Replaced by MN Sept 2009 ver.

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WINDBREAK/SHELTERBELT ESTABLISHMENT
(Feet)
CODE 380

DEFINITION

Linear plantings of single or multiple rows of trees or shrubs or sets of linear plantings.

PURPOSE

- To reduce soil erosion from wind.
- To protect plants from wind related damage.
- To alter the microenvironment for enhancing plant growth.
- To manage snow deposition.
- To provide shelter for structures, livestock, and recreational areas.
- To enhance wildlife habitat by providing travel corridors.
- To provide a tree or shrub product.
- To provide living noise or visual screens.
- To provide living barriers against airborne chemical drift.
- To improve irrigation efficiency.
- To enhance aesthetics.
- To increase carbon storage.

CONDITIONS WHERE PRACTICE APPLIES

On any areas where linear plantings of woody plants are desired and suited.

CRITERIA

General Criteria Applicable To All Purposes Named Above

- The location, layout and density of the planting will accomplish the purpose and function intended within a 20-year period.
- The maximum design height (H) for the windbreak or shelterbelt shall be the expected height of the tallest row of trees or shrubs at age 20 for the given site.
- State and local regulations must be followed in locating plantings adjacent to roadways. Avoid creating blind corners at road intersections.
- All plantings will be assessed for their potential to cause snow drifting onto public roadways. Appropriate setback distances will be calculated for all plantings on the north and west sides of roadways. Plantings on the south and east sides of roadways will be evaluated for back drifting of snow and creating shade patterns which reduce snow and ice melting. Avoid sites that will deposit snow on roadways unless additional plantings are placed upwind to mitigate snowdrift problems.
- Where subsurface drains (tile lines) cross through a planting, sealed conduit will be installed a minimum of 100 feet from rows of large spreading trees and 75 feet from all other trees and shrubs.
- Avoid planting trees or shrubs where they will interfere with structures or any above or below ground utilities.
- Avoid planting in areas of contaminated soil including areas affected by concentrated feedlot runoff, divert feedlot runoff away from the planting.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

- The planting will be protected from adverse impacts such as livestock damage or fire.

Windbreak Design Density

- Windbreak design density will vary based on the planned function of the barrier. Plant densities for
- trees and shrubs will depend on their growth habit, growth rate, and potential height at 20 years of age. Heights may be estimated based on: 1) performance of the individual species (or comparable species) in nearby areas on similar sites, or 2) predetermined and documented heights using Section II-N of the FOTG, Windbreak Suitability Groups.

- Total windbreak density is a function of the number of rows in the planting, the species and spacing used, and the season (leaf-on versus leaf-off). See Figure 1 for examples of windbreak density.

1. Spacing Between Rows

- Spacing between adjacent rows can vary or be uniform. If plantings are to be cultivated, plan the row spacing wide enough for maintenance equipment to operate freely between rows. Usually this requires about 4 feet more than the width of cultivation equipment.

Row Types/Heights	Minimum Row-to-Row Spacing
Between Shrubs less than 10 feet in height	10 ft
Between shrubs and small trees from 10 to 25 feet in height	12 ft
Between Small Trees less than 25 ft in height	12 ft
Between small and tall trees greater than 25 ft in height	16 ft
Between tall trees greater than 25 ft in height	16 ft
Between any wide crowned species and conifers	20 ft
Between faster growing species and conifers	20 ft

- Maximum row spacings will depend on site conditions and planned barrier function but will not exceed 20 feet. Exceptions to these spacings include the use of vegetation as a snow catch and where the landowner plans to remove every other row before crowding starts.

2. Spacing Within Rows

- Spacing between plants within any given row is generally uniform, unless species changes occur. Planting density recommendations are:

Plant Types/Heights	Plant-to-Plant Spacing in feet
Shrubs less than 10 feet in height	3 to 6
Shrubs and trees from 10 to 25 feet in height	5 to 10
Trees greater than 25 feet in height	8 to 16

- Where plantings exceed the minimum design criteria, through the use of additional rows, plant to plant spacings up to 20 feet may be planned for appropriate species.

- See Table 2 for spacing recommendations of individual species.

- Closer spacings result in providing protection in the shortest period of time. Where appropriate, plantings with narrow spacings can be designed with a thinning recommended to achieve the ultimate spacing.

