S.T.A.R.
ANNUAL REPORT

CROP YEAR 2019

Improving Conservation One Field At A Time

A letter from the S.T.A.R. Steering Committe Chairman

Readers,

As a full time farmer myself, reflecting on the 2019 crop year is not a favorite pastime. 2019 brought delays and record numbers of prevent plant acres, followed by an equally long and frustrating harvest season. For better or worse, these extreme weather bookends to the season brought into clear focus the need for a crop management system that builds resilience in each field,no matter its location.

Thankfully, we have the technology and tools today to produce a crop while building soil structure, limiting erosion, and increasing water infiltration. These same practices also reduce nutrient loss to our waterways. It's this simple win-win that drives my enthusiasm for the S.T.A.R. Initiative. S.T.A.R. doubly serves as an evaluation tool and a motivator by using responses from easy-to-answer management questions informed by the most up-to-date science to provide a simple 1-to-5 Star Rating for each field. As farmers seek to raise their rating, S.T.A.R. provides a clear roadmap for practice changes. I, and the rest of the 200+ farmers that used S.T.A.R. last year, can feel confident we're on the right track as we work to increase the Star Ratings on our farms.

The demand for conservation is only rising. There are generations growing up now that expect their food, fiber, and fuel to be grown while not harming, even improving, water quality and the larger environment. S.T.A.R. assists farmers in measuring their progress, clearly showing neighbors, consumers, and the agriculture industry how they're making conservation work.

On behalf of the S.T.A.R. steering committee, we're excited to bring you the annual report for S.T.A.R.'s 2019 Crop Year (beginning after harvest in 2018 and running through harvest of 2019). Join us as we look back on the initiative's growth and impact on Illinois and beyond over the past year.

Now more than ever, it's a great time to be in conservation!

Steve Stierwalt,
S.T.A.R. Steering Committee Chairman

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Saving Tomorrow's Ag Resources
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2019 was a year of unprecedented growth in participation and capacity with more farmers utilizing S.T.A.R. to evaluate their crop management systems and more entities signing up to serve as local licensees of the program. The S.T.A.R. Science Advisory Committee suggested several revisions to the field form including moving to one statewide form for Illinois and aligning points with the practices acknowledged by the Illinois Nutrient Loss Reduction Strategy to provide water quality benefits. Revisions were made to retain consistency across ratings and assign more points to practices with higher nutrient and sediment reduction efficiencies than practices with lower or unknown efficiencies. Where applicable, decisions as to why practices were encouraged are provided in the updated FAQ document in the Appendix. Also new for 2019, we have provided a summary of individual practices reported from S.T.A.R. fields and translated this data into environmental impacts. Read on for more information on 2019 Outcomes!

Program Overview

In 2016, the Champaign County Soil and Water Conservation District (CCSWCD) began to explore ways to encourage farmers in Champaign County, IL to adopt conservation practices identified in research to reduce nutrient losses into waterways in support of the Illinois Nutrient Loss Reduction Strategy (NLRS). This led to the development of Saving Tomorrow's Agriculture Resources (S.T.A.R.), an initiative that educates and encourages farmers, ranchers, and landowners to employ conservation management practices that improve water quality and soil health.

S.T.A.R. uses a Field Form for an individual field for a given crop year that includes practices such as cover crops, nutrient management, and tillage. Expertise of the Science Advisory Committee of university researchers and other experts ensures the Field Form accurately represents nutrient loss reduction and impacts on natural resources of Illinois. Fields are then ranked on the 5-S.T.A.R. scale, and participants can receive a sign for their fields to identify their S.T.A.R. designation. Roughly 10% of fields undergo a verification process to validate field forms. The initiative has been recognized nationally and adopted by SWCDs in Illinois, Iowa, Missouri, and Indiana.

S.T.A.R. is organized into committees of governmental, nongovernmental, and nonprofit partner organizations and farmers to implement and expand the initiative. These conservation-minded partners make up the following committees to ensure S.T.A.R. is efficient and effective in its goals to improve water quality in the state:

- S.T.A.R. Steering Committee
- Science Advisory Committee
- Outcomes and Alignment Subcommittee of the Science Advisory Committee
- Communications Committee
- Market Development Committee
- Training and Education Committee
- Evaluation and Verification Committee

We'd like to thank the following partners who serve on committees for their support and work developing, promoting, and implementing S.T.A.R.:

- American Farmland Trust
- Archer Daniels Midland Company
- Association of Illinois SWCDs
- Certified Crop Advisors
- Champaign Co. SWCD
- Centrec Consulting Group
- Champaign Co. Farmers
- CHS, Inc
- Coles Co. SWCD
- Crawford Co. Farmer
- Crawford Co. SWCD Director
- DC Analysis, LLC
- DIGS Associates
- Illinois Corn Growers Association
- Illinois Department of Agriculture
- Illinois Fertilizer and Chemical Association
- Illinois Nutrient Research and Education Council
- Illinois Soybean Association
- Kankakee Co. SWCD Director
- McHenry Co. SWCD
- Natural Resources Conservation Service-Illinois
- Piatt Co. SWCD Director
- Precision Conservation Management
- The Nature Conservancy
- The Strategic Collaboration Group, Inc.
- University of Illinois
- University of Illinois Extension
- Wabash Valley FS

