Chapter 3c Cross Wind Trap Strips

Definition of cross wind trap strips

Cross wind trap strips are herbaceous vegetation, resistant to wind erosion, and grown in strips as nearly as possible perpendicular to the prevailing wind erosion direction. Cross wind trap strips entrap wind-borne sediment and establish a stable area to resist wind erosion.

Purposes of cross wind trap strips

Cross wind trap strips catch wind-borne sediment and other pollutants, such as nutrients and pesticides. This practice as part of a conservation management system may support one or more of the following purposes:

- Reduce soil erosion from wind by establishing a stable area.
- Entrap wind-borne sediment within or near the trap strip.
- Induce soil deposition from wind erosion (saltation and surface creep) and entrap soil-bound pollutants, such as nutrients, pesticides, and organic material, before they are deposited downwind into the sensitive areas.
- Protect growing crops from damage by wind-borne soil particles.
- Provide food and cover for wildlife.

Benefits

- Reduce wind erosion on cropland when part of a planned resource management system.
- Reduce plant stress and damage from wind erosion and windblown sediment.
- Prevent topsoil from leaving the field.
- Benefit fish and other stream invertebrates from less suspended sediment and less pesticides, nutrients, and organics in surface water.
- Benefit drainage ditches by extending the time between clean-out maintenance that is required for removing wind deposited sediment.
- Benefit wildlife by having more cover, food sources, and travel corridors.

Negative impacts

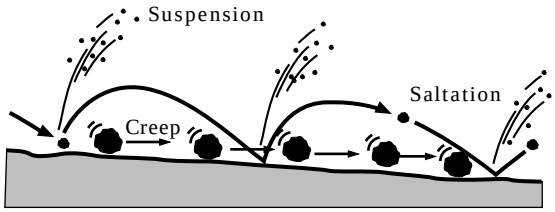
Trap strips may become a haven for burrowing rodents, such as groundhogs (woodchucks), that can create an economic crop loss by eating the adjacent crop before it matures. Such burrows, when discovered, should be managed by trapping, hunting, or poisoning the pests before they do excessive damage to the planted crop. Burrowing rodents can also damage banks and dikes along drainageways and watercourses.

Weeds and other pests can proliferate in cross wind trap strips if they are improperly maintained. Mowing and scouting for pests must become part of the operation and maintenance of the practice.

Functions

Since the primary function of cross wind trap strips is to capture saltating and creeping windblown soil particles, they should be designed to match the local landscape. When properly designed, trap strips capture about 50 to 80 percent of the predicted Wind Erosion Sediment. This range is provided in the National Agronomy Manual or the wind erosion prediction section in the Field Office Technical Guide. (Approximately 50 to 80 percent of the wind erosion occurs by saltation and surface creep of soil particles along the soil surface.) Figure 3c–1 shows the wind erosion process.

Figure 3c–1 The wind erosion process



Design considerations

Planning considerations

The effectiveness of cross wind trap strips is maximized when strips are oriented as close to perpendicular as possible to the prevailing wind erosion direction for the period for which the system is designed.

Additional trap strips may be placed in the field to reduce the in-field wind erosion rate.

Some plants are damaged by blowing wind as well as by wind-borne sediment. In such cases the spacing between trap strips may need to be reduced from that obtained using wind erosion prediction technology.

When trap strips are designed to enhance wildlife, plant species diversity within the strip should be encouraged. Trap strips that result in various plant heights within the strips maximizes wildlife use. For example, adding wildflowers to warm-season grass trap strips would add plant diversity.

Drifting snow or grazing by wildlife may reduce the trapping capability of trap strips. Other conservation practices, such as residue management, cover crops, windbreaks, and herbaceous wind barriers, may be used with trap strips to achieve the conservation objective.

Planting of annual wind strips upwind of the cross wind trap strip helps accumulate wind-borne sediment where it can be spread and leveled annually or as needed. This will extend the design life of the permanent cross wind trap strips.

Trap strips need to be designed to create a stable condition (fig. 3c–2). A stable condition is an area with sufficient vegetation to trap and hold expected saltation and surface creep from the upwind contributing area. For a grassed area to be stable, it must meet the following criteria:

- Width of 12 to 15 feet
- Height of 1 to 2 feet
- 50 percent or greater vegetated cover
- 50 to 75 per square foot stem density

Trap strip width must be 12 feet or wider when vegetation or stubble in the strips is normally 1 foot or more in height during periods when wind erosion is expected to occur.

The minimum width of the strip must be at least 25 feet when the effective height of the vegetation or stubble in the strip is normally less than 1 foot during periods when wind erosion is expected to occur. However, annually seeded and harvested trap strips of small grain should be adjusted to match the farmer's combine header width. Annual trap strips, such as rye, have proven beneficial for protecting sensitive crops, such as sugar beets.

