27.27%	16.67%	18.18%	4.17%	16.57%
Other	0.00%	5.56%	0.00%	4.17%	2.43%

Table I-48: Q18 (Post-Outreach KAP survey) write-in responses

If no, please specify an amount… Responses			
D2	D3	D6	D7
"4500"		"2,000"	

The majority of respondents in D6 indicated that the $1,500/acre per year compensation payment would convince them to participate. In D3, most survey participants selected the *Don't know* answer option. An equal proportion of D2 and D7 respondents chose the *Yes* and *Don't know* answer options. *No* was the least common answer option in all districts, excluding those who selected *Other (please specify).* A D2 respondent stated that a $4,5000 compensation payment would be required to convince him to participate and a D6 respondent indicated that a $2,000 payment would be necessary.

I.1.4.2 Q19 – Please share your questions, concerns, or comments regarding compensation here:

12 individuals answered this question; 65 skipped it. Descriptive statistics and write-in responses are given in Table I-49.

Table I-49: Q19 (Post-Outreach KAP survey) write-in responses – Compensation comments

Additional Questions, Concerns, or Comments			
D2	**D3**	**D6**	**D7**
"Our land from EGF has Hwy 2 angling SE across our fields and would be to much of an inconvenience with our equipment to farm"	"Don't think we live in a problem area" "I don't have property outside the city on 210/169" "I don't own enough land for that" "I own a very small amount of land along the highway."	"$1500/ac may be low in a year w/ high crop prices. A contract with a rolling increase would be helpful." "We would consider using a temporary snow fence in our field, and a living snow fence in our pasture." "Only interested in a temporary snow fence"	"Who would maintain the snow fence?" "I don't need it" "I'm all for your program, but my section of 4 is not a problem." "It seems like the compensation would need to be higher for the permanent structures/living fence than the corn rows"

Survey participants offered a variety of perspectives with regards to compensation payments. Firstly, the most common answer, which appeared multiple times in D3 and D7, related to respondents' perception that there is no snow problem adjacent to their property. A D2 survey participant stated that a snow fence would be too much of an inconvenience to his or her farming equipment. A D6 respondent commented that $1,500/acre per year would be inadequate during years with high crop prices and recommended a contract with a "rolling increase" or escalating payment. Other D6 respondents stated that they would prefer a temporary snow fence. D7 survey participant answers included: an implication that permanent structures should receive higher payments than standing corn rows and a question about who would maintain the snow fence.

I.1.5 Outreach and Promotion

I.1.5.1 Q20 – A few months ago, MnDOT and the UMN launched a campaign in Crookston/Aitkin/Lanesboro/St. James to increase awareness about MnDOT's snow control program. Which of the following outreach efforts did you see and/or hear? *(Please check all that apply)*

62 individuals answered this question; 15 skipped it. Descriptive statistics and write-in responses are given in Figure I-34 and Tables I-50 and I-51.

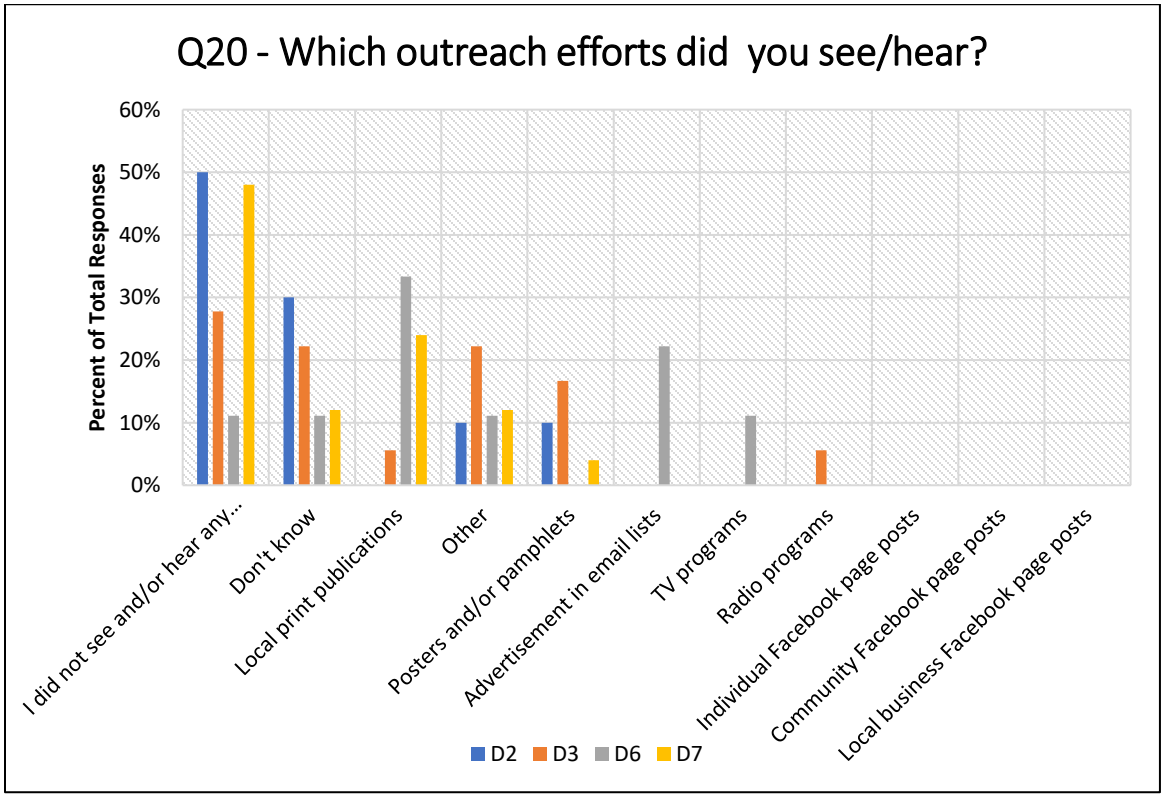


Figure I-34: Q20 (Post-Outreach KAP survey) descriptive statistics – Aware of outreach efforts?

