United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FIELD BORDER

CODE 386

(ac)

DEFINITION

A strip of permanent vegetation established at the edge or around the perimeter of a field.

PURPOSE

This practice is used to accomplish one or more of the following purposes–

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Reduce sediment transport to surface waters.
- Reduce excess nutrients in surface water and groundwater.
- Provide food and cover for wildlife and pollinators or other beneficial organisms.
- Reduce emission of greenhouse gases.
- Reduce emissions of particulate matter (i.e., dust and chemical droplet drift).

CONDITIONS WHERE PRACTICE APPLIES

This practice is applied around the inside perimeter of fields. Its use can support or connect other buffer practices within and between fields. This practice applies to cropland and pasture fields.

CRITERIA

General Criteria Applicable to All Purposes

Establish field borders at field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths will be based on local design criteria specific to the purpose or purposes for installing the practice.

Establish field borders to adapted species of permanent grass, forbs and/or shrubs that accomplish the design objective.

Plants selected for field borders will have the physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area. For portions of the border that will be subject to equipment traffic, establish species tolerant to such equipment traffic.

Seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods will be consistent with approved local criteria and site conditions.

Ephemeral gullies and rills present in the planned border area will be eliminated as part of seedbed preparation. If present, ephemeral gullies and rills located immediately upslope from the planned border area will be treated to ensure more sheet flow and less concentrated flow enters the field border area.

Break up or redirect concentrated water flow within the field borders to prevent gully erosion.

If the field border is established adjacent to a hay field or pasture, the Soil Conditioning Index (SCI) of the field border area must be greater than the adjacent pasture/hay land. In these cases, only fertilize the field border area once for establishment.

Additional Criteria to Reduce Wind Erosion and Sheet and Rill Erosion

Time field border establishment so that the soil will be adequately protected during the critical erosion period(s).

Establish permanent species that create a dense cover.

Establish stiff-stemmed, upright grasses, grass/legumes or forbs to trap windborne or waterborne soil particles.

Determine the amount of surface and/or canopy cover needed from the field border using current approved water and wind erosion prediction technology. Model soil erosion estimates to account for the effects of other practices in the management system.

Wind erosion reduction

Locate borders to provide a stable area on the windward edge of the field as determined by prevailing wind direction data during the critical erosion period(s).

Select grass or forb species which will have a minimum height of one foot during the critical wind erosion period.

Water erosion reduction

Locate borders to eliminate sloping end rows, headlands, and other areas where concentrated water flows will enter or exit the field.

Orient plant rows as closely as possible to be perpendicular to sheet flow direction.

Additional Criteria to Reduce Sediment Transport to Surface Waters and Reduce Excess Nutrients in Surface Water and Groundwater

Do not burn the field border more than once every ten years.

As a minimum, locate field borders along the edge(s) of the field where runoff enters or leaves the field. The minimum width for this purpose is 30 feet and the field border must have a dense vegetative stand (similar to a dense sod).

Design border widths to comply with all applicable State and local regulations regarding manure and chemical application setbacks.

Establish stiff-stemmed, upright grasses, grass/legumes or forbs to trap windborne or waterborne soil particles.

Additional Criteria to Provide Food and Cover for Wildlife and Pollinator or Other Beneficial Organisms

Use an approved habitat evaluation procedure to determine the appropriate amount, arrangement, and composition of plant species to provide adequate habitat, food source and/or cover for the wildlife species of interest.

The minimum width for this purpose is 30 feet.

Schedule mowing, harvest, weed control, burning, and other management activities within the field border to accommodate reproduction and other life-cycle requirements of target wildlife species.

When possible, disturb no more than 1/3 of the field border at any given time. Minimize vehicle traffic in the field border area.

For beneficial organisms (e.g., predatory and parasitic insects, spiders, insectivorous birds and bats, raptors, and terrestrial rodent predators) that prey on target pests, select diverse plant species that meet dietary, nesting and cover requirements for the intended benefit organism, at minimum during the critical period for control of target pests, but ideally year-round. Minimize exposure of the field border to pesticides and other chemicals that are potentially harmful to wildlife, pollinators, and other beneficial organisms.

A lower percent groundcover than would be needed if protecting soil and water quality is acceptable under this purpose as long as the soil resource concern is also adequately addressed (i.e., no excessive soil loss). This may be achieved by simply increasing the field border width or adding denser herbaceous strips on the upslope or downslope edges of the field border.

Additional Criteria to Reduce Emissions of Greenhouse Gases

Establish plant species that will produce adequate above and below-ground biomass for the site. A positive SCI will be achieved for the field border area.

Maximize the width and length of the field border to fit the site and increase total biomass production.

Do not burn the field border.

Do not disturb the roots of the established vegetation with tillage.

Additional Criteria to Reduce Emissions of Particulate Matter (i.e., Dust and Chemical Droplet Drift)

Establish plant species with morphological characteristics that optimize interception and adhesion of airborne particles. Select plants with persistent roots and residue that stabilize soil aggregates for mitigating the generation of airborne particles and that are resistant to dust deposition, chemical drift deposition and damage from equipment traffic.

Field border cross-sectional density windward of the area to be protected, shall be greater than 65% at full maturity. Select plant species with foliar and structural characteristics to optimize interception, adsorption of airborne particulate matter.

Do not burn the field border.

CONSIDERATIONS

Applicable to All Purposes

Plant field borders around the entire field, not just on the field edges where water enters or leaves the field, to maximize resource conservation benefits.

Establishing a narrow strip of stiff-stemmed upright grass at the crop/field border interface can increase soil particle and other airborne particle trapping efficiency of the field border.

