

**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**

- Reduce suspended solids and associated contaminants in runoff.
- Reduce dissolved contaminant loadings 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 sedimentation, other suspended solids and dissolved contaminants in runoff. This includes:

- In areas situated below cropland, forest land, grazing land or disturbed land
- Where sediment, particulate organic matter and/or dissolved contaminants may enter water bodies or environmentally sensitive areas
- In areas where permanent vegetative establishment is needed to enhance wildlife, or maintain or enhance watershed function

This practice applies when planned as a support practice as part of a comprehensive conservation management plan.

**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%.

Plants listed on Idaho's noxious weed list will not be established in the filter strip, and will be controlled when present.

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 planted to long-lived herbaceous perennial 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.

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. target ground/canopy cover, percent survival, stand density, etc. shall be specified prior to application.

Planting dates shall be scheduled during periods when soil moisture is adequate for germination and/or establishment. Seeding shall be timed so that fall or spring tillage does not damage the seeded strip. Filter strips must be established prior to the critical erosion period.

Seeding rates for perennial vegetation shall be 1.5- 2.0 times the rates listed in Idaho NRCS, Plant Materials, Technical Note No. 24, and density of vegetation based on this seeding rate will be used to determine the trapping efficiency based on RUSLE2.

#### **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 for irrigation tailwater contaminants shall be small grains (cereals), and the seeding rate shall be double that for normal crop production.

Small grains should be planted early so they are well established and mature enough to filter sediment from the first irrigation. Vegetation should be at least 3 to 4 inches tall before the first irrigation for proper function.

If filter strips are established late (once irrigation has begun), then additional practices must be used to adequately treat or reduce the contaminant load from the first several irrigation events until the filter strip is well established. Particular care must be exercised during stand establishment to minimize erosion and sediment transport through the filter strip zone.

On surface irrigated cropland, pull furrows or corrugates one-third of the way into the filter strip. This will assure even distribution of runoff through the filter.

The minimum flow length for this purpose shall be 20 feet.

For additional guidance, refer to Idaho, NRCS, Agronomy Technical Note No. 9.

#### **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.

***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 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 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 benefit wildlife and beneficial insects should be considered.
- Changing the seeding mix should not detract from the primary 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.

***Contaminants from Livestock Confinement Areas and Land Application of Animal Waste.***

Filter strips alone will not adequately treat runoff contaminated with animal waste where runoff has the potential to discharge to surface waters. Filter strips should be used with other pollution control practices as part of a comprehensive system to protect surface and ground water, and meet state and federal laws pertaining to animal feeding operations

(AFOs) and confined animal feeding operations (CAFOs).

***Air Quality.*** Increasing the width of a filter strip beyond the minimum required width 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 plan shall include:

- a) Length, width (flow path), and slope of the filter strip to accomplish the planned purpose (width refers to flow length through the filter strip).
- b) Species selection and seeding or sprigging rates to accomplish the planned purpose.
- c) Planting dates, 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 adapted seed will be used.
- e) Site preparation sufficient to establish and grow selected species.

Include in the plan a completed:

*Seeding/Planting Plan Specification ID-CPA-25*

## 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 stiff growth habit and remove nutrients and other contaminants that are contained in the plant tissue. The recommended stubble height at the beginning of the season and going into winter is 3- 5 inches.

Control invasive and undesired weed species, especially those on Idaho's noxious weed list.

If prescribed burning is used to manage and maintain the filter strip, an approved burn plan must be developed. Prescribed burning is not

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recommended for filter strips comprised of annual species.

Inspect the filter strip following storm events and repair any gullies and large rills 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 only 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, a prescribed grazing plan must be developed to insure the integrity and function of the filter strip is not adversely affected.

## REFERENCES

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