2019 Program Totals

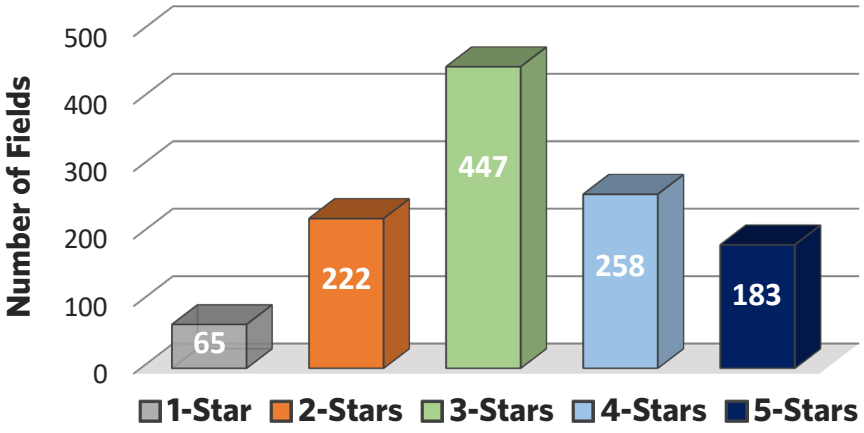
At a Glance

For the 2019 Crop Year, 214 participants utilized the S.T.A.R. tool on 83,592 acres over 1,175 Fields. Of the 1,175 Fields, there was a clear 'bell curve' noticed in distribution of S.T.A.R. Ratings. This is a good sign, as it shows our tool is being utilized by a large variety of producers.

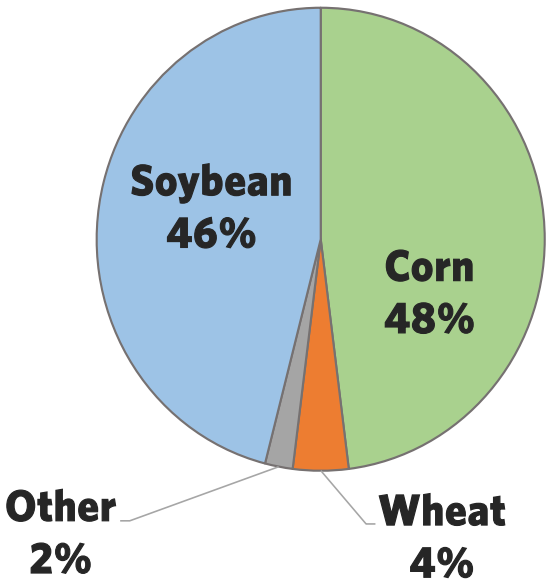
S.T.A.R. Farmers

70% have participated in federal or state cost-share programs
38% have attended a soil health or nutrient field day
21% participated in S.T.A.R. in 2018

DISTRIBUTION OF 2019 S.T.A.R. RATINGS



2019 S.T.A.R. FIELDS BY CROP TYPE



What Does a Top-Rated Field Look Like?

Most Common 5-S.T.A.R. Practices

★★★★★
96%
5 S.T.A.R. fields were under no-till or strip till management

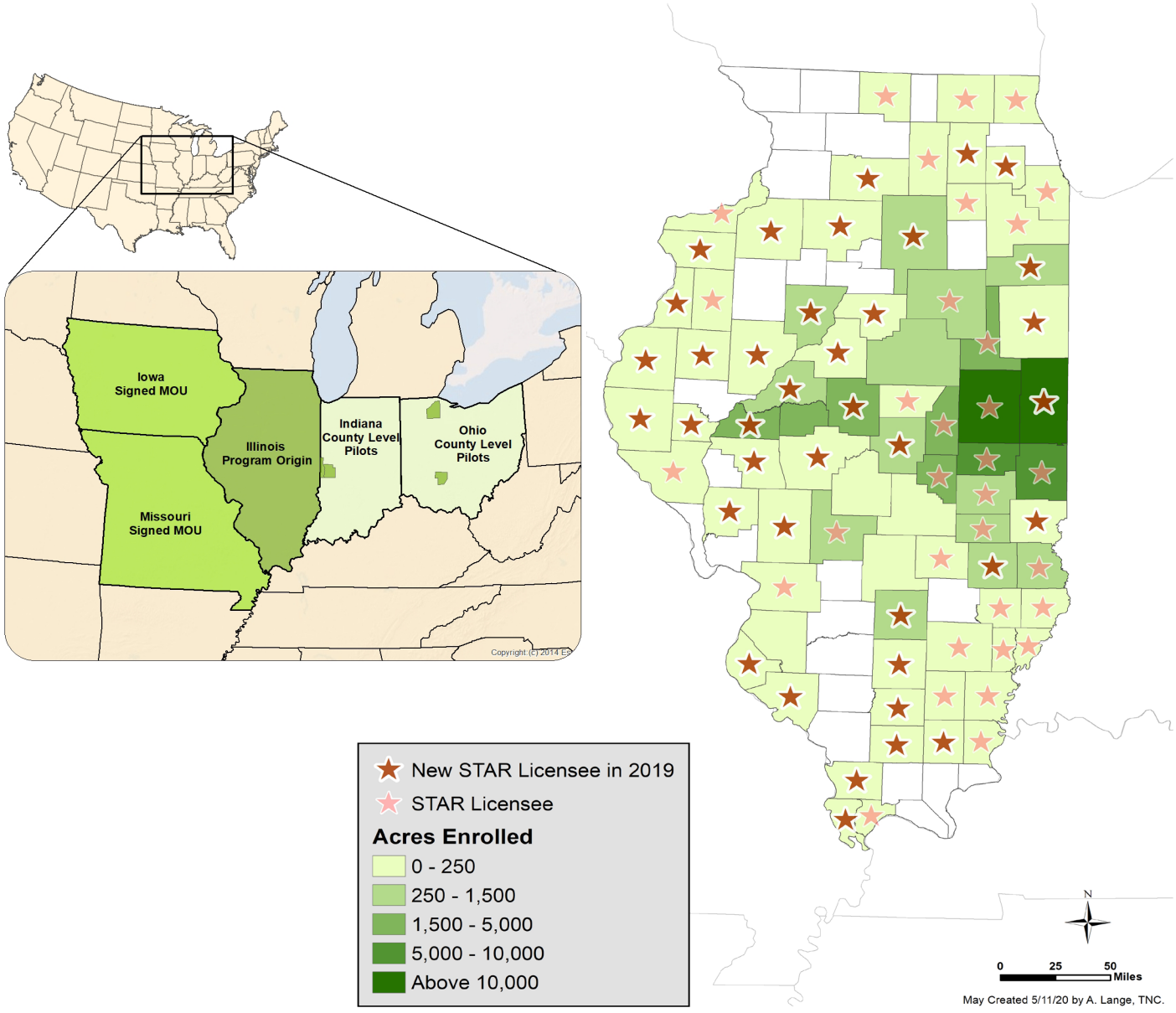
★★★★★
93%
5 S.T.A.R. fields planted a winter hardy cover crop