As part of a Resource Management System on a cropland field, cross wind trap strips can be planned and spaced across a field to reduce wind erosion. Determine trap strip design width and spacing by:

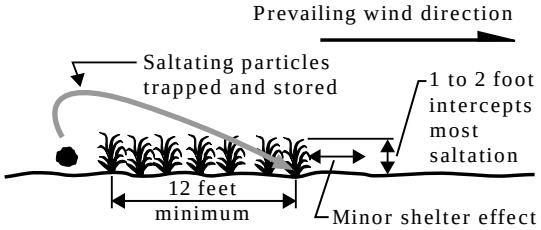
1. Determining the contributing area of **L**.
2. Estimating the wind erosion rate in tons per acres from the contributing area.
3. Selecting a trap strip width based on length and deposition depth less than or equal to 2.4 inches per year.

If the design accumulated deposition depth in the trap strips is 2.4 inches per year, this could accumulate up to about 2 feet in 10 years. In some regions of the country, more restrictive guidelines for deposition may be required depending on local observations and needs.

Locate trap strips for this purpose as follows:

- at the windward edge of fields
- immediately upwind from areas within fields to be protected from erosion or deposition
- in recurring patterns interspersed between erosion-susceptible and/or cropped strips

Figure 3c–2 Stable condition with a trap strip



Direction and width of erosion-susceptible strips

When trap strips are installed in patterns alternated with erosion-susceptible crop strips, and the direction of the strips deviates from perpendicular to the prevailing wind erosion direction, the width of the erosion-susceptible strips shall be correspondingly reduced.

The effective distance between strips is measured along the prevailing wind erosion direction during those periods when wind erosion is expected to occur. That distance shall not exceed the width permitted by the soil loss tolerance (T) of the predominate soil used in planning the Conservation Management System.

The width of the strips is determined using the current wind erosion prediction method. Calculations must account for the effect of other practices in the Conservation Management System.

Direction and width of strips planted in sensitive areas

Reduce the trap strip width when the predominant wind direction differs from perpendicular to the trap strip.

Measure the effective width along the prevailing wind erosion direction during those periods when sensitive crops are susceptible to wind erosion damage. Base strip width on the Crop Tolerance to Wind Erosion Table which is in the Wind Erosion Prediction Section of the NRCS Field Office Technical Guide (FOTG), or on other acceptable references. Crop tolerance to wind erosion is the maximum rate of soil blowing that crop plants can tolerate without significant damage by abrasion, burial, or desiccation.

Width of trap strips to improve water quality

The width of the strips is determined using the current wind erosion prediction method. Calculations must account for the effect of other practices in the Conservation Management System.

As part of a Resource Management System plan for a farm, trap strips can also improve water quality by entrapping contaminant-enriched soil blown into surface water, especially from tilled land on flat, open landscapes. These areas may be eroding at or slightly below **T**, yet significantly contributing to nonpoint source pollution. Trapping blowing soil in the vegetation also reduces sediment deposition, eutrophication, and algal blooms in the ditches.

To reduce sediment in drainage ditches and improve water quality in flat, open areas, select the level of soil loss reduction desired. However, if the contributing area is really large or eroding above the tolerable soil loss **T**, then a Resource Management System must be planned. Where necessary, additional erosion control measures, such as residue management, annual trap strips, and cover crops, may be necessary to prevent inundation of the trap strip.

The contributing area could potentially be eroding below **T**, but still contributing soil and sediment to a stream, creating a water quality problem. The planner needs to be careful not to design a trap strip too narrow as it could be buried by incoming saltation before it serves its useful life. It should be designed using the locally accepted wind erosion prediction methods according to the NRCS Field Office Technical Guide.

A planting of a locally adapted annual species next to the windward edge of the permanent trap strip can also entrap sediment. In the Cross Wind Trap Strip standard (589C), this option is offered to extend the life of the designed strip. This may prevent the trap strip from being buried in one large wind storm event.

Plant materials information

Select grass species with stiff, erect stems capable of maintaining the desired characteristic during the wind erosion period when the effect of filtering prevents sediment pollution of surface water. This effect varies depending on the local climate, tillage practices, crop grown, and other contributing area characteristics.

Seeding methods and dates should match the Critical Area Treatment standard (342).

A final stem density of 50 to 75 stems per square foot and 50 percent vegetative cover in the trap strip area is desired to achieve the entrapment of saltating soil.

Selection of plants for use in trap strips should favor species tolerant to herbicides used on adjacent crops or other land uses.

Select plant species for trap strips on the following criteria:

- Ability to withstand snow drifting
- Ability to remain erect during wind erosion periods
- Tolerance to annual predicted sediment deposition
- Adaptation to the soil condition onsite

Follow the local Critical Area Treatment standard (342) for seeding establishment guidelines.

Vegetation or its residue will be 1 foot or more in height during periods when wind erosion is expected to occur.

Designing for wildlife habitat

Cross wind trap strips are important in providing cover and food for pheasants, quail, and other game birds. For wildlife purposes trap strips should be at least 30 feet wide and are generally located next to wetlands, drainage ditches, or road ditches for maximum benefit. Narrower trap strips (less than 30 feet wide) planned for wind erosion control still have many wildlife benefits, such as travel corridors, cover, and nesting depending on the wildlife species using them.

