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2011
ILLINOIS SOIL CONSERVATION TRANSECT SURVEY SUMMARY REPORT

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Introduction

The results of the thirteenth statewide Soil Conservation Transect Survey conducted in the spring and early summer of 2011 indicates that Illinois producers conducted more tillage operations possibly to level fields from ruts and alleviate compaction created by wet field conditions over the two previous years. The survey, initiated by the Illinois Department of Agriculture (IDOA), involved the cooperation of Illinois' 98 Soil and Water Conservation Districts (SWCDs), and the USDA Natural Resources Conservation Service (NRCS). The biennial surveys measure progress in reducing soil erosion to T or tolerable soil loss levels statewide. The tolerable soil loss for most soils is between 3 and 5 tons per acre per year. This is the amount of soil loss that can theoretically occur and be replaced by natural soil-building processes. Reducing soil loss to T is essential to maintaining the long-term agricultural productivity of the soil and to protecting water resources from sedimentation due to soil erosion.

Transect Survey Background

The Soil Conservation Transect Survey provides a snapshot of the current status of soil conservation efforts on agriculture land in Illinois. Survey results provide data on the presence of conservation practices in each county, as well as an estimate of remaining land treatment needs.

Since 1982, the Conservation Technology Information Center, in cooperation with local SWCDs and the NRCS, has conducted an annual survey of tillage practices. During the 1980s, local staff estimated usage of various conservation tillage systems within their county. Although this method required only a small amount of time to complete the survey, it was soon recognized that a different procedure was needed to provide more useful data.

In an effort to improve the quality of the county-level data generated for the annual tillage survey, representatives from the state's natural resource management agencies and organizations met in 1993 and reviewed several survey options. The group recommended a county transect-survey method for use in Illinois. In conducting the transect survey, SWCD and NRCS staff collect data from approximately 450 fields along a random route that intersects each township in the county twice. The survey is conducted on a biennial basis after the crops are planted in the spring. Some counties with a significant amount of small grains conduct an additional survey in the fall to collect data on fall-planted crops.

Information on tillage systems and crop residue amounts is collected at more than 49,000 points across the state. In addition to collecting information on crop residue management and tillage practices, the surveyors also collect data on sheet/rill and ephemeral soil erosion. After the survey is completed in the 97 counties in Illinois that conduct a cropland survey, the data is sent to the Illinois Department of Agriculture to be analyzed. Data for each county and the entire state are available on soil loss relative to "T", the presence of ephemeral erosion, and tillage systems used to plant crops.

The transect surveys were conducted annually from 1994 through 2002. In 2002, the survey switched to a biennial format and was conducted in 2004 and 2006. The 2008 survey was postponed until 2009 due to adverse conditions. The biennial schedule has been resumed with the running of the survey in 2011. The data continues to provide an opportunity to analyze trends in tillage systems, crop residue cover, sheet/rill erosion and ephemeral

erosion. A brief analysis of the data is included in the summary tables and narrative that follows.

Soil Savings Trends

Table 1 summarizes soil loss data by T value for 1994 through 2011. The soil loss estimates for 1997 – 2011 were developed using the Revised Universal Soil Loss Equation (RUSLE), which was adopted as the formula for predicting soil loss by the NRCS in 1997. The National Resource Inventory (NRI) is conducted by NRCS every five (5) years to measure trends in soil conservation. The NRI provides data that are statistically reliable at the state level. While the Transect Survey data are not statistically reliable at the state or county level, the survey provides much detailed information that is useful for local planning and strategy development.

The 2011 survey showed that 84.2% of the points surveyed were at or below T (tolerable soil loss levels). This figure represents a drop of about 1% from what was recorded in 2009 and was 2% lower than the highest amount recorded in 1998. The 1994 Soil Conservation Transect Survey, the first ever conducted, used the USLE to estimate that 74.1% of the points surveyed were meeting T. Previous surveys conducted by the NRCS using the USLE indicated that 59.4% of the total cropland acres were at T or less in 1982, 67.7% were at T or less in 1987, 73.6% were at T or less in 1992, and 78.4% of the state's cropland was at, or less than, the tolerable soil loss level in 1997.

