

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSERVATION PRACTICE STANDARD**  
**FILTER STRIP**

(Ac.)

**CODE 393**

**DEFINITION**

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

width(distance (ft) through the Filter Strip) to the flow path distance of the contributing area.

*The minimum Filter Strip Width (distance through Filter Strip) for this purpose shall be 20 feet.*

**PURPOSE**

- Reduce suspended solids and associated contaminants in runoff.
- Reduce dissolved contaminant loadings in runoff.
- Reduce suspended solids and associated contaminants in irrigation tail water.

The filter strip shall be located immediately down slope from the contributing area of contaminants and sediment.

The contributing area above the filter strip shall have a slope of 1% or greater.

**CONDITIONS WHERE PRACTICE APPLIES**

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

**Vegetation:** The filter strip shall be established to permanent herbaceous vegetation.

Selected species selected shall be:

**CRITERIA**

**General Criteria Applicable to All Purposes**

Overland flow entering the filter strip shall be uniform sheet flow.

- Able to withstand partial burial from sediment deposition and
- Tolerant of the herbicides used on the contributing area land use.
- Shall have stiff stems and a high stem density near the ground surface.
- Shall be suited to the site conditions and the intended practice purposes.
- Shall have the capacity to achieve adequate density and vigor within an appropriate period to stabilize the site to permit suited uses with ordinary management activities.

Concentrated flow shall be dispersed before it enters the filter strip.

The maximum gradient along the leading edge of the filter strip shall not exceed one-half of the up-and-down hill slope percent that is immediately upslope from the filter strip, up to a maximum of 5%.

Species, rates of seeding or planting, minimum quality of planting stock, such as PLS or stem caliper and method of establishment shall be specified before application. Only viable, high quality seed and planting stock shall be used.

State-listed noxious plants will not be established *or maintained* in the filter strip area.

Filter strips shall not be used as a travel lane for equipment or livestock.

Site preparation and planting shall be done at a time and in a manner that best ensures survival and growth of the selected species.

**Additional Criteria to Reduce Suspended Solids and Associated Contaminants in Runoff**

The filter strip shall be designed 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).

Successful establishment objectives, e.g. minimum percent ground/canopy cover, percent survival, stand density, etc. shall be specified before application.

- The procedure is based on the sediment delivery determined with RUSLE2 to the upper edge of the filter strip and the ratio of the filter strip

**Conservation Practice Standard: Filter Strip 393**

**NRCS, WA**

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Planting dates shall be scheduled during periods when soil moisture is adequate for germination and/or establishment.

The minimum seeding and stem density shall be 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.

**Washington Plant Materials Technical Note 1: Conservation Seeding and Planting Guide for Washington** shall be used to identify plants that are adapted to specific site conditions and selected to achieve the conservation practice purposes.

#### **Additional Criteria to Reduce Dissolved Contaminants in Runoff**

The criteria provided in “**Additional criteria to reduce suspended solids and associated contaminants in runoff**” regarding site characteristics affecting filter strip design and vegetation characteristics and establishment apply to this conservation purpose.

*The minimum Filter Strip Width (distance through Filter Strip) for this purpose shall be 30 feet.*

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

Filter strip vegetation shall be a small grain or other suitable annual plant

The seeding rate shall be sufficient to ensure that the plant spacing does not exceed 4 inches.

Filter strips shall be established prior to the irrigation season so that the vegetation is mature enough to filter sediment and contaminants during the first irrigation event.

*The minimum Filter Strip Width (distance through Filter Strip) for this purpose shall be 20 feet.*

#### **CONSIDERATIONS**

**General:** Filter strip width (flow path 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 sediment and filtering 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 down slope 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.

**Maintain or Enhance Watershed Functions and Values. 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.

#### **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 length), and slope of the filter strip to accomplish the planned purpose (width refers to flow path length through the filter strip).
- b) Species selection and seeding or sprigging rates to accomplish the planned purpose

- c) Planting dates and establishment procedures that ensure that planted materials have an acceptable rate of survival
- d) A statement that only viable, high quality and regionally adapted seed shall be used
- e) Site preparation sufficient to establish and grow selected species
- f) *Filter Strip Design calculations using Agronomy Technical Note 2: Using RUSLE2 for the Design and Predicted Effectiveness of Vegetative Filter Strips (VFS) for Sediment.*

#### **OPERATION AND MAINTENANCE**

Permanent filter strip plantings shall be harvested 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.

Inspect the filter strip after storm events and repair any gullies that may have formed, remove unevenly deposited sediment accumulation that will disrupt sheet flow entering the Filter Strip, reseed disturbed areas and take other measures to prevent concentrated flow entering into or occurring within the filter strip area.

Apply supplemental nutrients 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 re-graded areas, if needed.

If grazing is used to harvest vegetation from the filter strip, the grazing plan must insure that the integrity and function of the filter strip is not adversely affected and sensitive resource areas continue to be protected from contaminants and sediment.

#### **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.
- 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.
- USDA-NRCS; Plant Materials Tech Note 1: Conservation Seeding and Planting Guide for Washington. WA- eFOTG Section I.
- USDA-NRCS, 2007. Agronomy Technical Note 2: Using RUSLE2 for the Design and Predicted Effectiveness of Vegetative Filter Strips (VFS) for Sediment.  
<http://www.nrcs.usda.gov/technical/agronomy.html>