An annual planting of grain crops or regionally adapted species of small grain at the trap strip upwind leading edge can

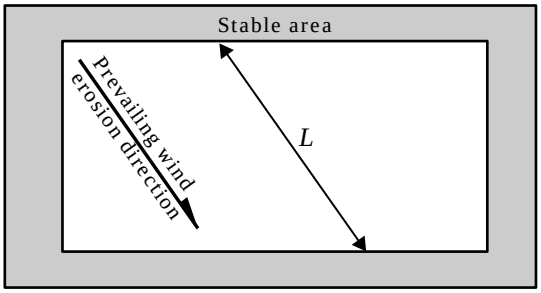
- provide additional food and cover for wildlife,
- protect permanent trap strips, such as switchgrass, from being totally buried by soil or snow,
- create habitat diversity, and
- allow the farmer to annually till next to the permanent trap strip and level accumulated soil that has been deposited by the wind.

Example design of cross wind trap strips

Step one–Estimate how much soil is blowing annually from the contributing area or a field. For those familiar with the USDA wind erosion prediction equation (WEQ), the contributing area is described by **L**, or the unsheltered distance along the prevailing wind erosion direction for the field or area to be evaluated. **L** represents the distance from a point upwind where no saltation or surface creep occurs to a point downwind where an edge of field or other stable occurs.

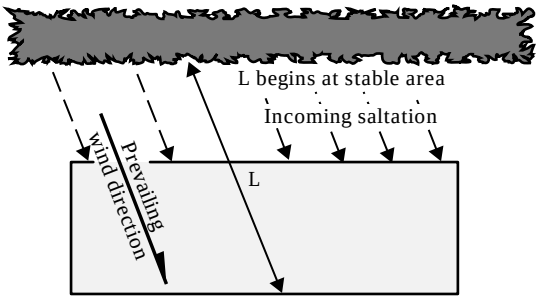
Figures 3c–3, 3c–4, 3c–5, and 3c–6, show how to determine **L**. Use the soil survey, aerial photo, or other means to determine the stable border or the area describing **L**.

Figure 3c–3 Determining L on an isolated field



Isolated field

Figure 3c–4 Determining L on a field that is not isolated



Field not isolated

Figure 3c–5 Determining L in wind strip cropping field

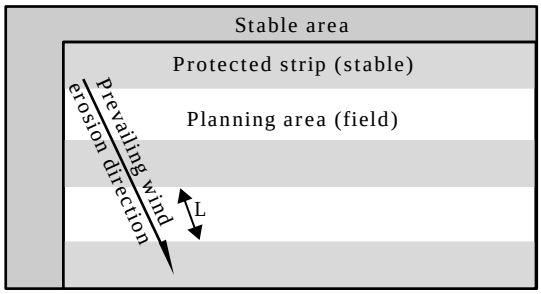
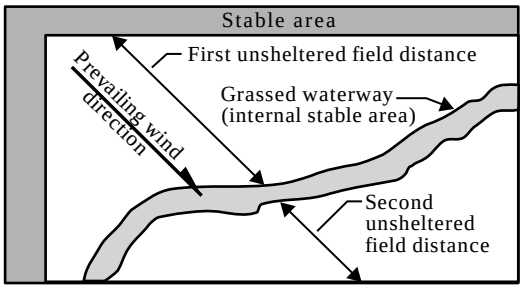


Figure 3c–6 Determining L in a field with internal stable border



Step two—Review the local soil survey and record the predominant soil type(s) in the contributing area. Then using the NRCS SOI-5 data base, soil survey, or local NRCS FOTG wind erosion prediction tables, determine the Wind Erodibility Groups (WEG) for the contributing area. Select the predominant soil WEG upwind of the planned trap strip, or if another soil WEG is close to the same size with a higher Wind Erodibility Group, then use the most erosive group to make the soil loss prediction and to design the trap strip width.

Step three—Use the current USDA wind erosion equation to estimate the wind erosion (in tons per acre per year) from the contributing area. Currently in the Eastern states, the annual wind erosion prediction method most accurately predicts the soil losses observed.

However, in the Western states that have a higher wind erodibility, the crop period wind erosion prediction method is used to determine the tons per acre per year and Resource Management System needs. Follow your local Field Office Technical Guide Wind Erosion Prediction Section when designing trap strips.

In all cases, to prevent inundation of the trap strips by too much soil, the width must accommodate the incoming sedimentation. Too high a soil rate could bury the vegetation in a year's wind erosion season or by a big wind storm, making the trap strips less effective in future wind storms. Therefore, soil loss tolerance **T** (or soil loss less than **T**), may be used to design the width between trap strips. Select additional practices, such as residue management, wind stripcropping, windbreaks, to achieve **T** or below in the contributing area.

Once the RMS is planned to achieve **T**, then the width as a trap strip is selected for its desired effects. Generally, as the contributing area increases, the trap strip width also widens to accommodate the incoming saltation.