The 2011 results also indicate that about 15.8% of the points surveyed were still exceeding tolerable soil loss levels. About 5% of the points surveyed exceeded 2T. For most of the survey points at which estimated soil loss was greater than T, estimated soil losses were 6 to 10 tons per acre per year. In a lot of cases slight adjustments in management systems to retain more crop residue on these acres could bring the soil loss to T or below.

Tillage System Trends

The survey also provided information on tillage systems used in planting corn and soybean crops this past spring, and small grain crops last fall. The data for 1994 through 2011 are summarized in Tables 2 through 5. Statewide, the survey showed that 24.2% of all fields planted to corn, soybean and small grain crops were farmed using no-till practices, which leave the soil virtually undisturbed from harvest through planting.

For these crops, this amounts to a 5% decrease from the number of fields planted by no-till in 2009, and a 9% decrease from the highest recorded amount of no-till recorded in 2006 of 33.2%. It appears a large portion of the decease in no-till was shifted to mulch-till as the percent of mulch-till increased 5% from the amount recorded in 2006.

To qualify as mulch tillage, at least 30% of the residue from the previous crop must remain on the soil surface after being tilled and planted. Residue is important because it shields the ground from the eroding effects of rain and helps retain moisture for crops. Mulch-till and no-till are conservation tillage systems because they both leave at least 30% residue on the soil surface after planting.

As stated earlier, the apparent shift of some fields from no-till to a full-width tillage system may be the result of wet field conditions over several years that have increased the need to till fields to reduce compaction and/or leveling of ruts to allow for planting. It remains to be

seen if this years reduction of fields planted by no-till is a small setback or the beginning of a trend.

Statewide, 31.8% of the cropland fields surveyed in 2011 were planted conventionally, which leaves less than 15% of the soil surfaced covered with crop residue after planting. This level of residue does not provide sufficient protection from erosion on fields with steep slopes. Fortunately this year's results did not show a significant increase in the fields planted by a conventional system.

Ephemeral Concentrated Flow Erosion Trends

Since 1995, surveyors have collected data on ephemeral or gully erosion in surveyed fields. Surveyors identify fields in which ephemeral erosion has occurred or is likely to occur in areas of concentrated surface water flow. This type of erosion requires structural conservation practices, such as grassed waterways, in addition to tillage or other cultural erosion control practices.

In both 1995 and 1996, the Transect Survey documented either ephemeral or gully erosion on 14% of the fields. In 1997, the number of fields increased to 16%. In 1998, the percentage of cropland fields with ephemeral/gully erosion increased to 22%. Heavy spring and summer precipitation was a factor in the increase of ephemeral/gully erosion from 1997 to 1998. In 1999, surveyors noted ephemeral or gully erosion on 18% of the fields.

The surveys conducted from 2000 through 2009 showed the ephemeral and gully erosion at 22% to 26%. The 2011 survey is the first one in over 10 years that has recorded just fewer than 20% of the fields experiencing ephemeral erosion. This observation may be due to the increase in tillage that may have closed gullies before the surveyors observed the fields after crops were planted or the increase in conservation practices applied over the past several years.

Summary

The Illinois Department of Agriculture, local Soil and Water Conservation Districts and the USDA Natural Resources Conservation Service will use the survey data to plan future conservation efforts. The information will be vital in determining the course of action each Soil and Water Conservation District will take to reach Illinois' goal of reducing soil erosion and sedimentation and improving water quality. Contact the local SWCD office for county level data.

TABLE #1

PERCENT OF POINTS SURVEYED WITH RELATIVE SOIL LOSS BY T VALUE 1994 – 2011

*(RUSLE used to calculate soil loss)

Year	<T	1-2 T	>2T	Unknown	Total %
2011*	84.2	10.9	4.9	0.0	100
2009*	85.4	10.2	4.4	0.0	100
2006*	85.8	10.2	4.0	0.0	100
2004*	84.9	10.7	4.4	0.0	100
2002*	85.0	10.8	4.2	0.0	100
2001*	85.0	10.6	4.1	0.3	100
2000*	85.7	10.4	3.6	0.3	100
1999*	85.7	10.5	3.6	0.2	100
1998*	86.5	9.9	3.4	0.2	100
1997*	86.2	9.8	3.7	0.3	100
1996	76.2	14.8	6.4	2.6	100
1995	76.7	15.3	6.3	1.7	100
1994	74.1	16.7	7.1	2.1	100

