

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD

FILTER STRIP

(Ac.)

CODE 393

DEFINITION

A strip or area of herbaceous vegetation that removes contaminants from overland flow.

PURPOSE

- Reduce suspended solids and associated contaminants in runoff.
- Reduce dissolved contaminant loadings (including nitrate and phosphate) in runoff.
- Reduce suspended solids and associated contaminants in irrigation tailwater.

CONDITIONS WHERE PRACTICE APPLIES

Filter strips are established where environmentally-sensitive areas need to be protected from sediment, other suspended solids and dissolved contaminants in runoff.

This practice applies:

- In areas situated down slope of cropland, grazing land, livestock loafing lots, or disturbed land (including forest land) adjacent to environmentally sensitive areas
- State regulations require a “vegetative buffer” between agricultural fields and certain environmentally sensitive areas. The use of Virginia Conservation Practice Standard *Filter Strip (Code 393)* may not be interchangeable with state regulations.

CRITERIA

General Criteria Applicable to All Purposes

Locate the filter strip along the downslope edge of a field or disturbed area.

Ensure overland flow entering the filter strip is

a uniform sheet flow.

Ensure the drainage area above the filter strip has a slope greater than 1% but less than 10%.

The filter strip slope will be equal to or less than the slope of the drainage area, but must not exceed 5%.

Place the filter strip on the contour to the extent possible. The placement should not vary from the contour more than one-half the up and down filter strip slope percent.

Grazing of the filter strip is not allowed.

The filter strip must be a minimum of 35 feet.

Vegetation. Establish permanent herbaceous vegetation in the filter strip.

Do not plant state-listed noxious plants in the filter strip. Do not use filter strips as a travel lane for equipment or livestock.

Use the *Plant Establishment Guide for Virginia* when selecting species to plant.

Select plant species that are:

- Able to withstand partial burial from sediment deposition and
- Tolerant of herbicides used on the area that contributes runoff to the filter strip.

Select species with stiff stems and a high stem density near the ground surface.

Select species for seeding or planting that are suited to current site conditions and intended uses. Selected species will have the capacity to achieve adequate density and vigor within an appropriate period to stabilize the site sufficiently to permit suited uses with ordinary

management activities.

Specify species, rates of seeding or planting, minimum quality of planting stock, such as PLS or stem caliper, and method of establishment before application. Only use viable, high quality seed or planting stock.

Perform site preparation and seeding or planting at a time and in a manner that best ensures survival and growth of the selected species. Specify what constitutes successful establishment, e.g. minimum percent ground/canopy cover, percent survival, stand density, etc. before application.

Schedule planting dates during periods when soil moisture is adequate for germination and/or establishment.

The minimum seeding and stem density is equivalent to a high quality grass hay seeding rate for the climate area or the density of vegetation selected in RUSLE2 to determine trapping efficiency, whichever is the higher seeding rate.

Additional Criteria to Reduce Suspended Solids and Associated Contaminants in Runoff

Design the filter strip to have a 10-year life span, following the procedure in the Agronomy Technical Note No. 2 (Using RUSLE2 for the Design and Predicted Effectiveness of Vegetative Filter Strips (VFS) for Sediment), based on the sediment delivery in RUSLE2 to the upper edge of the filter strip and ratio of the filter strip flow length to the length of the flow path from the contributing area. The minimum flow length through the filter strip is 35 feet.

Locate the filter strip immediately downslope from the source area of contaminants.

Additional Criteria to Reduce Dissolved Contaminants in Runoff

The criteria given in “**Additional criteria to reduce suspended solids and associated contaminants in runoff**” for location, drainage area and vegetation characteristics also apply to this purpose.

Additional Criteria to Reduce Suspended Solids and Associated Contaminants in Irrigation Tailwater

Filter strip vegetation for this purpose may be permanent herbaceous vegetation, or a small grain or other high residue annual planting that is of sufficient height and density to achieve the desired reduction in suspended solids for the duration of irrigation.

Ensure the seeding rate is sufficient to ensure that the plant spacing does not exceed 4 inches.

