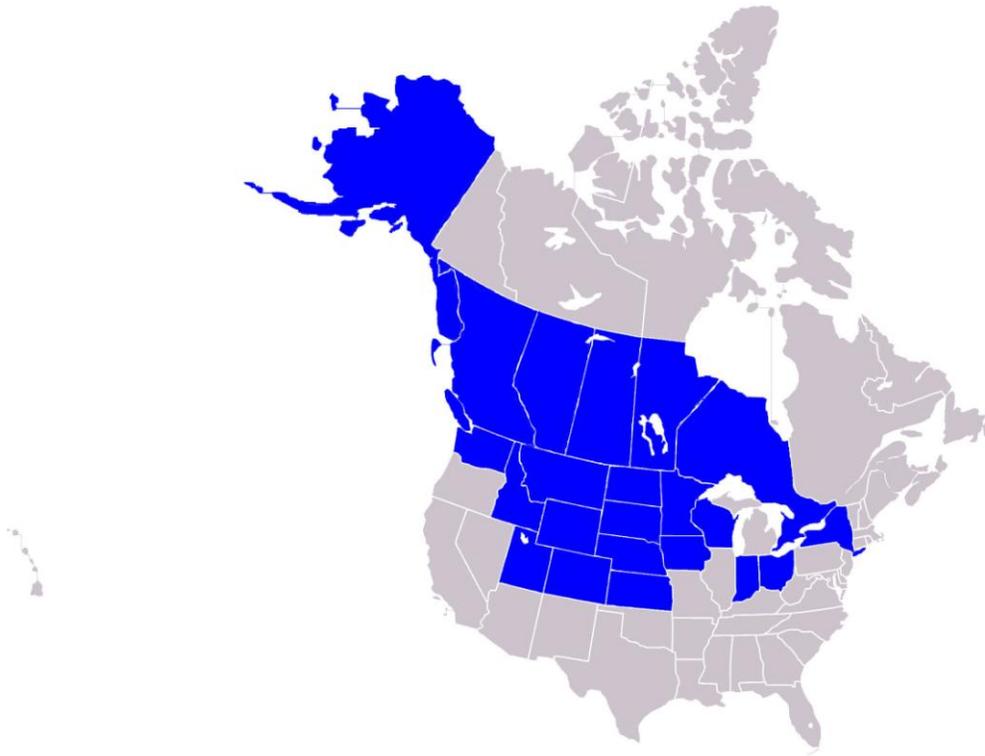


A Summary of Existing Living Snow Fence Programs in North America

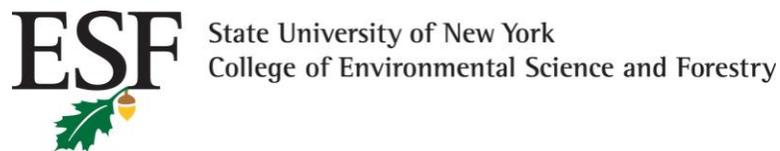


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Completed as part of Task 1-A of the New York State Department of Transportation Research Project C-06-09 “Designing, Developing, and Implementing a Living Snow Fence Program for New York State” (PIN R021.13.881, Research Consortium Contract: No. C030506)

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Living Snow Fence Programs in the United States and Canada

Interest in using living snow fences to control problems associated with blowing and drifting snow has increased over the past decade across parts of northern U.S. and Canada as agencies explore alternatives that are more aesthetically, environmentally and financially appealing.

To learn from other programs as NYSDOT develops a living snow fence program, Task 1-A of this project - - New York State Department of Transportation Research Project C-06-09 'Designing, Developing, and Implementing a Living Snow Fence Program for New York State' - - focused on identifying and summarizing the existing living snow fence programs in North America.

Programs were found through a combination of literature and web based searches and the researchers' knowledge of work underway across the continent. Material that was available online about each program was reviewed and summarized in a table (Table 1). An effort was made to contact someone at each of the programs to discuss its current status, what has made having a state living snow fence program successful, and what could be done to improve the program.

There are 17 state and five provinces that include living snow fences as part of either a dedicated program or as part of another program (Figure 1, Table 1). Of these jurisdictions, 10 states and one province have specific living snow fence programs. The living snow fence programs in other states and provinces are generally incorporated in conservation forestry or tree and shrub seedling distribution programs. In 10 states, the state department of transportation has a living snow fence program, typically focused on snow and ice control issues.

Each program overview includes a brief summary of key items discussed during the telephone conversation with someone at the program. Details and contact information are provided on the summary pages for each program.

The following key points emerged repeatedly from these conversations:

- Funding is generally a major limiting factor on the impact of the program.
- When living snow fences are installed off a highway right of way, most landowners required a level of direct support to make the living snow fence installations successful.
- Several of the programs in the U.S. make use of the USDA Conservation Reserve Program (CRP) to provide financial support for landowners who want to install living snow fences.