★★★★★
87%
5 S.T.A.R. fields applied P and K based on soil samples or removal rates

★★★★★
45%
5 S.T.A.R. fields used variable rate technology

Program Expansion

2019 represented the biggest year (yet!) for S.T.A.R. expansion within and beyond Illinois. Early in the year, the steering committee developed a Memorandum of Understanding for individual states to bring the program to their own farmers. This allows states to administer S.T.A.R. locally, develop committees, and develop their own Science Advisory Committee, changing the Field Form as necessary to reflect local resource concerns. In 2019, both Conservation Districts of Iowa and Missouri Association of Soil & Water Conservation Districts finalized MOUs to bring S.T.A.R. to their states. As another sign of support from conservation districts, the National Association of Conservation Districts officially endorsed S.T.A.R. at their February 2020 Annual Meeting in Las Vegas. Committee members continue to engage with NACD staff on further ways to educate SWCD staff and directors across the nation on the benefits of S.T.A.R.



Expansion continued within Illinois as well. Although all farmers can utilize the program anywhere in Illinois, entities within a particular county can sign up to be a S.T.A.R. Licensee to administer the program and provide technical assistance to the growers in their county. For the 2019 Crop Year, 36 additional SWCDs signed Licensee Agreements, making S.T.A.R. available in 70 Illinois counties.

Activities

With S.T.A.R. still being a new initiative, education and outreach is a vital component of the Steering Committee's work. Outreach was conducted for farmers, conservation staff, the larger community working on water quality in the state, and agriculture supply chain partners. Even more important than education around S.T.A.R. itself, many of our presentations focused on soil health management systems. Education on the practices known to provide the highest nutrient loss reductions for the state, while adding resilience for farmers, is vital to the long-term benefit of S.T.A.R.

DATES	S.T.A.R. PRESENTATIONS	LOCATION	ATTENDEES
4/9/2019	Soil Health Summit	Springfield, IL	90
7/15/2019	Assoc. of Illinois SWCDs Summer Conference	Springfield, IL	200
7/17/2019	Farm Tour with Senator Bennett	Sadorus, IL	12
8/14/2019	Saving the Value of Farmland	Tuscola, IL	25
8/15/2019	Saving the Value of Farmland	Champaign, IL	30
9/10/2019	Total Soil Management Field Day	Danville, IL	60
9/17/2019	Champaign Co. Farm Bureau Government Affairs Committee Meeting	Champaign, IL	12
9/24/2019	National Assoc. of Conservation Districts for State Assoc. Leaders	Lake Tahoe, CA	50
9/26/2019	Montgomery Co. Field Day	Hillsboro, IL	40
10/15/2019	Master Naturalist Training	Urbana, IL	27
11/20/2019	Sustainable Ag Summit	Indianapolis, IN	300
12/3/2019	Illinois Nutrient Loss Partnership Conference	Springfield, IL	100
12/5/2019	Illinois CCA Ag Masters Conference	Springfield, IL	100
1/6-7/2020	National Assoc. of Conservation Districts North Central Regional Meeting	St. Louis, MO	100
1/21/2020	Illinois Fertilizer and Chemical Assoc. Annual Meeting	Peoria, IL	50
1/28/2020	Monroe Co. SWCD	Waterloo, IL	10
1/29/2020	Vital Lands Conference	Champaign, IL	50
2/6/2020	Organic Grains Conference	Champaign, IL	25
2/7/2020	CCSWCD Annual Meeting	Champaign, IL	120
2/10-12/2020	National Assoc. of Conservation Districts Annual Meeting	Las Vegas, NV	100
2/18/2020	Conservation Mixer	Urbana, IL	40
2/24/2020	Conservation Series Session 1	Champaign, IL	15
2/26/2020	Cover Crop Toolshed Talk	Tolono, IL	30
		Total	**1,586**