Establish filter strips prior to the irrigation season so that the vegetation is mature enough to filter sediment from the first irrigation.

CONSIDERATIONS

General. Filter strip width (flow length) can be increased as necessary to accommodate harvest and maintenance equipment.

Filters strips with the leading edge on the contour will function better than those with a gradient along the leading edge.

Seeding rates that establish a higher stem density than the normal density for a high quality grass hay crop will be more effective in trapping and treating contaminants.

Take steps to improve infiltration in compacted soils.

Reducing Suspended Solids and Associated Contaminants in Runoff.

Increasing the width of the filter strip beyond the minimum required will increase the potential for capturing contaminants in runoff.

Creating, Restoring or Enhancing Herbaceous Habitat for Wildlife and Beneficial Insects.

Filter strips are often the only break in the monotony of intensively-cropped areas. The wildlife benefits of this herbaceous cover can be enhanced by:

- Increasing the width beyond the minimum required, and planting this additional area to species that can provide food and cover for wildlife. This additional width should be added on the downslope side of the filter strip.

- Adding herbaceous plant species to the filter strip seeding mix that are beneficial to wildlife and compatible for one of the listed purposes. Changing the seeding mix should not detract from the purpose for which the filter strip was established.
- Not mowing the filter during the nesting season (April 15 to August 15)

Filter strips can:

- Enhance connectivity of corridors and non-cultivated patches of vegetation within the watershed
- Enhance the aesthetics of a watershed
- Be strategically located to reduce runoff, and increase infiltration and ground water recharge throughout the watershed.

Air Quality. Increasing the width of a filter strip beyond the minimum required will increase the potential for carbon sequestration (and all other environmental benefits of a filter strip)

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for each field site where a filter strip will be installed. A plan includes information about the location, construction sequence, vegetation establishment, and management and maintenance requirements.

As a minimum, the plans shall include:

- a) Length, width (flow path), and slope of the filter strip to accomplish the planned purpose.
- b) Species selection and seeding or sprigging rates to accomplish the planned purpose.
- c) Planting dates, planting depth, care and handling of the seed to ensure that planted materials have an acceptable rate of survival.
- d) A statement that only viable, high quality and regionally adapted seed will be used.
- e) Site preparation sufficient to establish and grow selected species.

OPERATION AND MAINTENANCE

For the purposes of filtering contaminants, permanent filter strip vegetative plantings shall be managed as appropriate to encourage dense growth, maintain an upright growth habit and remove nutrients and other contaminants that are contained in the plant tissue.

Control undesired weed species, especially state-listed noxious weeds.

If prescribed burning is used to manage and maintain the filter strip, an approved burn plan must be developed by a VA Certified Prescribed Burn Manager.

Inspect the filter strip after storm events and repair any gullies that have formed, remove unevenly deposited sediment accumulation that will disrupt sheet flow, reseed disturbed areas and take other measures to prevent concentrated flow through the filter strip.

Apply supplemental nutrients and lime as needed to maintain the desired species composition and stand density of the filter strip.

Periodically re-grade and re-establish the filter strip area when sediment deposition at the filter strip-field interface jeopardizes its function. Reestablish the filter strip vegetation in these regraded areas, if needed.

If haying is used to harvest vegetation from the filter strip, ensure the integrity and function of the filter strip is not adversely affected.

REFERENCES

Dillaha, T.A., J.H. Sherrard, and D. Lee. 1986. Long-Term Effectiveness and Maintenance of Vegetative Filter Strips. VPI-VWRRC Bulletin 153.

Dillaha, T.A., and J.C. Hayes. 1991. A Procedure for the Design of Vegetative Filter Strips: Final Report Prepared for U.S. Soil Conservation Service.

Foster, G.R. Revised Universal Soil Loss Equation, Version 2 (RUSLE2) Science Documentation (In Draft). USDA-ARS, Washington, DC. 2005.

Plant Establishment Guide for Virginia, NRCS.

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. 1997.

Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture. Agriculture Handbook 703.

"The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer."