

COHYST Model Area Conservation Study

Field Work Preparation – 4/9/2020



Conventional Tillage leaves less than 15% residue on the soil surface.

Conservation Tillage leaves at least 30% residue on the soil surface.

No-Till leaves the soil covered 100% of the time.

Image Source:
<https://www.pennington.com/all-products/agriculture/resources/why-use-a-cover-crop>

Goal of this phase of the Conservation Study is to collect information on current Tillage Practices

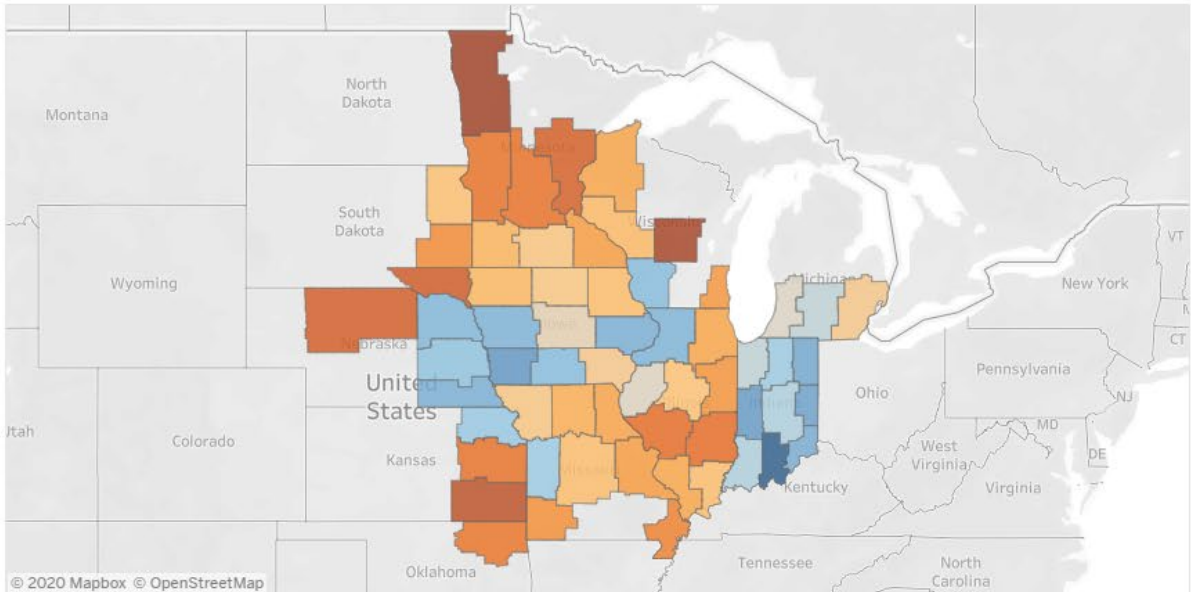
Collect information that is:

1. Collected in a manner consistent with previous collection efforts
2. Results can be used in current and future water use models

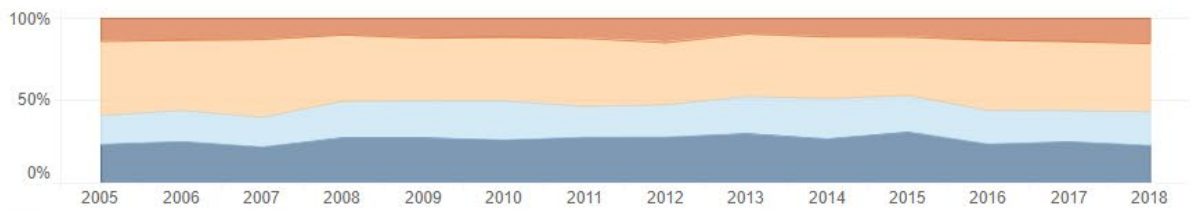
Year 2005 2018

Conservation Tillage (>30% residue)