TABLE #2

PERCENT OF POINTS SURVEYED WITH INDICATED TILLAGE SYSTEMS USED FOR CORN, SOYBANS & SMALL GRAINS 1994 – 2011

Year	Conventional	Reduced	Mulch	No-Till	NA/Unknown	Total %
2011	31.8	22.6	21.4	24.2	0	100
2009	29.2	20.9	20.7	29.2	0	100
2006	31.2	19.3	16.4	33.2	0	100
2004	33.5	20.1	17.2	29.2	0	100
2002	35.8	19.0	15.0	30.2	0	100
2001	31.7	21.2	17.8	29.3	0	100
2000	30.4	21.2	18.7	29.1	0.2	100
1999	36.4	22.0	15.0	25.8	0.3	100
1998	38.1	22.7	13.7	24.6	0.2	100
1997	33.6	21.7	19.1	24.6	0.3	100
1996	36.5	23.8	16.3	22.7	0.2	100
1995	33.5	26.3	14.7	24.8	0.1	100
1994	46.1	20.4	9.8	22.7	0.1	100

TABLE #3

PERCENT OF POINTS SURVEYED WITH INDICATED TILLAGE SYSTEMS USED FOR CORN CROP 1994 – 2011

Year	Conventional	Reduced	Mulch	No-Till	NA/Unknown	Total %
2011	45.5	24.8	18.9	10.8	0	100
2009	42.3	25.0	19.5	13.2	0	100
2006	47.9	21.9	13.5	16.7	0	100
2004	51.2	21.9	12.0	14.9	0	100
2002	52.9	19.5	10.7	16.9	0	100
2001	49.0	23.5	10.5	17.0	0	100
2000	48.7	23.2	11.5	16.4	0.2	100
1999	56.2	21.3	8.5	13.7	0.3	100
1998	56.7	22.4	8.2	12.5	0.2	100
1997	50.4	22.6	12.3	14.4	0.3	100
1996	47.6	24.7	12.8	14.7	0.2	100
1995	44.3	27.7	11.0	16.9	0.1	100
1994	59.6	14.6	6.9	18.8	0.1	100

TABLE #4

PERCENT OF POINTS SURVEYED WITH INDICATED TILLAGE SYSTEMS USED FOR SOYBEAN CROP 1994 – 2011

Year	Conventional	Reduced	Mulch	No-Till	NA/Unknown	Total %
2011	13.7	19.9	25.2	41.2	0	100
2009	13.9	15.2	22.1	48.8	0	100
2006	13.8	16.5	18.7	51.0	0	100
2004	14.4	17.9	22.1	45.6	0	100
2002	19.2	18.0	18.9	43.9	0	100
2001	14.2	18.9	24.8	42.1	0	100
2000	12.4	19.8	26.0	41.7	0.1	100
1999	16.4	23.2	21.9	38.3	0.2	100
1998	20.5	24.0	19.1	36.3	0.1	100
1997	16.0	22.0	26.3	35.3	0.4	100
1996	25.5	23.2	19.8	31.2	0.3	100
1995	24.3	25.5	17.3	32.7	0.2	100
1994	32.0	23.8	15.5	28.6	0.1	100

TABLE #5

PERCENT OF POINTS SURVEYED WITH INDICATED TILLAGE SYSTEMS USED FOR SMALL GRAINS CROP 1994 – 2011

Year	Conventional	Reduced	Mulch	No-Till	NA/Unknown	Total %
2011	24.4	19.1	17.2	39.3	0	100
2009	16.3	26.7	22.5	34.5	0	100
2006	21.9	17.3	25.3	35.5	0	100
2004	20.7	20.5	25.9	32.9	0	100
2002	16.5	25.2	24.3	34.0	0	100
2001	20.8	18.9	27.9	32.4	0	100
2000	16.9	13.2	21.9	38.2	9.8	100
1999	19.2	16.9	17.5	34.9	11.5	100
1998	21.8	15.2	17.9	33.3	11.8	100
1997	22.0	11.8	22.4	30.4	13.4	100
1996	15.4	20.6	22.5	32.4	9.1	100
1995	19.6	22.0	22.3	28.2	7.9	100
1994	24.6	26.3	16.9	14.2	18.0	100