DATES	S.T.A.R. DISPLAYS	LOCATION	ATTENDEES
4/20/2019	Earthcare Expo	Urbana, IL	30
6/20/2019	Advanced Conservation Drainage Training Field Day	Broadlands, IL	50
8/27-29/2019	Farm Progress Show	Decatur, IL	300
9/5/2019	Coles Co. Soil Health and Cover Crop Field Day	Charleston, IL	30
12/20/2019	U of I Extension Economics Summit	Champaign, IL	100
1/29-30/2020	Midwest Ag Expo	Rantoul, IL	300
		Total	**810**

2019 S.T.A.R. Awards

Numerous players in the agriculture community assist growers daily with their conservation goals. The S.T.A.R. Steering Committee was happy to recognize three vital stakeholders that went above and beyond to promote S.T.A.R. in 2019 to their peers, customers, and larger community. The Kellogg Company sponsored the awards, and Mary Gallagher (Sr. Manager, North America Responsible Sourcing for Kellogg) was on hand at the Illinois Sustainable Ag Partnership's Risk Management Conference in June to assist Chairman Steve Stierwalt in presenting the awards.

Advisor of the Year:
Scott Lagger- CHS, Inc.

Scott Lagger, CCA and Agronomist with CHS, Inc, Elburn, devoted hours of time to S.T.A.R.'s Verification Committee, giving insight and advice on how to structure quality control, making sure it will be accepted by the larger ag community. Scott also championed the S.T.A.R. tool with the IL Certified Crop Advisors.

Licensee of the Year:
Moultrie & Douglas County SWCDs

Moultrie & Douglas County SWCDs actively engaged with supply chain partners in their area to promote and utilize the S.T.A.R. tool. The staff, including Brad Elliot, Devon McCumber, and Tammy Clayton, provided the enthusiasm and face of the program to their farmers, ultimately increasing interest and use of the tool.

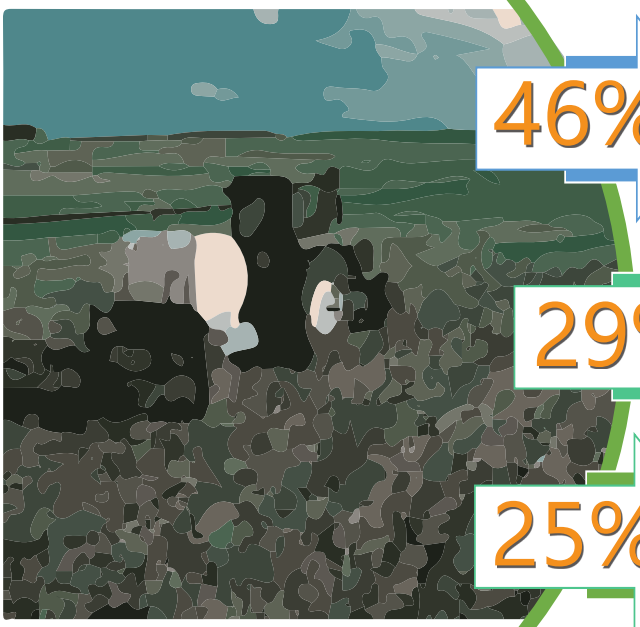
Farmer of the Year:
Steve Fulling (Crawford County)

Farmer of the Year:
Jeff O'Connor (Kankakee County)

And finally, where would we be without the growers themselves? Steve and Jeff not only utilized S.T.A.R. themselves but went above and beyond to influence other growers to participate. They fielded questions, set up meetings, and were seen as advocates for the program. This shows the commitment our farmers have to finding practical, feasible solutions to IL's water quality issues.

The following statistics provide a breakdown of a majority of the practices included in the Field Form. All reported metrics have been calculated on a per practice basis and are meant to provide an estimate of practice level performance. Values presented are not additive. All methods employed to quantify environmental outcomes, including equations and data sources, can be found in the appendix.

Phosphorus Management



46% *of total fields apply P & K at or below removal rates*

29% *of total fields applied MAP or DAP before December 1*

25% *of total fields have a nutrient management plan*

1,465 lbs

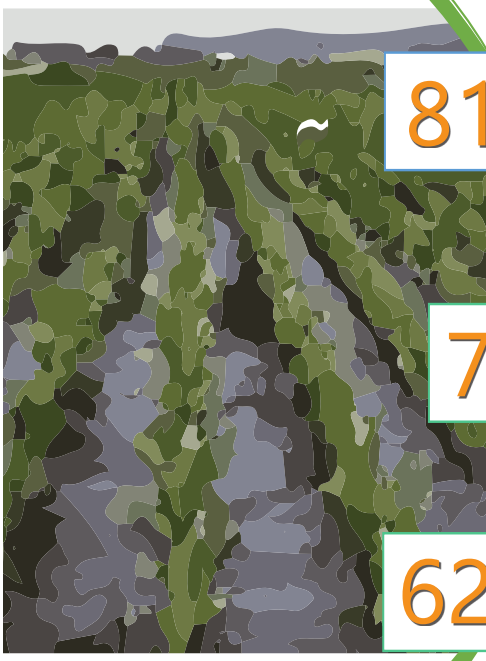
of phosphorus loss avoided from applying at or below removal rates