Table 1. Characteristics of living snow fence programs for different states and provinces in North

Program Characteristics → ↓ State/Province	Landowner Assistance	Financial Incentives	Active Program	Information Provided On Design	Seedlings Provided or Available	Specific Focus on Living Snow Fences	Conservation Forestry or Roadside Landscape Projects	Organization
Alaska	Y	Y	X (not state-wide)	Y	?	N	Both	Alaska Division of Forestry
Colorado	N	Y	X (not state-wide)	?	Y	Y	Conservation Forestry	Colorado State Forest Service
Idaho	Y	Y	Y	?	?	N	Both	<ul style="list-style-type: none"> • Idaho Department of Lands • Idaho Department of Transportation
Indiana	Y	Y	Y	Y	Y	Y	Conservation Forestry	USDA NRCS CRP
Iowa	Y	Y	Y	Y	N	Y	Conservation Forestry	IDOT & USDA NRCS CRP
Kansas	Y	Y	Y (not for LSFs)	Y	Y	N	Conservation Forestry	Kansas Forest Service
Minnesota	Y	Y	Y	Y	?	Y	Neither	Minnesota DOT
Montana	N	N	Y	Y	Y	N	Conservation Forestry	DNRC Forestry Division
Nebraska*	Y	Y	N	?	?	Y	Conservation Forestry	<ul style="list-style-type: none"> • National Agroforestry Center, • Department of Roads, Game and Parks • CRP
New York ⁺			Y			Y		NYS Thruway Authority, SUNY-ESF, & NYSDOT
North Dakota	Y	Y	Y	?	?	Y	Neither	North Dakota State Forest Service
Ohio	Y	Y	Y	Y	Y	N	Both	ODOT, ODNR Division of Forestry, USDA NRCS, SWCD, FSA
South Dakota	Y	Y	Y	Y	?	Y	Neither	South Dakota Department of Agriculture

Utah	Y	Y	Y	Y	Y	N	Conservation Forestry	USU Extension, Utah Division of Forestry Fire and State Lands, NRCS
Washington ⁺			?	X		Y	Roadside Landscape	WSDOT & NRCS
Wisconsin	Y	Y	Y	Y	Y	N	Conservation Forestry	DNR Division of Forestry, NRCS
Wyoming	Y	Y	Y	Y	?	Y	Neither	Wyoming State Forestry Division, WYDOT, & Wyoming Association of Conservation Districts
Alberta	N	Y	Y	Y	Y	N	Conservation Forestry	AAFC-PFRA (?)
British Columbia	N	Y	Y	Y	Y	N	Conservation Forestry	AAFC-PFRA
Manitoba	N	Y	Y	Y	Y	N	Conservation Forestry	AAFC-PFRA
Ontario ⁺	Y	Y	Y	Y	?	Y	?	Region of Peel Public Works & University of Toronto's Faculty of Forestry
Saskatchewan	N	Y	Y	Y	Y	N	Conservation Forestry	AAFC-PFRA

This matrix compiles characteristics of living snow fence programs by state/province. In this matrix, a Y indicates that the state or province has the listed type of program or item (landowner assistance, financial incentives, etc.), and an N indicates the state or province does not have the listed item. A question mark denotes that information on the particular listed item is unknown or inaccessible for the state or province.

If the state or province's program is not specific to planting living snow fences, often the program is more focused on conservation forestry or improving roadside landscape. Therefore, the matrix notes whether a program focuses on conservation forestry or roadside landscape when it does not focus on living snow fences. Sometimes a program has focus on all three aspects and sometimes the program may not be specific to living snow fences, but the efforts for conservation forestry and/or roadside landscape include some planting of living snow fences.

The "Information Provided on Design" item/category specifies whether the state or province provides information to landowners on how to design and/or plant living snow fences.

* Nebraska does not have an active living snow fence program anymore; however, information was gathered about the program when it was active.

⁺Washington and Ontario appear to have living snow fence programs, but contacting the state and province about their programs was unsuccessful for gathering current information. New York has a developing living snow fence program, making inputting information in this matrix difficult at this time.

United States

Alaska:

“Community Forestry Grants – 2008.” Alaska Community Forestry Program. (2008). 18 May 2009 <http://forestry.alaska.gov/community/08GrantProposal.doc>

Summary: This brochure outlines how applicants can apply for grant money to “solve community problems” using community forestry programs.

Contact: Alaska Division of Forestry
Community Forestry Program
550 W. Seventh Avenue, Suite 1450
Anchorage, Alaska 99501-3566
Patricia Joyner, Program Coordinator
907-269-8465
patricia.joyner@alaska.gov

Telephone Interview:

In 2009, the program is offering one grant for the cities of Ketchikan and Sitka for inventory and management of tree plantings. There isn't much of a state-wide living snow fence program; however some of the trees have been used to create living snow fences.

Currently, the program encourages and educates people in communities to properly plant trees in cities and parks and aid people in building windbreaks.

This program has found it best to offer hands-on help, to actually be with the people while planting trees to show them exactly how to do it correctly. They have also produced publications explaining the best practices of tree planting and management and benefits of trees and windbreaks; these publications are helpful to people. It has also been beneficial to work with partners, such as the Forest Service and companies who provide trees. Working with people who can pass on information and train others has also worked well in the success of the program.

This program, like many others, could use more money in their budget and they would like to pursue funds from the state. It has been found that training community leaders to plant trees and take advantage of the program correctly is important because the program relies on the leaders of each community to utilize the program and communicate it to others in the community. Also, the program would like to try using webinars and seminars to train people in the planting and management of trees.

