



HABITATS

South Dakota Forests

WINDBREAKS: THE NEW PRAIRIE FORESTS

What Is A Windbreak?

Two words, shelterbelt and windbreak, are often used to describe long rows of trees on the prairie. These terms are used interchangeably, both referring to a planting of vegetation to reduce the force of the wind and direct the movement of snow. More precisely, a shelterbelt is considered to be a type of windbreak. A *shelterbelt* is composed of several rows of trees and shrubs to "shelter" dwellings or livestock. A windbreak may be only a single row of vegetation (typically trees or shrubs, but can be grasses) to reduce the force of the wind or direct snow.

Where Did All These Trees Come From?

The early European settlers found the prairie soil productive farmland, but the environment harsh for them and their livestock. The summers were hot, and without trees to provide cooling shade some days were almost unbearable. In the winter the cold winds were so strong they blew through every crack and crevice in the homes and barns. There was also the psychological effect of living in "treeless" country, which many homesteaders found "unsettling."

To improve this condition, homesteaders began planting trees around their farm

buildings. The United States government encouraged this activity by passing the Timber Culture Act of 1873. If a homesteader would plant trees on a 10-40 acre block of their 160 acre claim, the government would provide title to the land. This offer continued until 1891, when the law was repealed by Congress.

Later during the 1930's, the United States government started another ambitious program to plant belts of trees across the prairie. The purpose of the Prairie States Forestry Project was to establish windbreaks throughout the plains states to protect soils from wind erosion. The project also provided jobs to many unemployed people. When the project came to an end with the beginning of World War II, over 200 million trees had been planted on 30,000 farms. A total of 3,200 miles of windbreaks were planted in 33 counties across the United States. The area covered over 44,000 acres and included 42 million trees.

What Is Their Status In South Dakota?

Driving through the South Dakota countryside, it is still possible to find blocks of trees, now a 100 years old, that were planted as tree claims. In

South Dakota, many farmers have continued to plant belts of trees around buildings and along fields. However, with average farm sizes increasing, thousands of acres of shelterbelts and windbreaks are now being removed. In addition, the trees planted in the 1950's and 60's are beginning to deteriorate and most of these belts are not being renovated. People who live on the Great Plains cannot take this tremendous resource for granted. We must care for our windbreak trees, and continue to plant them so that we will always have the trees and the benefits they provide.

Why Weren't Trees Here Before?

There are several reasons why the prairie was a grassland rather than a forest. The dry climate, natural fires and grazing were responsible for keeping the forest in check. The grasses themselves compete very vigorously for water and nutrients with young trees. In a windbreak, trees are protected from these problems. The trees are watered for a year or two until they become established, fires are controlled and the windbreaks fenced to prevent livestock from trampling and eating the young plants. As you drive through South Dakota, notice that the windbreaks receiving care are the ones growing best. Windbreaks that are not receiving any weed or grass control and have livestock grazing in them, are dying.

Another reason windbreak trees survive in areas without a natural forest is because these trees are planted; they did not grow on the site from seed. Trees, like most life forms, are most vulnerable when young. A seed has to have certain conditions in order to germinate. Once beyond the seedling stage, the conditions required to grow are not as exacting.

Why Are Windbreaks Important?

Windbreaks provide a variety of benefits to people. By reducing the force of the wind, they cut fuel costs in homes and

farm buildings. They also protect livestock. Studies have shown that livestock gain more weight when protected from the full fury of the winter winds. Windbreaks also protect fruit trees from the abrasive soil particles that are carried by strong winds. Crops do better when sheltered from hot, drying winds, increasing yields by up to one-fourth. A properly designed windbreak can direct the placement of snow, reducing the need to plow roads.

Windbreaks provide critical habitat for wildlife in farmed areas, such as eastern South Dakota, where they may provide the only meaningful woody plant habitat in the agricultural landscape. The value that wildlife gain from windbreaks depends on the size, density, plant diversity, and location of the windbreak.

Windbreaks are important reproductive sites for many species of South Dakota wildlife. Game birds such as ring-necked pheasant, sharp-tailed grouse and many songbirds use windbreaks for nesting. Mammals that use the windbreak habitat for their young include fox squirrels cottontail rabbits and white-tailed deer.

Plants in windbreaks provide essential protective covering and food for many wildlife species. Potential foods available from the windbreaks are fruits, nuts seeds, foliage and twigs, buds, insects, and other invertebrates. Deer and squirrels especially rely on the acorns and nuts. Colorado blue spruce, Russian olive, and Siberian elm are important windbreak food sources for many songbirds, and will be used by pheasants, deer and grouse that are under stress.

