

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**FILTER STRIP  
(Acre)  
CODE 393**

**DEFINITION**

A strip or area of herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forestland) and environmentally sensitive areas.

**PURPOSE**

- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff.
- To reduce dissolved contaminant loadings in runoff.
- To serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391.
- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater.
- To restore, create or enhance herbaceous habitat for wildlife and beneficial insects.
- To maintain or enhance watershed functions and values.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies:

1. in areas situated below cropland, grazing land, or disturbed land (including forest land)
2. where sediment, particulate matter and/or dissolved contaminants may leave these areas and are entering environmentally sensitive areas;
3. in areas where permanent vegetative establishment is needed to enhance wildlife and beneficial insects, or maintain or enhance watershed function.

This practice applies when planned as part of a conservation management system.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Filter strips shall be designated as vegetated areas to treat runoff and are not part of the adjacent cropland rotation.

Overland flow entering the filter strip shall be primarily sheet flow. Concentrated flow shall be dispersed.

State listed noxious weeds will not be established in the filter strip and will be controlled if present.

Filter strip establishment shall comply with local, state and federal regulations.

**Additional criteria to reduce sediment, particulate organics and sediment-adsorbed contaminant loadings in runoff**

Filter strip flow length shall be determined based on field slope percent and length, and filter strip slope percent, erosion rate, amount and particle size distribution of sediment delivered to the filter strip, density and height of the filter strip vegetation, and runoff volume associated with erosion producing events. The minimum flow lengths for slope percentages have been pre-determined for these conditions in Arkansas. Refer to “slope percent and spacing for filter strips” on page 3 of this document.

#### Filter strip location requirements:

- The filter strip shall be located along the downslope edge of a field or disturbed area. To the extent practical it shall be placed on the approximate contour. Variation in placement on the contour should not exceed a 0.5% longitudinal (perpendicular to the flow length) gradient.
- The drainage area above the filter strip shall have greater than 1% but less than 10% slopes.
- The ratio of the drainage area to the filter strip area shall be less than 70:1 in regions with RUSLE-R factor values 0-35, 60:1 in regions with RUSLE-R factor values 35-175, and 50:1 in regions with RUSLE-R factor values of more than 175.
- The average annual sheet and rill erosion rate above the filter strip shall be less than 10 tons per acre per year

The filter strip shall be established to permanent herbaceous vegetation consisting of a single species or a mixture of grasses, legumes and/or other forbs adapted to the soil, climate, and nutrients, chemicals, and practices used in the current management system. Species selected shall have stiff stems and a high stem density near the ground surface. Stem density shall be such that the stem spacing does not exceed 1 inch.

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

The criteria given in “Additional criteria to reduce sediment, particulate organics and sediment adsorbed contaminant loadings in runoff” also apply to this purpose.

Filter strip flow length required to reduce dissolved contaminants in runoff shall be based on management objectives, contaminants of concern, and the volume of runoff from the filter strip’s drainage area compared with the

filter strip’s area and infiltration capacity.

The flow length determined for this purpose shall be in addition to the flow length determined for reducing sediment, particulate organics and sediment-adsorbed contaminant loadings in runoff. The minimum flow length for this purpose shall be 30 feet.

#### **Additional Criteria to Serve as Zone 3 of a Riparian Forest Buffer, Practice Code 391**

Except for the location requirements, the criteria given in “Additional criteria to reduce sediment, particulate organics and sediment adsorbed contaminant loadings in runoff” also apply to this purpose.

If concentrated flows entering Zone 3 are greater than the filter strip’s ability to disperse them, other means of dispersal, such as spreading devices, must be incorporated.

#### **Additional Criteria to Reduce Sediment, Particulate Organics and Sediment-adsorbed Contaminant Loadings in Surface Irrigation Tailwater**

Filter strip vegetation may be a small grain or other suitable annual with a plant spacing that does not exceed 4 inches.

Filter strips shall be established early enough prior to the irrigation season so that the vegetation can withstand sediment deposition from the first irrigation.

The flow length shall be based on management objectives.

#### **Additional Criteria to Restore, Create or Enhance Herbaceous Habitat for Wildlife and Beneficial Insects**

If this purpose is intended in combination with one or more of the previous purposes, then the minimum criteria for the previous purpose(s) must be met.

Additional filter strip flow length devoted to this purpose must be added to the length required for the other purpose(s).

Any addition to the flow length for wildlife or beneficial insects shall be added to the downhill slope of the filter strip.

Vegetation to enhance wildlife may be added to that portion of the filter strip devoted to other purposes to the extent they do not detract from its primary functions.

Plant species selected for this purpose shall be for permanent vegetation adapted to the wildlife or beneficial insect population(s) targeted.

If this is the only purpose, filter strip width and length shall be based on requirements of the targeted wildlife or insects. Density of the vegetative stand established for this purpose shall consider targeted wildlife habitat requirements and encourage plant diversity. Dispersed woody vegetation may be used to the extent it does not interfere with herbaceous vegetative growth, or operation and maintenance of the filter strip.

The filter strip shall not be mowed during the nesting season of the target wildlife.