Colorado:

“Annual Report.” Colorado State Forest Service, Woodland Park District. (2007). 14 May 2009
[http://csfs.colostate.edu/pages/documents/
WoodlandPark_District_2007Annual_Report.pdf](http://csfs.colostate.edu/pages/documents/WoodlandPark_District_2007Annual_Report.pdf)

Contact: Colorado State Forest Service

Greg Sundstrom
5060 Campus Delivery
Fort Collins, CO 80523-5060
970-491-5342
970-491-7736 FAX

Summary: The Colorado State Forest Service Trees for Conservation Program “provides affordable tree and shrub seedlings” to landowners that can be planted for conservation purposes such as living snow fences.

Telephone Interview:

Colorado’s living snow fence program is no longer current on a state-wide level. However, over the course of the state-wide program over 200 living snow fences were planted and have been maintained. Many of those living snow fences were planted as demo projects to introduce new technology such as drip systems and weed barrier materials.

Currently, living snow fences are planted on the local level through the conservation districts. Often these local programs have cost-share relationships with the Forest Service, DOT and other agencies to plant the snow fences.

When the state-wide living snow fence program was active, coordination at the local level was very important. Cooperation with all the contributing entities (DOT, Forest Service, etc.) involved was crucial. Also, the maintenance of the living snow fences after they were planted was very important to their survival and success; the maintenance of living snow fences in Colorado was successful and most of those snow fences are still working.

Promoting more living snow fences would have helped the living snow fence program in Colorado; and, more specifically, promoting the benefits of living snow fences to stakeholders. They are not just for snow control, but also provide wildlife habitat, protection from wind, and aid in a clean environment.

Idaho:

“Idaho Department of Lands Announces Community Transportation Enhancement Grant.”
Urban and Community Forestry Program. 2007. 15 May 2009 http://www.idl.idaho.gov/bureau/community_forestry/grants/cte_grant_pgm/cte2007/cte2007-08_announcement_ltr.pdf

Contact: Coeur d’Alene Staff Headquarters
Urban and Community Forestry Program
3780 Industrial Avenue South
Coeur d’Alene, ID 83815
Joyce S. Jowdy – (208) 666-8622
communitytrees@idl.idaho.gov

Summary: The information sheet listed above contains information about the Community Transportation Enhancement Grant in Idaho, which provides grant money to city, county and tribal governments for landscaping and building living snow fences and windbreaks. The grant is funded by the Idaho Department of Transportation and administered by the Idaho Department of Lands and the Idaho Community Forestry Advisory Council.

Telephone Interview:

The Urban and Community Forestry Program is still current, and this is their second year of providing grant money. This program provides up to \$30,000 grants to communities to aid their enhancement of transportation corridors (such as bikeways, highways, business districts, and railways). The funds come from the Idaho Department of Transportation, but the program is administered by the Idaho Department of Lands. In 2009, there is \$172,000 available. The program aims to educate communities in using the right plant species for each purpose and promote the utilization of the functional aspect, rather than the aesthetic aspect, of the trees; for example, using trees as snow fences, noise barriers, and windbreaks.

The program has found that having individual assistance in each project to be helpful, such as having foresters work directly with the communities. These individuals/foresters make sure the community is thinking of the useful characteristics of the trees, give technical assistance, extra guidance and follow-up.

Keeping the new tree planting projects maintained is the biggest concern and usually there is a lack of funding, staff, or expertise for maintenance. Idaho’s program recognizes the importance of encouraging the proper planting of trees because often the trees are not planted correctly and the trees do not last. Idaho also suggests that a successful program should be sure to partner with the DOT and other non-profit entities and make sure that proper education is given for proper planting of trees.

Indiana:

“CRP Practice CP17A Living Snow Fence.” USDA Natural Resources Conservation Service. March 2007. 18 May 2009 <http://www.in.nrcs.usda.gov/programs/CRP/07%20program%20sheets/IN%20CP17A%20Program%20Sheet%20vJan%201-0.doc>

Contact: NRCS - Indiana State Office
Ken Collins
6013 Lakeside Boulevard
Indianapolis, Indiana 46278-2933
Phone: (317) 290-3200 ext. 356
FAX: (317) 290-3225

Summary: The Conservation Reserve Program of the USDA NRCS provides fact sheets on many projects, including living snow fences and shelterbelts, for Indiana, as well as other states.

Telephone Interview:

Currently, Indiana’s living snow fence program relies on the Conservation Reserve Program (CRP), which is funded by the Commodity Credit Corporation, administered by the Farm Service Agency, and the NRCS provides technical and conservation planning. Landowners use this program primarily for windbreaks, and often the windbreaks serve as living snow fences.

Indiana also uses the Conservation Reserve Enhancement Program (CREP), which is a part of CRP and pays landowners fifty-eight cents per foot of windbreak as an incentive. Landowners can purchase trees from the state nursery and are responsible for planting them themselves. Sometimes landowners will hire professionals to help in planting the trees and some counties rent tree planting machines to landowners. The program provides job sheets for different conservation plantings that give information on proper planting, maintenance of trees, and provide a guide to choosing the appropriate trees.

The program has been successful in promoting the program to landowners. The state nursery is very essential in the success of the program because the landowners have a great source for trees. Also, the landowners rely on the local agencies for help in using the program and this is helpful so that the landowners do not have to go to the state agencies in Indianapolis or Chicago.

One thing that could be helpful for the program in Indiana is getting landowners to work together cooperatively so the benefits of windbreaks are fully realized. For example, if farmer A plants a windbreak, it might be beneficial if farmer B down the road also plants a windbreak so that the farmer A’s windbreak is actually more useful. Operation of the program would also be more efficient when landowners work together and the local/county agencies also work together to get jobs done.