Cross wind trap strips need to be planted to a species capable of maintaining a 12-inch or greater height, a stem density of 50 to 75 stems per square foot, and a 50 percent vegetative cover during wind erosion events to function properly. A design table placed in a spreadsheet was created (appendix 3c–A) to estimate the width of trap strips needed to entrap all of the saltation and surface creep. The percentage of the total wind erosion present in the saltation and surface creep is referred to as the *saltation factor*. This example table for 25-foot design width for trap strips was developed using a spreadsheet assuming 80 percent of the total erosion in the form of saltation and surface creep is entrapped in the trap strip. If desired, adjust the design table to match local conditions or use a higher or lower saltation factor. A spreadsheet using the formulas can be programmed to recreate the design table for easily adjusting the results obtained.

A 10-year design life with an annual accumulation of 2.4 inches of deposition from an annual wind erosion prediction level of any soil loss rate is possible.

Cross wind trap strip design for water quality improvement could depend on the desired reduction of sedimentation or contaminant reduction requirements to meet local, state, or federal water quality nonpoint source standards or goals.

Because of sediment accumulation along the leading edge of trap strips, a narrow row planting of upright grass may be needed to protect the practice from the overloading and shortening of the normal 10-year-life expectancy. This option will require leveling the sediment hump annually and reestablishing the narrow protective strip.

Orientation of the field and the beginning point for wind erodibility prediction is critical to the design width of the trap strips. The larger the contributing area, the wider the trap strip width is needed to keep from burying the planned trap strip species. So trap strip design width is also a function of the area described by **L,** which may or may not be at the upper field edge. (See the NRCS National Agronomy Manual wind erosion prediction section or the local NRCS Field Office Technical Guide wind erosion prediction section.) See previous figures for determining **L**.

The design of a cross wind trap strip is based on the following formulas:

1. Determine the contributing area through **L**, the distance downwind from a point of stable area to a point where no saltation or surface creep occurs. Area is measured in acres.
   Example: 20 acres

2. Estimate the wind erosion rate of the contributing area using current wind erosion prediction methods.
   Example: 5 tons/acre/year

3. Sum the total erosion from the contributing area.
   Total tons = (acres)(erosion rate)
   $$(20 \text{ acres})(5 \text{ tons / ac / yr}) = 100 \text{ tons / yr}$$

4. Estimate the percent of saltation and surface creep trapped in the cross wind trap strip.

   Saltation factor ranges from 0.5 to 0.8 (50 to 80 percent) of the total wind erosion sediment that is transported as saltation and surface creep.
   Example: 80 percent

5. Total sediment that can be potentially trapped in the strip.

   Soil trapped in trap strip = (Total tons/ac from contributing area)(saltation factor)
   Example: (100 tons / yr)(80%) = 80 tons / yr

6. Find the bulk density value for the soil used in the soil loss prediction. From table 3c–1 select the depth in a ton of soil with that bulk density.
   Example: Soil has a bulk density of 1.3.
   Depth in 1 ton of soil from table 3c–1 is 0.007 inch.

7. Select trap strip width: 15, 20, 25, or 30 feet.
   Example: 15 feet.

   Calculate:

$$\text{trap strip acres} = \frac{(\text{strip width - ft})(\text{trap strip length - ft})}{(43{,}560\ \text{ft}^2 / \text{ac})}$$

   For a 20-acre rectangular field (1,320 ft by 660 ft) the calculation for a 15-foot trap strip is:

$$\frac{15\ \text{ft} \times 1{,}320\ \text{ft}}{43{,}560\ \text{ft}^2 / \text{ac}} = \frac{19{,}800\ \text{ft}^2}{43{,}560\ \text{ft}^2 / \text{ac}} = 0.45\ \text{ac}$$

Table 3c–1 Soil bulk density in relation to depth in inches-per-ton of soil

Soil bulk density (g/cc)	Weight (lb/ft^3)	Depth / ton (in)
0.5	31.2	0.018
0.6	37.44	0.015
0.7	43.68	0.013
0.8	49.9	0.011
0.9	56.16	0.010
1.00	62.4	0.009
1.1	68.64	0.008
1.2	74.88	0.007
1.3	81.12	0.007
1.4	87.36	0.006
1.5	93.6	0.006
1.6	99.84	0.005
1.7	106.08	0.005
1.8	112.32	0.005
1.9	118.56	0.005
2	124.8	0.004

8. Calculate deposition depth as follows

$$\frac{(\text{soil trapped in tons / ac})(0.007\ \text{in / ton of soil / ac})}{(\text{trap strip acres})}$$

   Example: $\frac{(80\ \text{tons})(0.007\ \text{in / ton})}{.045\text{ac}} = 1.24\ \text{in / yr}$

An alternative calculation can be made to determine the width of a cross wind trap strip if the annual depth of sediment deposition is known or predicted. Steps 1 through 6 are the same as the first method.