Table I-50: Q20 (Post-Outreach KAP survey) descriptive statistics – Aware of outreach efforts?

Answer	D2 *n=10*	D3 *n=18*	D6 *n=9*	D7 *n=25*	Frequency Average (all districts)
I did not see and/or hear any outreach efforts	50.00%	27.78%	11.11%	48.00%	34.22%
Don't know	30.00%	22.22%	11.11%	12.00%	18.83%
Local print publications	0.00%	5.56%	33.33%	24.00%	15.72%
Other	10.00%	22.22%	11.11%	12.00%	13.83%
Posters and/or pamphlets	10.00%	16.67%	0.00%	4.00%	7.67%
Advertisement in email lists	0.00%	0.00%	22.22%	0.00%	5.56%
TV programs	0.00%	0.00%	11.11%	0.00%	2.78%
Radio programs	0.00%	5.56%	0.00%	0.00%	1.39%
Individual Facebook page posts	0.00%	0.00%	0.00%	0.00%	0.00%
Community Facebook page posts	0.00%	0.00%	0.00%	0.00%	0.00%

Table I-51: Q20 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"This mailing"	"Mail" "Work Conversation" "US Mail" "Mailings" "MnDOT Mtg"	"Fillmore County Journal" "Mailer"	"Shopper" "I only saw this pamphlet in the mail" "Have participated for 10 or more years" "Mail"

According to frequency averages, *I did not see and/or hear any outreach efforts* (34.22%), *Don't know* (18.83%), *Local print publications* (15.72%), and *Other* (13.83%) were the most common answer choices across all districts. There was some variation between districts. Most respondents in D2, D3, and D7 selected the *I did not see…* answer option, while the most frequently chosen answer in D6 was *Local print publications.* A strong majority of the respondents who selected the *Other (please specify) option* indicated that they had received mail, which likely was in reference to the pre- and post-outreach survey questionnaires. A couple survey participants who selected the *Other (please specify)* wrote in the name of the print publication they had seen, while another stated that he or she had heard about the program through a conversation at work.

I.1.5.2 Q21 – How helpful were the outreach efforts in improving your understanding of MnDOT's snow control program?

61 individuals answered this question; 16 skipped it. Descriptive statistics and write-in responses are given in Figure I-35 and Table I-52.

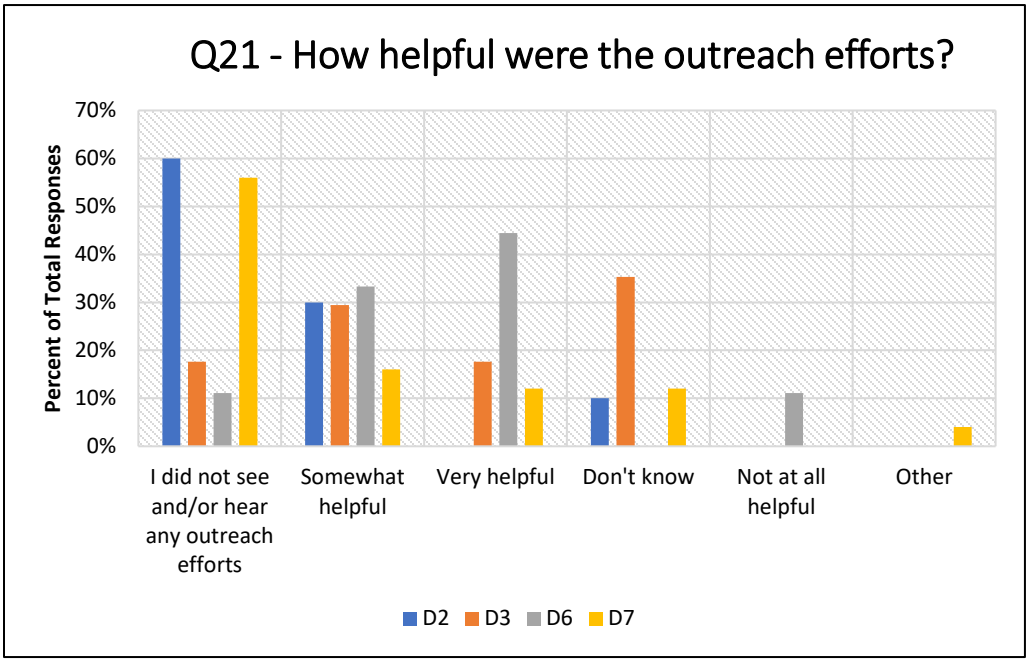


Figure I-35: Q21 (Post-Outreach KAP survey) descriptive statistics – Outreach efforts helpful?

Table I-52: Q21 (Post-Outreach KAP survey) descriptive statistics – Outreach efforts helpful?