Iowa:

“Iowa’s Cooperative Snow Fence Program.” Iowa Department of Transportation, July 2002. 13
May 2009 <http://www.iowadot.gov/maintenance/internetpages/pdf/snowfence%20booklet.pdf>

Contact: Local DOT maintenance office, info found at <http://www.iowadot.gov/>
Iowa Department of Transportation Maintenance
Dennis Burkheimer
515-239-1355

Summary: The Iowa Department of Transportation started the Cooperative Snow Fence Program in 2002 to create agreements with landowners to build living snow fences on private land.

Telephone Interview:

The Cooperative Snow Fence Program in Iowa is still operational, although it is not very active. The program is collaboration between the DOT and the USDA Farm Service Agency CRP programs.

Landowners can set aside acreage for planting of living snow fences under CRP. The Cooperative Snow Fence Program also builds permanent or temporary wood or plastic snow fences. The living snow fences are generally a couple of rows of native shrubs and grasses, as landowners/farmers do not want trees with deep root systems planted.

Landowners are reimbursed for the cost of the shrubs and grasses. Iowa DOT maintenance forces will do the planting. The most active part of the program buys, from farmers, eight to ten rows of standing corn at fifty cents per bushel over the current market rate at the end of harvest time to act as living snow fences.

Cooperation of landowners has been crucial in success of the program; they see the benefits of having a living snow fence and let others know.

Funding is always a difficulty, especially as the price of corn fluctuates so much and the majority of the program is buying standing rows of corn. The program would like to see another source of funding to give more incentive to landowners to plant living snow fences. Also, it often is difficult to find enough people to plant the shrubs and grasses.

Kansas:

“Conservation Tree Planting Program.” Kansas Forest Service. 5 May 2009. 14 May 2009

<http://www.kansasforests.org/conservation/index.shtml>

Living Snowfences in Kansas. 2006. Kansas Forest Service. 11 May 2009

<http://www.oznet.ksu.edu/library/FORST2/L744.PDF>

Contact: Jim Strine

Kansas Forest Service

District Forester - Northwest District

Champion Tree Program Coordinator

1232 240th Avenue

Hays, KS 67601

785-625-3425 ex. 220

www.kansasforests.org

Summary: The Kansas Forest Service’s Conservation Tree Planting Program offers seedlings for planting in conservation efforts such as windbreaks. The Kansas Department of Transportation has helped in planting living snow fences; however, there does not appear to be a specific program just for living snow fences at this time. A brochure from the Kansas Forest Service in 2006 outlines information about living snow fences in Kansas at that time. It describes how the snow fences should be designed with suggestions of trees and shrubs to use. There are also diagrams of living snow fence designs. The brochure gives information on obtaining assistance from the Kansas Forest Service in designing a snow fence.

Telephone Interview:

The Conservation Tree Planting Program is still current, but not as far as promoting or planting living snow fences. The program was successful for a little while in planting living snow fences.

Currently the program offers tree and shrub seedlings for planting in conservation efforts, particularly for farmstead and livestock windbreaks (which do protect from snow) and for providing wildlife habitat. These efforts are cost-shared with Wildlife and Parks, KDOT, and NRCS.

The program has done well in contacting landowners about planting trees for windbreaks and living snow fences. It also has had success in paying for the cost of the trees, planting them for the landowner, and installing weed barriers to help in the maintenance of the windbreaks.

This program realized that it would be more successful if the DOT was more involved because the DOT has money and knows the areas that need living snow fences. If the DOT is not interested in snow fence efforts of this program, then it is an uphill battle in promoting and installing them.

Minnesota:

Living Snow Fences. 2009. Minnesota Department of Transportation. 11 May 2009

<http://www.dot.state.mn.us/environment/livingsnowfence/>

Contact: Minnesota Department of Transportation

Dan Gullickson

(651)366-3610

Summary: The Minnesota Department of Transportation Living Snow Fences program website contains information on the importance of snow fences and descriptions of different kinds of structural and living snow fences. There are four types of living snow fences described including: twin shrub row, deciduous tree windbreak, community shelterbelt, and grassland nesting bird component. A link to a plant selector for determining which plants would be best for snow fences is provided, although the link is broken. There are links to photographs of living snow fences and contact information, and information in joining the program.

Telephone Interview:

MnDOT partners with the USDA Conservation Reserve Program to plant living snow fences. Currently, landowners receive money for agreeing to have a snow fence planted on their property as part of the CRP process.

There are about five plantings per year on state highways, with many other plantings along county roads. Sometimes, contractors are hired to plant the trees. In 2009, the program has been using some economic stimulus money for plantings.

The program has continually been making improvements and looking to better promote the program. Last year they took an inventory of over 4,000 problem sites on roadways and has been working towards improving them. Research over the next year includes: 1) Assessing farmer/landowner costs to take farmland and convert it into planting snow fences. Some of the costs are hand pulling weeds and giving up land used for crops. 2) Evaluating MnDOT operating costs; keeping the roads open is the goal. 3) Reviewing safety of roadways in effort to reduce accidents. The findings of this research should tell whether the program is working well and what steps can be taken to improve the program. So far, it has been noted that the shrubs in the living snow fences catch the most snow.