Soil Sampling

88% *of total fields were soil sampled using GPS technology*

45% *of total fields were soil sampled in the spring or summer*

Timing of N Application



81% of corn fields did not receive any fall N applications*

75% of fields applying N applied > 75% of the total N program in spring*

62% of fields applying N applied > 25% of the total N program as a side or top-dress application*

*The unseasonably wet fall of 2018 may have made this higher than normal

78,514 lbs

of nitrate loss avoided from in-season N application

Nitrogen Management

51% of fields applying N used a rate at or below the MRTN suggested rate

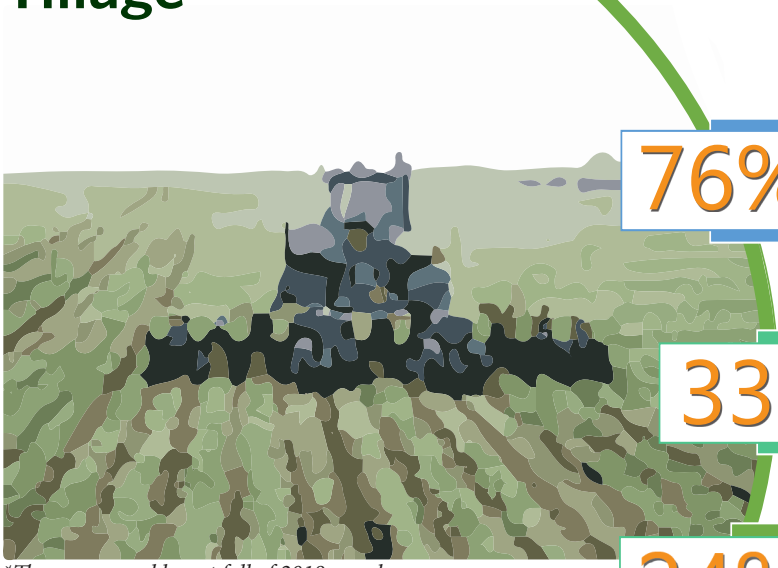
35% of fields applying fall N applied less than 50% of the total N Program as NH_3 with an inhibitor when the 4" soil temp. was below 50°F

24% of total fields have a nutrient management plan

27,195 lbs

of nitrate loss avoided from applying at or below suggested MRTN rate

Tillage



**The unseasonably wet fall of 2018 may have made this higher than normal*

76% of total fields did not perform any fall tillage*

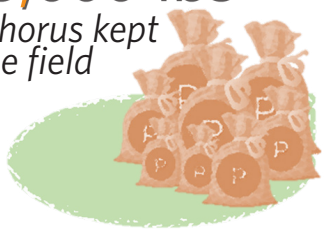
33% of soy fields are under no-tillage or strip till management

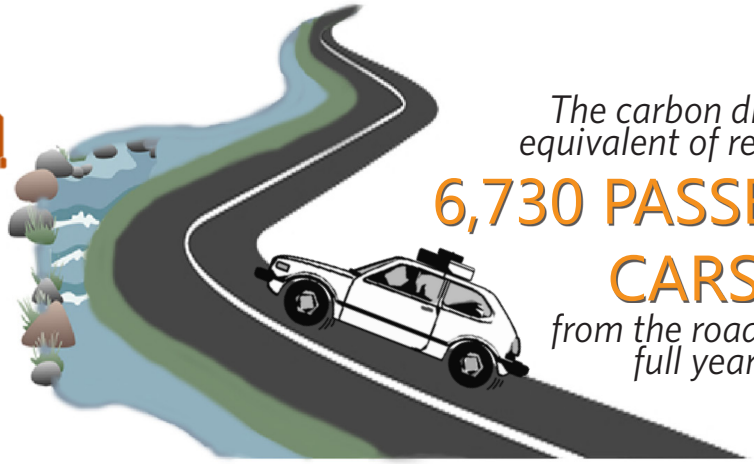
24% of corn fields are under no-tillage or strip till management

The use of no-till & strip-till by S.T.A.R. farmers accounted for...

3,374 TRUCKLOADS
of sediment kept out of waterways

OVER 15,000 lbs
of phosphorus kept in the field





The carbon dioxide equivalent of removing
6,730 PASSENGER CARS
from the road for a full year

Cover Crops

35% *of total fields planted a cover crop*

29% *of total fields planted a winter hardy cover crop*

24% *of fields planting covers planted "green"*

The use of cover crops by S.T.A.R. farmers accounted for...

1,168 TRUCKLOADS
of sediment kept out of waterways

OVER 4,000 lbs
of phosphorus kept in the field

OVER 73,000 lbs
of Nitrate-Nitrogen kept in the field

The carbon dioxide equivalent of removing
1,175 PASSENGER CARS
from the road for a full year

Looking to the Future

While the reported practices and associated metrics are impressive, if all fields enrolled in S.T.A.R. in 2019 planted cover crops, the carbon dioxide equivalent of removing an additional 5,911 passenger cars from the road could have been avoided and over 163,000 tons of sediment, 1 M lbs of NO3-N and 58,000 lbs of phosphorus could have been kept in the field. Aside from keeping valuable topsoil in it's place, avoided nutrient, sediment and carbon losses translate to on-farm benefits by way of increased fertility and soil productivity. We look forward to working with more farmers across Illinois to improve their soil health and overall profitability and strive to see more S.T.A.R.s in 2020! Farmers can use the S.T.A.R. tool for the 2020 Crop Year beginning July 1. Start your journey at www.freestartool.com!