3. Plant to Plant Spacing in Adjacent Rows

- Spacing all rows at a uniform spacing creates undesirable gaps in multi-row windbreaks. Uniform staggering of rows creates diagonal gaps. Plant to plant spacings of adjacent rows should be varied to eliminate gaps and achieve the designed function.

4. Twin Row - High Density Designs

- Twin row, high-density plantings may be used as an alternative design in appropriate settings. This design will consist of two closely spaced rows (4 to 10 feet row-to-row spacing) using tightly

spaced plants (4 to 10 feet between plants). With this design use only species having similar growth rates, crown characteristics, life spans, and those resistant to diseases in close grown conditions. The most widely used species for this design include most shrubs, red cedar, and northern white cedar. When mature each twin row will appear and function as a single, thick row of vegetation.

- Use of a multiple twin row design can be very effective in reducing snow loading. Spacing between twin rows shall vary from 25 to 100 feet to achieve the desired objective, see Figure 2.

Species Selection

- Species must be suitable and adapted to the soils, climate, site conditions, and the planned practice purpose. Refer to the NRCS Field Office Technical Guide Section II-N for a detailed listing of species suited to the soils at the site.

- Where a portion of a planting has variable on-site conditions (such as pockets of high pH soils, high water table soils, an area subject to inundation, depressional areas, wetlands or other environmental condition(s) tree and shrub species should be selected to compensate for the unique site characteristic(s).

- Multiple row plantings should contain a variety of species to lessen the chance of loss due to species specific insects or disease.

- Alternating species, either trees or shrubs, within the same row is only recommended if the species used have similar growth habits and their projected height (H) at 20 years of age is within 10%.

- In multiple row plantings the species with the shortest 20 year height and slower growing species should be planted in outer rows so they are not overtopped by fast growing and taller species.

- In multiple row plantings, containing more than 3 rows, the leeward rows may be planted in groups or segments containing 5 or more plants of one species in a series to enhance wildlife values.

Planting Stock

- Only viable, high quality and adapted planting stock will be used. All planting stock will conform to requirements according to current "American Standards for Nursery Stock" adopted by the American Association of Nurserymen (ASA Z60). See Table 1 for detailed guidance on age and size classification by species.

- Planting stock must be of known origin.

Planting Site Preparation

- Site preparation shall be sufficient for establishment and growth of selected species and appropriate for the site. Necessary site preparation shall be done at a time and manner to insure survival and growth of planted species. In all cases trees and shrubs shall be planted into prepared sites free of weeds, grass, and all other herbaceous vegetation.

- Planting sites shall be properly prepared based on the soil type and vegetative conditions listed below. Avoid sites that have had recent applications of pesticides harmful to woody species. If pesticides are used, apply only when needed and handle and dispose of properly and within federal, state, and local regulations. Follow label directions and precautions listed on containers.

- Based on the site conditions and soils procedures to prepare sites include:

1. Sod and Alfalfa

- Till (moldboard plow, disk plow, rototiller or similar equipment) in the fall before planting. If needed to control erosion, seed a temporary cover crop and/or perform tillage on the contour or cross-slope.

- Sod may be killed by non-selective herbicides. These herbicides are most effective when used in the year prior to planting with stock planted into the residue. On heavy soils, tillage is usually necessary to achieve a satisfactory planting when a tree planting machine is used.

2. Small grain or row crop sites

- If the site is in row crop, till (moldboard plow, disk plow, rototiller or similar equipment) in the fall or in the spring prior to planting. If the site has a plow pan or hard pan in the subsoil perform a deep disking or ripping operation in the fall. If needed to control erosion, seed a temporary cover crop and/or perform tillage on the contour or cross-slope.

- If the site is in small grain stubble or soybean residue, planting can be done in the spring without further preparation. If geotextile fabric or other mulch materials are to be installed, till the soil in the spring prior to planting and installing the mulch.

3. On sites where: it is not practical or possible to operate equipment; where tillage of the site will cause excessive erosion; where potential abrasion of seedlings due to wind blown soil exists; or where tillage of the site is impractical the methods listed below may be used.

- Machine or hand scalp an area at least 36 inches in diameter and place planted stock in the center of the scalped area.