7. Weight of cubic foot of soil, lb/ft^3:
   Water = 62.4 lb/ft^3.

$$(\text{Bulk density})(62.4) = \text{Wt. soil}\ (\text{lb / ft}^3)$$

   Example: Soil with a bulk density of 1.28 cc weighs 80 lb/ft^3 (1.28 x 62.4 = 80)

8. Determine the cubic feet per ton of sediment:

$$\text{Cubic feet} = \frac{2{,}000\ \text{lb / ton}}{\text{lb / ft}^3}$$

$$\frac{2{,}000\ \text{lb / ton}}{80\ \text{lb / ft}^3} = 25\ \text{ft}^3\ / \text{ton}$$

9. Volume of sediment trapped in trap strip

$$\text{ft}^3 = \text{tons of sediment entrapped} \times \text{ft}^3 / \text{ton}$$

$$\text{ft}^3 = 80\ \text{tons} \times 25\ \text{ft}^3 / \text{ton} = 2{,}000\ \text{ft}^3$$

10. Length of cross wind trap strip or length of field perpendicular to wind direction, in feet:
    Example: 1,320 feet

11. Depth of annual deposition to be permitted in the cross wind trap strip, in feet:
    Example: 0.2 feet =2.4 inches

12. Width of cross wind trap strip required to entrap transported sediment:

$$\text{Width} = \frac{\text{Volume of sediment entrapped}\ (\text{ft}^3)}{\text{length of trap strip}\ (\text{ft}^3) \times \text{depth of annual accumulation}\ (\text{ft})}$$

$$\frac{2{,}000\ \text{ft}^3}{(1{,}320\ \text{ft} \times 2\ \text{ft})} = 7.5\ \text{ft}$$

80 tons sediment spread over a trap strip 7.5 feet wide and 1,320 feet long would be equivalent to 2.4 inches of soil on about a quarter acre. The minimum width for the trap strip, 15 feet, would accumulate an annual deposition of 1.2 inches on about a half acre.

In this example: a 15-foot-wide trap strip along the drainage area or field edge should catch most of the wind erosion below **T**, which is contributing sediment and phosphorus that is polluting the nearby stream. A water quality concern has been identified. The annual deposition is less than 2.4 inches per year, so a 15-foot-wide trap strip should catch the soil without being totally buried (fig. 3c–7).

Phosphorus entrapment estimate

The following procedure for estimating pounds of phosphorus (P) delivered to the trap strip from the contributing area on an annual basis is based on the soil loss prediction, contributing area erosion rate, soil test phosphorus levels, and the total phosphorus enrichment ratio (PER). The data are from observation and local soil test P in both field and wind sediment from a wind study. This procedure may be applicable to areas where eroded sediment is deposited directly into a surface drainage ditch.

To estimate the pounds of phosphorus contributed to a waterbody by wind erosion and sedimentation, use the following formulas for contributing areas with a soil phosphorus test:

1. Soil phosphorus test level, in ppm, derived from laboratory analysis:
   Example: 250 ppm soil phosphorus, or 0.025%

2. Total PER is the ratio of total P found in the sediment to soil test P found in the contributing area. The ratios shown in table 3c–2 are based on field sampling for different WEG soils in the contributing area. These ratios can be used as guidance until local information is collected and made available.

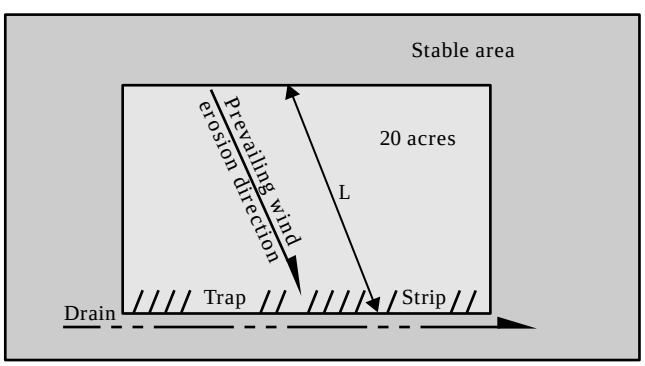
3. Phosphorus entrapment estimate procedure using the previous example for a soil sith WEG=3:

$$\text{Total P} = (\text{Soil trapped tons / ac / yr}) \times (\text{Soil test P}[\text{ppm}]) \times (\text{PER for WEG}) \times (2{,}000 \text{ lb / ton})$$

$$(80 \text{ tons / ac / yr})(0.0025)(5)(2{,}000) = 200 \text{ lb P / yr}$$

80 tons of sediment entrapped in a cross wind trap strip will also entrap 200 pounds of phosphorus.

Figure 3c–7 Trap strips protecting drainage ditch



Isolated field with drainage ditch catching wind erosion
Assume: soil loss at 5 tons/acre/year

Table 3c–2 Phosphorus enrichment ratio per wind erodibility group *

Wind erodibility group	P enrichment ratio
1, 2, 3	5
5, 7	7.5
4, 4L, 6	10

* The P enrichment ratio has not been validated by research and is based on NRCS field trial soil test analysis at one location in the Midwest and on NRCS judgment and observation. It may be different by WEG for other locations. Check with the land grant university.