*click on a CRD to filter the trend chart *control+click to select multiple CRDs



Pct of Row Crop Acres by Tillage Method

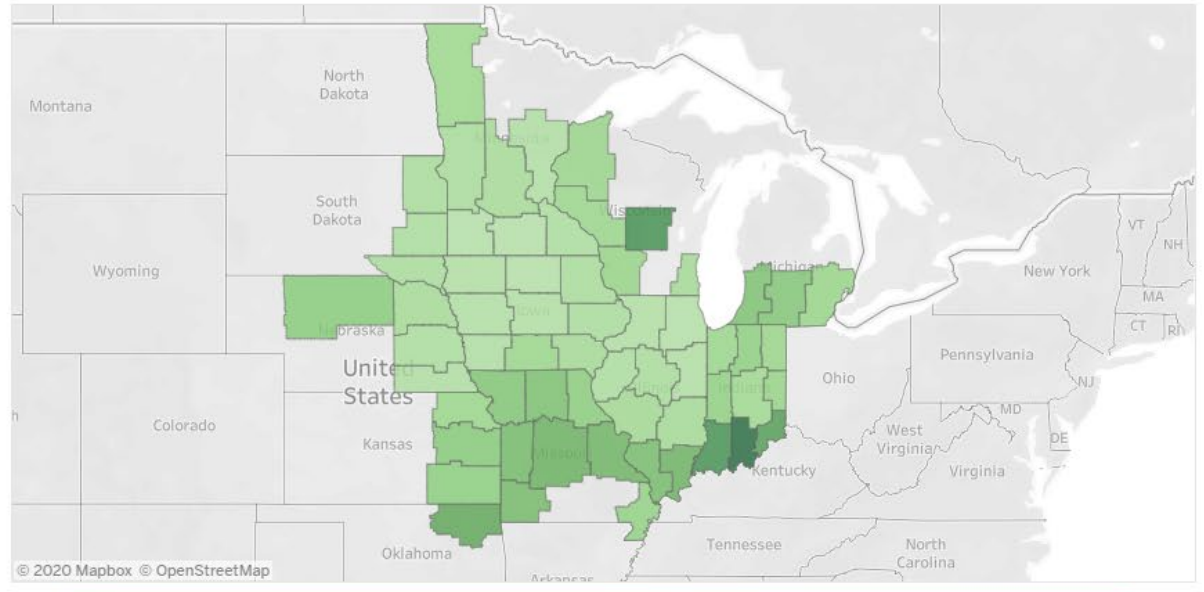


Conventional Tillage (<15% Residue) Reduced Tillage (15-30% Residue) Reduced Tillage High Residue (>30% Residue) No Till (>50% Residue)

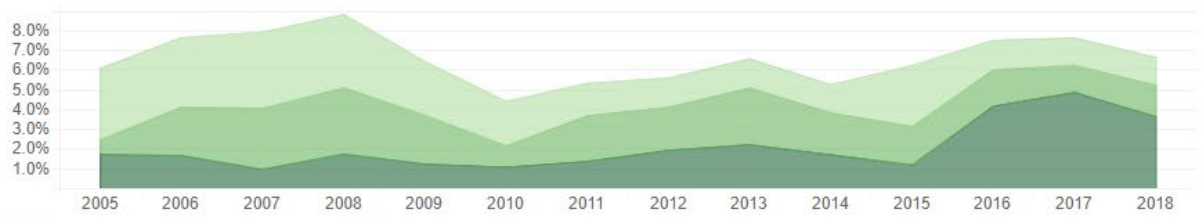
Year 2005 2018

Cover Crops

*click on a CRD to filter the trend chart *control+click to select multiple CRDs



Pct of Row Crop Acres by Cover Method



Perennial Winter Commodity Cover Crop

Nebraska Roadside Transect Survey 2016

Procedures for Using a Roadside Transect Survey For Obtaining Tillage/Crop Residue Data and Resource Assessment

Adapted from procedures designed by:
Conservation Technology Information Center
www.ctic.purdue.edu