Utilize native plants that are best suited for wildlife and pollinator habitat enhancement and provide other ecological benefits.

When enhancement of wildlife habitat is a purpose, plant species diversity should be encouraged. Plantings that result in multiple structural levels of vegetation will maximize wildlife benetis.

Include native plants, local germplasm preferred, that provide diverse pollen and nectar sources to encourage local pollinator populations. Where possible, re-establish the native plant community for the site.

Overseed the field border with forbs for increased plant diversity, soil quality, pollinators, and wildlife benefits.

In selecting plant species consider the plant's tolerance to—

- Sediment deposition and chemicals planned for application.
- Drought in arid areas or where evapotranspiration can potentially exceed precipitation during the field border's active growing period(s).

Establish plant species that will have the desired visual effects and that will not interfere with field operations or field border maintenance.

Establish plant species considering shading from adjacent vegetation.

The use of native perennial plant species as opposed to introduced species may provide a longer period of resource protection.

NRCS Conservation Practice Standards Prescribed Burning (Code 338), Prescribed Grazing (Code 528), and Early Successional Habitat Development and Management (Code 647) are management practices that can be used to maintain suitable habitat for specifically desired wildlife species.

To minimize wildlife mortality and habitat degradation, turn or drive machinery on field borders only when necessary, at low speed, and with implements fully raised. If extensive turning/traffic will be necessary on the field border during the nesting season, mortality may be reduced by mowing it early to reduce its attractiveness as a nesting site, if alternative nesting cover is available.

Design border widths to match the required field application setback widths for easier management (i.e., land-use and management changes occur in the same location).

Consider installing a contour buffer system, no till practice, or other conservation practices on adjacent upland cropped areas to reduce surface runoff and excessive sedimentation of field borders.

For operations following USDA's National Organic Program, apply and manage field borders according to program regulations.

Where genetic drift is a concern, use buffer vegetation to create a barrier between the pollen-producing crop and the crop that must be protected, or increase the distance between them so that cross-pollination is less likely.

Border widths can be designed to accommodate equipment turning, parking, loading/unloading equipment, grain harvest operations, etc. to minimize soil compaction on the high-traffic field edges.

Water bars or berms may be needed to breakup or redirect concentrated water flow within the field borders.

PLANS AND SPECIFICATIONS

Develop plans and specifications for each field or treatment unit according to the Criteria section requirements above, and Operation and Maintenance section requirements below. Specifications must describe the requirements to apply this practice to achieve the intended purpose. Record the following specification components in an approved CPS Field Border (Code 386) implementation requirements document.

- Practice purpose(s).
- Field border widths and lengths based on purpose-driven design criteria.
- Field border location(s) within the field(s) or farm boundary.

- Species to be used and the location and planting density of the species used.
- Site preparation requirements.
- Timing of planting and planting method.
- Liming or fertilizer requirements.
- Description of successful establishment.
- Operation and maintenance requirements.

OPERATION AND MAINTENANCE

Field borders require careful management and maintenance for performance and longevity. The following O&M activities will be planned and applied as needed:

- Repair storm damage.
- Remove sediment from above, within, and along the leading edge of the field border when accumulated sediment either alters the function of the field border or threatens the degradation of the planted species.
- Shut off pesticide sprayers and raise tillage equipment to avoid damage to field borders.
- Shape and reestablish (to original specifications) border areas damaged by animals, chemicals, tillage, or equipment traffic.
- Reestablish to original specifications if the plant stand no longer meets the intended purpose.
- Do not use the field border as a hay yard or machinery parking lot for any extended period of time that will damage or impair the function of the field border.
- Maintain desired vegetative communities and plant vigor by liming, fertilizing, mowing, disking, or burning and controlling noxious and invasive weeds to sustain effectiveness of the border.
- Repair and reseed ephemeral gullies and rills that develop in the border.
- Minimally invasive vertical tillage (e.g., paraplowing) may be performed in rare cases where compaction and vehicle traffic have degraded the field border function. The purpose of the tillage is strictly to relieve soil compaction and increase infiltration rates to provide a better media for reestablishment of vegetation and field border function.
- When managing for wildlife, maintenance activities should avoid the primary nesting, fawning and calving seasons.
- When managing for wildlife, pollinator, and beneficial habitat, conduct any pesticide spray operations in the production area in a manner that prevents exposure of the field border to the pesticides, considering toxicity of the materials used to non-pest organisms, and weather conditions. Activities should be timed to allow for regrowth before the growing season ends whenever possible. The optimal vegetative successional state shall be maintained to accommodate target wildlife species' requirements.
- Periodic removal of some products such as medicinal herbs, nuts, and fruits is permitted provided the conservation purpose is not compromised by the loss of vegetation or harvesting disturbance.
- The field border cannot be harvested or grazed more than once a year as a maintenance activity.
- Avoid vehicle traffic when soil is prone to compaction because of wet soil conditions, or when soils are saturated.
- Manage weeds to ensure field border is meeting the intended purpose and to maintain the desirable species.
- Maintain records of the field border maintenance.

REFERENCES

Baumgartner, J. et al. 2005. Biodiversity Conservation – An Organic Farmer's Guide. Wild Farm Alliance. http://www.wildfarmalliance.org.

K. G. Renard, G.R. Foster, G.A. Weesies, K.D.K. McCool and D.C. Yoder. 1997. Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), Agricultural Handbook Number 703.

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

USDA-NRCS Windbreak/Shelterbelt Establishment and Renovation Conservation Practice Standard (Code 380).