- Rototill a strip at least 36 inches wide the year prior to planting and plant stock in the center of the tilled area.

- Kill the vegetation in a 36-inch diameter or larger area with a non-selective herbicide. This is most effective when done the year prior to planting. Plant the stock in the center of the treated area.

- Sites with undesirable brush will need initial treatments that physically removes and kills the brush species to facilitate planting of desired stock and prevents re-encroachment of the brush. Suitable methods include hand-cutting and removal, brush hogging, brush blading, or other equivalent procedure with repeated treatment or use of herbicides to control resprouting.

4. Temporary Cover Crops

- Temporary cover crops may be required for erosion control and weed suppression when seedlings are not available, the normal planting period has passed, chemical residues are likely to carry-over in the soil, steep slopes, erosive soils, or other site conditions exist. Temporary cover crops are an interim ground cover and proper site preparation is required prior to planting.

Alternative Temporary Cover Crops

Crop	Rate/acre
Small grains (Oats, Wheat, Barley, Rye)	1 ½ to 2 ½ bu.
Perennial rye	8 lbs.
Timothy	2 to 3 lbs.

Mulch Materials

- Geo-textile fabric, tree mats and other appropriate organic mulch materials may be used for weed control and moisture conservation for new plantings on all sites.

- Acceptable mulches, fabric, or mat materials must allow for water infiltration and air movement. Fabric mats will be a minimum of 3 feet by 3 feet in size and properly secured. Manufactured fabrics and tree mats must have a serviceable lifespan of at least 36 months.

- When organic mulches are used the material shall be placed in a minimum 4 inch deep layer and at least a 2 foot wide radius around the seedling. Organic mulches should be kept at least 6 inches away from the main stem of trees and shrubs to discourage adverse feeding and damage by mice and rodents.

Planting Methods

- All plantings will be done in a manner to promote maximum survival and seedling growth. Plant seedling in a nearly vertical position with the root collar at or no deeper than 1 inch below the soil surface.

- Protect seedling roots from drying during all operations. Pack soil around newly planted seedlings to eliminate air pockets.

- Plantings using bare rooted stock and non-rooted cuttings should be made in the spring as soon as possible after the frost leaves the ground but no later than June 1.

- Containerized and balled and burlap stock may be planted in frost free ground provided soil moisture is adequate.

- To assure proper alignment of rows and spacing the windbreak should be staked or laid out prior to planting.

- Moisture conservation or supplemental watering shall be provided for plant establishment and growth where natural precipitation is too low for the selected species.

Additional Criteria To Reduce Wind erosion; Protect Growing Plants

- The windbreak will be oriented as close to perpendicular to the troublesome wind as possible.

- The interval between windbreaks shall be determined using current, approved, wind erosion technology. Interval widths shall not exceed the planned purpose of the practice including that permitted by the quality criteria level for the 1) plant resource or 2) the soil resource or 3) other planed soil loss objective.

- Plants are protected in the sheltered area provided by the barrier. The sheltered area is defined as 10 times the design height (H) on the leeward side and two times the design height (H) on the windward side of the windbreak.

- For wind erosion control, the minimum barrier density will be 40%. This can be achieved through use of properly spaced plants within a single row windbreak comprised of species from Table 3.

- The wind erosion control system should consider temporary measures to supplement the windbreak until it is fully functional.

Additional Criteria to Manage Snow

- The windbreak will be oriented as close to perpendicular to the snow-bearing wind as possible.

- For snow distribution, the minimum windbreak density will be 25% and the maximum windbreak density will be 65% and the interval between barriers will not exceed 20H.

- For snow accumulation, the barrier density and appropriate set back distance will be determined on a site specific basis using the design criteria found in the "Catching the Snow with Living Snowfences" guidebook. All designs will be calculated utilizing at least a 64-inch annual snowfall accumulation.

- Effective designs for this function generally include a densely planted shrub row or the twin row high density planting.

- Windbreaks will be located so that snow deposition will not adversely impact the area to be protected.

- Multiple row plantings for snow accumulation will be designed so that snow deposition will not adversely impact plants located in downwind rows.

- The minimum calculated set back distance for windbreaks protecting roadways from snow accumulation will be measured perpendicular from the road right-of-way to the downwind row of the windbreak, see figure 2.

