Inside Agroforestry

USDA

Forest Service, Rocky Mountain Research Station
Natural Resources Conservation Service

Successful Colorado Living Snowfence Program

A living snowfence (LSF) is a planting of trees and shrubs designed to keep snow from drifting onto roads and help prevent road closings. The Colorado Department of Natural Resources and the Colorado State Soil Conservation Board have a successful 15-year-old program that establishes an average of 21 living snowfences per year.

Properly placed, living snowfences can: store blowing snow and keep roads clear in most storms; enhance road safety; provide wildlife habitat; enhance beauty; provide winter livestock protection and sheltered calving areas; help reduce soil erosion; and decrease tax dollars needed to plow snow.

Following is a summary of information about Colorado's program.

Objectives

- Reduce road closures due to drifting snow.
- Reduce costs and increase efficiency of snow control on roads.
- Provide stable and critical wildlife habitat.
- Enhance environmental aesthetics.
- Improve visibility and enhance driver safety.
- Fifty new plantings per year.

Background

- An average of 21 living snowfences per year have been established over the program's 15-year existence.
- 80.4 miles of LSF containing 241,037 trees and shrubs have been planted in 318 locations throughout Colorado.
- Average planting is 1/4 mile in length and contains two to three rows of trees and shrubs.

Program Operation

- A cooperative effort involving the

(See Colorado on page 6)

Trees, Wind, and Blowing Snow

As winter blizzards hit, residents of the Great Plains have been reminded to respect nature's fury. A sinister snowstorm can leave behind many things, perhaps the most impressive is the snow drift. Experience with snow drifts and how they can interfere with normal activities can range from inconvenience, to economic hardship, to real life danger.

These experiences could be minimized given adequate resources, education, cooperation, and technology application. Access to land would allow the placement of living snowfences that could collect and deposit snow in priority areas. According to Ed Ryen, Assistant Maintenance Engineer for the North Dakota Department of Transportation, eastern North Dakota has many miles of mature multiple-row windbreaks. The winter of 1996-97 was a vicious one for the northern Great Plains. North Dakota alone spent $4.7 million from the federal government on snow removal for state roads, with another $1.2 million spent by the National Guard to open county roads. Furthermore, parts of the Interstate

(See Wind on page 7)

This landowner planted a series of windbreaks to catch snow and protect both his farmstead and the county road. The three rows parallel to the highway consist of a twin-row of Green Ash, set back 200 feet from the edge of the right-of-way. A row of Tatarian Honeysuckle is set back another 100 feet. The county road runs north-south.

Inside This Issue

Comments from the Center Leadership

A commentary on the status of agroforestry as reported by Co-Interim Program Manager, Jerry Bratton

Plan for the Blizzard of 2007!

During the winter of 1996-97 residents of the Northern Great Plains and Midwest experienced one of the most severe snow seasons on record. People were trapped in cars or in unheated homes and died of acute overexposure. Livestock — cattle, horses, sheep, hogs, and wildlife succumbed by the thousands to lack of available water and feed, and sub-zero wind chill factors. Local commerce came to a total standstill. The trucking industry had to go on-hold and could not transport goods into or out of the region. They were often detained in truck stops for days. Perishables spoiled and deadlines could not be met. The local, regional, and national economy suffered as a result.

Could the loss of life, suffering, and waste have been avoided? To some degree, *YES!* Of course, we can't keep snow from falling and wind from blowing. We can, however, affect the final outcome of catastrophic snow and wind events by carefully planning and implementing snow and wind buffers including: farm and field *windbreaks, living snowfences,* and *outdoor living barns.*

By planting *now,* we can be ready for the blizzard of 2007 or whatever year it happens, *and it will happen again.* We can control where the snow piles. We can diminish the effects of harsh wind-driven "horizontal" snowstorms. We can reduce chill indexes for humans, livestock, and wildlife. We can safeguard lives of travelers by keeping snow off slick roads and decrease the cost of snow removal at the same time.We can keep snow from covering livestock's feed. We can distribute snow evenly across cropland fields, making it available to replenish depleted soil moisture with the spring thaw.