Answer	D2 *n=10*	D3 *n=17*	D6 *n=9*	D7 *n=25*	Frequency Average (all districts)
I did not see and/or hear any outreach efforts	60.00%	17.65%	11.11%	56.00%	36.19%
Somewhat helpful	30.00%	29.41%	33.33%	16.00%	27.19%
Very helpful	0.00%	17.65%	44.44%	12.00%	18.52%
Don't know	10.00%	35.29%	0.00%	12.00%	14.32%
Not at all helpful	0.00%	0.00%	11.11%	0.00%	2.78%
Other	0.00%	0.00%	0.00%	4.00%	1.00%

As indicated in the previous question, strong majorities of respondents in D2 and D7 did not see and/or hear any outreach efforts. The second most common answer across all districts, according to frequency

average, was *Somewhat helpful.* The majority of respondents in D6 selected the *Very helpful* answer option, while most survey participants in D3 chose *Don't know.*

I.1.5.3 Q22 – Did you attend an invitation-only informational meeting hosted by MnDOT and the UMN?

64 individuals answered this question; 13 skipped it. Descriptive statistics and write-in responses are given in Figure I-36 and Tables I-53 and I-54.

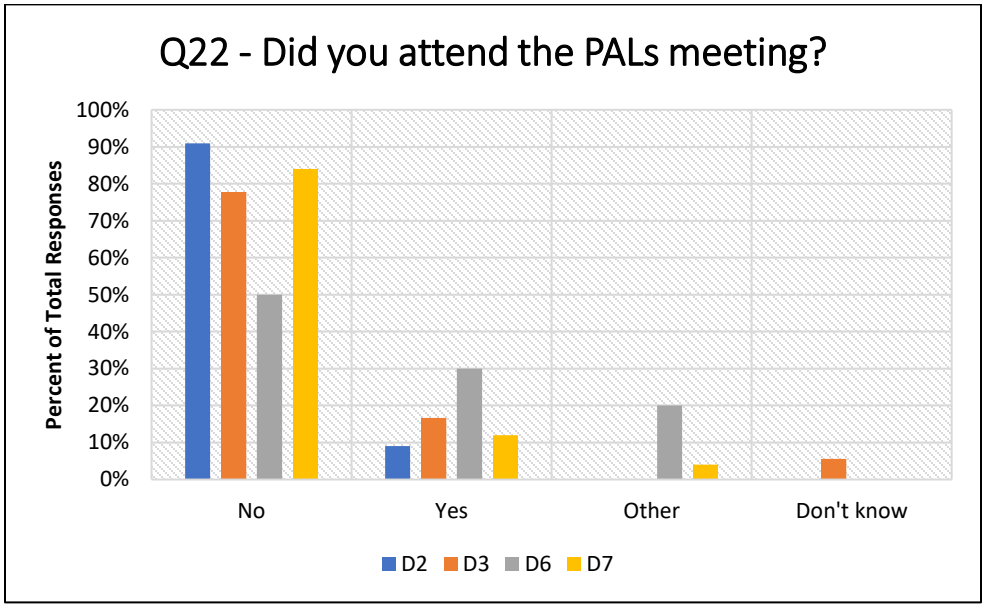


Figure I-36: Q22 (Post-Outreach KAP survey) descriptive statistics – Attend PALS meeting?

Table I-53: Q22 (Post-Outreach KAP survey) descriptive statistics – Attend PALS meeting?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=10*	D7 *n=25*	Frequency Average (all districts)
No	90.91%	77.78%	50.00%	84.00%	75.67%
Yes	9.09%	16.67%	30.00%	12.00%	16.94%
Other	0.00%	0.00%	20.00%	4.00%	6.00%
Don't know	0.00%	5.56%	0.00%	0.00%	1.39%

Table I-54: Q22 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
		"You were trying to steer the meeting to the type of barrier you wanted" "Could not attend"	"Did not receive an invitation"

Most respondents (by a significant margin) in all districts indicated that they did not attend the invitation-only PALs meeting. The highest proportion of survey participants who selected *Yes* was in D6. One respondent in D6 commented that meeting organizers were attempting to "steer" meeting-goers toward the snow control measure that they wanted. Others indicated that they were either not invited or unable to attend.

I.1.5.4 Q23 – How helpful was the informational meeting in improving your understanding of MnDOT's snow control program?

61 individuals answered this question; 16 skipped it. Descriptive statistics and write-in responses are given in Figure I-37 and Table I-55.

