

Soil Facts

Conservation Compliance: The Clock Is Running

Soil erosion is a major cause of environmental damage, especially to our state's waterways. The soil particles that erode from land—and the contaminants they often carry with them—threaten water quality.

Recognizing the importance of soil conservation as a way of reducing erosion and protecting water quality, lawmakers included conservation compliance requirements in the 1985 Farm Bill. According to the bill, farmers who grow annual crops on highly erodible land are required to develop a conservation plan for their farms and a schedule for carrying out each part of the plan. All parts of the plan must be completed by December 31, 1994. Farmers who do not comply may lose federal farm program benefits, but benefits can be lost even before the end of 1994 if the plan's annual schedule is not followed.

This publication traces the progress that has been made in achieving conservation compliance, describes conservation practices that can be used to reduce erosion, and discusses the economic factors to be considered.

Impact of Conservation Compliance

Major USDA agencies, namely, the Cooperative Extension Service (CES), Soil Conservation Service (SCS), and Agricultural Stabilization and Conservation Service (ASCS), are working hard to help farmers implement plans and maintain benefits. USDA officials estimate that about one-third (140 million acres) of U.S. cropland is highly erodible and is therefore affected by the conservation compliance policy. About 1.3 million compliance plans have been written for the nation's highly erodible cropland.

A Monumental Task for North Carolina

In North Carolina, about one-fourth (or 1.5 million acres) of all cropland is highly erodible. The piedmont region contains the most highly erodible land in our state (Figure 1). In some piedmont counties, as much as 90 percent of the cropland is highly erodible.

Figure 2 illustrates the magnitude of the planning and implementation tasks. Although more than 100,000 compliance plans have been prepared for North Carolina cropland, conservation compliance measures have been implemented on less than 50 percent of the total acreage required. To meet the December 31, 1994, deadline, our landowners and producers must increase the implementation rate.

Surveys show that most producers require some technical help, and many need financial assistance to implement practices. These factors, along with the need to revise existing plans, are slowing achievement.

Each year, the Soil Conservation Service checks 5 percent of farm tracts for compliance. Growers who are not applying the scheduled conservation practices are reported to the Agricultural Stabilization and Conservation Service and may be denied USDA farm program benefits.

As the number of installations increases, monitoring and enforcement activities will require increasing amounts of time from members of the SCS technical staff, reducing the amount of time they can spend helping

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growers develop and adjust their individual plans. Therefore, if you will need assistance, contact your local SCS office soon.

Conservation Options

You can choose from many different practices to meet conservation requirements. Some of these practices are quite inexpensive. In choosing practices, aim to select those that will work together in a system that fits well with your farming operation.

SCS personnel can describe conservation options and help with the design, installation, and monitoring of the system. Contact your local SCS district conservationist for assistance. Using this resource will not only improve your plan but will also help you find ways to minimize soil loss while maintaining profitability. If you need to make changes in your plan, you must contact the district conservationist to ensure that the changes do not threaten conservation compliance.

Residue Management

Residue management is an important and very effective strategy for meeting conservation compliance requirements. Residue management refers to conservation cropping, conservation tillage, and crop residue use practiced alone or in combination. Table 1 shows the effectiveness of ground cover in reducing soil loss. It is also apparent from the table that the steeper the slope, the more difficult it is to reduce erosion to acceptable levels. Brief discussions of conservation cropping and conservation tillage follow.

Conservation Cropping

Conservation cropping includes many practices. Some of these are discussed here.

Cropping Sequence (Rotation).

Growing adapted crops in an order that promotes the addition of crop

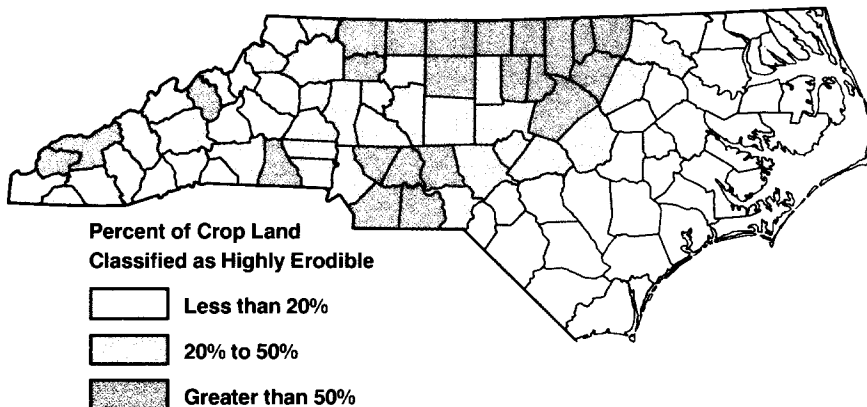


Figure 1. Occurrence of highly erodible cropland in North Carolina.