What we have are choices! We can wait, do nothing, and complain about nature's fury or we can plan for the future and plant wind and snow barriers to make life safer and more comfortable. If we wait, we will certainly have to pay the price of lost lives, income, time and resources. If we plant the proper trees and shrubs now, many of the trees will be large enough to be functiional in five to ten years.

Some states have already initiated programs to manage wind-driven snow. You will read about some of them in this newsletter. Special praise is due the state of Colorado for their 15-year living snowfence program. Wyoming, Idaho, Kansas, Nebraska, and Oklahoma have planted snowfences, but have much yet to do. South Dakota, North Dakota, and Minnesota have begun new, ambitious windbreak snow management programs that will certainly benefit their states if they continue at the present pace. Several other states are just beginning to consider the advantages of tree buffers to manage snow.

We, at the Center, certainly encourage you to contact your State Department of Transportation, wildlife agency, forestry agency, conservation district, and other applicable resource management agencies to form an initiative to buffer snow. As so well stated in the past...***the best time to plant a tree is yesterday, the next best time is today!*** So, begin planning, designing, and planting windbreaks, living snowfences, and outdoor living barns to soften the effects of the blizzard of 2007.

Making the Most Out of Snow Drifts

When you hear someone talk about large drifts of snow, often times the first mental images that come to mind are blocked roads, school closings, or livestock losses. However, with a little planning, snow drifts can be turned into a valuable water resource. In fact, several researchers have studied ways to "capture" snow using windbreaks, tall grass barriers, and/or annual crop barriers.

Thousands of excavated ponds, sometimes called "dugouts," are used for livestock water across the rangelands of the Great Plains. Are we making the most use of all the water resources available?

In the early 1980's, Robert Jairell and Ron Tabler with the USDA Forest Service in Laramie, Wyoming, used scale models to simulate snow drift patterns around excavated livestock ponds. These ponds normally have excavated material piled adjacent to it. According to Jairell and Tabler's research, when the embankments are on the windward side of the pond, little snow accumulates in the pond. But, with the embankment on the downwind side of the pond, the pond fills with snow. Snow accumulation was then maximized by placing a snowfence on the windward side of a pond with a downwind embankment. The research experiment used a wooden snowfence design, but similar results could be achieved with a living snowfence using shrubs or trees with about a 50 percent density. For ponds with embankments on the windward side, they were able to induce more snow drift into the pond by placing a snowfence on top of the embankment. Although they used a wooden snowfence in that example, too, a living snowfence of shrubs or even stiff grasses on the windward spoil bank would probably have similar results.

This data illustrates to us that snow in the wrong place can be a hazaard and a nuisance, but snow in the right place becomes a resource.

Adapted from: "Model Studies of Snowdrifts Formed by Livestock Shelters and Pond Embankments" by David L. Sturges and Ronald D. Tabler.

Windbreaks, Snow, and Water

by Craig Stange, State Staff Forester, USDA NRCS, Bismarck, North Dakota

Everyone knows about the ability of a windbreak to prevent wind erosion and slow down wind speeds. Often overlooked is the ability of a windbreak system to harvest snow. In the Great Plains, where snow fall can equal 30 percent of the total precipitation for the year, harvested snow is valuable. Many parts of the Great Plains and Prairie Provinces receive only 10 to 16 inches of precipitation per year. Whether the crop receives the full precipitation amount or is three to five inches short is the difference between a success and failure.

According to a 1989 Canadian study, "a section of land protected by shelterbelts had 29 percent more water in the form of snow than did a section of land without windbreak protection. The shelterbelts reduced ground drifting, trapped snow and therefore reduced atmospheric losses. The water conserved in the sheltered section is an important factor of higher yields found on sheltered land."

After nearly a decade of study, researchers at the Agricultural Research Station at Mandan, North Dakota have shown that harvesting an additional foot of snow is often equivalent to an additional inch of water that can translate to an additional five bushels of wheat per acre. When wheat yields only run 20 to 25 bushels per acre normally, five more is a pretty good increase.

"Trees have the ability to create a microclimate that is beneficial to crops that cannot be created by artificial snowfences."

——Craig Stange

Many times conservationists hear the negative aspects of field windbreak systems. One commonly voiced complaint in the northern Great Plains is the delay in spring field work caused by the snow drift on the leeward side of the windbreak. After the winter of 1996-97, conservation district staff reported snow drifts were still present in June in some locations. Over the years conservationists and farmers have elected to prune or thin windbreaks to allow more uniform distribution of snow and earlier spring field work.