Appendix

Methodology

Methodology for Calculating Environmental Outcomes of the S.T.A.R. Initiative in Illinois

Emily Bruner, PhD
Midwest Science Director
American Farmland Trust

Background: A rough approximation of nutrient, greenhouse gas (GHG) and sediment load reductions from acres enrolled in the Saving Tomorrow's Agriculture Resources (S.T.A.R.) Initiative were estimated utilizing the data sources, tools and equations listed below. All reported metrics have been calculated on a per practice basis and are meant to provide an estimate of practice level performance, as such equations are not additive.

Data Sources:

- Acres enrolled in S.T.A.R in IL
  - Champaign County Soil and Water Conservation District (CCSWCD)
- GHG reductions in Carbon Dioxide Equivalents (CO_2e) from adding a non-legume cover crop to non-irrigated cropland (CPS 340) and switching from intensive till to no-till or strip-till on non-irrigated cropland (CPS 329) as estimated via USDA and Colorado State University's COMET-Planner Tool
  - http://comet-planner.com/
- Nutrient Removal Efficiencies of selected practices – IL Nutrient Loss Reduction Strategy (NLRS)
  - https://www2.illinois.gov/epa/Documents/iepa/water-quality/watershed-management/nlrs/nlrs-final-revised-083115.pdf
- HUC 8 NPS Nutrient Loading - IL NLRS 2019 Science Assessment Update
  - https://www2.illinois.gov/epa/topics/water-quality/watershed-management/excess-nutrients/Documents/NLRS_SCIENCE_ASSESSMENT_UPDATE_2019%20v7_FINAL%20VERSION_web.pdf
- HUC 8 and Illinois County Boundaries – Geospatial Data Gateway
  - https://datagateway.nrcs.usda.gov/
- Non-irrigated cropland acres per county (calculated as total cropland acres remaining after subtracting irrigated cropland acres reported per county) - 2017 Census of Agriculture
  - https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/2/table/1/state/IL/year/2017
- Average annual sediment load per county - 2018 IL Department of Agriculture Tillage Transect
  - https://www2.illinois.gov/sites/agr/Resources/LandWater/Pages/Illinois-Soil-Conservation-Transect-Survey-Reports.aspx

Methodology

Nutrients

Non-point Source (NPS) Nitrate-N (NO_3-N) and Total Phosphorus (TP) Load Reductions

County level Agricultural NPS NO_3-N and TP Loads were estimated using total non-irrigated cropland acres calculated from acres reported by the 2017 Census of Agriculture and the HUC 8 NPS Loads estimated by the 2019 IL Nutrient Loss Reduction Strategy Science Assessment Update averaged for water years 2012 – 2017. Briefly, a weighted average of county area contained within each HUC 8 was used to allocate estimated NPS HUC 8 loads (NO_3N and TP) to the county scale using the following equations:

Methodology Cont.

Non-irrigated Cropland Acres in each HUC8 per County = Percentage of Area in each HUC 8 draining the county * 2017 non-irrigated cropland acres for that county [EQ 1]

Annual Load from Non-Irrigated Cropland Acres in each HUC8 per County (lbs/yr) = Non-irrigated Cropland Acres in each HUC8 per county * Estimated NPS NO3-N and TP yield (lbs/ac-yr) associated with each HUC8[a] [EQ 2]

Annual County NPS Load (lbs/yr) = Sum of Annual Load from Non-Irrigated Cropland Acres in each HUC8 per County (lbs.) by county [EQ 3]

Average County NPS Loading (lbs/ac-yr) = Annual County NPS Load (lbs/yr) / Non-irrigated Cropland Acres in each County [EQ 4]

Annual County NPS Load Reduction (lbs/yr) from Cover Crops = (Average County NPS Loading (lbs/ac-yr) * Acres of Cover Crops enrolled in S.T.A.R. per County) * NLRS Nutrient Removal Efficiency of Cover Crops[b] [EQ 5]

Annual County NPS P Load Reduction (lbs/yr) from No-till/Strip-till = (Average County NPS Loading (lbs/ac-yr) * Acres Under No-till/Strip-till Management enrolled in S.T.A.R. per County) * NLRS Nutrient Removal Efficiency of changing conventional tillage to conservation tillage or no-till [EQ 6]

Annual County NPS P Load Reduction (lbs/yr) from acres applying P at or below Removal Rates = (Average County NPS P Loading (lbs/ac-yr) * Acres Applying P at or Below P Removal Rates enrolled in S.T.A.R. per County) * NLRS Nutrient Removal Efficiency of P application rate reduction [EQ 7]

Annual County NPS N Load Reduction (lbs/yr) from acres applying N at or below Maximum Return to Nitrogen Rates (MRTN) = (Average County NPS Loading (lbs/ac-yr) * Acres applying N at or below MRTN enrolled in S.T.A.R. per County) * NLRS Nutrient Removal Efficiency of reducing N application rate [EQ 8]

Annual County NPS N Load Reduction (lbs/yr) from acres applying in-season N = (Average County NPS Loading (lbs/ac-yr) * Acres applying > 25% in-season N enrolled in S.T.A.R. per County) * NLRS Nutrient Removal Efficiency of split N application [EQ 9]

Assumptions:

[a] *Negative values for NPS NO3N were not reported in the NLRS and were assumed to be based on mismatches between HUC areas and monitored drainage areas and/or load estimation errors. For the 2019 Update, negative values were reported to facilitate future identification and correction of inappropriate assumptions or errors in calculating point and non-point yields. For the S.T.A.R. methodology, where negative NPS NO3N and TP values were reported in the 2019 Science Update for the 2012 – 2017 period, zeros were substituted. This could lead to a slight overestimate of NPS load from agriculture, but given the magnitude of NPS nutrient loading, any potential overestimate would be considered negligible. HUC8s reporting negative values for NPS NO3N and TP include Lower Illinois - Senachwine Lake, Upper Fox, Upper Rock, and Chicago. HUC8s reporting negative values for NPS TP only include Lower Illinois - Lake Chautauqua & Lower Illinois.*

[b] *An estimate of 30% was used for both NPS NO3N and TP removal efficiencies.*

Methodology Cont.

Sediment

Non-point Source (NPS) Sediment Load Reductions

Annual Sediment Load Reductions from Cover Crops (tons/yr) = (Average sediment load per acre (tons/ac-yr, averaged across corn and soy estimates provided by the 2018 IDOA tillage transect) * Acres of Cover Crops enrolled in S.T.A.R. per County) * Sediment Removal Efficiency of Cover Crops provided by literature[c]

[EQ 10]

Annual Sediment Load Reductions from No-till/Strip-till (tons/yr) = (Average sediment load per acre (ton/ac-yr, averaged across corn and soy estimates provided by the 2018 IDOA tillage transect) * Acres under No-till/Strip-till Management enrolled in S.T.A.R. per County) * NLRS Nutrient Removal Efficiency of changing conventional tillage to conservation tillage or no-till[d]

[EQ 11]

Assumptions:

While average sediment loads per acre vary depending on if the field is planted to corn or soy, in any given year it is assumed that roughly half a county's commodity acres will be in corn or soy, so averaging these estimated erosion rates was considered reasonable for the purpose of calculations.

Truckloads of sediment reported in annual report used an average number of 14 tons per dump truck.

[c]*Previous studies have reported sediment removal rates by cover crops ranging from 11 to over 90% for Midwest soils. A bibliography compiled by the Sustainable Agriculture Research and Education Program (SARE) and the University of Missouri reported a range of soil loss reduction of 31 to 100% by non-legume cover crops, including rye species. Given these ranges, a Sediment Removal Efficiency estimate of 40% was used in EQ 10.*

[d]*50% reduction for P assumed to be primarily due to phosphorus attached to soil particles, thus reduction efficiency for P extended to sediment in EQ 11*

Carbon Sequestration and Greenhouse Gas Emissions

Tonnes of Carbon Dioxide Equivalents (CO2e) Reduced per Year

Calculated using USDA and Colorado State University's online COMET-Planner Tool by selecting IL and the county of interest in Step 1, Cropland Management in Step 2, Cover Crop (CPS 340) and Add Non-Legume Seasonal Cover Crop to Non-Irrigated Cropland or Residue and Tillage Management OR No-Till (CPS 329) and Intensive Till to No Till or Strip Till on Non-Irrigated Cropland in Step 3, and the number of acres utilizing cover crops or no-till/strip-till management enrolled in S.T.A.R. per county in Step 4. The COMET-Planner Tool provides approximate carbon sequestration and GHG emission reductions in tonnes of CO2 equivalents (CO2e) per year. CO2e estimates were converted to number of passenger vehicles driven for one year using the equations provided by the Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator available here: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

2019 Field Form

S.T.A.R. - Field Form – *2019* Crop Year *(after harvest in '18 through harvest of '19)* **Farmer/Owner Information:**

1. Name _____ Street/City/ZIP _____

Phone (_____) _____-_____ Email _____

2. Crop _____ **3.** Field name & number/tract _____ **4.** Acres _____

5. County _____ **6.** Township & Range _____ **7.** Section_____ **8.** Owner _____

Instructions: **Check ALL THAT APPLY in each category, and were used on this individual field.**

9. Cover Crops (Summer 2018 – Fall 2018)- Established with NRCS guidelines (must have some growth):

- ○ Annual ryegrass *
- ○ Clover
- ○ Oats
- ○ Tillage radish
- ○ Cereal rye *
- ○ Winter wheat * (*even if intended for harvest*)
- ○ Other species _____

* Was a winter hardy cover crop terminated AFTER spring 2019 planting? Yes or No

10. Soil Sampling- Use the previous 5-year history:

- ○ Not Sampled
- ○ Sampled every 4 years or less
- ○ Spring or summer sampled
- ○ Fall sampled
- ○ GPS sampled (by grid or zone)

11. Nutrient Management (Fall 2018 – February 2019):

- ○ No nitrogen was applied in this time frame (other than MAP or DAP or February top-dress on wheat fields south of I-70)
- ○ No more than 50% of the total Nitrogen Program (from all sources) was applied as NH_3 with an inhibitor and when the 4-inch soil temperature was below 50 degrees
- ○ MAP or DAP was applied before December 1st
- ○ Manure/Biosolid injected or incorporated after Oct. 20th
- ○ Manure applied, not incorporated

