Maintenance

It is critical that livestock be excluded from an OLB with a stout fence or electrified fence at least 20 feet away from the trees. This will protect the trees from grazing and rubbing. Continue control of weeds and other plants until the canopy closes and effectively shades out competition.

The object of an OLB is to create a continuous barrier. Gaps in the planting will funnel wind and snow into the protection pocket.

Summary

There are many areas of open grasslands and pasture that could offer excellent livestock grazing, if protection from adverse weather is provided. Investing in long-term structures that increase livestock survival, reduce winter and summer stress, decrease feed costs, and provide wildlife habitat is a wise investment. An outdoor living barn may be the answer.

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Outdoor Living Barn

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Division of Resource Conservation and Forestry

Outdoor Living Barn: A Specialized Windbreak

In South Dakota, severe winter storms or spring blizzards have killed newborn calves and stressed animals. These losses could have been reduced had protection, such as outdoor living barns (OLB), been provided to reduce windchill. An OLB is a specialized windbreak composed of trees and shrubs, strategically located in open grasslands, center pivot irrigation corners, or pasture areas to protect livestock during severe storms.

The purpose of an OLB is to: 1) diffuse and deflect cold winds away from livestock, moderating windchill; and 2) trap and hold snow, preventing it from covering feed, water and livestock. OLB pay for themselves by reducing livestock losses, cutting feed costs, and sustaining animal health during harsh weather conditions.

Design

The following OLB designs are guidelines and should be adjusted to meet landowner objectives, and local conditions and constraints.

Shape: Normal shapes are typically a "U" form or an inverted "L" as shown in figure 1.

Figure 1 – Various design configurations for outdoor living barns.

Orientation: The windbreak needs to be perpendicular to normal winter and early spring wind direction.

Number of rows: Typically, plantings contain three to five rows; however, more rows may be required the further north you are. To control high snow levels, design outdoor living barns with a "trip row" to trap snow before it reaches the windbreak. Design the trip row to attain a 60-80 percent density and locate at least 100 feet upwind from the outside row of the windbreak. Figure 2 shows an example OLB with trip row.

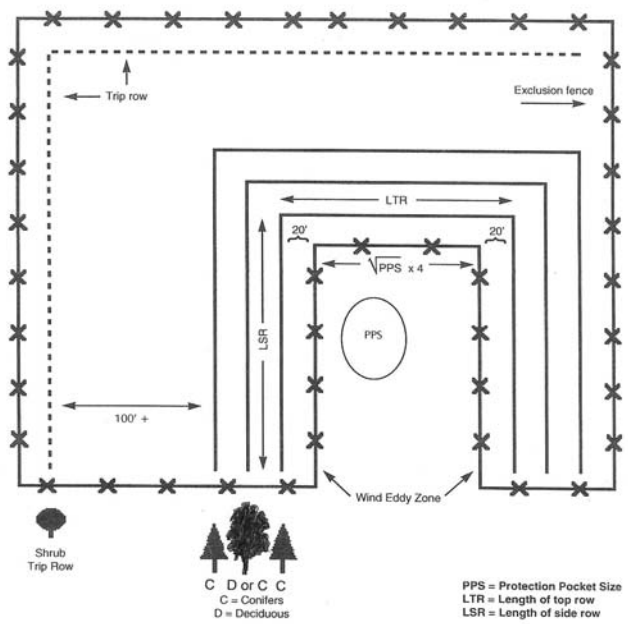

Figure 2 – Possible Outdoor Living Barn design with trip row.

Length: Length is dependent on the number of animals requiring protection and the minimum area requirements of confined livestock (table 1).

Table 1: Minimum area requirements for livestock in confined areas.

	Cattle		Sheep	Swine
	Beef	Cow/Calf		
Area Requirement (ft^2/animal)	25-35	40	8-10	15-20

Example

Design an OLB for 50 brood cows held in an open pasture. Assume that the landowner wants a three-row design with a "trip-row" (figure 2), and 20 year deciduous tree height (H) of 20 feet. First, determine interior top and side row lengths. Measurements of the inside rows are calculated as follows (figure 2):

1. Protection Pocket Size (PPS) – the minimum size of area for confined livestock:
   Formula: # livestock X required area (table 1) =PPS
   Example: 50 brood cows X 40 ft^2 = 2000 square feet
2. Length of interior top row (LTR)
   Formula: ($\sqrt{PPS}$ x 4) + 40 ft = LTR
   Where: the square root of the PPS multiplied by 4 represents the length outside of the exclusion fence on the interior of the outside living barn, to allow the herd to roam. The addition of 40 feet is the sum of the added distance required for location of the fence (20 feet for both ends).
   Example: ($\sqrt{2000}$ x 4) + 40 ft = (45 x 4) +40 = 220 ft (LTR)
3. Length of interior side rows (LSR)
   Formula: $\sqrt{PPS}$ + 10(H) + 100 ft = LSR
   Where: 10(H) equals ten times the 20 year height of the tallest tree in the OLB, 100 feet is recommended to reduce wind eddy effects and keep "end drift" out of the OLB.
   Example: $\sqrt{2000}$ +10(20) + 100 ft = 45 + 200 +100 = 345 ft (LSR)

The calculated LTR and LSR are 220 feet x 345 feet, respectively (figure 2). Now the remaining outside rows can be established using "between row" distances. The formulas for LTR and LSR present above are guidelines, and should be adjusted on an individual project basis to provide proper dimensions. When designing an OLB it is important that the dimension 1) meet landowner objectives; 2) are adjusted to accommodate animal species and site conditions: 3) allow adequate space for feeding and a water source: and 4) provide maximum protection from severe local weather events.

Species

A mixture of tree and shrub species is recommended. The windbreak effectiveness (percent of wind speed reduction) is determined by height and density. Deciduous tree species will provide height attribute, while coniferous tree species are best for regulating lower level density. An OLB with a "trip row" should have a density of 40 to 60 percent; otherwise, the density should be 60 to 80 percent.

Location

Livestock drift with the wind of the storm. Therefore, locate the OLB in the area of the pasture where the livestock will congregate during a typical storm and as close to water as possible. In addition, the OLB should be accessible by vehicle to facilitate livestock feeding and veterinary services during extreme weather. It is important that surface water drainage be away from the protection pocket to keep livestock dry.