Livestock and vehicular traffic in the filter strip shall be excluded during the nesting season of the target species.

#### **Additional Criteria to Maintain or Enhance Watershed Functions and Values**

Filter strips shall be strategically located to enhance connectivity of corridors and non-cultivated patches of vegetation within the watershed.

Filter strips shall be strategically located to enhance aesthetics of the watershed.

Plant species selected for this purpose shall be for establishment of permanent vegetation.

## **CONSIDERATIONS**

Filter strips should be strategically located to reduce runoff, and increase infiltration and ground water recharge throughout the watershed.

Filter strips for the single purposes of wildlife/beneficial insect habitat or to enhance watershed function should be strategically located to intercept contaminants thereby enhancing air and water quality.

To avoid damage to the filter strip consider using vegetation that is somewhat tolerant to herbicides used in the up-slope crop rotation.

Increasing the width of the filter strip will increase the potential for capturing particulates.

Consider using this practice to enhance the conservation of declining species of wildlife, including those that are threatened or endangered.

Consider using this practice to protect National Register listed or eligible (significant) archaeological and traditional cultural properties from potential damaging contaminants.

Filter strip size should be adjusted to a greater flow length to accommodate harvest and maintenance equipment.

Select grass species that sequester more carbon.

Increasing the width of filter strip will increase the potential for carbon sequestration.

## **PLANS AND SPECIFICATIONS**

Based on this standard, plans and specifications shall be prepared for each specific 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.

Specifications will include:

**Slope percent and spacing for filter strips:**

- Filter strips on cropland at the lower edge of fields, or on cropland, pasture or other areas adjacent to streams, ponds, and lakes, and above conservation practices such as terraces or diversions for the purpose of removing sediment and related pollutants, the length of the flow will be:

Slope %	Length of Flow
0 - 1	10 ft.
1 - 3	15 ft.
3 - 8	20 ft.
8 - 20	25 ft.

- Filter strips (or buffer zones) on any manure spreading area adjacent to streams, ponds, and lakes, and near critical landscapes features such as springs, seeps, sinkholes, wells, rock outcrops, and losing streams, the length of flow will be:

Slope %	Length of Flow
0 - 2	20 ft.
3 - 8	50 ft.
>8	100 ft.
Critical Landscape Feature	100 ft.

- Filter strips (or stream management zones) as part of a forestry operation to reduce delivery of sediment and related pollutants into waterways, such as for clear-cut and other disturbed areas, the length of flow through undisturbed forest floor will be:

Slope %	Length of Flow
0 - 1	25 ft.
1 - 8	50 ft.
8 - 20	70 ft.
20 - 40	90 ft.
40 - 60	120 ft.
60 - 70	150 ft.

When slopes exceed 70 percent, measurement of the length of flow will begin at the point upslope where the slope becomes less than 70 percent. When the drainage area contributing to the forested filter strip exceeds 160 acres, special considerations are needed in consultation with the area engineer.

For undisturbed woodland filter strips adjacent to land other than woodland, the length of flow will be the same as for grass or legume filter strips for the same purposes.

Any area of grazed woodland containing no understory of grasses or forbs is not suitable for use as a filter strip adjacent to any land use and must be augmented with a grass, legume, or ungrazed woodland filter strip using specified widths.

**Additional Width Criteria.**

When the filter strip is located on a soil with a high rate of runoff (Hydrologic group D) an additional width of 25 percent should be added to improve filtering.

**Runoff from Concentrated Livestock.**

A settling basin, vegetative barrier, or low velocity channel shall be provided between the waste source and filter strip when more than one hundred – one thousand pound animal units are confined.

A constructed settling basin, if needed, shall have sufficient capacity, as a minimum, to store the runoff computed for 15 minutes' duration at the peak inflow rate resulting from a 2-year, 24-hour rainfall. Any basin outflow shall be disregarded in computing minimum storage.

Additional storage capacity, based on frequency of cleaning, shall be provided for manure and other solids settled within the basin. When the basin is cleaned after each significant runoff event, additional storage equivalent to at least

0.5 inches from the concentrated waste area should be provided. If only annual cleaning of the basin is planned, additional storage equivalent to at least 6 inches from the concentrated waste area shall be provided.

Grass channel filter strips shall be designed to carry the peak flow at a depth of 0.5 feet or less. Flow length shall be sufficient to provide at least 30 minutes of flow-through time. Grass species and shape of channel shall be such that grass stems will remain upright during time of flow.

Specifications will also include:

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

## **OPERATION AND MAINTENANCE**

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

Prescribed burning may be used to manage and maintain the filter strip when an approved burn plan has been 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.

To maintain or restore the filter strip's function, periodically regrade the filter strip area when sediment deposition at the filter strip-field interface jeopardizes its function, and then reestablish the filter strip vegetation, if needed.

If wildlife habitat is a purpose, destruction of vegetation within the portion of the strip devoted to that purpose should be minimized by regrading only to the extent needed to remove sediment and fill concentrated flow areas.

Grazing shall not be permitted in the filter strip unless a controlled grazing system is being implemented. Grazing will be permitted under a controlled grazing system only when soil moisture conditions support livestock traffic without excessive compaction.