

Final Report on Conservation Tillage based on Watershed Transects

St. Joseph River Sediment, Pesticide and Nutrient Reduction Project
ARN 02-502

The St. Joseph River Watershed Initiative Partnership

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St. Joseph River Watershed
Counties and Urban Areas

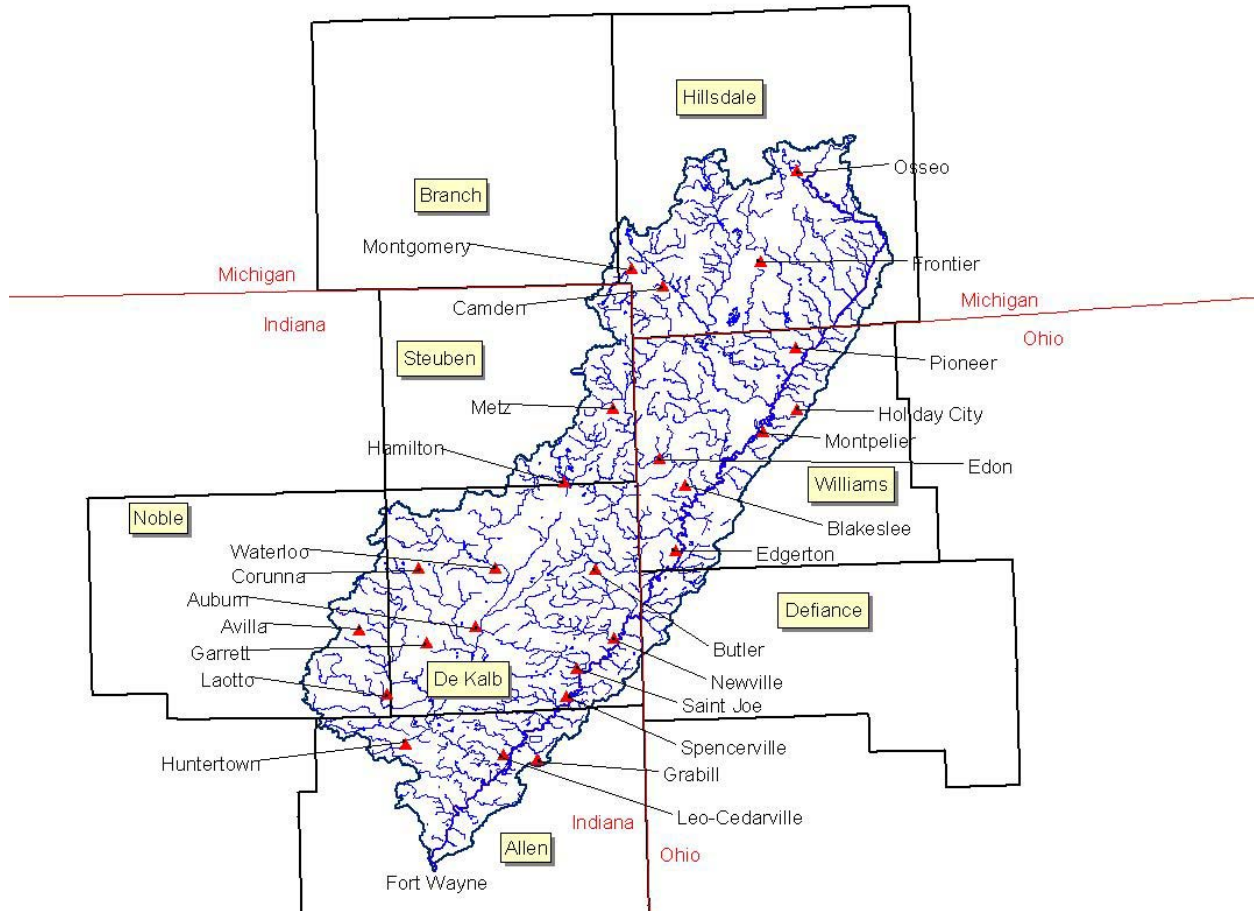


Figure 1 The St. Joseph River watershed lies in portions of 6 counties within three states

Introduction

The information in this report was compiled from cropland roadside surveys (“transects”) taken during 2002- 2005 in the study area, which included the counties of Allen, DeKalb, Noble and Steuben (Indiana), Williams (Ohio), and Hillsdale (Michigan). Portions of these counties comprise the 8-digit St. Joseph River watershed (HUC 04100003).

The cropland roadside survey, or road transect survey method, was designed to gather information on various agricultural practices, primarily tillage and crop residue management systems. One purpose of the transect survey is to provide accurate data on tillage systems and crop residue cover for the national survey, making it an ideal tool for assessment as well as measuring progress for locally led conservation efforts.

Transects are generally done in the spring after planting; annually in some counties; biennially in others. Using a randomly drawn driving route through all soil regions heavily used for crop production, a survey team collects data on present crop, previous crop, tillage system, residue cover, soil loss factors, and watershed location for at least 460 cropland sites on one-half to one mile intervals along the driving route. The same county driving route is used in subsequent surveys.

Further information about the methodology and statistical reliability of the cropland roadside survey method is available on the Conservation Tillage Information Center (CTIC) website, www.ctic.purdue.edu/Core4/CT/transect/Transect.html.

The 694,400-acre St. Joseph River watershed lies within the boundaries of four counties in Indiana (56% of total area) and one county in Ohio (22%) and one county in Michigan (22%).

Conservation tillage information in this report is compiled by county. As is evident in the map in Figure 1, only DeKalb County lies almost exclusively within the St. Joseph River watershed. The St. Joseph watershed generally occupies less than 50% of the remaining counties. The small areas that lie within Defiance County, Ohio, and Branch County, Michigan, have not been included in this report.

The St. Joseph River watershed in Allen County includes a significant portion of the city of Fort Wayne. Agricultural areas of northern Allen County have been developed for residential and commercial uses very quickly over the past five years. Other counties have significantly smaller urban footprints in the watershed.

Conservation Tillage Adoption

Conservation tillage, also known as crop residue management, is the practice of leaving last year's crop residue on the soil surface by limiting tillage. Conservation tillage is defined as having at least 30 percent ground cover after planting. No-till can reduce erosion by 90% and conserve 2-4 inches of soil moisture for dryer periods. (CTIC Core 4)

Technically, "conservation tillage" includes mulch till and ridge till as well as no-till. Residue left on the field improves soil tilth and adds organic matter to the soil as it decomposes. Fewer trips with farm equipment across the fields reduce soil compaction. Conservation tillage also improves water quality by reducing the movement of soil and associated potential pollutants to surface waters. (USDA Natural Resources Conservation Service)



Figure 2 Photo
courtesy USDA NRCS

All types of conservation tillage (no-till, ridge-till, mulch-till and reduced-till systems) are used across the St. Joseph River watershed on soybeans to a greater extent than on corn. The focus of this grant was to increase the use of conservation tillage on corn in Indiana counties.

Tillage system definitions

No-till. The soil is left undisturbed from harvest to planting except for nutrient injection. Planting or drilling is accomplished in a narrow seedbed or slot created by coulters, row cleaners, disc openers, in-row chisels or rototillers. Weed control is accomplished primarily with herbicides. Cultivation may be used for emergency weed control.

Ridge-till. The soil is left undisturbed from harvest to planting except for nutrient injection. Planting is completed in a seedbed prepared on ridges with sweeps, disk openers, coulters or row cleaners. Residue is left on the surface between ridges. Weed control is accomplished with herbicides and/or cultivation. Ridges are rebuilt during cultivation.

