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**Windbreaks provide livestock
protection by reducing wind speed.**

Benefits Provided

- Lower animal stress
- Improved animal health
- Increased feed efficiency
- Snow control
- Improved working environment
- Noise and odor screens
- Wildlife habitat

Areas to Protect

- Feedlots
- Livestock pastures
- Calving areas

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

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Benefits of Livestock Windbreaks



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

Windbreaks play an important role in livestock production, particularly in young animals and in areas with cold northerly winds during the winter and early spring. Properly placed windbreaks provide benefits to feedlots, livestock pastures, and calving areas from reduced wind speed. This lowers animal stress, improves health, and increases feeding efficiency. Windbreaks also provide wildlife habitat, a protected working environment, and noise and odor screens.

Winter Protection

All warm-blooded animals must maintain their body temperatures within a relatively narrow range. When air temperatures fall below this range, the animal must expend energy to keep warm. As winter approaches, many animals develop winter coats as insulation against the cold. In the case of beef cattle, a heavy winter coat will provide protection against temperatures as low as 18 degrees (Table 1). At temperatures below 18 degrees the animal is stressed and starts to require additional feed to maintain body temperature. Exposure to winter winds will increase the need for additional feed.

If the temperature reaches zero degrees and the wind speed is 25 mph, the windchill is 44 degrees below zero (Table 2). Under these extreme stress conditions, animals require significantly more feed, are less efficient at converting this feed into energy, and are more susceptible to disease and other health problems. If a windbreak were present, the wind speed in the protected zone would be reduced, reducing windchill temperature to 15 degrees below zero.

Feed requirements are reduced when cattle are protected by windbreaks. For example, an 880-pound animal, with its winter coat, has a critical temperature of 32 degrees (Table 1) and requires 1.1 percent more feed per degree of cold (Table 3). If the temperature is 10 degrees and the wind speed is 10 mph, the wind-

Table 1. Critical temperatures for beef cattle are determined in part by the condition of the coat. Below the critical temperature, livestock must expend more energy in order to keep warm.

| Coat Description | Critical Temperature |
|--------------------|----------------------|
| Summer coat or wet | 59°F |
| Fall coat | 45°F |
| Winter coat | 32°F |
| Heavy winter coat | 18°F |

Adapted from D.R. Ames, Kansas State University.

| | | ACTUAL THERMOMETER READING °F | | | | | | | | | | | |
|-----------------------------|------|---|----|-----|-----|--|-----|-----|------|--|------|------|------|
| | | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| Wind Speed (Miles per Hour) | Calm | Equivalent temperature °F | | | | | | | | | | | |
| | 5 | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 | -50 | -60 |
| | 10 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -35 | -47 | -57 | -68 |
| | 15 | 40 | 28 | 16 | 3 | -9 | -22 | -34 | -46 | -58 | -71 | -83 | -95 |
| | 20 | 36 | 22 | 9 | -5 | -18 | -31 | -45 | -58 | -72 | -85 | -99 | -112 |
| | 25 | 32 | 18 | 4 | -10 | -24 | -39 | -53 | -67 | -81 | -95 | -110 | -129 |
| | 30 | 30 | 16 | 1 | -15 | -29 | -44 | -59 | -74 | -88 | -103 | -118 | -133 |
| | 35 | 28 | 13 | -2 | -18 | -33 | -49 | -64 | -79 | -93 | -109 | -125 | -140 |
| | 40 | 27 | 11 | -4 | -20 | -35 | -52 | -67 | -82 | -97 | -113 | -129 | -145 |
| | 45 | 26 | 10 | -5 | -21 | -37 | -53 | -69 | -84 | -100 | -115 | -132 | -148 |
| | 25 | 9 | -6 | -22 | -38 | -54 | -70 | -85 | -102 | -117 | -135 | -150 | |
| | | Zone 1 Little danger to mature animals. | | | | Zone 2 Increasing danger; will freeze exposed flesh such as teats and scrotums; will stress animals causing latent diseases to appear. | | | | Zone 3 Great danger especially to young animals. | | | |

Adapted from John Herrick, Iowa State University, Extension Veterinarian

chill temperature is 9 degrees below zero (Table 2) and the animal needs 45 percent more feed (critical temperature minus windchill temperature times increased feed requirements). If this same animal was protected by a windbreak providing a 70 percent reduction in wind speed, the windchill factor would change from minus 9 degrees to 2 degrees above zero. The degrees of cold would be 30 and the increased feed requirements would be only 33 percent, a saving of 12 percent. Colder temperatures or higher wind speeds would result in larger savings.

Studies in Montana indicated that during a mild winter beef cattle sheltered by windbreaks gained an average of 34 to 35 pounds more than cattle in an open feedlot. During severe winters, cattle in protected feedlots, maintained 10.6 more pounds than cattle in unprotected lots.

Table 3 Increased maintenance energy requirements for cattle at temperatures below the critical temperature.

| Description | Beef Animal Weight (lbs) | | | | | |
|--------------------|---------------------------------|-----|-----|------|------|------|
| | 440 | 660 | 880 | 1100 | 1210 | 1320 |
| | Percent Increase per degree (F) | | | | | |
| Summer coat or wet | 2.3 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 |
| Fall coat | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 |
| Winter coat | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 |
| Heavy winter coat | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 |

Adapted from D.R. Ames, Kansas State University.

Summer Protection

If a windbreak is designed properly it can protect livestock from winter winds and still allow summer winds to circulate, reducing potential heat stress. In South Dakota, winter and early spring winds are predominately northerly. Locating windbreaks on the north and west sides of livestock operations provides winter protection on the south and east sides of windbreaks. Summer winds are generally southerly. Since wind speed reductions on the windward side of windbreaks (the side towards the wind) are limited, livestock will benefit from the southerly wind.

Other Benefits

Livestock windbreaks provide an improved working environment, wildlife habitat, livestock area screens for odors and noises, and snow control, reducing removal and equipment costs.

A windbreak designed to protect livestock must take into account a number of different factors and should be designed to meet the specific site needs, farming operation, and landowner preferences.