There is a need for more funding to tackle improvement of problem areas; as of now, only five to ten of the 4,000 problem sites are being resolved every year. Non-severe winters do not help people remember how important living snow fences and proper snow control are. This hinders the progress of the program. Also, the program has found that there needs to be better communication with private landowners and more partnering with county and local USDA offices. A local contact would be beneficial to promoting the program.

Minnesota suggests that for a successful living snow fence program, there is a need for good data on how to best design living snow fences. The state suggests looking at its Memorandum of Understanding, which outlines how Minnesota developed partnerships with the DOT as this will aid other states in developing essential partnerships (this document is listed in

the literature review). In addition, Minnesota suggests that a living snow fence program needs to have a decentralized approach for landowners, yet there needs to be a centralized place for contact and information.

Montana:

“Suitable Uses for MCSN Seedlings.” Montana Department of Natural Resources and Conservation Forestry Division. 2009. 15 May 2009 <http://dnrc.mt.gov/forestry/Nursery/suitable.asp>

Contact: Department of Natural Resources and Conservation
Conservation Seedling Nursery
John Justin
PO Box 201601,
Helena MT 59620
406-542-4327

Summary: The Montana Conservation Seedling Nursery of the Department of Natural Resources and Conservation Forestry Division produces and provides seedlings for conservation practices such as living snow fences and windbreaks.

Telephone Interview:

The program is still providing information on proper planting and selling seedlings to landowners for planting windbreaks and shelterbelts. However, it does not provide actual assistance in tree planting. Sometimes, landowners will plant living snow fences to help provide access to their property when it snows. However, the nursery doesn't keep track of what specifically the landowners use the trees for, just so long as they are used for conservation purposes.

About 800 private landowners per year buy seedlings from the Conservation Seedling Nursery. If a landowner needs actual assistance in planting the trees, local conservation districts are available to help landowners properly plant the seedlings.

The Conservation Seedling Nursery has provided quality seedlings that survive after planting and the program is fully funded through the sale of the seedlings. The program has been successful due to a close relationship with local conservation districts who will promote the seedling program to landowners.

There isn't much the program would do differently, although sometimes being self-funded is limiting and if it was subsidized in some way, the program would expand more.

Nebraska:

Forest Land Enhancement Program. (n.d.). 16 July 2009

<http://www.nfs.unl.edu/documents/flep%20brochure2.pdf>

Contact:

Forest Stewardship Program Coordinator

109 Plant Industry Bldg., UNL

Lincoln, NE 68583-0815

Phone: 402-472-5822

National Agroforestry Center

Richard Straight – Referred by John Hinnners

402-437-5178

Roadway Design Manual. Nebraska Department of Roads. (2006). 14 May 2009

<http://www.dor.state.ne.us/roadway-design/pdfs/rwydesignman.pdf>

Summary: Living snow fences in Nebraska are planted through a cost-share program through the Nebraska Forest Service and the Forest Land Enhancement Program (FLEP) of the USDA. This cost-share program helps private landowners improve forest land and plant trees for conservation purposes. The above cited brochure gives details on the program and how a landowner would go about participating in the program. The Nebraska Department of Roads (NDOR) discusses the possibility of using building living snow fences along roadways in the Roadway Design Manual, but there does not appear to be a specific program with NDOR.

Telephone Interview:

The program is not active, due to a lack of funding. When the program was active in the early 1980s and again in the late 1990s, it was primarily a cost-share program for planting trees as living snow fences. The Department of Roads, Game and Parks, and CRP each contributed funds to landowners for planting living snow fences. The program sometimes put in a feed plot for wildlife because the landowners were concerned about preserving wildlife. Many of the snow fences were planted on grassland or pasture land because landowners saw their farmland as too valuable to give up for living snow fences.

The program is not currently active, largely because the funding agencies need to allocate their funds to other pressing matters. The program needs funds from several agencies (not just one) to work. Also, snow fences can be an imposition to landowners because they are hard to manage when there is no money to maintain the snow fences.

The program was successful in that there was cooperation with landowners and local technicians in the soil conservation district and NRCS offices. The landowners knew these technicians were credible and had established trust with them, and so the benefits of living snow fences were recognized. Because many of the snow fences were planted on pastureland, a fence needed to be placed around the trees to keep the livestock out; this fencing was completely paid for by the program and helped out the landowners. The landowners were also concerned with protecting wildlife and this was often a great incentive to planting living snow fences.

One problem that was recognized was the Department of Roads required a long-term lease on the land to be planted and this lease was very expensive. The lease was needed to ensure landowners would not remove the trees once planted. By having to purchase vegetation and a lease, the available money in the program could not go as far.

New York:

“Ecology – Living Snow Fence Program.” New York State Thruway Authority. 14 May 2009
<http://www.nysthruway.gov/environmental/ecology.html>

“Living Snow Fences.” New York State Department of Transportation. 2008. 14 May 2009
https://www.nysdot.gov/divisions/engineering/design/landscape/trees/rs_liv_sn_fence

“Willow Living Snow Fence.” Cooperative Conservation America. 14 May 2009. 14 May 2009
<http://www.cooperativeconservation.org/viewproject.asp?pid=817>

Contact for Willow Living Snow Fence:

Mary O'Reilly
Environmental Specialist II
NYS DOT
44 Hawley Street
Binghamton, NY 13901
607-721-8138
mbrophy@dot.state.ny.us
Tim Volk
Senior Research Associate
SUNY ESF
345 Illick Hall 1 Forestry Drive SUNY ESF
Syracuse, NY 13210
315-470-6774
tavolk@esf.edu

Summary: The New York State Thruway Authority website gives a brief description of the first project in the Living Snow Fence Program in the Buffalo area in July 2006. This project was possible through collaboration with the New York State Thruway Authority and SUNY-ESF. The Living Snow Fence project in New York involves the New York State Department of Transportation and the SUNY-ESF. The website contains information on the projects progress and contact information. The New York State Department of Transportation Office of Design – Landscape Architecture has started planting living snow fences to help prevent snowdrifts on highways. This program does not seem to have collaboration with the NYS Thruway Authority or SUNY-ESF.