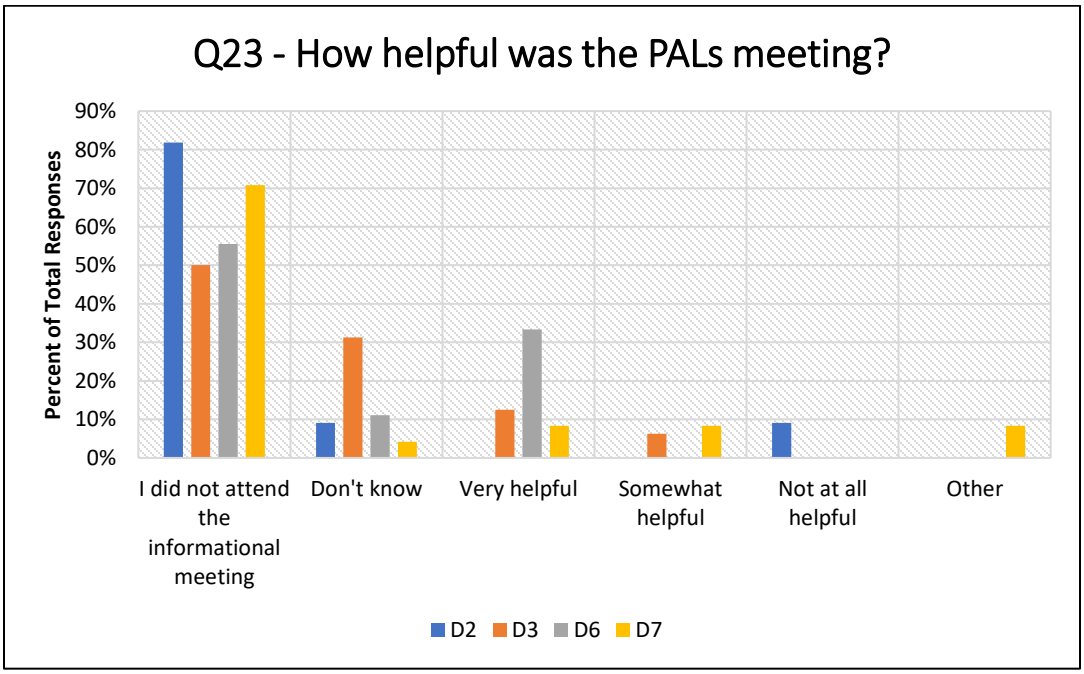


Figure I-37: Q23 (Post-Outreach KAP survey) descriptive statistics – PALs meeting helpful?

Table I-55: Q23 (Post-Outreach KAP survey) descriptive statistics – PALs meeting helpful?

Answer	D2 *n=11*	D3 *n=16*	D6 *n=9*	D7 *n=25*	Frequency Average (all districts)
I did not attend the informational meeting	81.82%	50.00%	55.56%	70.83%	64.55%
Don't know	9.09%	31.25%	11.11%	4.17%	13.91%
Very helpful	0.00%	12.50%	33.33%	8.33%	13.54%
Somewhat helpful	0.00%	6.25%	0.00%	8.33%	3.65%
Not at all helpful	9.09%	0.00%	0.00%	0.00%	2.27%
Other	0.00%	0.00%	0.00%	8.33%	2.08%

Consistent with the previous question, most respondents in all districts did not attend the informational meeting. *Don't know* was the second most common answer in D3 and *Very helpful* was the second most common answer in D6.

I.1.6 Background Information and Your Property

I.1.6.1 Q24 – Which of the following best describes the nature of your property? *(Choose one)*

64 individuals answered this question; 13 skipped it. Descriptive statistics and write-in responses are given in Figures I-38 and I-39 and Tables I-56, I-57 and I-58.

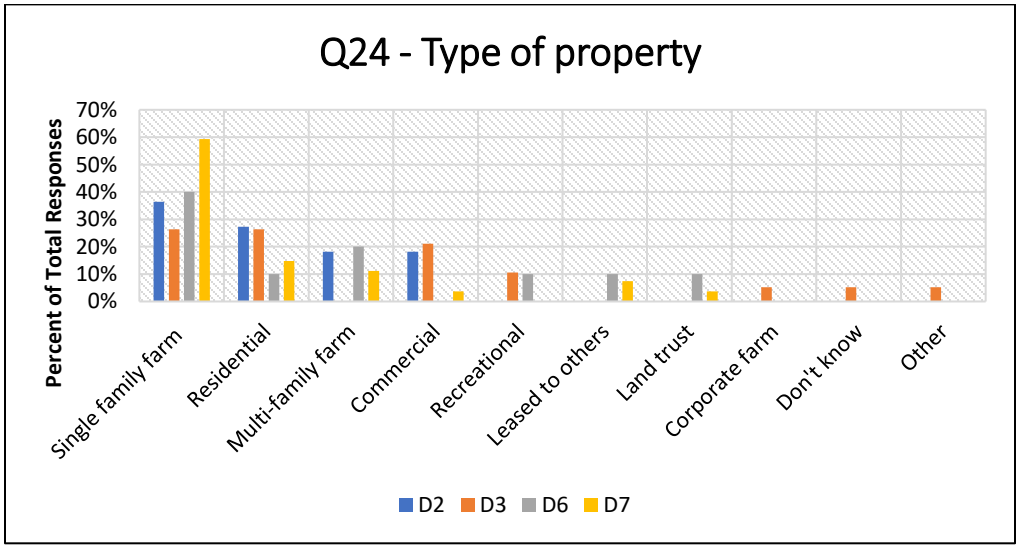


Figure I-38: Q24 (Post-Outreach KAP survey) descriptive statistics – Type of property?

Table I-56: Q24 (Post-Outreach KAP survey) descriptive statistics – Type of property?

Answer	D2 *n=11*	D3 *n=19*	D6 *n=10*	D7 *n=14*	Frequency Average (all districts)
Single family farm	36.36%	26.32%	40.00%	59.26%	40.49%
Residential	27.27%	26.32%	10.00%	14.81%	19.60%
Multi-family farm	18.18%	0.00%	20.00%	11.11%	12.32%
Commercial	18.18%	21.05%	0.00%	3.70%	10.73%
Recreational	0.00%	10.53%	10.00%	0.00%	5.13%
Leased to others	0.00%	0.00%	10.00%	7.41%	4.35%
Land trust	0.00%	0.00%	10.00%	3.70%	3.43%
Corporate farm	0.00%	5.26%	0.00%	0.00%	1.32%
Don't know	0.00%	5.26%	0.00%	0.00%	1.32%
Other	0.00%	5.26%	0.00%	0.00%	1.32%

Table I-57: Q24 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
	"Family trust"		

According to frequency averages, the most common types of property across all districts were the following (from most common to least common): *Single family farm* (40.49%), *Residential* (19.60%), *Multi-family farm* (12.32%), *Commercial* (10.73%), and *Recreational* (5.13%). *Single family farms* was the most frequently selected answer in all districts except D3, where the majority of respondents were split between the *Single family farms* and *Residential* answer options. Property type varied slightly by district. *Residential* and *Commercial* properties were common answer choices in D2 and D3 than in D6 and D7. One D3 respondent who selected the *Other (please specify)* option characterized his or her property as a family trust.