Operation and maintenance

Established vegetation in the trap strip or plant residue is managed at a height of at least 12 inches, a minimum stem density of 50 to 75 stems per square foot, and more than 50 percent ground cover during those periods in which wind erosion is expected to occur. Trap strips should be mowed in time to allow for new growth to the planned height before periods when wind erosion or crop damage is expected to occur.

Spot spray or mow perennial weeds to meet state noxious weed laws for weed control.

Trap strips should not be used as travel lanes. Flattened grass is not as effective as erect grass in trapping saltating soil.

Remove entrapped soil sediment from the trap strip area and spread onto the adjacent field when the depth of the sediment begins to impede the ability of the established vegetation to trap additional sediment. This should occur before the sediment reaches a depth of 6 inches in the trap strip area.

If wildlife habitat is a purpose, the vegetation species should be mowed to promote the desired species and plant density. Avoid mowing, harvesting, or burning during critical nesting and brooding periods.

A headland or end row, where needed for turning, is required to prevent the loss of trap strip function and design.

After establishment, fertilize trap strips with nitrogen as needed to maintain plant vigor.

Establish and relocate trap strips as needed to maintain plant density and height.

Burning of warm-season grasses is not allowed unless new growth will obtain the minimum height criterium during the critical period when wind erosion, crop damage, or water quality impairment is expected to occur.

Install surface drainage outlets where required to prevent concentrated flow from flushing out sediment in trap strip area.

Fertilizing the cross wind trap strip vegetation
Fertilizer is to be applied according to a current soil test taken from the trap strip area. All phosphorus is to be incorporated to prevent phosphorus movement into the nearby surface water (except in no-till seeding). Nitrogen applications are delayed until after plant emergence and establishment to minimize nitrogen losses from leaching or runoff to the adjacent surface waterbody.

Information needed to fill in job sheet

The job sheet provides information for the design of a cross wind trap strip. The following is guidance in how to complete the specification sheet for the landowner's use.

Landowner

Enter the name of the landowner planning the cross wind trap strip.

Field number

Enter the field number or numbers from the conservation plan, job sketch, or plan map. A field name is sometimes more commonly used. Correspond the field identification with the job sketch on the back of the job specification sheet.

Purpose

Check the appropriate purpose or purposes that the cross wind trap strip will serve.

Location and layout

Cultivated width (feet)
This is the distance across the cropped field that contributes to the sediment load being deposited at the cross wind trap strip. It is the width in the direction of the **L** unsheltered distance.

Grass strip width (feet)
The case example gives two ways of determining the width of the cross wind trap strip. The first is to select from a series of predesigned trap strip width (see table for 15 feet width in appendix 3c–A) and use these precalculated tables to determine the deposition depth that would occur each year. The second method is to select the sediment deposition depth that the trap strip can tolerate each year and calculate the cross wind trap strip width using the cubic feet of sediment predicted to be entrapped.

Grassed strip length (feet)
Determine the length of the field across the landscape. Length is measured perpendicular to the flow direction of wind across the field. Some cross wind trap strips may be placed across the entire length of the field while others may traverse only a partial distance.

Acres in buffer strip
Calculate the total acreage established in cross wind trap strips. This is the width of each individual trap strip multiplied by the length of that strip. Total trap strip acres will determine seeding requirement.

Plant material information

Provide the vegetation species and/or cultivar planned to be planted in each cross wind trap strip. Cross wind trap strips need to stand upright during wind events and have a density of 50 stems per square feet. Acceptable species adapted to the location are listed in the Field Office Technical Guide. The seeding rate or transplanting distance, planting date, and any recommendations for soil amendments and fertilizer are also given. Fertilizer and soil ammendments are applied according to a soil test or following guidance from conservation practice standard for Critical Area Treatment (342). Follow recommended timings of soil and fertilizer amendments.

Site preparation

Site preparations follow normal seeding and transplanting guidelines from conservation practice standard Critical Area Treatment (342). Additional guidance can be given in Additional Specifications and Notes on the back page.

Planting method

Specify the seeding depth or transplant spacing. Generally grass seeds are planted shallow (top 0.25 inch) in a firm seedbed. Give the amount and placement of mulch material, if used. Guidance is available from conservation practice standard Critical Area Treatment (342). Use same guidance to recommend planting small grain cover or nurse crop.

Operation and maintenance

In this section provide guidance for any routine operations that are necessary to maintain the function of the cross wind trap strips. Provide weed control methods based on vegetation tolerance to herbicides, tillage, mowing, and/or burning. Program mowing to maintain plant height. Recommend fertilizer according to crop and trap strip needs. Give reminders to repair weak vegetation in the trap strips and where to obtain seedling for repair. Caution against using herbicides in cropped areas that will damage the vegetation in the trap strip. Use the section Additional Specifications and Notes to provide the information to the landowner.

Job sketch

Draw a sketch on the back page that will show field locations of each cross wind trap strip. Number each trap strip. Show all drainageways where the trap strips may be required. Show field boundaries, trap strip widths, and wind direction. Also show any other conservation buffer practices that may be planned for the field.