Pruning and thinning windbreaks can effectively spread snow, thus reducing the delay in planting the area covered by a snow drift. The spreading of snow, however, is not without its cost. Studies in 1985 and 1986 from Canada indicated that even when soil moisture is not limited, crop yields still increased when protected by a windbreak. In this study the fields being studied were protected by a double row Colorado spruce windbreak. Researchers surmise that the yield increase on durum wheat was due to less evaporation from the windbreak slowing the wind.

A companion study conducted at the same time in the same area, using slatted snowfences, did not show the same yield increase. Trees have the ability to create a microclimate that is beneficial to crops that cannot be created by artificial snowfences.

Just how effective are windbreaks in harvesting snow and affecting crop yields? Wayne Carter, a farmer in western North Dakota, states that his neighbor is not happy that Wayne planted a field windbreak 20 years ago. Wayne's windbreak now stops the snow from blowing across the road onto the neightbor's alfalfa field. The neighbor knew that the increased snow improved the alfalfa yeilds and prevented winter injury to the alfalfa crowns. In some cases, maybe, windbreaks can work too well!

How can producers maximize the benefits and minimize the negatives of field windbreaks? The answer lies in applying a systems approach. As Grandma always said, "don't put all of your eggs in one basket."

Crops respond best, *during the growing season*, to the protection provided by very dense windbreaks. Yet, dense windbreaks often create deep snow drifts delaying field work. Ways to minimize negative aspects of deep snow drifts are:

- Leave stubble stand over winter areas upwind of the windbreak.
- If field management requires some tillage, leave three to four feet wide strips of standing stubble between each tillage pass. Field observations indicate that this method can effectively spread snow across the field to the depth of the stubble.
- If necessary, based on the upwind

(See Water on page 6)

A windbreak across a large field distributes snow throughout the field, providing winter protection and moisture for crop production.

Four-Generation-Old Windbreaks Protect Cattle from Winter Stress and Death

It appears that Gordon Kadrmas' grandfather was not only a successful cattle producer, but was also quite a weather forecaster. He may not have actually predicted the early April blizzard that hit North Dakota last winter, but by planting trees on his land, he saved his grandson from losing even a single head of livestock.

The first trees on the farm were planted by Gordon's grandmother and grandfather when they homesteaded the place. His father planted more trees when he took over, in particular adding some field windbreaks. Gordon planted several more windbreaks when he bought the farm in 1970. His daughter has since planted several additional rows and has helped to install a drip irrigation system.

"Each generation plants for someone else," Gordon said. "If it hadn't been for my father's and grandfather's insight to plant trees many years ago, I wouldn't be enjoying the benefits today."

These benefits were demonstrated last April when a two-day blizzard hit the north central United States. According to the North Dakota Agricultural Statistics, the winter of 1996-97 was more severe and untimely for the livestock industry than at any other time on record. Cattle death losses were accessed at 100 percent above normal. Some producers lost 40-60 percent of their herd. In the entire state of North Dakota, 6,000-9,000 head of livestock perished, effecting a $33 million loss to the livestock industry.

Gordon's operation includes 125 stock cows and 50 yearlings. All were outside during the entire winter, except for a few days when the cows were actually calving. Within a day or two after each cow had her calf, they both went back outside since there wasn't enough barn space. When the blizzard struck, he was in the midst of calving and lost no cows or calves.

The Kadrmas family planted secondary tree belts (four rows) in 1976 which trap the bulk of the snow and distribute it over the land. That winter, there was 15 inches of snow collected evenly for 150 feet downwind of the secondary windbreak.

The primary windbreak (nine rows) catches the remaining snow and provides wind and thermal protection to the farmstead, benefiting the livestock and the Kadrmas family.

"The hay stacks were not snowed in, the lots were not full of snow, and there was easy access around the yard," Gordon said.

Gordon believes he saved a considerable amount of fuel and stress, compared to his neighbors, in digging out last winter. He had to feed a lot of hay, but he used considerably less feed than producers without adequate wind protection.