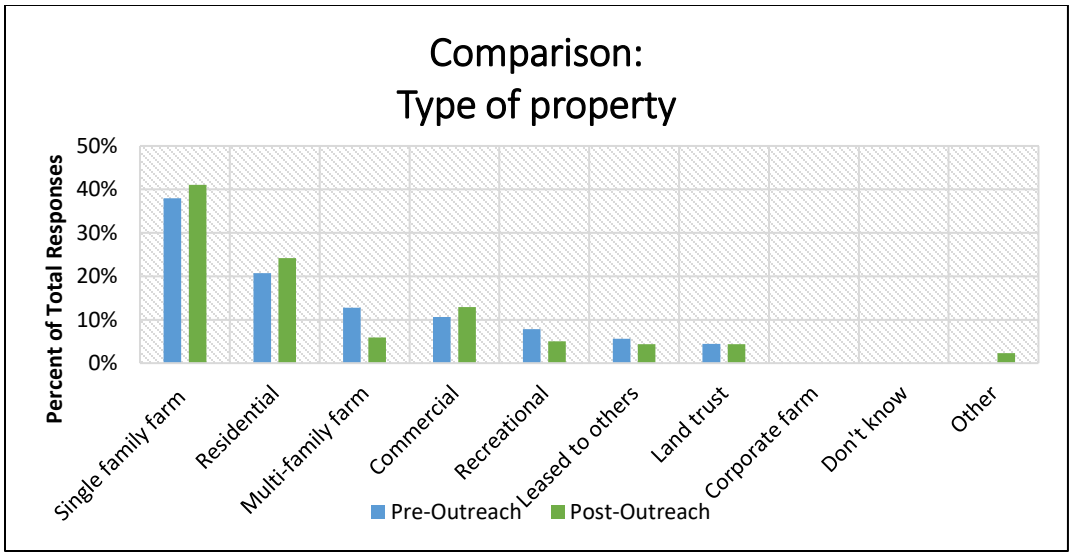


Figure I-39: Type of Property - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-58: Type of Property - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=39*	Frequency Average (all districts) Post-Outreach *n=39*
Single family farm	37.98%	41.03%
Residential	20.76%	24.18%
Multi-family farm	12.78%	5.90%
Commercial	10.61%	12.88%
Recreational	7.83%	5.05%
Leased to others	5.61%	4.34%
Land trust	4.45%	4.34%
Corporate farm	0.00%	0.00%
Don't know	0.00%	0.00%
Other	0.00%	2.27%

Overall, respondents' answers remained consistent from the pre to the Post-Outreach survey. There were slight increases (from 37.98% to 41.03% and 20.76% to 24.18%, respectively) in the *Single family farm* and *Residential* answer choices. There also was a minor decrease (from 12.78% to 5.90%) in survey respondents' selection of the *Multi-family farm* answer option.

I.1.6.2 Q25 – Which of the following statements best describes how you use your property? *(Please check all that apply)*

66 individuals answered this question; 11 skipped it. Descriptive statistics and write-in responses are given in Figures I-40 and I-41 and Tables I-59, I-60 and I-61.

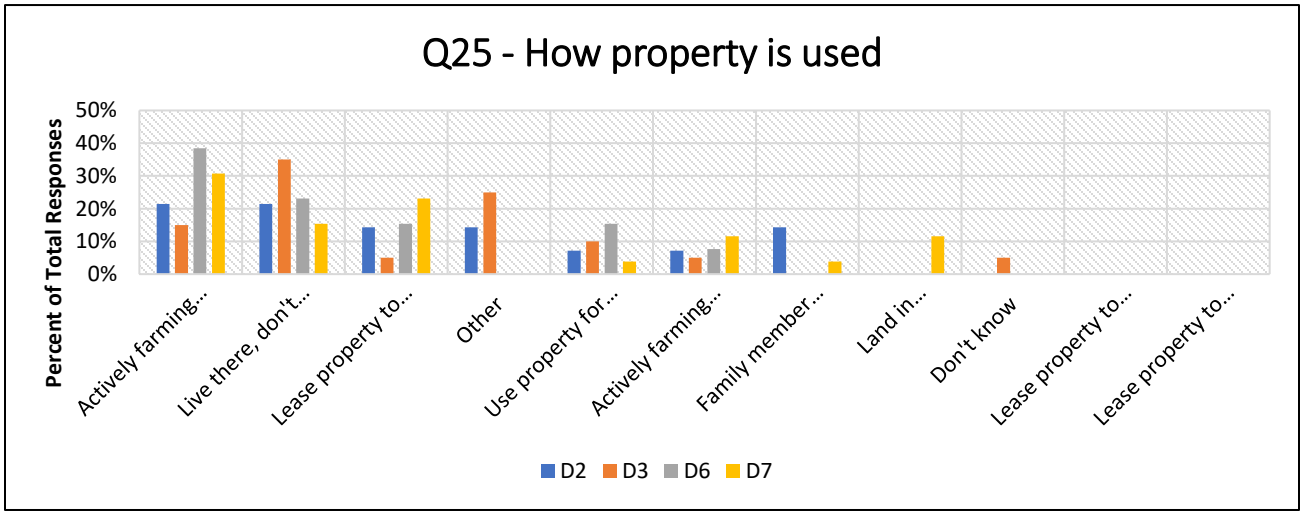


Figure I-40: Q25 (Post-Outreach KAP survey) descriptive statistics – How property is used?