North Dakota:

“Living Snow Fence.” n.d. North Dakota State Forest Service. 11 May 2009

http://www.ndsu.nodak.edu/forests/service/sustain/living_sf.htm

Contact: Tom Claeys

Forestry and Fire Management Assistance Team Leader

(701) 328-9945

Thomas.Claeys@ndsu.edu

Summary: Simple website outlining the need for and benefits of living snow fences in North Dakota. A link to a form for requesting a grant and permission to build a snow fence is provided.

Telephone Interview:

The living snow fence program in North Dakota started in 1997 as a cost-share program. There have been over 500 living snow fences planted and there are living snow fences in every county. The program also partners with the NRCS and the Forest Service.

Currently, the program has an incentive/cost-share program for private and public landowners to build living snow fences to protect public roads.

Utilizing local natural resource professionals and involving local soil conservation districts has been key to the success of the program because they are able to work with the landowners and help plant the snow fences. Also, learning from what adjacent states have done has aided in improving the program. So far, the program has been able to provide 100 percent of the cost of the trees for the landowners and has found that installing weed barriers greatly increases survival of the trees.

Timing of projects is always an obstacle. For example, land must be surveyed for culture resources before a living snow fence can be planted. This takes a great deal of time and there needs to be a way to streamline the process.

Ohio:

“Roadside Safety Landscaping Guidelines.” Ohio Department of Transportation. 2006. 18 May 2009 http://www.dot.state.oh.us/policy/AestheticDesign/Documents/ref_landscaping_jan06.pdf

Contact: The Ohio Department of Transportation
1980 West Broad Street
Columbus Ohio, 43223

“Northwest Ohio Windbreak Program.” Ohio Department of Natural Resources Division of Forestry. 2008. 18 May 2009 <http://www.ohiodnr.com/tabid/5290/Default.aspx>

Contact: Division of Forestry, Service Forester
Brian Riley
419-429-8315

Summary: The Ohio Department of Transportation has a landscaping program that takes into account planting trees for snow fences. Also, the Department of Natural Resources Division of Forestry has a windbreak program that is more focused on preserving wildlife and curbing soil erosion than it is on creating living snow fences. However, the windbreak program has published a thorough windbreak guide with information on designing windbreaks and descriptions of plants to use.

Telephone Interview:

The Northwest Ohio Windbreak Program began in 1977 and is still current. However, it now focuses on planting windbreaks for preventing soil erosion, presenting aesthetics, and providing wildlife habitat in the seventeen county northwest region of Ohio. While the purpose of this program is not specifically to plant living snow fences, often the windbreaks will catch a certain amount of snow as an added benefit. The program plants about 360,000 row feet of windbreaks every year, which works out to about sixty-eight miles and about twenty to thirty windbreaks every year.

The program is a turn-key program that works with partner groups such as local NRCS and FSA offices, as well as the Division of Wildlife to plant windbreaks in the spring. Landowners receive thirty cents per row foot of windbreak planted. The program pays for and provides labor for planting the windbreaks, replacing plants and applying herbicide. The program also selects the plant species to be planted at each site. Windbreaks can have up to six rows and at least one row must be made up of evergreens.

Because the program has been operating for over thirty years, people see how nice the windbreaks look and they are likely to plant more. The program has received good feedback from landowners and the success of the program has largely been promoted by word of mouth from satisfied landowners.

The program adjusts as problems come up. Sometimes the plant species (there are thirteen different species used in the program) are adjusted based on site, soil conditions, and

growing requirements. There isn't much the program would do differently; it is a very successful program.

South Dakota:

The Living Snow Fence Program in South Dakota. 2004. South Dakota Department of Agriculture. 11 May 2009 <http://www.state.sd.us/doa/forestry/publications/LSF%20Brochure.pdf>

Contact: Office of the State Forester
South Dakota Department of Agriculture
Resource Conservation & Forestry
John Hinners
523 E. Capitol Avenue
Pierre, SD 57501-3182
605-353-7187

Summary: The Living Snow Fence Program in South Dakota is funded by the South Dakota Department of Transportation and the South Dakota Department of Agriculture Division of Resource Conservation and Forestry. A brochure (link provided above) is available that describes living snow fences and how landowners in South Dakota may participate in the program.

Telephone Interview:

In 2009, South Dakota's living snow fence program has had one contract for a living snow fence and two more are pending. The program started in 1986 as a part of the DOT and living snow fences were only planted on federal highways. In 2000, the Division of Resources Conservation and Forestry of the Department of Agriculture took management of the program and has since planted over 110 living snow fences near public roads. This program will draw up a design plan and provide technical service for the landowner to plant a snow fence. For South Dakota, planting living snow fences in a five row configuration of mostly shrubs with some mid-size and tall deciduous trees has worked well.

