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.

PURPOSE

This practice supports one or more of the following purposes:

- Reduce suspended solids and associated contaminants in runoff – Resource concerns (WATER QUALITY DEGRADATION – Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications, and Excessive sediment in surface waters).
- Reduce dissolved contaminant loadings in runoff – Resource concerns (WATER QUALITY DEGRADATION – Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, and Excess pathogens and chemicals from manure, bio-solids or compost applications).
- Reduce suspended solids and associated contaminants in irrigation tailwater – Resource concern (WATER QUALITY DEGRADATION – Excess nutrients in surface and ground waters, Pesticides transported to surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications, and Excessive sediment in surface waters).

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

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%.

State-listed noxious or invasive plants will not be established in the filter strip. Filter strips shall not be used as a travel lane for equipment or livestock.

Additional Criteria to Reduce Suspended Solids and Associated Contaminants in Runoff

The filter strip will 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), 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 shall be 20 feet.

The filter strip shall 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.

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

Species selected shall be:

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

Species selected shall have stiff stems and a high stem density near the ground surface.

Species selected for seeding or planting shall be 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.

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 or planting stock will be used. Suitable species, planting rate and dates are shown in **Appendix 1**, Seeding Table.

The application of dead litter cover, where needed, will follow the guidance in **Appendix 2.**

Site preparation and seeding or planting shall be done at a time and in a manner that best ensures survival and growth of the selected species. What constitutes successful establishment, e.g. minimum percent ground/canopy cover, percent survival, stand density, etc. shall be specified before application.

Planting dates shall be scheduled during periods when soil moisture is adequate for germination and/or establishment. Seeding shall be timed so that tillage for adjacent crop does not damage the seeded filter strip.

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.

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 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 (about 16-18 plants per square foot).

Filter strips shall be established early enough 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.

If needed, invasive plant species may be controlled through mowing, herbicides and hand weeding based on the land users situation.

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 and Pollinators.

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

- Where site appropriate, use native grass species that fulfill the purposes of the practice while also providing habitat for priority wildlife.
- Adding herbaceous plant species including native forbs to the filter strip seeding mix that are beneficial to wildlife and pollinators and be compatible for one of the listed purposes. Changing the seeding mix should not detract from the purpose for which the filter strip was established.
- Increasing the width beyond the minimum required. This additional area can increase food and cover for wildlife and pollinators.
- Management activities on filter strips, such as mowing, burning, or light disking, should not be done more often than every other year with frequency dependent on geographical location to maintain the purposes of the practice.
- Management activities on the filter strip should be completed outside of the primary nesting, fawning, and calving seasons. Activities should be timed to allow for regrowth before the growing season ends whenever possible.
- Organic producers may have to submit plans and specifications to their certifying agent for approval prior to installation, as part of the organic producer's Organic System Plan

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.

Increase Carbon Storage. Increasing the width of a filter strip beyond the minimum required will increase the potential for carbon sequestration.

PLANS AND SPECIFICATIONS

Applicable to All

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

As a minimum, the plans shall include:

- Length, width (width refers to flow length through the filter strip), and slope of the filter strip to accomplish the planned purpose.
- Species selection and seeding or sprigging rates to accomplish the planned purpose.
- 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 instructions sufficient to establish and grow selected species.

OPERATION AND MAINTENANCE

For the purposes of filtering contaminants, permanent filter strip vegetative 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 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.

Organic producers may have to maintain records for five years, as part of their Organic System Plan.

REFERENCES

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.

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

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

M.G.Dosskey, M.J Helmers, and D.E.Eisenhauer 2008 A Design Aid for Determining Width of Filter Strips, Journal of Soil and Water Conservation

OMRI Organic Seeds Database. Organic Materials Review Institute. http://www.omri.org/seeds

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.

Revised Universal Soil Loss Equation Version 2 (RUSLE2) website (checked May 2007): http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm.

Sources of Organic and Untreated Non-GMO Seeds. National Sustainable Agriculture Information Service. http://attra.ncat.org/sorg/seeds.html

USDA-AMS National Organic Program National List of Allowed and Prohibited Substances. http://www.ams.usda.gov/AMSv1.0/nop

USDA-AMS National Organic Program Regulations, 7 CFR Part 205. http://www.ams.usda.gov/AMSv1.0/nop

APPROVAL AND CERTIFICATION

Filter Strip

(Ac.)

CODE 393

PRACTICE SPECIFICATIONS APPROVED:

/s/ William H. Durham	**12/01/2014**
State Agronomist	**Date**
/s/ Alfonso Leal	**12/01/2014**
State Resource Conservationist (Acting)	**Date**

NRCS, TEXAS
December 2014