Table I-59: Q25 (Post-Outreach KAP survey) descriptive statistics – How property is used?

Answer	D2 *n=11*	D3 *n=18*	D6 *n=10*	D7 *n=27*	Frequency Average (all districts)
Actively farming the property	21.43%	15.00%	38.46%	30.77%	26.42%
Live there, don't farm	21.43%	35.00%	23.08%	15.38%	23.72%
Lease property to another farmer	14.29%	5.00%	15.38%	23.08%	14.44%
Other	14.29%	25.00%	0.00%	0.00%	9.82%
Use property for rec. purposes	7.14%	10.00%	15.38%	3.85%	9.09%
Actively farming and rent land	7.14%	5.00%	7.69%	11.54%	7.84%
Family member actively farming	14.29%	0.00%	0.00%	3.85%	4.54%
Land in conservation easement	0.00%	0.00%	0.00%	11.54%	2.89%
Don't know	0.00%	5.00%	0.00%	0.00%	1.25%
Lease property to a corporate farm	0.00%	0.00%	0.00%	0.00%	0.00%
Lease property to others for rec. purposes	0.00%	0.00%	0.00%	0.00%	0.00%

Table I-60: Q25 (Post-Outreach KAP survey) write-in responses

Other (please specify) Responses			
D2	**D3**	**D6**	**D7**
"Commercial" "Industrial"	"Place of business" "Business" "Some farming and rent out hay crop" "Commercial business" "Live there and let a farmer use the pasture land for beef cattle"		

According to frequency averages, the most common forms of land-use were the following (from most common to least common): *Actively farming the property* (26.42%), *Live there, don't farm* (23.72%), *Lease the property to another farmer* (14.44%), and *Other* (9.82%). Land-use varied across districts. *Live there, don't farm* was a significantly common response in D3, while *Actively farming the property* was especially frequent in D6 and D7. Multiple respondents in D2 and D3 selected the *Other (please specify)* option and offered a variety of land uses including commercial, industrial, and details about how the property is used for a combination of farming, haying, and pasturing.