"During one of the very windy days with gusts to 60 mph, cows were standing in the lots just chewing their cud with a light dusting of snow falling on their backs," Gordon said. "The deer and pheasants enjoyed the wind and snow protection also. They were around all winter. It was a win-win situation for anyone or anything trying to survive the North Dakota outdoors."

The spring and summer that followed the difficult storms, brought about a drought. With this drought, Gordon noticed another benefit of his windbreaks.

"The only green grass was in those areas where the trees and shrubs had trapped snow."

Even a year later, Gordon is realizing the benefits of protecting his cattle from the harsh winter winds and snow.

"Most producers are experiencing conception problems this year, due to the stress that their surviving cows went through last winter," Gordon said. "I had no problems breeding my cattle that were sheltered."

Gordon believes that it is time to promote tree planting, not only to landowners, but to the natural resource professionals who educate them.

"Farmers need to establish livestock belts in their pastures to provide protection to yearlings in the early spring," Gordon said. "Conservation districts need to push the value of trees while the memory of last winter is still fresh in people's minds."

He stressed that it is critical to put windbreaks in the correct spot. If positioned improperly, they can create a very severe problem. Also, he reminds landowners to use a variety of tree species to protect against losing an entire shelterbelt to disease or insects.

An additional benefit of windbreaks is the monetary value added to the property. "Properties with trees are worth more than properties without," Gordon said. "Farmsteads with trees sell faster than those without."

The Kadrmas farm had a rough winter, but because of the windbreaks, the winter weather was easier to deal with and benefited the operation tremendously.

"It is never too late to plant trees," Gordon said. "It is because of the unselfish efforts of the people before us that we have the wind protection now."

Protecting livestock from cold winds can reduce feed requirements and improve profitability. And, in some cases, windbreaks can make the difference between cattle living through a storm or dying.

Windbreaks for all Seasons and Reasons

Windbreaks have been a key agroforestry practice for at least the past 100 years in the United States, and continue to be probably the most widely used agroforestry practice. Windbreaks have a long history. Hedges were used in Europe as far back as the English Tudors in the 1600's.

How widespread have windbreaks been applied in the United States? According to the 1992 USDA Natural Resources Conservation Service (NRCS) National Resources Inventory (NRI), windbreaks comprise a substantial resource, being identified in 41 of the 50 states. From protecting blueberries in Maine to controlling drifting sand in California, and from protecting grain crops in North Dakota and Minnesota to providing cover for wildlife in New Mexico and the Texas panhandle, windbreaks provide many benefits. The tree species used are as diverse as the geographic regions from alder protecting orchards in New York to ponderosa pine protecting livestock in Nebraska to Rocky Mountain juniper stopping snow in Colorado and Wyoming to 'Tropic Coral' protecting flower crops in Hawaii. A person traveling across the country can find a use for a windbreak in just about every state. The region with the least number of windbreaks is the Southeast probably due to the abundance of forest land. Even in the Southeast, however, there are opportunities for windbreaks such as crop protection on sandy soils.

According to the 1992 USDA Natural Resources Conservation Service (NRCS) National Resources Inventory (NRI), windbreaks comprise a substantial resource, being identified in 41 of the 50 states.

Windbreaks have traditionally been used to protect soil, plants, animals, and people from adverse winds. The term windbreak is often used interchangeably with shelterbelt. The NRCS considers a windbreak/shelterbelt to be a linear planting of trees or shrubs established for environmental purposes. These types of tree and shrub plantings are used to meet a variety of purposes including reducing wind erosion, protecting growing plants, managing snow, providing shelter for structures and livestock, providing wildlife habitat, providing a tree or shrub product, providing living screens, improving aesthetics, and improving irrigation efficiency. The most commonly planted windbreak types include farmstead windbreaks and field windbreaks.

Landowners recognize the values of farmstead windbreaks. In fact, it is usually the first windbreak planting opportunity for most farmers or ranchers. A farmstead windbreak provides a number of benefits to the owner. Some of these benefits can be easily translated into dollars such as a 10 to 30 percent reduction in energy costs, increased property values, reduced snow removal, lower feed costs for livestock, or less physical wind damage to buildings. Other benefits are less tangible including reducing noise, improving animal health, screening unsightly areas, and improving working conditions. In a North Dakota subdivision, windbreaks were planted around two to three acre lots before the first lot was sold. The subsequent selling prices were higher than those in adjoining subdivisions without trees.