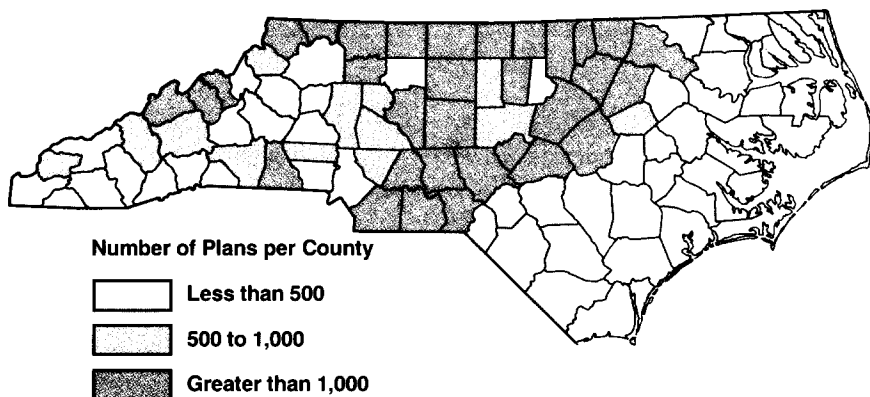


Figure 2. County requirements for conservation compliance plans in North Carolina.

residues to the soil can reduce erosion. The cropping sequence is complete when the last crop has been harvested. Table 2 shows examples of acceptable cropping sequences on highly erodible land in the piedmont.

Cover Crops. Close-growing grasses, legumes, or small grains can help control erosion during periods when the major crops do not furnish adequate cover. Conservation cover crops can increase water infiltration, reduce weeds, and provide nitrogen (if legumes are used).

In North Carolina, cover crops are most often used from late fall to early spring. Cover crops, especially the small grains, are sometimes harvested. However, maximum land benefits are obtained when the cover crops are incorporated into the soil by tillage or left on the surface for extended protection against erosion.

Some widely used winter cover crops are small grains, crimson clover, and hairy vetch. Pearl millet and sorghum-sudan hybrids are recommended summer cover crops.

Contour Farming. In contour farming, the land is plowed, prepared, planted, and cultivated on the contour (almost perpendicular to the slope with the rows less than 0.6 percent grade). Proper contouring reduces erosion and controls water. Contouring is effective on slopes in the 3 to 8 percent range. When exact contouring is not feasible, the rows may be arranged across the slope. Although not as desirable as contouring, this row design can be effective.

Strip Cropping. Erosion can be reduced by growing two or more crops in alternating strips on the same field. The crops are arranged so that a strip of grass or a close-

Table 1. Effectiveness of Ground Cover in Reducing Soil Loss on Sloping Land

Slope (%)	Ground Cover		
	30%	60%	90%
	(soil loss in tons/acre/year)		
3	3.7	2.7	0.4
6	10.0	7.7	6.0
9	17.2	13.2	10.5

Table 2. Cropping Sequences on Highly Erodible Land

Sequence	Year 1	Year 2
1	Corn (small grain)	No-till soybeans
2	No-till corn (small grain)	No-till soybeans
3	Tobacco (small grain)	Fescue
4	Tobacco (cover crop)	No-till corn

Table 3. Influence of Tillage System on Amount of Residue and Corn Yield

Tillage Method*		Residue Percentage	1988 Corn Yield (bushels/acre)
1987	1988		
CT	CT	7	66
NT	NT	6	64
CT	NT	62	90
NT	NT	88	109

* CT = Conventional tillage; NT = No-till

growing crop, such as small grain, lies between strips of a clean-tilled crop. The number and width of grass strips must be equal to, or cover a greater area than, the cultivated strips. On land devoted to row crops, the crop residue must be left on the land over winter, or a winter cover crop must be established. Strip cropping on the contour produces the greatest erosion reduction. Arranging the strips across the general slope also gives excellent results. Strip cropping can be very economical.