Introduction

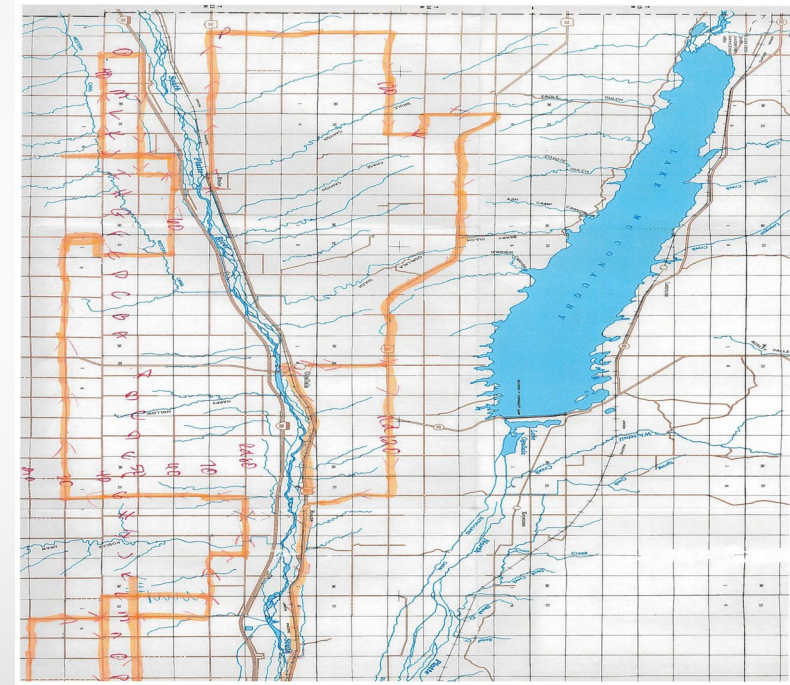
This 2016 Nebraska roadside transect survey is designed to gather information to be used as part of Nebraska's resource assessment. Items that information are being gathered on includes visible erosion, common structural practices, tillage and crop residue management systems, and Eastern Red Cedar (ERC) invasion. It is adapted from the 2008 procedures for the Cropland Roadside Transect Survey designed by the Conservation Technology Information Center (CTIC). In 2016, approximately 20 Counties will be surveyed

The purpose of the survey is threefold: (1) to provide information that can be used by Nebraska NRCS and the Natural Resource Districts in establishing priorities for conservation needs, and for educational or other programs, (2) to evaluate progress achieved in reaching county or statewide goals, and (3) to provide accurate data on the adoption of conservation tillage systems and the state of Nebraska's Resources. The roadside transect survey is an ideal tool for rapid assessment as well as measuring progress for locally led conservation. The state data used for Resource Assessment will have a higher confidence level with the inclusion of data from the Roadside survey.

Procedures Establishing and Marking the Route

Base our methods on CTIC procedures adopted by NRCS for use in previous tillage practice surveys.

- Roadside Survey Approach



- Data collection occurs at ½ mile intervals along route
 - Need minimum of 460 sites per county (reduced proportionately for partial counties)

So what kind of information is collected?

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		Conservation Tillage					Reduced - Till 15-30% cov	Conven - Till <15% cov	
Site #	Crop Growing (Planted)	No-Till	Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov				

Under No-Till, Strip-Till, or Ridge-Till systems only a portion (if any) of the field will have been tilled prior to planting.

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage				Conven - Till <15% cov	Unknown or NA	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov	Reduced - Till 15-30% cov			

>50% Residue



Image Source: <https://www.no-tillfarmer.com/articles/7688-making-no-till-cover-crops-work-in-the-dust-bowl>

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage				Conven - Till <15% cov	Unknown or NA	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov	Reduced - Till 15-30% cov			

~10" Wide Tilled Strip
(approx. 30% of Area)

>30% Residue



Image Source:
<https://www.farmmanagement.pro/common-strip-till-mistakes-and-how-to-avoid-them/>

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Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage			Reduced - Till 15-30% cov	Conven - Till <15% cov	Unknown or NA	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov				

~2" on top of ridge scraped off
(Ridge still present)

>30% Residue



Image Source:
<https://cropwatch.unl.edu/tillage/ridge>

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage			Reduced - Till 15-30% cov	Conven - Till <15% cov	Unknown or NA	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov				

Under Mulch-Till, Reduced-Till, and Conventional-Till systems, the entire field will be worked prior to planting. The difference lies in how much residue remains.

