Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

VEGETATIVE BARRIER

Code 601

(Ft.)

DEFINITION

Permanent strips of stiff, dense vegetation established along the general contour of slopes or across concentrated flow areas.

PURPOSE

- Reduce sheet and rill erosion.
- Improve water quality by trapping sediment.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where sheet and rill erosion are resource concerns.

CRITERIA

General Criteria Applicable to All Purposes

Physical Characteristics of Plants.

Stiffness Index. Establish vegetative barriers with vegetation having the minimum Vegetation Stiffness Index (VSI) designated in table 1 measured at a point 6 inches above the ground.

Table 1. Stem Diameter and Minimum Stem Density Values for Vegetation Stiffness Index (VSI) Values of 0.05 and 0.10.

Stem Diameter (Inch)	Stem Density Per Square Foot @VSI=0.05
0.10	500
0.15	100
0.20	30
0.25	15
0.50	10
=/>1.00	1.0

Density. Gaps between plants will be no greater than 3 inches at the end of the first growing season.

Species Selection. Species must be adapted to local soil and climate conditions, be easily established, long-lived, and manageable.

Select species which exhibit characteristics that are required for adequate functions, such as, emergence though several inches of sediment or resuming growth from buried stem nodes, rhizomatous or stoloniferous growth habit, and stems that remain intact and erect year-round

Establishment. Barriers may be established vegetatively or from seed.

Seeding dates, depths, and rates will be appropriate for the species selected and the conditions of the site. Seeds will be placed to ensure good seed-to-soil contact.

Barriers established vegetatively will be planted at a density to ensure a functional barrier as quickly as possible (usually two growing season). For most herbaceous species, this will require a spacing in the row of no more than 6 inches for bare-root seedlings, cuttings, sod chunks, plugs, rhizomes, or divisions consisting of no less than 5 viable stems. Suckering shrubs or herbaceous species established from 6-inch (gallon) potted material will be established at a spacing in the row of no more than 12 inches.

Site preparation must be sufficient to ensure seed germination or proper rooting conditions for vegetated material establishment. Plants will be placed to ensure good root-to-soil contact and packed after planting.

Plan appropriate site stabilization measures when needed, during the barrier establishment period.

Barrier Width. The mature barrier widths will be the largest of 3 feet wide or 0.75 times the design vertical interval. Broadcast or drilled seed will be sown in a strip at least 3 feet wide. Seed sown with a row planter will be seeded in a minimum of 2 rows.

Do not use vegetative barriers as a field road or turn row.

Additional Criteria for Reducing Sheet and Rill Erosion

Gradient. Gradients along the barrier will be no less than 0.2 percent and no greater than 1.0 percent except where the vegetative barrier crosses concentrated flow areas. Gradients entering a concentrated flow area may be up to 1.5 percent for 100 feet in order to get better row alignment.

All tillage and equipment operations in the interval between barriers will be parallel to the vegetative barrier.

A berm must exist at the upslope edge of the barrier and/or a channel must exist immediately upslope of the barrier to divert water along the vegetative barrier. Minimum berm height/channel depth will be 3 inches. Water flowing along a vegetative barrier berm/channel must be delivered to a stable outlet.

Spacing. Horizontal spacing between the vegetative barriers will be determined using the lesser of:

- The horizontal distance between barriers when the vertical interval is 6 feet, or
- The water erosion planning length of slope “L” that achieves the allowable soil loss for the field, considering the planned practices in the conservation management system.

Crop strip width will be planned in multiples of widths of planting, tillage, spraying, and harvest equipment. This spacing may be adjusted up to 10 percent between the barriers.

Vegetation. The vegetation will be of species to provide the designated minimum stem density with the designated stem diameter and have a minimum VSI of 0.05. See table 1 for guidance.

Additional Criteria for Trapping Sediment

Location and Alignment. Barriers will be aligned as close to perpendicular as possible to flow coming off the fields or out of the ends of furrows.

Width. Vegetative barriers for this purpose will be a minimum of 3 feet wide.