Field windbreaks can provide wind protection and other microclimatic changes to adjacent fields resulting in improved crop quality and quantity. They can also serve as buffer strips to help improve water quality and add wildlife habitat. Field windbreaks provide a variety of benefits to adjoining fields and crops including increasing crop production from 6 to 44 percent, reducing wind erosion from 50 to 100 percent, improving irrigation efficiency, and managing the moisture from snow more effectively. Field windbreaks have changed significantly from the ten row windbreaks of the 1930's to narrow one and two row windbreaks of today.

What does the future hold for this "old" agroforestry practice? Nationwide we have seen a gradual decline in the number of windbreaks planted and the condition of those remaining. The NRI shows about a four percent decline for field windbreaks and about a two percent loss for farmstead windbreaks. A survey of the key windbreak states in the Great Plains also showed that 60 to 80 percent need some type of renovation. This renovation may be as simple as removing sod from the windbreak, to releasing the trees by thinning, to total removal and replacement. A person may wonder why this decline is occurring. There are no easy answers but a large percentage of the existing windbreaks are over 60 years old and reaching the end of their natural life. Other reasons include changes in agricultural production methods such as larger equipment leading to larger fields and greater use of herbicides which can be detrimental to the adjoining windbreaks.

The positive windbreak benefits far outweigh the negatives. Windbreaks can increase "profits" for clients and society, reduce resource problems and costs, create biodiverse habitats for humans and wildlife, and enhance local ecosystems.

(Colorado from page 1)

federal government, state government, local governments, private organizations, special purpose districts, private landowners, and private industry.

- The program does not "belong" to any one agency or entity. It is a statewide partnership where everyone involved contributes to a commom fund to get individual plantings established and maintained.
- Individual plantings originate at the local level. Resource needs are determined by mutual agreement and contributions solicited to meet these needs.

Comparative Costs

- Service life of LSF's is estimated at 50 to 75 years.
- Service life of the commonly-used slat snowfences is five to seven years.
- Over a 50-year period, installation and maintenance cost of slat snowfences is estimated to be four times more than for a two-row living fence.
- LSF is more efficient in capturing snow, thus snow removal costs will be reduced with living snowfences.

Program Needs

- Increased funding.
- Increased number of partners.
- Increased pooling of resources through partnerships is needed to accelerate numbers of new plantings established annually and to maintain these plantings.
- Estimated snowfence needs for state and country roads is between 1,500-2,000 miles. At the current planting rates, it will take approximately 360 years to meet projected needs.

It's never too late to start a cooperative effort like this in your own state. If you have questions or would like further information, contact John S. Berst, State Living Snowfence Coordinator, with the Colorado Department of Natural Resources, State Soil Conservation Board at 303-866-5895.

The "Journal of Forestry" is accepting scholarly papers on agroforestry for consideration for the November, 1998 issue. For deadlines and guidelines, contact, Jeff Goell, SAF, at 301-897-8720, ext. 130; e-mail goellj@safnet.org

Agroforestry: Integrating Conservation, Crops, Livestock, and Trees in the Pacific Northwest

May 12 & 13, 1998, Richland, Washington
May 14 & 15, 1998, Portland, Oregon

One day of each workshop will be spent indoors learning about new windbreak designs and establishment, riparian buffer technology, silvopasture systems, and hybird poplar applications for buffers and wastewater treatment. Speakers will include a wide array of university, federal agency, state agency, and private industry individuals, as well as private landowners which will all address the applicability, markets, benefits, and risks of agroforestry in the Pacific Northwest (PNW).

The second day will be spent in the field looking at agroforestry plantings in the area. Field trips will feature hybrid poplar, wastewater treatment, riparian buffers, alley cropping, and silvopasture systems.

For more information, contact:

- Gary Kuhn, NAC Western Representative, 206-616-7166
- Beverly Gonyea, U. of Washington Conference Coord., 206-543-0867
- Don Hanley, Washington State U. Extension Forester, 206-685-4960

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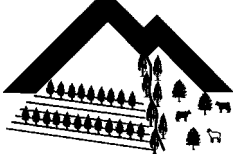


(Water from page 3)

unprotected area, install a series of field windbreaks.