The program is a cost-share one in which money is provided from the DOT for site preparation, planting of trees (which is done by the conservation districts), five years of maintenance, two years of replanting, 20% of the cost of trees, and the land is rented for ten years. The amount of money for each contract depends on an eligibility number calculated by the DOT.

This program has had success due to promotion of the benefits of living snow fences and working with the DOT in finding the roads that have problems with snow. It has been important to have DOT engineers and superintendants on board and working with the program.

Snow helps promote living snow fences and encouraging people to plant them, When there is heavy snow during a winter, people want a solution to snow-covered roads. Therefore, the program is often cyclical based on how much snow falls each year.

Some problems that have occurred since the program started are: snow fences are planted too close to the road because landowners don't want to give up so much land, sometimes the

trees planted are not compatible with soil type, the increasing number of non-resident landowners who do not see the need for planting living snow fences or shelterbelts limits planting of living snow fences in needed areas, and evergreen trees have not worked as well in windbreaks because a heavy snow will break them in half and then they are not able to re-sprout.

Utah:

Utah Forest Facts. 1998. Utah State University Extension. 15 May 2009 http://extension.usu.edu/forestry/Reading/Assets/PDFDocs/NR_FF/NRFF005.pdf

Contact: Mike Kuhns

USU Forestry Extension
5230 Old Main Hill
Logan, UT 84322-5230
State of Utah Division of Forestry – Moab Office
Natalie Conlin
435-259-3766

Summary: The fact sheet listed above gives an overview on the use of tree and shrub windbreaks. It describes the many benefits of windbreaks and goes over important aspects of windbreak design.

Telephone Interview:

Utah does not have a program that is specific to living snow fences at this time. However, the Division of Forestry does provide advice and assistance to landowners who want to build windbreaks.

Utah is split into six areas; each area has a state forester who helps landowners design windbreaks and find seedlings for planting. Utah used to have a state nursery that provided seedlings under the FLEP program, but now landowners are referred to local nurseries or Colorado and New Mexico state nurseries. The state foresters help landowners get cost-share assistance through the NRCS Environmental Quality Incentive Program that operates in many states. They also will provide free assistance in drawing up plans for windbreaks and suggest species for planting. Sometimes landowners will be partnered with local Boy Scout troops to help in the actual planting of trees. Usually, landowners build windbreaks for the protection from winds, but an added benefit is that they sometimes also function as living snow fences.

The assistance program through the Division of Forestry is a free service for landowners and they appreciate the help very much. The program realizes that having a windbreak expert on staff would greatly help the success of the program, but foresters can always refer landowners to NRCS personnel who are very knowledgeable.

Washington:

“Living Snow Fence.” USDA Natural Resources Conservation Service. March 2003. 18 May 2009 ftp://ftp-fc.sc.egov.usda.gov/WA/news/fact_sheet_pdf_files/living_snow_fence_fs.pdf

MacDonald, D.B. Measures, Markers and Milestones. Washington State Department of Transportation, March 2003. 18 May 2009 <http://www.wsdot.wa.gov/NR/rdonlyres/255D5A7C-932F-4C76-9944-D0576ED4C538/0/GrayNotebookMar03.pdf>

Contact: Gary Kuhn, Agroforester Western Office
(509) 358-7946
kuhn@wsu.edu

Summary: The fact sheet from the Natural Resources Conservation Service listed above gives information on a living snow fence planted in Washington. The snow fence project is a partnership with the USDA National Agroforestry Center and Natural Resources Conservation Service, Lincoln County Conservation District, Washington Department of Fish and Wildlife, and the Washington State Department of Transportation. The publication from the Washington State Department of Transportation also describes a living snow fence that was planted along State Route 25.

Wisconsin:

Contact: DNR, Division of Forestry

Wisconsin State Nursery Program

Griffith State Nursery

Jeremiah Auer

473 Griffith Avenue

Wisconsin Rapids, WI 54494

(715) 424-3700

<http://www.dnr.state.wi.us/forestry/Nursery/>

Summary: Wisconsin has a program for planting windbreaks, which can also be used as living snow fences, that is managed by the Wisconsin Department of Natural Resources Division of Forestry and the Natural Resources Conservation Service.

Telephone Interview:

The State Nursery Program sells trees to landowners for use in primarily reforestation and wildlife conservation projects, although many of the trees are used to plant windbreaks and living snow fences. Wisconsin also participates in EQIP, a program of the NRCS. The State Nursery has worked some with the Wisconsin Forest Landowner Grant Program which pays for half of the cost for planting windbreaks for eligible landowners.

The State Nursery Program provides trees to landowners in ten different packets of 300 seedlings. The energy packet is made up of conifers and is used mainly for windbreaks. Landowners must buy at least 1,000 trees at a time. The program also provides technical assistance to landowners and information on proper planting techniques. Each county has a forester who helps landowners with planting if needed, and have tree planters for rent. Mr. Auer will go out to recently planted sites every summer to see how the trees are doing.

The State Nursery Program has in existence since 1932 and the trees that have been planted since then have been very successful. The state looks very nice with all the trees that have been planted through the program. The fact that the nursery will visit sites is important to assessing success of trees and plantings.

Conifers do very well in Wisconsin and it has been found that they are quite deer resistant. The program has also distributed many pamphlets on windbreaks to residents and school children to promote the usefulness of windbreaks. The State Nursery also prides itself on keeping up with trends in tree species, windbreak designs, and understanding the farmer/landowners needs for trees.