The primary disadvantage of strip cropping is the inconvenience of laying out the strips and farming them. Strip cropping also removes land from production of the row crop, which may be a greater source of income than could be earned by harvesting the crop from the vegetative strips and either feeding it to livestock or selling it.

Grassed Waterways and Field Borders. Vegetated waterways and borders can be used to prevent soil from leaving the field and possibly entering streams. A vegetative

cover, usually grass, is established in a strip over natural waterways and as a border around the field. Various types of vegetation can be used for field borders because they don't have to withstand the harsh treatment of grassed waterways. Many producers interplant vegetative covers and food plots for wildlife. Initial costs for grassed waterways and field borders can be relatively high, but the cost per unit of soil saved is low.

Conservation Tillage

A variety of practices can be used to conserve soil and water by leaving residue on the surface. In North Carolina, no-till planting is the most widely used method. Other kinds of tillage (chiseling and disking) may qualify as conservation tillage if adequate amounts of residue are left on the surface.

The critical factor in conservation tillage is that at least 30 percent of the surface must be covered by residue at the time of planting. To determine the amount of ground cover on cropland, stretch a 100-foot string with markings at each foot across part of the field, then count the number of times the residue crosses the markings. The number of contacts equals the percentage of ground covered by residue. For example, when pieces of residue cross 35 of the marks, 35 percent of the ground is covered. Because of the importance of residue management practices in erosion control, the level of residue maintained on the soil surface is a critical issue. Conservation tillage is frequently recommended to achieve the necessary residue levels.

Increases in crop yields provide the most compelling reason for raising residue levels. The data in Table 3 were collected at Reidsville and show the effect of conservation tillage on the amount of residue and the subsequent effect on yield.

Several factors lead to the beneficial effects of conservation tillage

systems. Water movement into the soil increases as the amount of residue on the surface increases. Table 4 shows the increased intake of water (infiltration) when the no-till method is used. Residue improves soil structure, providing a better environment for root growth and development as well as allowing better water and air movement in the soil. Table 5 shows the relationship between the tillage method used, soil water content, and crop yield.

It is wise to experiment with conservation tillage on a limited acreage before fully adopting a system such as no-till. While conservation tillage systems have proven profitable for many farmers in North Carolina, they require new skills and often new equipment. Weed and insect problems will change under the new system as will the methods used to control them. It is easier to make adjustments on a single field rather than on the whole farm.

Economic Considerations

Several economic factors should be considered when planning for conservation systems.

Net Return

The most important element of a successful business is net return. The profitability of a system is determined by income less expenses. Producers must not be discouraged by higher costs or lower yields unless they mean lower profits. Carefully weigh the costs and benefits of conservation systems and practices.

Table 4. Effects of Tillage System on Water Infiltration Rate (Reidsville, North Carolina)

Tillage Method*	Infiltration (inches per hour)	
	At Planting	At Lay-by
CT	1.06	0.46
NT	1.34	1.02

* CT = Conventional tillage; NT = No-till

Table 5. Effects of Tillage System on Residue Cover, Soil Water Content, and Corn Yield

Tillage Method*	Residue Percentage	Soil Water (0 to 3 in.) Percentage	Corn Yield (bushels/acre)
NT	89	21	92
FCP-D	14	15	75
FMP-D	3	3	52

* NT = No-till; FCP-D = Fall chisel plow, spring disk;

FMP-D = Fall moldboard plow, spring disk

(Note: Measurements taken after a saturating rain early in the growing season at Oxford, North Carolina.)

Cash Flow

With reduced equipment costs, conservation tillage may earn greater returns than conventional tillage. Annually, however, it may earn less and decrease cash flow.

But some growers have found that conservation systems can improve cash flow in the short term.

Crop Prices and Farm Program Benefits

Prices and benefits influence returns. Conservation plans must take into account changes in market con-

ditions, such as those that led to a doubling of cotton acreage over the last two years. Crop selection, sequence, and residue management may need to be modified.

The Final Word

Conservation compliance plans are important. Plans must be implemented exactly or changed in accordance with SCS technical guidance. Changes should be made soon. December 31, 1994, is rapidly approaching. The clock is running!

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