In areas of high winds and blowing snow, windbreaks can reduce the effort spent on snow management.

Snow Management Benefits

- **Field and Pasture**
  - Increased yield
- **Living Snow Fence**
  - Safer roads
  - Reduced snow removal costs
- **Farmstead and Feedlot**
  - Improved living and working environment
  - Better livestock feed conversion
  - Reduced snow removal costs
  - Reduced heating and cooling costs

For more information contact the South Dakota Division of Resource Conservation & Forestry

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Windbreaks and Snow Management

Department of Agriculture and Natural Resources
Division of Resource Conservation and Forestry

In areas of high winds and blowing snow, windbreaks serve the dual purposes of climate modification and snow management. In open areas, wind lifts, carries, and deposits snowflakes just as it does soil particles. By modifying wind flow, blowing snow can be distributed over a field or deposited within a given area.

Effective snow management can yield many different results. A low-density field windbreak will spread snow across the protected area; provide additional moisture for crop fields and pastures, and increase productivity and economic return. Field windbreaks reduce spring runoff partly through the physical retarding action of snowdrifts on water flow and partly through better moisture recovery due to unfrozen ground under the snow covers.

Dense multiple row windbreaks or living snow fences will pile snow in a restricted area, reducing snowplowing costs on highways and driveways. Dense windbreaks on pastureland provide protection for spring calving and reduce newborn mortality. Living snow fences on the windward side of stock ponds deposit snow into ponds and provide significant water for summer livestock use. Windbreaks can prevent large snowdrifts in the working areas of farmsteads and feedlots and reduce snow removal costs.

Snow Control on Fields and Pastures

In areas where snow provides a large amount of the soil moisture for crops and forage production during the next growing season, windbreaks help capture the available moisture by keeping it on the fields. On average, winter wheat yields are increased by 15 to 20 percent. These increases are a result of increased soil moisture from snow capture and protection from winter wind desiccation.

Design and Location

Field windbreaks designed exclusively for uniform snow distribution across a field should have a density of no more than 40 percent. Planting a single row of tall deciduous trees on a wide spacing (15 to 20 feet between trees) perpendicular to the prevailing winter wind will provide good snow distribution across the field to a distance of 10 to 15 times the height of the trees. Snow blowing over the tree tops falls out of the air-stream on the relatively still, leeward side of the windbreak. Wind passing through a porous windbreak will distribute snow evenly across the field. Field windbreaks that are too dense will cause snow to collect in narrow, deep drifts near the windbreak.

Living Snow Fence

When the snow management goal is to confine snow to a limited area, a dense windbreak of trees and shrubs can be a cost–effective method of controlling blowing snow. Living snow fences planted along highways, county or private roads, driveways, irrigation ditches, and fence lines provide economic advantages over slate-fence barriers and provide other landowner benefits. Living snow fences provide greater snow storage capacity, require less maintenance once they are established, have a longer life span, and provide multiple benefits such as livestock protection, crop protection, soil erosion control, wildlife habitat, and aesthetic value.

Design and Location

In major storms, short (3-4 feet), vertical slat fences reach snow-storage capacity quickly. Wind blown snow then sweeps across the filled barrier causing drifting on the roadway and reducing visibility. In open areas drifting often continues long after actual snowfall has stopped. If the snow fence is already full, snowdrifts may continue to develop requiring repeated snowdrift removal.

Living snow fences achieve optimum storage capacity when winter density is about 50 to 60 percent. As density increases, drifts become deeper and shorter and may damage windbreaks with densities greater than 60 percent. Density will vary with the number and spacing of tree rows, the species chosen (evergreen vs. deciduous) and the distance between trees within the row. Tree height is important since snow storage capacity increases more than four times when height doubles. Species selection will vary depending on climate, soil, and available space and should be selected based on local growing conditions and landowner objectives.

A living snow fence needs to be located perpendicular to the prevailing winter winds with the area to be protected located on the leeward side. In most areas, winter winds come from the northwest, north, or northeast. Living snow fences should be located on the north side of east-west roads, or on the west side of north-south roads. Allow plenty of room for leeward drifting by locating the windward row a minimum 175 feet from the centerline of the road. Trees should not be planted closer than 200 feet from corners or intersections to allow for traffic visibility. Be sure to check local regulations in your area.

Snow Control for Farmsteads and Feedlots

The main objectives of farmstead or feedlot windbreaks are to reduce the force of the winter wind on the activities within the sheltered zone and to enhance the microclimate on the leeward side of the windbreak. These windbreaks can provide additional management benefits for blowing and drifting snow.

Without windbreak protection, farmhouses and other structures act as solid barriers to the wind, resulting in swirling wind currents. Driveways and work areas may be subject to snow drifting, become inaccessible, and require additional hours of labor for snow removal.

One purpose of feedlot and livestock windbreaks is to maintain an area relatively free from deep snow where hay and feed are stored. These windbreaks provide an area where livestock can get out of strong winds and driving snow. This reduces animal stress and decreases feed requirements, resulting in better animal health, lower death loss, and lower feed costs.

Design and Location

Farmstead and feedlot windbreaks should be located so that the windward row is a least 150 feet from buildings, driveways and feedbunks to provide room for snowdrift on the leeward side. This distance should allow 75 to 100 feet from the leeward side of the windbreak and the area needing protection. On the windward side of the windbreak, there should be at least 50 feet between the windbreak and roads or other features that may be within the zone of the windward snowdrift. The ends of the windbreak should extend beyond the area to be protected at least 100 feet to prevent the drifts that form at the end of a windbreak from interfering with farm operations.