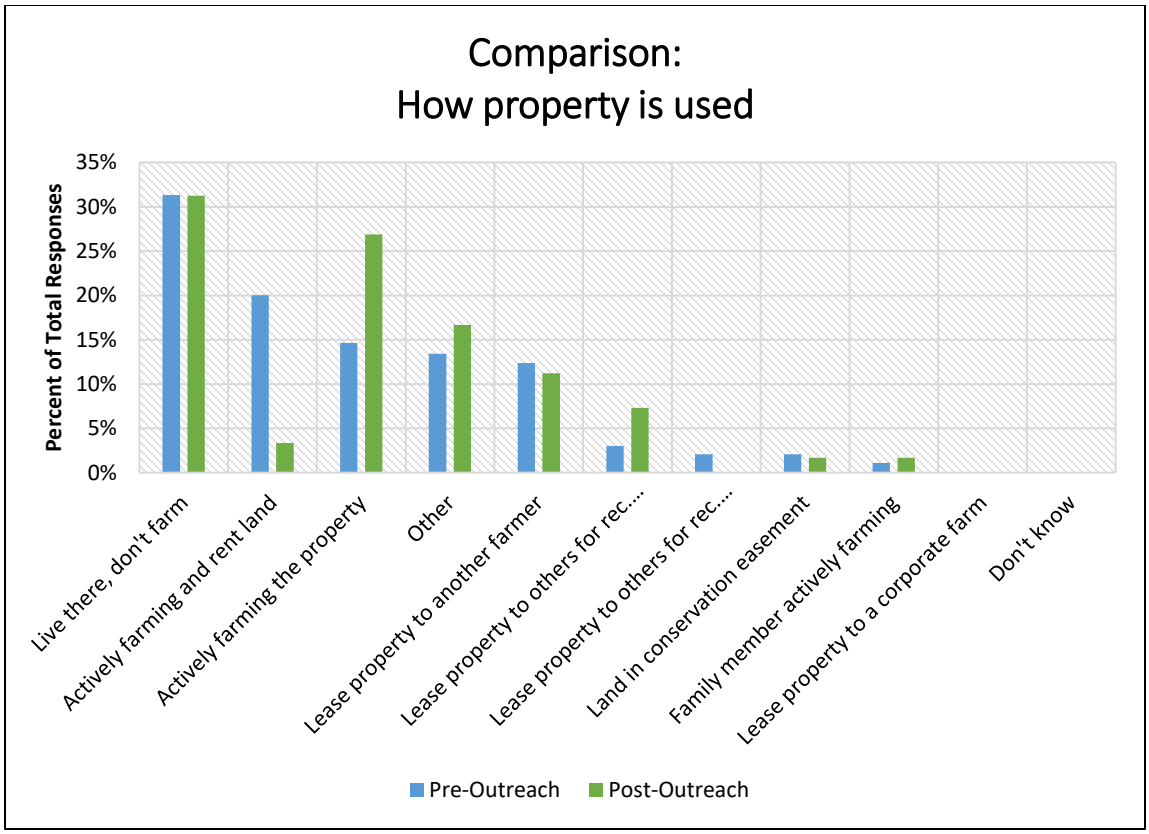


Figure I-41: How Property is Used - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-61: How Property is Used - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=37*	Frequency Average (all districts) Post-Outreach *n=37*
Live there, don't farm	31.31%	31.26%
Actively farming and rent land	20.02%	3.33%
Actively farming the property	14.62%	26.87%
Other	13.43%	16.67%
Lease property to another farmer	12.36%	11.21%
Lease property to others for rec. purposes	3.01%	7.32%
Lease property to others for rec. purposes	2.08%	0.00%
Land in conservation easement	2.08%	1.67%
Family member actively farming	1.09%	1.67%
Lease property to a corporate farm	0.00%	0.00%
Don't know	0.00%	0.00%

Most notably, there was a significant decrease (from 20.02% to 3.33%) in the proportion of respondents who selected the *Actively farming and rent land* answer option in the pre as compared to the Post-Outreach survey. This decrease could, in part, be explained by a slight change in the wording of this question between the pre and post surveys. There were also slight increases in the percentage of survey participants who chose *Actively farming the property,* and *Other.*

I.1.6.3 Q26 – If MnDOT were to contact you, how would you prefer to be contacted? *(Please check all that apply)*

60 individuals answered this question; 17 skipped it. Descriptive statistics and write-in responses are given in Figures I-42 and I-43 and Tables I-62 and I-63.

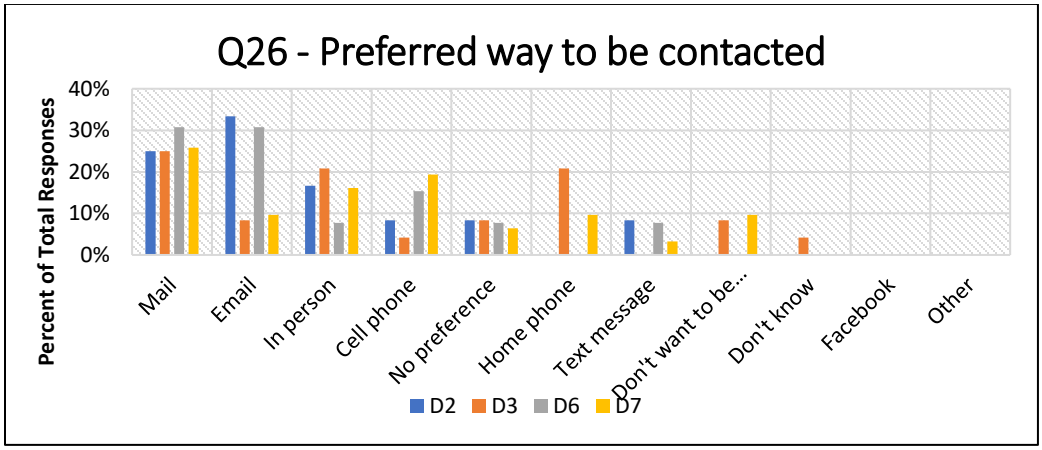


Figure I-42: Q26 (Post-Outreach KAP survey) descriptive statistics – Preferred way to be contacted?

Table I-62: Q26 (Post-Outreach KAP survey) descriptive statistics – Preferred way to be contacted

Answer	D2 *n=9*	D3 *n=18*	D6 *n=10*	D7 *n=23*	Frequency Average (all districts)
Mail	25.00%	25.00%	30.77%	25.81%	26.65%
Email	33.33%	8.33%	30.77%	9.68%	20.53%
In person	16.67%	20.83%	7.69%	16.13%	15.33%
Cell phone	8.33%	4.17%	15.38%	19.35%	11.81%
No preference	8.33%	8.33%	7.69%	6.45%	7.70%
Home phone	0.00%	20.83%	0.00%	9.68%	7.63%
Text message	8.33%	0.00%	7.69%	3.23%	4.81%
Don't want to be contacted	0.00%	8.33%	0.00%	9.68%	4.50%
Don't know	0.00%	4.17%	0.00%	0.00%	1.04%
Facebook	0.00%	0.00%	0.00%	0.00%	0.00%
Other	0.00%	0.00%	0.00%	0.00%	0.00%

According to frequency averages, the most common preferred contact methods were the following (from most common to least common): *Mail* (26.65%), *Email* (20.53%), *In person* (15.33%) and *Cell phone* (11.81%). *Mail* was a relatively frequent answer option in all districts, garnering majorities in D3, D6 (split majority), and D7. *Email* was the most common contact method, by a notable margin, in D2 and D6 (split majority). *In person* was relatively common in D2 and D3, while the *Cell phone* answer option was consistently frequent in D6 and D7.