Additional Criteria To Provide Shelter For Structures, Livestock, and Recreational Areas

- The planting will be oriented as close to the troublesome wind as possible.

- For wind and snow protection, the minimum barrier density will be 65% and the area to be protected will fall within 10H. The minimum barrier density can be achieved with a minimum of 3 rows of non-deciduous conifers or 2 rows of non-deciduous conifers and a dense shrub row. Appropriate hardwoods and deciduous conifer species can be substituted for non-deciduous conifers at a ratio of 2 rows to 1. All plantings for this purpose will contain at least one row of non-deciduous conifer species and a dense shrub row.

- If sufficient space is available a dense single or double row of shrubs planted 40 to 100 feet windward of the windbreak, may be planted to create a snow trip. An effective snow trip will: a) reduce snow deposition and potential snow damage of plants within the windbreak; b) allow placement of the windbreak closer to the area being protected and; c) reduce the minimum number of rows in the windbreak by one.

- Drainage of snowmelt from drifts associated with the windbreak shall not flow across the livestock area.

Set-back Distance For Structures

- The distance from farmstead buildings or feedlot to the outside row of the windbreak will be determined by the Annual Wind Erosion Climatic Factor ("C" Factor) assigned to each county. The minimum setback distance for counties having a "C" Factor greater than 15 will be 175 feet. The minimum setback distance for counties having a "C" Factor less than 10 will be 100 feet.

- A setback distance of 175 feet is desirable in all locations. Where property lines or other features will not allow the minimum set-back or where winds will be significantly reduced by existing topography or large blocks of existing forest cover the minimum set-back of 100 feet may be used.

- An alternative method to determine the appropriate set back distance for structures can be calculated by using a 64 inch annual snowfall accumulation in the design process found in the "Catching the Snow with Living Snowfences" guidebook.

Additional Criteria for Screens

- Noise screens shall be at least 65% dense, as tall as, and as close to the noise source as practical. To mask high-speed traffic noise the barrier will be at least 100 feet in width.

- The length of the noise screen should be twice as long as the distance from the noise source to the receiver.

- Visual screens shall be located as close to the observer as possible and will be of sufficient density to provide an adequate visual screen.

Additional Criteria For Improving Irrigation Efficiency

- For sprinkler irrigation systems, the windbreak shall be as tall as the sprinkler heads.

- The barrier shall not interfere with the operation of the irrigation system.

Additional Criteria To Enhance Aesthetics

- Aesthetics may be enhanced by planting evergreens or species with showy flowers, brilliant fall foliage, or persistent colorful fruits.

CONSIDERATIONS

- Older age and medium to larger size planting stock, including bare rooted, transplants, balled and burlap and container grown stock, are recommended in single row and minimum design windbreaks. Death loss is more critical in these designs and larger and older planting stock may provide an advantage in survival rates.

- Favor the use of seedlings certified through the Minnesota Crop Improvement Association (MCIA). Refer to Plant Materials Technical Note #4 for information on certified seedlings.

- When available recommend planting stock with known superior traits and named varieties, such as those released through the Plant Materials Program.

- Spacing between windbreaks and rows of windbreaks may be adjusted within limits of the criteria above to accommodate widths of equipment.

- Selection of plants for use in windbreaks should favor species or varieties tolerant to herbicides used in the area.

- Where pesticide spray drift from adjacent cropland could adversely effect windbreak plants consider establishing a 10 foot wide tall grass barrier adjacent to and immediately upwind of the windbreak.

- Plants which may be alternate hosts to undesirable pests should be avoided.

- All plantings should compliment natural features.

- Where water erosion and/or runoff from melting snow is a hazard supporting practices should control it.

- Wildlife needs should be considered when selecting tree or shrub species. Refer to Biology Technical Note #4 "Wildlife Habitat Evaluation System" for wildlife habitat assessment guides for shelterbelts, and field windbreaks.

- Species diversity should be considered to avoid loss of function due to species specific pests.

- If appropriate consider and encourage the use of native species. Do not favor native species if they
- are not capable of providing the designed windbreak function. Refer to Standard 645, Wildlife Upland Habitat Management for information on native trees and shrubs.

- Consideration should be given to adverse offsite effects.

- Plants established within cropping systems that have root systems which adversely effect crop growth can be root pruned, refer the standard 650, Windbreak/Shelterbelt Renovation.