There isn't much the State Nursery would do differently. However, they realize that they need to do more to promote or market the program as there isn't much effort in that area. Also, they have noticed that deer, dry spells, and improper site maintenance are the leading causes to unsuccessful tree plantings.

Wyoming:

Wyoming State Forestry Division. 11 May 2009 <http://slf-web.state.wy.us/forestry/snow.aspx>
Contact: Wyoming State Forestry Division, State Forester

John Crisp
1100 West 22nd Street
Cheyenne, WY 82002
307-777-6680
forestry@state.wy.us,

Summary: The Wyoming State Forestry Division website gives information about advantages and disadvantages of living snow fences on its website. The website also provides the requirements for proposal of state funded living snow fences. The Wyoming State Forestry Division partners with the Wyoming Department of Transportation in designing and installing living snow fences. Organizations in Wyoming that have used state funding to build living snow fences include: Popo Agie Conservation District (<http://www.popoagie.org/fence/index.php>) and Larimer County Conservation District (http://www.lccdnet.org/trees/living_snow_fence.html).

Telephone Interview:

The living snow fence program in Wyoming has been fully operational for about ten years; and there were several years prior in which the program developed.

Currently, the program has a \$100,000 per year budget. Seven living snow fences were planted last year. The program works with the Wyoming Department of Transportation and local conservation districts to fully fund and plant living snow fences along public roadways. Local conservation districts do the planting and maintenance and are reimbursed for expenses through the program. Conservation districts also work with private landowners when living snow fences are needed on private land. The program also maintains the living snow fences for three years and then the maintenance responsibility is on the landowner.

Funding from the Wyoming Department of Transportation has made the program successful and the program would not in operation without that funding. Also, the relationships among the DOT and the local conservation districts have made the program work and be successful. At this point there isn't anything the program would do differently; it is a very successful program.

Canada

Alberta, British Columbia, Manitoba, & Saskatchewan:

“Prairie Shelterbelt Program.” AAFC-PFRA Agroforestry Division. 2009. 18 May 2009

<http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1180103439791&lang=eng>

Contact: AAFC-PFRA Shelterbelt Centre

Laura Poppy

PO Box 940

Indian Head SK

SOG 2K0

agroforestry@agr.gc.ca

306-695-2284

Summary: This program “provides technical services and tree and shrub seedlings for establishment of shelterbelts and other agroforestry, conservation and reclamation projects on agricultural and eligible lands in Manitoba, Saskatchewan, Alberta, ... and British Columbia.”

Telephone Interview:

The Prairie Shelterbelt Program is a part of the Agriculture and Agri-Food Canada – Prairie Farm Rehabilitation Administration and has been in operation since 1901. The program operates from Saskatchewan, but also serves Manitoba, Alberta, and British Columbia. It started to encourage settlers to come to the area and to reduce soil erosion. It is a federal program that distributes prairie hardy trees and shrubs primarily to farmers for use in planting shelterbelts. To date the program has distributed over 600 million seedlings to over 700,000 farm clients. The seedlings are grown in the nursery in Saskatchewan, and there are between four to five million trees distributed every year to about 7,000 farmers.

Farmers must apply to the program and have at least five acres of land for the trees. The program provides the trees, but leaves planting and maintenance to the landowners. The center provides information on planning and planting the shelterbelts. The shelterbelts are primarily used to reduce soil erosion, although they are also used in snow control. The program provides twenty-eight different plants, both native and imported. The program has a research center that researches tree breeding, value of trees, shelterbelt impact on landscape, energy conservation, biomass, and snow effects.

The fact that 600 million trees have been distributed is impressive. Scientists in the research center have made many gains in improving the trees that are used in shelterbelts and their efforts in researching other aspects of the trees and the landscape have contributed greatly to the success of the program. There are many general benefits of shelterbelts (snow control, reduced soil erosion, etc.) that people have come to understand and they appreciate the presence of shelterbelts. The program has seen that putting numbers to things such as amount of money saved, the number of shelterbelts planted, etc. has added to the apparent success. Also, the shelterbelts have changed landscape of the prairie provinces into something more pleasing to the eye.

There isn't much the program would do differently, as it is so successful. However, it realizes that there is a need for continual research especially since the needs from 100 years ago have changed. The program has evolved and could evolve more. Right now, the researchers are working to make shelterbelts match the needs of farms and new farming methods. Farmers don't see the value of having shelterbelts as much anymore because there isn't as much soil erosion; therefore, trees could be planted more on periphery of farms rather than in the field. There is also the problem of the trees being maintained and getting them to survive; the program is working to help farmers address this problem.

Ontario – Region of Peel:

“Winter Roads Maintenance.” Region of Peel Public Works. 18 May 2009

<http://www.peelregion.ca/pw/roads/winter-maint/faq-corn-fences.htm>

“Designing and Caring for Windbreaks.” Extension Notes. LandOwner Resource Centre and University of Toronto’s Faculty of Forestry, 1995. 18 May 2009

http://www.lrconline.com/Extension_Notes_English/pdf/wndbrk.pdf

Contact: Richard Sparham

905-791-7800, ext. 7825

Summary: The Region of Peel in Ontario has a seemingly active living snow fence program. The University of Toronto published a useful newsletter on windbreaks and the kinds of plants that work well for windbreaks and snow fences in Ontario.