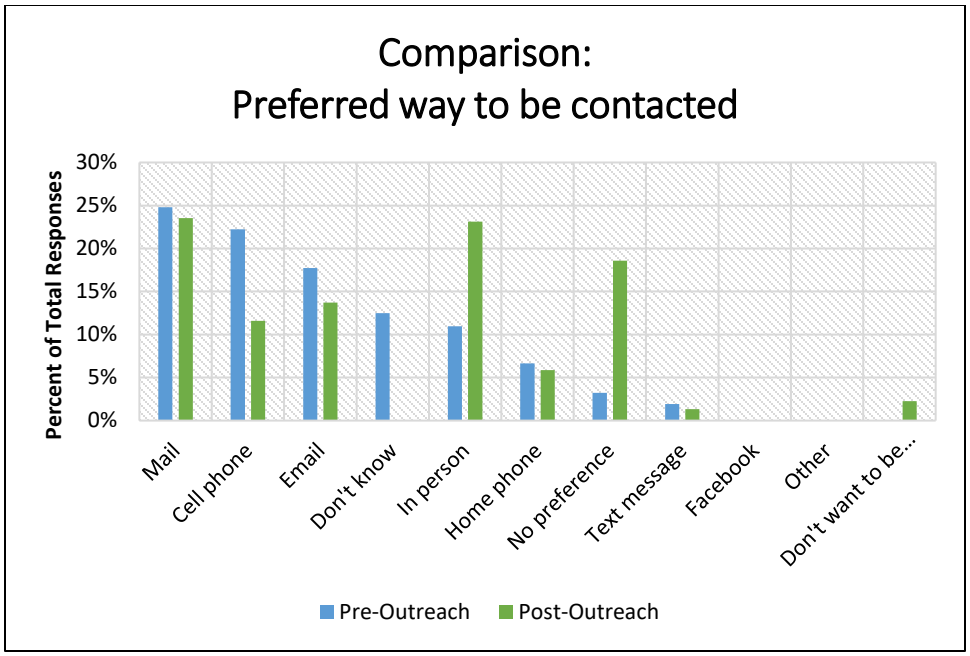


Figure I-43: Preferred Way to Be Contacted - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Table I-63: Preferred Way to Be Contacted - (Pre vs Post-Outreach KAP Survey) descriptive statistics

Answer	Frequency Average (all districts) Pre-Outreach *n=33*	Frequency Average (all districts) Post-Outreach *n=33*
Mail	24.79%	23.53%
Cell phone	22.22%	11.58%
Email	17.73%	13.72%
Don't know	12.50%	0.00%
In person	10.97%	23.13%
Home phone	6.64%	5.86%
No preference	3.24%	18.59%
Text message	1.92%	1.32%
Facebook	0.00%	0.00%
Other	0.00%	0.00%
Don't want to be contacted	0.00%	2.27%

There were also marked increases in the proportion of survey participants who chose the *In person* and *No preference* options. *Mail* remained the most frequently selected answer in the pre and post surveys.

I.1.6.4 Q27 – If you are willing, please share your contact information (phone number, email, etc.) here:

All contact information received will be privately shared with MnDOT TAP members in a separate file.

I.1.6.5 Q28 – Do you have any questions, concerns, or comments for us about any of the topics mentioned in this survey?

22 individuals answered this question; 55 skipped it. Write-in responses are given in Table I-64.

Table I-64: Q28 (Post-Outreach KAP survey) and write-in questions, concerns and comments

Additional Questions, Concerns, or Comments			
D2	**D3**	**D6**	**D7**
"My brother, Dan Driscoll, farms the land. He owns the adjoining property and would make decisions on the property. He does not grow corn which is not an easy solution for them as presented in your handouts. Sincerely, Doug Driscoll" "Would you be willing to pay for some trees for my property?" "My family was to sell the land that is now Fisher Rest Area. The state of MN invoked a "scenic easement" on my land. So now the state would like me to put snow control barriers on the same land I now farm. How "scenic" would that be? I was told the easement was to do a park like play ground with little boats in the	"We close up our place in the fall and don't open until spring. I have no info on snow on the highway." "I have lived on the east side of the highway for 22 years. There are no snow problems there." "No longer farming. Land is leased out." "Not in MN winter!" "I think my land has more problems with deer than snow blowing. I would guess about 6 deer a year get killed on the road along my land."	"We would need someone to help us measure distances from highway and length of areas where we would install different snow fences. The meeting in Lanesboro was so very helpful. Thank you for spearheading this activity!" "I think you need to understand deer patterns on Hwy 250; When I asked that question no one had inquired the DNR as to what problems may arise by putting up permanent barriers" "No"	"I worked for MnDOT (Highway Maintenance) in St. James for 33 years. I am aware of a lot of snow problem areas between St. James and Sleepy Eye." "I farm the east side road it hasn't caused snow problems" "great approach to the problem - may need to up the incentive - cost to get better participation" "I have no info, do not live on highway 4" "Do not have info - Do not live on Highway 4" "Snow removal challenges currently are the result of trees etc. in adjacent to the right of way. These need to be dealt with"

"Grand Marais Creek". Have not seen boats yet." "Stay off the road in bad weather Be responsible for your own actions Don't spend taxpayers money foolishly"			"I do not have time for this, everything is working good." "No" "Do the trees already on my property count for maintenance assistance?"

A few respondents indicated that there are no snow problems adjacent to their property or that they are away from their property during the winter and are therefore unable to comment on snow problems along the identified corridors. A large variety of perspectives were shared including: 1) recommendations to avoid the imprudent use of taxpayer dollars and to prepare for winter road conditions 2) questions about the program and requests for assistance 3) deference to renters for decision-making 4) concerns about program enrollment due to potential conflicts with cropping methods, impacts on deer movement, and poor experiences with other government initiatives and 5) compliments of the program and the outreach meeting.