- If lack of residue or local conditions do not allow for standing stubble, install tall wheat grass barriers or densely seeded double corn rows between windbreaks to better harvest the snow.
- Encourage neighbors to become a part of the snow harvesting system so that several sections of snow do not have to be stored behind just a few field windbreaks.
- If large snow drifts are still a problem, plant a deep-rooted perennial such as alfalfa in the first 50 feet downwind of the windbreak. The area won't need to be worked when it's wet. The alfalfa can compensate for any nitrogen leached from the soil profile. It will also protect the soil from spring runoff. Most importantly, alfalfa can effectively use any additional available water to produce higher yields. Quality alfalfa almost always has a buyer.

In many parts of our country, cattle must fend for themselves with the "sky overhead" as their barn roof. Even with adequate feed stocks, livestock must be protected from severe winter winds.

No where was this more evident than during the April blizzard that struck North and South Dakota and western Minnesota in 1997. Tens of thousands of cattle were lost in that one storm. The cattle that survived were either in barns or protected by very extensive windbreak systems. That storm was one of the worst for animals. It started with a cold wet rain, turned to freezing rain and sleet and within 24 hours the temperatures had dropped to 20 below zero with gale force winds.

Those windbreak systems that were wide enough and dense enough still provided the protection the livestock needed. The cattle with wet coats, protected by extensive windbreak systems didn't chill as severely as those exposed to the full force of the wind. "Normal" sized windbreaks had filled with snow early in the season and were providing little protection by the time of the April storm.

Strategically placed windbreaks, when part of a complete conservation system, can effectively increase livestock survival, weight gain, crop yields, and accessibility of local citizens. These benefits are available to all because windbreaks can effectively reduce wind speeds and control where the snow will be deposited.

(Wind from page 1)

System were blocked on seven occasions for a total of two to three weeks. Ryen said that the windbreaks provided "an oasis of clear road in the midst of blinding ground blizzards," even when the trees were as far back as 3/8 to 1/2 mile from the road. Ryen added, "It was obvious when one drove out from behind the windbreaks -- because it was impossible to see the road."

Just east of Bismarck are two interchanges that remained open all of last winter. Ryen said, "Only normal snow plowing was needed to get a clear road surface." In both cases, just northwest of the interchange was a quarter section of cropland that was protected with a series of single-row field windbreaks oriented in a north-south direction. Any drifts created by the trees were deposited in the fields where they caused no problems for the roads.

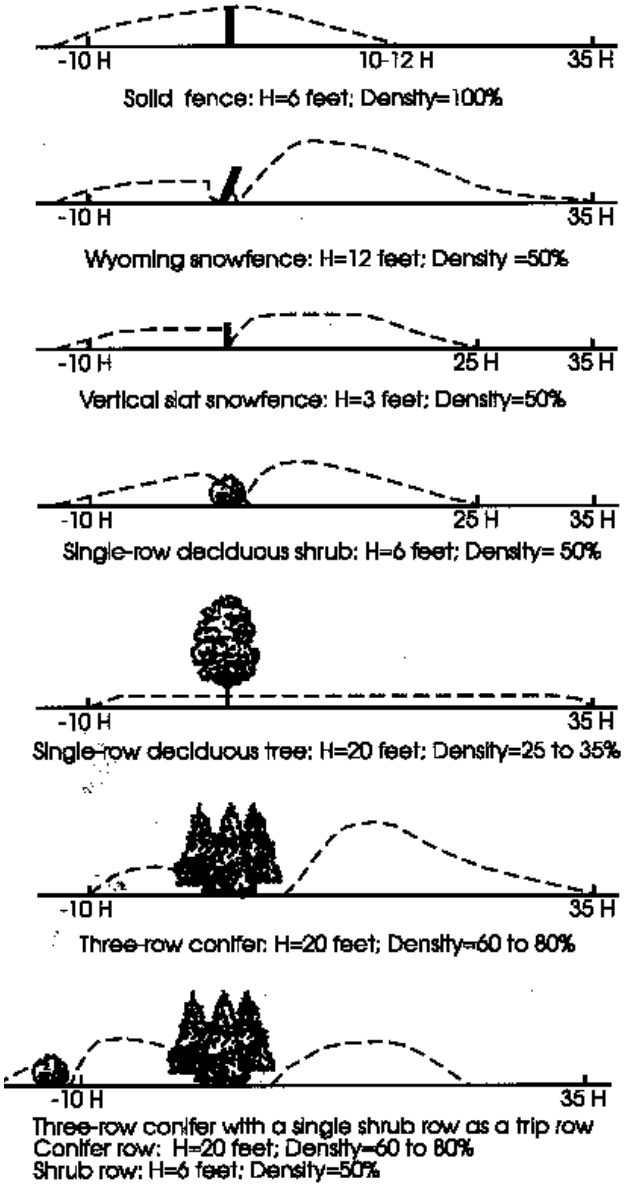
There are proven techniques for controlling blowing and drifting snow but application is often limited because of the problems associated with obtaining the necessary right-of-way or easements from adjacent property owners. There are, however, compelling arguments for looking beyond the limits of right-of-way and creating win-win partnerships. For example, consider some of the advantages of living snowfences; most site establishment and maintenance costs are much less than structural fences with a life span of 50 years compared to 20 years for a structural fence and sites can be designed for wildlife habitat and livestock protection. They are more aesthetically pleasing and can serve as visual screens. Living snowfences can also be designed to conserve energy for farmsteads and communities or to function as a windbreak to reduce soil erosion and increase crop yields. Compare these to the advantages of conventional slatted snowfences or structural fences which include: their short-term preparation of being erected and used very quickly, ability to be used on sites where vegetation is not practical, and the fact that the density is fixed and known.