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage				Reduced - Till 15-30% cov	Conven - Till <15% cov	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov				

Field entirely worked

<15 % Residue



Image Source:
<https://www.etsprayers.com/wp-content/uploads/2013/04/>

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage			Reduced - Till 15-30% cov	Conven - Till <15% cov	Unknown or NA	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov				

Field is entirely worked – classification based on Residue Cover

>30%: Mulch-Till

15% - 30%: Reduced Tillage

How do we determine Residue Cover?



Image Source: <https://wamsco.org/conservation-tillage-mulch-till/>

VT NRCS Agronomy Technical Note 1

The Line Transect Method for Estimating Crop Residue Cover

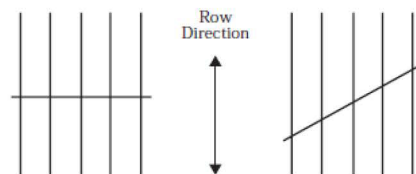
Guidance From: **NRCS National Agronomy Manual** -- 503.43

The line transect method has been proven effective in estimating the percent of the ground surface covered by plant residue at any time during the year. Estimates of percent cover are used for determining the impact of residue on sheet and rill erosion.

Estimates of percent cover obtained using the line transect method to evaluate the impact of residue on sheet and rill erosion are most accurate when the residue is lying flat on the soil surface and is evenly distributed across the field. The following is the recommended procedure for using the line transect method:

- 1.** Use a commercially available 50- or 100-foot long cable, tape measure, or any other line that has 100 equally spaced beads, knots, or other gradations (marks) at which to sight.
- 2.** Select an area that is representative of the field as a whole and stretch the line out tightly across the crop rows. The line may be oriented perpendicular to the rows, or in a direction that is at least 45 degrees off the row direction (fig. 503-1).

Figure 503-1 Acceptable orientations for residue measurement lines



The locations in the field where the line is stretched out to make measurements should be selected randomly from among the areas of the field that are typical of the entire field. End rows, field borders, and parts of the field that appear different are probably not typical of the entire field and should be avoided.

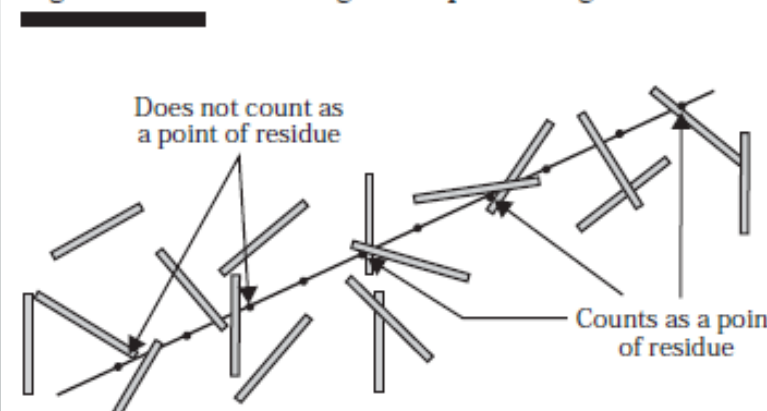
- 3.** Walk along the line, stopping at each mark. Position the eye directly over the mark, and look straight down at it. When sighting, do not look at the entire mark. Rather look at a single point on each mark. A point has an area about like the end of a needle. On

Will need to initially estimate coverage percentages via measurement. To stay consistent with past work, we will use the NRCS Line Transect Method.

Key Highlights:

- Using a 100' tap, measure across rows at 45° angle
 - Avoid end rows/high traffic areas
- If residue large enough to stop a rain drop intersects a one foot increment on the measurement tape, it counts. The percent residue is equal to the number of one foot increments under which residue is seen.

Figure 503-2 Counting residue pieces along a line transect



- Five transects per site recommended



Image Source:

[https://commons.wikimedia.org/wiki/File:Crop_Residue_Management22.tif_\(24966818228\).jpg](https://commons.wikimedia.org/wiki/File:Crop_Residue_Management22.tif_(24966818228).jpg)

Crop Residue Measurement Video

Can use forms in back of guidance document to record transect information.
Keep those with the Tillage Survey Results forms.



