

Standing up to Ol' Man Winter... It's all in How you Plant the Trees

When it's winter in North Dakota, there's one thing you can almost always expect—snow.

In and of itself, snow isn't really a bad thing. But combine it with even a moderate wind and look out. The result is blowing and drifting snow that can snap visibility in an instant and clog or even close roads and highways.

There is, however, a remedy for this common winter problem that's catching on in North Dakota. It's trees. Rows and rows of trees.

Formally, they're called "living snow fences." Technically, they're a windbreak of trees and shrubs strategically planted in certain areas to slow down, catch or channel snow.

It's hard to imagine that a bunch of trees and bushes can really make a difference in a blowing, howling snowstorm. But they've been proven effective in improving visibility and reducing the amount of snow that's deposited on roadways, near bridges, at airports or just about any other critical location.

Here's how they work. A combination of trees and shrubs are planted in rows—usually five deep—to create varying layers in density and height. Generally, shrubs are used for the two outside rows, short trees for the two interior rows, and large trees for the center row. The combination creates a camel-hump or mound shape that provides protection from top to bottom.

As snow blows across the trees and shrubs, they act as a filter—catching and dropping the majority of the snow in place before it gets to a road. Not all snow fences are created equal—they vary in size, species and direction of planting depending on what they are designed to protect. Generally, to protect transportation routes, they must be at least 200 feet from the side of the road to be effective.



In 1996–97, a brutal winter of record snowfall and high winds that caused severe blowing and drifting provided the impetus for a statewide effort to plant living snow fences.

When compared with a slatted or picket fence, living snow fences can capture up to 12 times more snow and are up to 90 percent cheaper to install and maintain. Once established, living snow fences need little care and can last for decades.

North Dakota started its living snow fence initiative in 1997 after one of the state's harshest winters on record. It was a season of extreme cold, high winds, and record snowfall that, at times, made travel impossible because of excessive blowing and drifting snow.

State and local road crews, private contractors and the North Dakota National Guard worked 14-hour days for weeks on end to clear roads and highways that sometimes blew shut again within hours of being plowed.

That winter was not only dangerous, it was costly. Seven people lost their lives as a direct result of the blizzards. About \$7 million was spent for plowing, road clearing and snow removal. More than 100,000 head of cattle died. The agriculture industry reported about \$200 million in losses.

The severity of the situation prompted a search for solutions. In March 1997, representatives from a number of state and federal agencies came together to determine what could be done to avoid such a serious impact in the future.



Not all living snow fences are created equal. According to Tom Claeys, North Dakota Forest Service, this snow fence (right) combines rows of trees with a structural fence. The fence is along I-94 just east of Bismarck.

A multi-agency task force, coordinated by the North Dakota Forest Service, quickly formed and a game plan was set. The goal—plant trees and shrubs in documented problem areas to protect 100 miles of North Dakota roads by 2001.

Task force projections in January 2001 show that when the spring planting season begins, the initiative will have blown past its original goal. By spring, trees and shrubs protecting 104 miles already will be in the ground. The plantings will benefit parts of township, county, state and Bureau of Indian Affairs roads as well as the two federal interstates that cross North Dakota.

So far, in three years, 222 living snow fence projects have been planted in 32 of the state's 53 counties at a cost of about \$936,000, said Tom Claeys of the state forest service. Of that amount, nearly \$400,000 has come from the Hazard Mitigation Grant Program, about \$112,000 has come from the state department

of transportation and the balance has come from other state transportation and U.S. Department of Agriculture grant programs.

The Hazard Mitigation Grant Program, funded in large part by the Federal Emergency Management Agency, is administered by the state to pay for projects that will reduce or prevent future disaster damages.

The projects in place so far mean that hundreds of thousands of trees can be used in the fight against Ol' Man Winter. Some benefits can be realized in as little as three to five years, Claeys said. To be effective in a severe storm, the trees usually need from 10 to 20 years' growth.

Although statewide interest in living snow fences grows daily, one county in southwestern North Dakota is on the leading edge of the initiative.

It's Adams County—ranch country, scenic, open, and in the winter, downright desolate in places. With its buttes, rolling hills and winding roads, there are plenty of places for snow to pile up.

But the local Natural Resources Conservation Service (NRCS) office, a partner in the snow fence initiative, has been creating a flurry of activity among the county's 3,200 residents.

In the year 2000 alone, the NRCS worked with area landowners to plant living snow fences at 42 sites that would protect 23.3 miles of roads. In 2001 and 2002, new snow fence plantings at 72 different sites will protect another 65 miles.

That's good news for Dean Erickson, Adams County's highway superintendent. In the wintertime, he's responsible for keeping clear about 314 miles of county roads and about 500 miles of certified township roads.

For more than 20 years, the county has been using both temporary and permanent measures to minimize the impact of blowing snow, Erickson said. As old roads with known trouble spots have been replaced, the county has been adjusting the angle and/or surface of the new roads to minimize drifting. Also, each fall, road crews put up about 4,500 feet of temporary picket snow fence in key trouble spots throughout the county to provide road protection.

With the addition of the living snow fences, the county's work, and cost, to remove snow will decrease even more because additional trouble spots will be minimized or eliminated.

"It's great for Adams County," Erickson said, where 90 percent of their disasters are snowstorms. "We are pretty rural here and there isn't a lot of money for plowing snow. Even though the trees are still young, they are starting to catch some snow. As soon as they get some height to them in a couple of years, it'll really make a difference.

Dave Seifert's living snow fence holds the key to one of the county's problem areas. Some of his land parallels ND Highway 8, including a troublesome curve where snow blows in from Seifert's side of the road and is stopped cold by a butte on the other side. As a result, snow piles up on the curve.

In the spring of 2000, Seifert put in about a mile of living snow fence along that road. Though the trees and shrubs were only a few feet high as of January 2001, he says he's already noticing a difference.

"They had a really good growth year in 2000," Seifert explained. "We've had some pretty nasty winter here so far and even at this young age, these trees are holding some snow. When they grow more, it's going to make a whale of a difference in that curve."

Seifert, a rancher, is a strong proponent of the program not only for the snow-reduction benefits but because he loves trees and wildlife. Snow fences can provide a good habitat for wildlife depending on the variety of trees and shrubs that are used and the purpose for which the fence is planted. (Near airports, vegetation that will repel wildlife is used to keep animals away from runways and other critical areas).



Adams County rancher Dave Seifert checks one of the trees in a living snow fence he planted in spring 2000.



As this young snow fence matures, it will reduce the amount of snow that blows onto nearby ND Highway 8. The black row is a fabric weed barrier that also helps hold in soil moisture around the trees.

Snow fences have other environmental benefits as well—namely minimizing soil erosion, increasing crop production, saving energy, reducing non-point water pollution and beautification.

Claeys says living snow fences also save money. According to a 10-year study in Wyoming, the cost to store snow with a living snow fence is 3 cents per ton. The cost to move snow is \$3 per ton.

Based on those figures, Claeys says, North Dakota's state transportation department estimates it could have saved about \$1.9 million in snow and ice control costs during that 1996–97 season.

The lesson hasn't gone unnoticed. The transportation department is a major partner in the snow fence initiative—both in identifying problem areas and in funding new snow fences.

“Even though we've been planting trees here for decades, the severity of the '96–'97 blizzards really got everyone's attention,” Claeys said. “In some places, we hadn't seen problems like this before. Then, because of that winter, we were suddenly trying to understand how we could have let Mother Nature get the best of us.

“We learned great lessons from that winter,” he added. “Because of the living snow fence initiative, more people are realizing that we can better protect our state in the future.”

It's all in how you plant the trees.