PLANS AND SPECIFICATIONS

- Specifications for this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documentation.

- Documentation shall specify the requirements for installing the practice, such as the kind, amount or quality of materials to be used, or the timing or sequence of installation activities. Requirements for operation and maintenance of the practice shall be incorporated into site specifications.

OPERATION AND MAINTENANCE

- The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation) and repair and upkeep of the practice (maintenance):

- Replacement of dead trees or shrubs will be continued until the barrier is functional.

- Vegetative competition will be controlled.

- Thin the barrier to maintain its function.

- Damaging pests will be monitored and controlled. Repellents, poisons, tubing, netting and cages of various kinds may be needed to control rodents and animal damage.

- Periodic applications of nutrients may be needed to maintain plant vigor.

- Refer to Standard 612, Tree/Shrub Establishment for additional information on the age, size, handling, storage and quality of planting stock.

- Livestock shall be controlled or excluded as necessary to achieve and maintain the intended purpose.

- Harmful pests present on the site shall be controlled or eliminated as necessary.

- The windbreak will be inspected periodically, protected and restored as needed from adverse impacts such as excessive traffic, pest infestations, pesticide use on adjacent lands, livestock use and fire.

- As applicable control of wind or concentrated flow erosion shall be continued in the area up-wind or up-gradient of the windbreak to maintain its function. Following severe storms check for evidence of sediment deposit, erosion or concentrated flow channels. Prompt corrective action needs to be taken to stop erosion.

- Maintain central stem on trees by eliminating forks and multiple leaders.

REFERENCES

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Scholten, H.S., 1989. Field Windbreaks. University of MN, NR-FO-0824, St. Paul, MN.

Scholten, H.S., 1988. Farmstead Shelterbelts - Protection Against Wind and Snow. University of MN, BU-0468, St. Paul, MN.

USDA, NRCS Windbreaks for Conservation, 1997. Agriculture Information Bulletin 339.

USDA, NRCS Windbreak Technology, 1997. NEDC Training Course Handbook, Ft. Worth, TX.

Table 1 - QUALITY GUIDE FOR NURSERY STOCK

AGE AND SIZE GUIDE

CONIFERS	AGE CLASS	RANGE STEM CALIPER	HEIGHT RANGE	ROUTE 1/ LENGTH
Austrian pine	2-1, 2-2	7/32-24/32	6-9"	7-10"
Black Hills spruce	3-2, 2-3	7/32-24/32	6-9"	7-10"
Blue spruce	2-2, 2-3	7/32-24/32	6-9"	7-10"
Eastern redcedar	2-0, 3-0, 2-1	7/32-16/32	6-9"	7-10"
Eastern white pine	3-0, 2-1, 2-2	7/32-24/32	6-9"	7-9"
Jack pine	2-0, 3-0	7/32-24/32	9-12"	8-10"
Northern white-cedar	2-0, 3-0, 2-1	7/32-16/32	6-9"	7-10"
Norway spruce	2-1, 2-2	7/32-24/32	6-9"	7-10"
Ponderosa pine	2-1, 2-2	7/32-16/32	6-9"	7-10"
Red pine	3-0, 2-1, 2-2	7/32-24/32	6-9"	7-9"
Scotch pine	3-0, 2-1	7/32-24/32	6-9"	7-9"
White spruce	2-2, 2-3	7/32-24/32	6-9"	7-10"
HARDWOODS				
Common hackberry	1-0, 2-0	7/32-24/32	12-18"	
Green ash	2-0	7/32-24/32	9-12"	
Cottonwoods	1-0 rooted cutting	10/32-1"	12-18"	
Shrubs	1-0, 2-0	6/32-1"	9-12"	
Siberian elm	1-0, 2-0	7/32-1"	12-18"	
Silver maple	1-0, 2-0	7/32-1"	12-18"	
Willows	1-0 rooted cuttings	8/32-1"	12-18"	
Poplars	1-0 unrooted cuttings	3/8-3/4"	10"	
Other hardwoods	1-0, 2-0	7/32-1"	12-18"	

1/ A HIGH PERCENTAGE OF ROOTS SHOULD BE FIBROUS!