Estimating Percent Residue Cover Using the Photo-Comparison Method

This NebGuide presents photographs and describes how to use the photo-comparison method to estimate the percentage of the soil surface covered with crop residue.

David P. Shelton, Extension Agricultural Engineer
Paul J. Jasa, Extension Engineer - Conservation Tillage

- [Using the Photo-Comparison Method](#)
- [Photographs for Estimating Percent Residue Cover](#)
- [Summary](#)

Leaving crop residue on the soil surface is the easiest and most cost-effective method of reducing soil erosion. Research in Nebraska and other midwestern states shows that leaving as little as 20 percent of the soil surface covered with crop residue can reduce soil erosion caused by rainfall and flowing water by one-half compared to residue-free conditions. Greater amounts of residue cover will further reduce erosion. (Refer to *Residue Management for Soil Erosion Control*, NebGuide G81-544, for further details on the erosion process and the benefits of residue cover.)

Many conservation plans that were developed to meet conservation compliance provisions of the 1985 Food Security Act and the 1990 Food, Agriculture, Conservation, and Trade Act (Farm Bills) specify crop residue management, or residue left on the soil surface, as the primary erosion control method. Generally, the amount of cover required after planting ranges from 20 percent to 65 percent.

It is important to accurately determine percent residue cover to verify effective erosion control and compliance with conservation plan specifications. When accurate determinations are needed, the line-transect method should be used for in-field measurements. (Refer to *Estimating Percent Residue Cover Using the Line-Transect Method*, NebGuide G93-1133, for specific procedures.)

However, in some instances, it may only be necessary to obtain a quick approximation of percent residue cover. An example is when determining whether after-harvest residue cover is closer to 70 percent or to 90 percent or if the cover left after a specific sequence of field operations is close to 40 percent. In these cases, the photo-comparison method can be useful. Percent cover usually can be estimated within 10 to 20 percentage points of the actual cover when using this method.

With experience, teams may be able to begin visually identifying residue coverages within the sorting ranges –

<15%

15% – 30%

30% – 50%

>50%

Following are a few pages from the UNL NebGuide handouts

Photographs for Estimating Percent Residue Cover

Corn

25%



50%



75%



90%



Grain Sorghum

25%



50%



Date: 5/3/2020

County: Dawson

Survey Team: A Smith & J Public

Table 1: Tillage Survey Results

Site and Crop Growing		Tillage System Surveyed							Terraces Present (Y/N)
		No-Till	Conservation Tillage			Reduced - Till 15-30% cov	Conven - Till <15% cov	Unknown or NA	
Site #	Crop Growing (Planted)		Strip-till >30% cov	Ridge-Till >30% cov	Mulch-Till >30% cov				
D1	Corn		x						N
D2	Soybeans				x				Y
D3	Pasture							x	N
D4	Wheat	x							Y
D5	Alfalfa							x	N
D6	None							x	N

Table 2: Site Information

Site #	Site Location	Site Notes
D1	SP Coords / Latitude & Longitude / Miles from start of route	North Side of road - Tillage assigned via visual reconnaissance
D2	SP Coords / Latitude & Longitude / Miles from start of route	South Side of road - Confirmed tillage via field measurement
D3	SP Coords / Latitude & Longitude / Miles from start of route	East Side of road
D4	SP Coords / Latitude & Longitude / Miles from start of route	West Side of road - Visual Survey - standing corn stalks from last year present
D5	SP Coords / Latitude & Longitude / Miles from start of route	East Side of road
D6	SP Coords / Latitude & Longitude / Miles from start of route	West Side of Road - Farmstead

To Recap our general process:

1. Establish the route to drive through the County. If previous years' paths are available, those would be excellent to use. Plan to sample sites every ½ mile – you can get two sites at each stop (e.g. field to the left of the road is Site 1 and field to the right is Site 2).
2. Establish a time to conduct the survey. Will need to be after planted crops have emerged, but before crop canopies completely shade rows or the first cultivation occurs.
3. At each site, complete the Tillage Survey Results form. If measured transects are conducted, keep transect record sheets with the Results forms.
4. Once a county is completed, the information on the various forms will be compiled and percentages of each crop/tillage combination will be determined

Questions / Discussion

Thank You