Windbreaks are also used as corridors by wildlife to get from one habitat to another. These sheltered areas are used for cover from predators and routes for safe dispersal for adults and young. The protection provided by windbreaks is especially important during severe weather.

What Trees Are Planted As Windbreaks?

Many of the trees first used in windbreak plantings were taken from the nearby flood plains. Early settlers would often go to the nearest river or stream to dig up trees and transplant them to their farm. Even today, most of our windbreak trees are native species, green ash, hackberry, cottonwood, ponderosa pine, Black Hills spruce, Rocky Mountain juniper, and eastern redcedar. These trees are fast growing and can survive our climate extremes.

Usually native tree species make the best windbreak species, but sometimes trees are brought in from other areas. There are areas of the United States and the world that have climates similar to South Dakota and trees have been tried from these places. One example is the Siberian elm.

How Are Windbreaks Designed?

Location around the home, outbuildings and fields is the first consideration in planning a windbreak. Secondly, the number of rows must be considered. Generally, five to seven rows are sufficient, with more needed if quality wildlife habitat is desired. The height of the tallest trees used determines the area of protection. The distance that protection extends on the leeward side of the windbreak is proportional to the windbreak height, and is commonly expressed in those terms, or H's. The following diagram (Figure 1) from a 1965 Extension Circular, *Shelterbelts For South Dakota*, shows a cross section of a typical 10-row, farmstead shelterbelt. While the general structure holds true today, the list of tall trees in rows 6-8 has been somewhat reduced. For various reasons, American elm, cottonwood, and Siberian elm are no longer recommended. Soft maple and willows should only be used on sites with adequate moisture available in the soil.

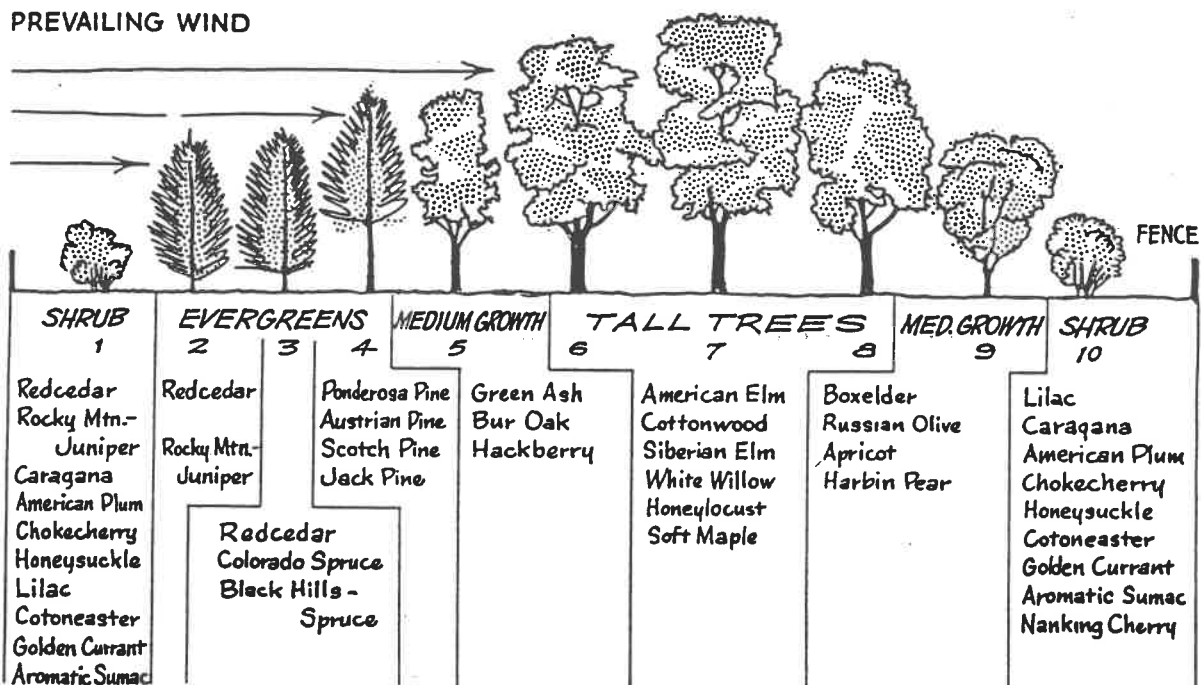


Figure 1: Cross Section of a Typical Farmstead Shelterbelt

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Resources for Teachers

South Dakota's Forests, a video by the South Dakota Society of American Foresters, Spearfish, SD, grades 4-12.

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Illustration taken from *Shelterbelts for South Dakota*, Extension Circular.