Ryen said that the windbreaks provided "an oasis of clear road in the midst of blinding ground blizzards... It was obvious when one drove out from behind the windbreaks -- it was impossible to see the road."

In the words of George F. Welk, Area Maintenance Engineer for the Minnesota Department of Transportation "With the magnitude of problems that were experienced in the past across the Great Plains, isn't it time to reduce the impacts that drive the cost of government higher? Would it seem appropriate for institutions of higher learning to include courses in the discipline of snow control? After all, no one would ever build a new road without culverts and then examine the need for drainage after experiencing a heavy rain storm and then react to it by placing drains. Why does this happen with snow? Are there other ways? It's time to give this serious thought."

Adapted from: "Commentary on Snow Control" by George F. Welk, PE, "Snow Control Challenges and Opportunites Across the Minnesota Landscape" by Dan Gullickson, Minnesota Department of Transportation Forester, and "Living Snowfences Fact Sheet" by Mike Majeski.

Height and Density of a Living Snowfence or Windbreak Will Determine How Much Snow Can Be Stored in the System



Height (H) equals the height of the snowfence or windbreak. Both height and density affect the amount of snow stored and the area in which it is deposited. Return to the diagram example to compare actual differences in snow storage.

From: "Windbreaks for Snow Management" by James R. Brandle and H. Doak Nickerson, University of Nebraska.

Upcoming Events

May 12-13 and 14-15, 1998
Agroforestry: Integrating Conservation, Crops, Livestock, and Trees in the Pacific Northwest, (12-13) Richland, WA and (14-15) Portland, OR. Contact Gary Kuhn, 206-616-7166.

October 4-7, 1998
North American Conference on Enterprise Development Through Agroforestry: Farming the Forest & Agroforest for Specialty Products, Minneapolis, MN. Contact, Scott Josiah, 612-624-7418.

June 22-23, 1998
Windbreak Renovation Workshop, North Platte, NE. Contact, Jon Wilson, 308-532-3611.

June 23-26, 1998
Plains & Prairie Forestry Association Annual Meeting, North Platte, NE. Contact, Dennis Adams, 402-472-5822.

We Need Your Help...

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Mission

The National Agroforestry Center (NAC) is a partnership of the USDA Forest Service and the USDA Natural Resources Conservation Service.The Center's purpose is to accelerate the development and application of agroforestry technologies to attain more economically, environmentally, and socially sustainable land-use systems. To accomplish its mission, the Center interacts with a national network of partners and cooperators to conduct research, develop technologies and tools, establish demonstrations, and provide useful information to natural resource professionals.

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