Appendix 3c

Cross Wind Trap Strip
15-foot design table
for a soil with 1.3 g/cc bulk density
wind erosion contributing area

Erosion rate (tons/ac/yr)	Acres 20	40	80	160	320	640
	(total tons)					
5	100	200	400	800	1600	3,200
4	80	160	320	640	1280	2,560
3	60	120	240	480	960	1,920
2	40	80	160	320	640	1,280
1	20	40	80	160	320	640

80.0% soil trapped by filter

Salt factor=0.8 erosion rate (tons/ac/yr)	Acres 20	40	80	160	320	640
	(total tons)					
5	80	160	320	640	1280	2,560
4	64	128	256	512	1024	2,048
3	48	96	192	384	768	1,536
2	32	64	128	256	512	1,024
1	16	32	64	128	256	512

Trap strip width - 15 ft

	Acres 20	40	80	160	320	640
Trap strip length (ft)	660	1,320	1,320	2,640	2,640	5,280
	1,320	2,640	2,640	5,280	5,280	

Trap strip acres

	0.23	0.45	0.45	0.91	0.91	1.82
	0.45	0.91	0.91	1.82	1.82	

Deposition depth in trap strip

Erosion rate (tons/ac/yr)	(in/yr)					
5	2.5	2.5	4.9	4.9	9.9	9.9
	1.2	1.2	2.5	2.5	4.9	
4	2.0	2.0	3.9	3.9	7.9	7.9
	1.0	1.0	2.0	2.0	3.9	
3	1.5	1.5	3.0	3.0	5.9	5.9
	0.7	0.7	1.5	1.5	3.0	
2	1.0	1.0	2.0	2.0	3.9	3.9
	0.5	0.5	1.0	1.0	2.0	
1	0.5	0.5	1.0	1.0	2.0	2.0
	0.2	0.2	0.5	0.5	1.0	

Additional Reading

Bensley, R.P. 1974. Erosion and sediment pollution control. Chapter 3 (Wind Erosion) Iowa State University Press, Third Ed.

Robertson, L.S. Crops and soils newsletter. Michigan State Cooperative Extension Service, E. Lansing, MI.

United States Department of Agriculture, Natural Resources Conservation Service, Field Office Technical Guide, Section IV, Cross Wind Trap Strips 589C, Field and Filter Standards.

United States Department of Agriculture, Natural Resources Conservation Service, National agronomy manual, Subpart B, Wind Erosion.

United States Department of Agriculture, Natural Resources Conservation Service, 1997. Wind erosion process, prediction, and control manual, Wind Erosion Workshop, Ft. Collins, CO.

Cross Wind Trap Strips

Conservation Practice Job Sheet ***589C***

Natural Resources Conservation Service (NRCS) ***January 1998***

Landowner_____

Definition

A cross wind trap strip is an area of herbaceous vegetation, resistant to wind erosion, and grown in strips perpendicular to the prevailing wind direction. As the name implies, cross wind trap strips entrap wind-borne sediment.

Purpose

Cross wind trap strips catch wind-borne sediment and other pollutants, such as nutrients and pesticides, from the eroded material before it reaches waterbodies or other sensitive areas.

Where used

Cross wind trap strips can be used along watercourses, drainage ditches, waterbodies, and other sensitive areas adjacent to agricultural fields susceptible to wind erosion or wind erosion damage.

Conservation management systems

Cross wind trap strips are recommended as part of a resource management system that addresses all natural resource concerns and the objectives of the landowner or operator. For this practice to be fully effective, crop rotation, nutrient and pest management, crop residue management, and other cropland practices should be considered.

Wildlife

Cross wind trap strips provide excellent opportunities to improve wildlife habitat by creating travel lanes that connect important habitat areas or infield escape cover. For wildlife habitat benefits, select native or other adapted species that provide wildlife food and cover.

Operation and maintenance

Trap strips must be inspected periodically. Weeds must be controlled to allow proper establishment and maintenance of the desirable species. Fertilizer will be applied as needed to maintain plant vigor. Mowing or grazing will be scheduled to accommodate wildlife species and to allow regrowth to planned height before the critical wind period or crop damage is expected to occur. Trapped material will be removed and vegetation reestablished as necessary to maintain adequate efficiency of the practice.

Specifications

Site-specific requirements are listed on the specifications sheet. Additional provisions are illustrated on the job sketch sheet. Spacing of the erosion-susceptible strips is determined using the NRCS erosion prediction technology. Specifications included in this job sheet are based on guidance contained in the local Field Office Technical Guide.

Cross Wind Trap Strips – Specifications Sheet

Landowner C.W. Strip Field number 6

Purpose (check all that apply)	
☐ Reduce soil erosion from wind	☐ Provide wildlife habitat
☑ Reduce pollution from wind-borne material	☐ Other (specify)
☐ Protect crops from wind-borne soil	

Location and Layout	Strip 1	Strip 2	Strip 3	Strip 4
Cultivated width (ft)	660			
Grassed strip width (ft)	15			
Grassed strip length (ft)	1320			
Acres in buffer strip	0.45			

Plant Materials Information				
Species/cultivar by row number	Seeding rate (lb/acre)	Seeding date	Recommend lime (tons/acre)	Recommend fertilizer N-P_2O_5-K_2O (lb/acre)
Strip #1				
1 Indiangrass	9	April 10	0	30-50-80
2				
3				
Strip #2				
1				
2				
3				
Strip #3				
1				
2				
3				
Strip #4				
1				
2				
3				

Site Preparation

Prepare firm seedbed. Apply lime and fertilizer according to recommendations.