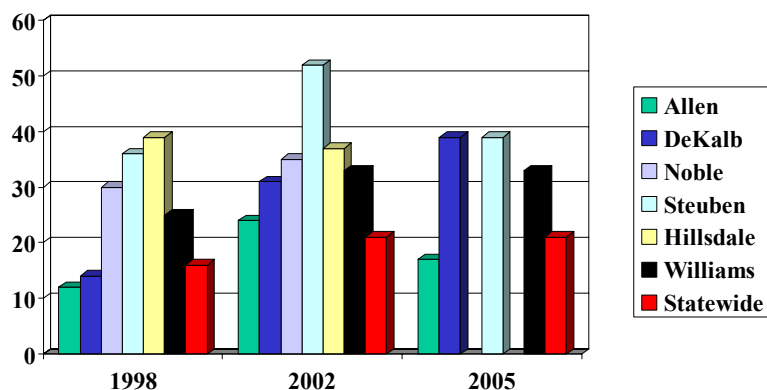
Mulch-till. The soil is disturbed prior to planting. Tillage tools such as chisels, field cultivators, disks, sweeps or blades are used. Weed control is accomplished with herbicides and/or cultivation.

Zone-till and **strip-till** are popular terms in some areas, and are considered modifications of no-till, mulch-till or other tillage types, depending on the amount of crop residue left on the soil surface after planting.

Reduced-till leaves 15-30 percent residue after planting. **Conventional tillage** leaves less than 15 percent residue cover after planting. It generally involves plowing or intensive tillage.

(CTIC. <http://www.ctic.purdue.edu/Core4/CT/transect/Transect.html> 3/30/2006)

No-till Corn Trends in the St. Joseph River Watershed



Graph courtesy J. Lake, ISDA, Div. of Soils

The tables below show the adoption of conservation tillage in counties in the St. Joseph River watershed in 2002, prior to the start of the grant, and in 2004-2005 at the end of the grant.

Table 1 2002 Conservation tillage adoption for corn and soybeans by county in the St. Joseph River watershed

County	Corn			Soybeans		
	No-till	Other Cons Till	Conventional	No-till	Other Cons Till	Conventional
Allen	24%	17%	59%	57%	19%	23%
DeKalb	31%	17%	52%	78%	09%	13%
Noble	35%	22%	43%	78%	16%	6%
Steuben	52%	15%	33%	81%	12%	61%

Source: Jim Lake, Indiana Department of Agriculture, Division of Soils.

Table 2 2004-2005 Conservation tillage adoption for corn and soybeans by county in the St. Joseph River watershed

County	Corn			Soybeans		
	No-till	Other Cons Till	Conventional	No-till	Other Cons Till	Conventional
Allen	17%	20%	63%	75%	9%	15%
DeKalb	39%	26%	35%	83%	11%	5%
Hillsdale*	35.5%	40%	24.5%	70%	23%	2%
Noble*	29%	50%	20%	70%	23%	6%
Steuben	39%	29%	32%	82%	17%	1%
Williams	33%	24%	45%	60%	15%	25%

Source: Jim Lake, Indiana Department of Agriculture, Division of Soils; Hillsdale and Williams SWCD offices.

- Hillsdale and Noble transect reflects year 2004; all other counties reflect 2005 information.

As illustrated in the tables above, conventional tillage has decreased in DeKalb County from 52% to 39%, and the county is showing the most successful adoption of all types of conservation tillage for corn within the watershed. Note that DeKalb County is the only country in which the majority of the land lies within the St. Joseph River watershed. See Figure 1.

While it experienced a drop in pure no-till between 2002 and 2004, Noble County showed an increase from 22% to 50% in other forms of conservation tillage, netting a drop in conventional tillage from 43% to 20%.

Steuben County displayed a drop in no-till and a slight increase in other forms of conservation tillage, accounting for just a 1% overall drop in conventional tillage.

Despite intensive efforts under this program, in Allen County, the 3% increase in other forms of conservation tillage could not offset the 7% drop in pure no-till. Allen recorded an overall increase in conventional tillage of 4% between 2002 and 2004. However, per the graph on page 5, conservation tillage in 2002 was up significantly from 1998. As noted above, Allen County is increasingly urbanizing, with agricultural land being subdivided for residential and commercial areas and small acreage “hobby” farms.

Figure 3 Fort Wayne-Allen Co. urban area, circa 2002

