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.

PURPOSES

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

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.

CRITERIA

General Criteria Applicable to All Purposes

Use of this standard will comply with all applicable federal, state, and local laws and regulations.

Native plant species will be used whenever possible. Known invasive species will not be used.

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

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, immediately upslope from the filter strip, up to a maximum of 5%. Filter strips shall not be used as a travel lane for equipment or livestock.

Prevent erosion where filter strips outlet into streams or channels.

The filter strip will be designed to have a 10-year life span, following the procedure in the national NRCS 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.

Vegetation. The filter strip will be established to permanent herbaceous vegetation as found in Table 1 or the Indiana Seeding Tool.

Selected species will have stiff stems and a high stem density near the ground surface and will be:

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

Site preparation and seeding or planting requirements will follow the Indiana Seeding Tool guidelines.

Table 1. Suitable Seeding Mixtures.

Select one grass mix and add one legume at the rate indicated or two legumes at half the rate. Forbs can be added if desired for extra wildlife benefits.	
Grass Mix	**Rate (PLS lb/Ac)**
Switchgrass Redtop	8 0.5
Orchardgrass Low Endophyte Tall Fescue	5 10
Orchardgrass Timothy	8 1
Orchardgrass Redtop	6 2
Tall Fescue[1/]	15
Smooth Brome	8
Legumes	**Rate (PLS lb/Ac)**
Annual Lespedeza (common, kobe or marion)[2/]	4
Red Clover	4
Alsike Clover	1.5
White Clover	1
Alfalfa	5

[1/] Tall Fescue should only be used for sites where erosion control is a concern, or for grazing management or where other species are not adapted or will not be successful.

[2/] Use South of US 40.

Additional Criteria to Reduce Suspended Solids and Associated Contaminants in Runoff

The minimum flow length through the filter strip shall be 20 feet.

The filter strip will be located immediately downslope from the source area of contaminants.

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

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.

The minimum flow length will be 30 feet.

CONSIDERATIONS

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

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

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. Wildlife benefits 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 from the Indiana (IN) Field Office Technical Guide Standard (645) Upland Wildlife Habitat Management 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 will be prepared for the practice site. Plans will include the following:

- Length, width (flow path), and slope of the filter strip to accomplish the planned purpose (width refers to flow length through the filter strip).
- Species selection and planting rates to accomplish the planned purpose with minimum percent ground/canopy cover, percent survival, stand density that constitutes successful establishment of the selected species.
- Planting dates, care and handling of the seed to ensure that planted materials have an acceptable rate of survival.
- A statement that only viable, high quality and regionally adapted seed will be used.
- Site preparation sufficient to establish and grow selected species.

OPERATION AND MAINTENANCE

Any plant species, whose presence or overpopulation may jeopardize this practice, will be controlled. Spraying or other control methods will be performed on a "spot" basis to protect forbs/legumes that benefit native pollinators and other wildlife.

An operation and maintenance plan will be provided to and reviewed with the landowner. The plan will include the following items and others as appropriate.

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

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.