Planting Method(s)

Drill grass and/or legumes seed 0.25 inches deep uniformly. Establish stand of vegetation according to recommended seeding rate. If necessary, mulch newly seeded area with Ø tons per acre of mulch material. May seed small grain as a companion crop at the rate of Ø pounds per acre, but clip or harvest before it heads out.

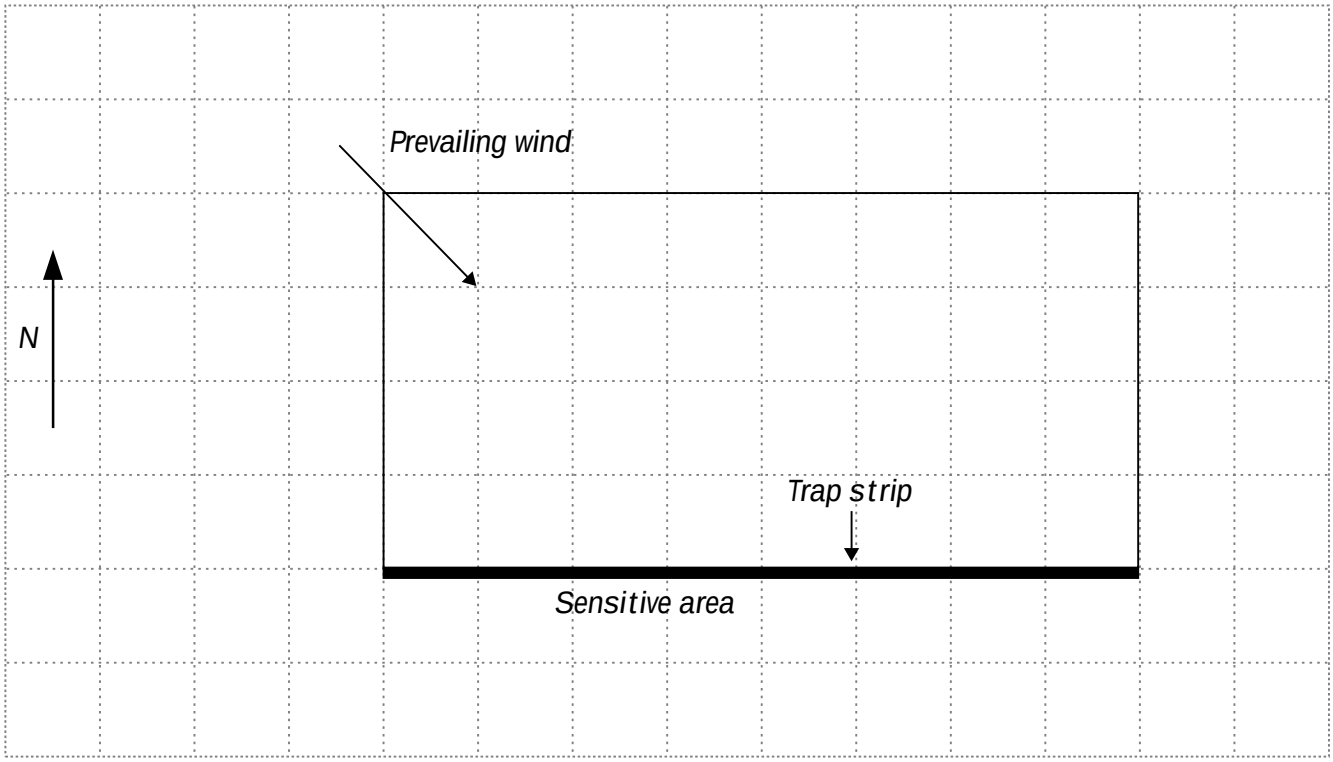
Operation and Maintenance

Trap strips must be inspected periodically. Weeds must be controlled to allow proper establishment and maintenance of the desirable species. Fertilizer will be applied as needed to maintain plant vigor. Mowing or grazing will be scheduled to accommodate wildlife species and to allow regrowth to planned height before critical wind period or crop damage is expected to occur. Trapped material will be removed and vegetation reestablished as necessary to maintain adequate efficiency of the practice.

Cross wind trap strips—Job sketch

If needed, an aerial view or a side view of the windbreak/shelterbelt shown below. Other relevant information, such as complementary practices and adjacent field or tract conditions including structures and crop types, and additional specifications may be included.

Scale 1"=_____ ft. (NA indicates sketch not to scale: grid size=1/2" by 1/2")



Additional Specifications and Notes:
Prepare seedbed an additonal width for drilled sorghum on the field side of the trap strip.

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