Use this guide as a reference when advising landowners as to the size, age and quality of woody plant reproductive materials desirable for use in the establishment of woodland and windbreak plantings.

The age, caliper and height growth specifications shown are for live, healthy plants, dormant, free of disease and insect damage. Plants should be free of any physical damage. Height measurement is the length of the unpruned top. It is permissible to measure roots after pruning.

The first figure in the age class symbol indicates the number of years in the seedbed and the second figure is the number of years in the transplant bed. Example 2-1, means 2 years in seedbed and 1 year in transplant bed.

Stem caliper is taken the greatest stem diameter also called the root collar swell. Height is measured from the ground line (root collar) to the terminal bud.

Table 2 - WITHIN ROW PLANT-TO-PLANT SPACING RECOMMENDATIONS

Table 2 contains information on the spacing recommendations for shrubs, small trees, tall trees, and conifers for use in windbreak plantings, spacing are given in feet. See Section II-N of the Minnesota NRCS Field Office Technical Guide for additional information on which species are suited to the soils at the site. An alternative reference for selecting species to site conditions is the MN Department of Transportation expert system for selecting landscape plants.

Shrubs 3-8	Small Trees (deciduous)	Tall Trees (deciduous)
		Black ash 10-16
Amur privet	American plum 6-10 6/	Black walnut 10-20 3/
Common ninebark	Amur maple 6-10	Common hackberry 10-16 6/
Cotoneasters	Common chokecherry 6-12	Eastern cottonwood 10-20
Honeysuckles 7/	Crabapples 6-12 1/ 6/	Green ash 10-16
Common & Late lilac	Mountain ash 6-12	Honey locust 10-16
Silky & Redosier dogwood	Hawthorn 6-10 6/ 2/	Oaks 10-16
Siberian peashrub (caragana)	Ussurian Pear 8-16	Poplars 8-16 4/
	Apricot 6-10 6/	Siberian elm 10-16
Silver buffaloberry		Silver maple 10-20 5/
Viburnums		White Ash 10-16
Russian Almond		Willows 10-16 4/
False Indigo		
Sandbar Willow	(Conifers) 6-10	(Conifers) 8-16
Chokeberry		
Hazel	Eastern redcedar 2/	Austrian pine
	Northern white-cedar	Black Hills spruce
		Blue spruce
		Douglas-fir
		Eastern white pine
		Jack pine
		Norway spruce
		Ponderosa pine
		Red pine
		Scotch pine
		Siberian larch 6/
		White fir
		White spruce

1/ Subject to fire-blight. Some species may require wider spacings.
2/ May cause a cedar-apple rust problem in nearby orchards.
3/ Do not plant with or adjacent to a row of conifers because of toxic substance (juglone) secreted by walnut roots.
4/ Relatively short lived trees. Consider as a temporary tree. Fast growing.
5/ Should be considered as a temporary tree because they will crowd adjacent rows even when rows are spaced 20 feet or more apart.
6/ Seedlings very susceptible to rabbit damage.
7/ Highly susceptible to aphid damage use only those varieties proven to be resistant to aphids.

Table 3 - RECOMMENDED SPECIES FOR USE IN SINGLE ROW WINDBREAKS

The following list of species are suitable for use in single row windbreaks. See Section II-N of the Minnesota NRCS Field Office Technical Guide for additional information on which species are suited to the soils at the site.

Single row windbreaks.