CONSIDERATIONS

General Considerations

This practice is not well-suited to soils that are shallow to rock or other restrictive layers and where tillage is used on the cropped strips. The “benching” process that occurs on slopes where barriers are installed (tillage erosion moves soil from the upper part of the cropped strip, which then accumulates in the lower part of the cropped strip) can expose soil material unfavorable for crop growth.

Management practices such as Conservation Crop Rotation (code 328) and the residue and tillage management practices (codes 329 and 345) should be considered in designing the conservation management system on cropland.

Practices such as water and sediment control basins, subsurface drainage, and underground outlets may be needed to adequately handle surface and subsurface water.

This practice may improve the efficiency of other practices such as stripcropping, filter strips, riparian forest buffers, grassed waterways, diversions and terraces.

On tilled fields, consider soil profiles that have sufficient depth to retain productivity where benches will develop as soil is moved down gradient by tillage. Soil upslope of barriers will gradually build up while soil will be removed down slope of the barrier. The effect of this movement should be considered with respect to soil depth, subsoil characteristics and response to amendments.

Established vegetative barriers systems can pond water above the barriers. Subsurface drains may need to be installed across the slope parallel to the barrier, or through the ponded areas above barriers that are installed across concentrated flow areas.

When compatible with the purposes and criteria for this practice, plant materials can be selected to attract undesirable insects away from crops or desirable insects that are beneficial to the adjacent crops.

When compatible with the purposes and criteria for application of this practice, plant materials can be selected that enhance food and cover for targeted wildlife.

When compatible with the purpose and the barrier vegetation avoid conducting activities within the barrier during the nesting season to minimize illegal take of birds, nests, and eggs.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for each field site where a vegetative barrier will be installed. Record practice specifications on the Vegetative Barrier Implementation Requirement document. Plans and specifications will include:

- Field map with location of vegetative barriers
- Purpose of the barrier
- Width of crop strip
- Vegetative barrier and crop strip orientation
- Width of barrier
- Vegetative species and cultivar
- Establishment date, establishment method, seeding rate (when seeded) or spacing of vegetative planting stock
- Site stabilization, if needed to ensure establishment

OPERATION AND MAINTENANCE

The following actions will be carried out to ensure that this practice functions as intended. These actions include normal activities in the application and use of the practice and repair and maintenance of the practice.

- Establishment failures will be replanted or reseeded immediately; short gaps in seeded barriers may be reestablished more effectively and immediately with transplanted plant material.
- Mowing of herbaceous barriers may be used as a management practice to encourage the development of a dense stand and prevent shading of crops in adjacent fields. Mow at a 15-inch stem height, or the recommended height for the species, whichever is taller.
- Barriers may be burned (where permitted), if the species used will tolerate fire. Carry out burns just prior to the spring regrowth period, while the vegetation is dormant. All burns will be conducted in accordance with a smoke/burn management plan.
- Control any plant on the Federal or State noxious weed list. Control other weeds as necessary to ensure a dense stand within the barrier.
- Perform pest control with techniques and pesticides that will not irreversibly damage the vegetative barrier.
- Washouts or rills that develop will be filled and replanted immediately. Short gaps in established barriers will be reestablished with transplanted plant material.

REFERENCES

Dabney, S.M., Z. Liu, M. Lane, J. Douglas, J. Zhu and D. C. Flanagan. 1999. Landscape benching from tillage erosion between grass hedges. Soil Tillage Res. 51:219-231.

Dewald, C., J. Henry, S. Bruckerhoff, J. Ritchie, D. Shepard, J. Douglas, and D. Wolfe. 1996. Guidelines for the establishment of warm season grass hedge for erosion control. J. Soil Water Conserv. 51(1):16-20.

Douglas, J.L., and C.E. Mason. 1996. An alternative erosion control practice for cropland. Jamie L. Whitten Plant Materials Center Progress Report. 12(7).

Dunn, G.H., and S.M. Dabney. 1996. Modulus of elasticity and moment of inertia of grass hedge stems. Trans. ASAE 39(3):947-952.