



DEPARTMENT OF
TRANSPORTATION

RESEARCH SERVICES & LIBRARY

IMPLEMENTATION SUMMARY

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IMPLEMENTATION PROJECT COST:

\$99,988



Man-made materials can be used to build effective fences for capturing blowing and drifting snow alongside agricultural fields, keeping roadways clearer.

Putting Research into Practice: MnDOT District Training Promotes Benefits of Snow Fence Program

What Was the Need?

Snow fences effectively capture blowing and drifting snow alongside state roadways. These barriers improve driver safety and can reduce the need for plowing and deicing, which can decrease roadway wear that may result from salting and plowing. In addition, snow fences provide habitat for wildlife, decrease salt damage to fish and plant life, reduce erosion and sequester carbon.

MnDOT's current snow fence program promotes two types of barriers: temporary and permanent. Temporary snow fences include standing corn rows, stacked corn or hay bales, and 4-foot plastic fences; permanent barriers typically include approved tree species, structural wood or composite fences, and earthwork such as raised road grades or flattened back slopes. To encourage landowners to participate in the program, MnDOT offers compensation for snow fences, including \$1,000 or more to landowners who leave corn rows standing at the edges of fields.

About 3,700 sites on state and federal roads in Minnesota are suitable for snow fences. Based on [research conducted in 2012 that calculated the benefits of living snow fences](#), MnDOT estimates that if 40 percent of problematic sites had living snow fences, the state could save \$1.3 million per year in snow management costs. Despite the cost, safety and environmental benefits, private landowners have shown limited interest in the program. An effective outreach program was needed along with strategies for identifying MnDOT personnel who could promote the practice and recruit landowners to the program.

What Was Our Goal?

Investigators from the University of Minnesota's Center for Integrated Natural Resource and Agricultural Management worked with MnDOT District 8 staff to develop and test a snow fence outreach program that could be used by MnDOT district offices.

What Did We Implement?

Earlier research projects established the value of snow fences. The 2012 MnDOT study demonstrated their usefulness. Other MnDOT projects developed a [snow fence calculator](#) that determines landowner compensation for installing snow fences, and identified [shrub willows as effective and inexpensive living snow fences](#). This project puts the established value of snow fences into a public outreach program.

How Did We Do It?

In January 2016, investigators conducted a KAP (knowledge, attitudes and practices) survey of MnDOT District 8 employees to gauge their understanding of snow fences as well as their approach to working with landowners to implement blowing snow control

Investigators developed a training program for MnDOT district staff to learn about MnDOT's snow fence program and methods to promote snow fence use among private landowners. Surveys before and after the initial training helped investigators refine and improve the program.

“If we can implement our blowing snow control program more consistently, we can help reduce crash severities, improve operational efficiencies due to snow and ice control measures, and improve the mobility of the public.”

—**Dan Gullickson**,
Snow Control Program
Administrative
Coordinator, MnDOT
Office of Environmental
Stewardship

“After our training, we saw a 300 percent increase in the number of standing corn rows, and that was on the initiative of a few people in the maintenance group. We’d like to spread the training to other districts.”

—**Dean Current**,
Director, University of
Minnesota Center for
Integrated Natural
Resource and Agricultural
Management

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Living snow fences like these rows of corn capture blowing and drifting snow before it reaches roadways.

measures. The investigators studied survey responses to assess awareness of and interest in promoting the use of snow fences and grading to reshape road environments for snow and erosion control. They also examined snow fence programs from around the country, identifying types of snow fences used and characteristics of programs that successfully recruit landowner participation.

Results from these efforts were used to design an outreach program that was presented to District 8 staff. In January 2017, investigators surveyed the staff to evaluate the training and redesign the program accordingly. Finally, investigators evaluated market values of various snow fence designs.

What Was the Impact?

Initial survey results identified two relevant types of district personnel: maintenance and program delivery staff. Maintenance staff involved in plowing and road care interact more with landowners than do program delivery staff, who design or redesign roadways and may be involved in acquiring land for snow fences. Though tailored for each group, all training described the MnDOT blowing snow control program and its implementation, the role of snow fence coordinators, operational benefits and awareness of how promotion of the program fits within the scope of an employee’s duties.

Keys to the success of snow fence programs around the country include strong relationships and direct communication with local landowners, funding, landowner interest in conservation and public safety, and observable benefits.

A second KAP survey showed marked improvement in staff knowledge of the program and willingness to promote it. Landowner participation grew from four sites to 15 in the year after training, due mostly to maintenance staff participation. Survey respondents suggested potential program improvements such as more program champions; outreach in spring and summer at community and farmer gatherings as well as at local and state fairs; and a clearer understanding of how program promotion fits within job responsibilities.

The market study demonstrated that nonliving snow fences, though the most expensive option for MnDOT, offer the largest benefit per acre. Landowners seem to prefer living snow fences and standing corn rows. MnDOT may wish to raise the annual payment for all living snow fences.

What’s Next?

Considerations for MnDOT include applying KAP pre- and post-training in other districts, further defining central and district staff roles in snow fence promotion and implementation, incentivizing snow fence champions, developing more outreach material and maintaining relationships with landowners.

This Implementation Summary pertains to Report 2017-42, “Expanding the Adoption on Private Lands: Blowing-and-Drifting Snow Control Treatments and the Cost Effectiveness of Permanent versus Non-Permanent Treatment Options,” published November 2017. The full report can be accessed at mndot.gov/research/reports/2017/201742.pdf.