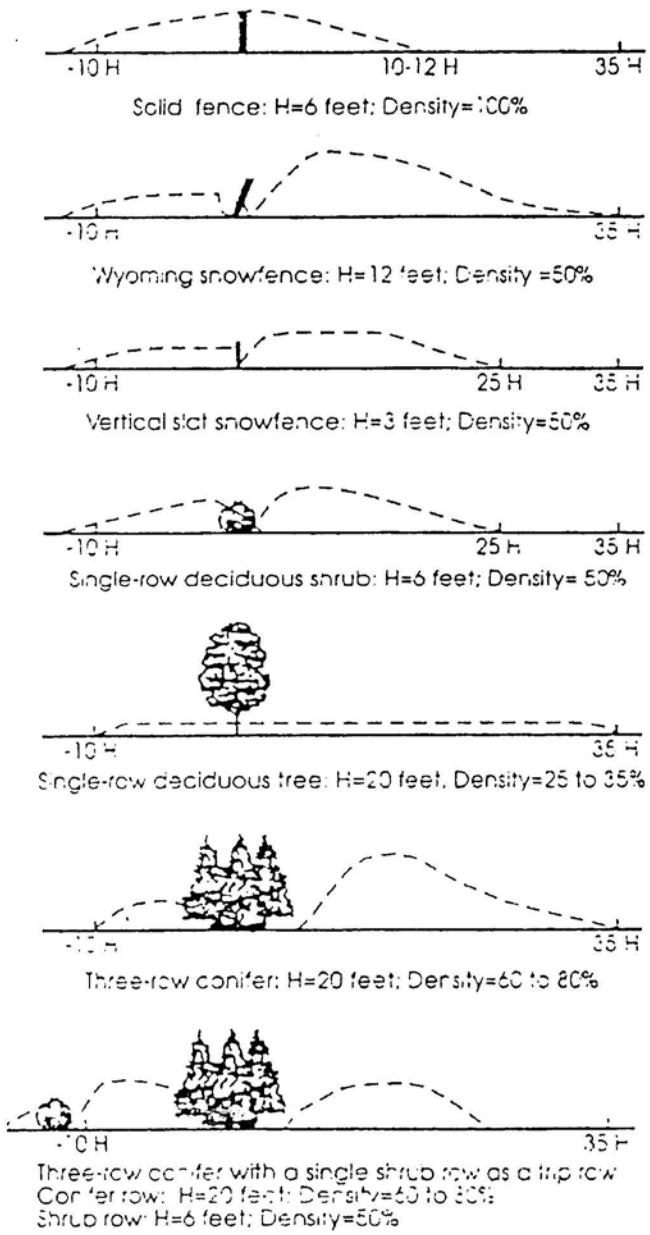
Trees:

Black Ash 1/
Black Hills spruce 1/
Carolina (Norway) poplar 2/
Eastern redcedar 1/
Eastern white pine 1/
Green ash
Hackberry 1/ 3/
Jack pine 1/
Northern white-cedar 1/
Northwest poplar
Norway spruce 1/
Ponderosa pine 1/
Red pine 1/
Robusta poplar 2/
Silver maple 1/
Bur oak
Siberian elm
Siberian larch 1/ 3/
Siouxland cottonwood
White ash
White spruce
Willows (Golden, white, and tall purple) 2/

1/ Rarely used in single row field windbreaks in the past, consequently proper management techniques (spacing, pruning) have yet to be determined. This should not discourage use, if landowners are willing.
2/ Fast growing, but relatively short lived (30-40 years).
3/ Young plantings very susceptible to rabbit damage.

Figure 1 - Examples of Windbreaks and Snowfence Density

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.

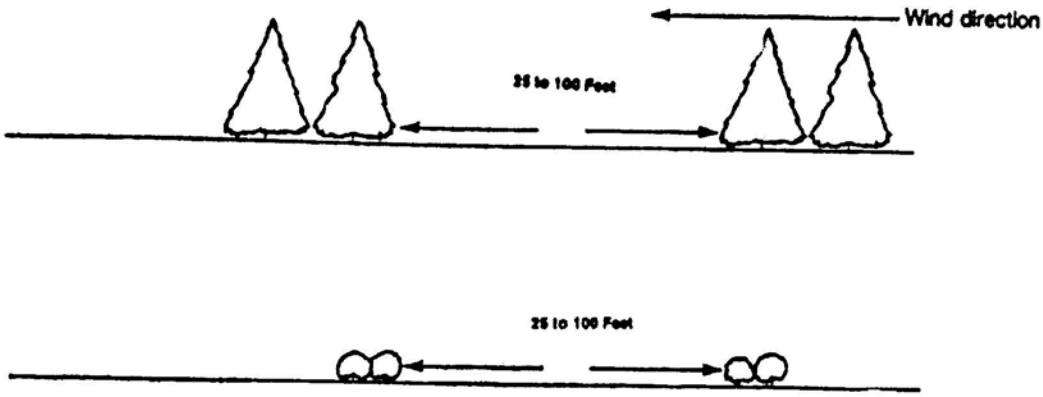



Figure 2 - EXAMPLES OF TWIN ROW HIGH DENSITY WINDBREAK DESIGN