12. Nutrient Management (March 1st – Summer 2019):

- ○ No nitrogen was applied in this time frame (and no prior Fall through February nitrogen other than MAP or DAP)
- ○ Spring/summer nitrogen application(s) amounted to 50% - 74% of the total Nitrogen Program (all sources)
- ○ Spring/summer nitrogen application(s) amounted to at least 75% of the total Nitrogen Program (all sources)
- ○ A nitrogen side-dress (or top-dress) application was at least 25% of the total Nitrogen Program (all sources)
- ○ Manure/Biosolid injected or applied and incorporated
- ○ Manure applied, not incorporated

13. Additional Nutrient Activities:

- ○ Nitrogen on corn after other crop = 181 to 200 lbs./acre OR on corn after corn = 201 to 220 lbs./acre
- ○ Nitrogen on corn after other crop = 180 lbs. or LESS/acre OR on corn after corn = 200 lbs./acre or LESS
- ○ At least 50% of actual phosphorus was banded subsurface Fall or Spring
- ○ Used Triple Super Phosphate (0-45-0)
- ○ Phosphorus and/or potassium rates applied based on removal rates and/or soil samples (may be zero)
- ○ Used Variable Rate Technology application
- ○ Any fertilizer source containing nitrogen or phosphorous was broadcast on ***frozen*** or ***snow covered*** ground

14. Crop Rotation- use an "X" to indicate the crop history of this individual field for each year:

Crop	2019	2018	2017	2016	2015
Corn					
Soybean					
Small Grain: _____					
Forage: _____					
Other: _____					

15. Tillage Practices- Starting after harvest of the 2018 crop:

- ○ Fall- No tillage or low disturbance fertilizer toolbar
- ○ Fall- Strip tillage on non-HEL field and/or shank type fertilizer toolbar, and no other fall tillage performed
- ○ Fall- Any full width operation not exceeding a 3" depth
- ○ Fall- Any full width operation exceeding a 3" depth
- ○ Fall- Any full width tillage operation on soybean stubble

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- ○ Spring- No tillage or low disturbance fertilizer toolbar
- ○ Spring- Strip tillage or Strip Freshener on non-HEL field, and/or shank type fertilizer bar and no other spring tillage
- ○ Spring- Any full width operation, limited to a single pass, where no fall tillage was performed
- ○ Spring- Any full width operation, two or more passes, where no fall tillage was performed
- ○ Spring- Any full width operation, one or more passes, where fall tillage was performed

16. Conservation and Management Practices:
(*check all that apply on this individual field*):

- ○ Saturated Buffers
- ○ Bioreactor
- ○ Constructed Wetland
- ○ Terraces/Contours/WASCOBs
- ○ Grass Filter Strip/Riparian Buffer
- ○ Grass Waterway
- ○ Pollinator Planting (½ acre minimum)
- ○ Windbreak
- ○ Conservation Plan that reduces sheet & rill erosion to "T"
- ○ Nitrogen rate study
- ○ Attended soil or nutrient management meeting/field day
- ○ Have a written nutrient management plan and/or farm is under CCA advisement
- ○ Enrolled in a Federal, State, or Local Conservation Program
- ○ Completed S.T.A.R. Form in 2018

I understand my field may be randomly selected for verification. To the best of my knowledge, this information is correct.

Signature:_____

Date _____

2019 FAQ

S.T.A.R. - FAQ

Instructions, definitions and (FAQ) Frequently Asked Questions: 2019 Crop Year

1. Should I mark something on each section of the Field Form? Yes, it is very important to mark **all** applicable activities in **each** section of the Field Form. Separate forms should be completed for every field you would like rated through the S.T.A.R. Program.

2. Why is my contact information needed? Once your field is rated, we will contact you with your results and offer to you a field sign to display your rating.

3. What is the definition of the "Crop Year?" The 2019 Crop Year began the day after the 2018 fall harvest and ends the day of 2019 harvest.

4. How will my answers to the form(s) be verified? The county Resource Conservationist will typically have enough knowledge of any farm to know if there are inconsistencies. However, the S.T.A.R. Coordinator will use random sampling to identify up to 10% of the fields in each of multiple regions in Illinois. Each county will have a person serve as the "Verifier" who will contact the participant(s) to confirm the use of the practices identified.

5. Who will know my S.T.A.R. rating(s)? While we strongly encourage participants to post field signs to display their S.T.A.R. ratings, your ratings are confidential and will not be shared with anyone but you. Your Field Form may be placed in your NRCS folder (which is not subject to Freedom of Information Act requests), but all materials submitted to the S.T.A.R. Program are destroyed annually once the verification process is complete.

6. Is a post provided with the sign? No.

7. Why am I asked to sign and date the form? Your signature acknowledges that you have completed the form as accurately as possible and that you understand that your field may be randomly selected for verification.

8. Verification process will occur in March of 2020. Potential items and information that may be requested from participants whose field or fields are randomly selected for verification are as follows:

- Dated copies of soil test results and maps
- Dated pictures of growing cover crops
- Dated spread maps as applied or application logs
- Invoices/receipts of fertilizer, seed, and/or application
- Copy of MRTN plan
- Manure application rate and sample test results
- Planter or harvest log/map
- FSA 578 or Crop Insurance APH summary
- Enrollment verification in PCM, EQIP, CSP or other government conservation programs
- Cost share program documentation
- Plans and results from trials
- HEL compliance confirmation
- Dated drone imagery confirmation for fall and spring growth
- Residue check fall and/or spring

9. **Section 9**: A cover crop credited for the 2019 Crop Year must have been planted in the Fall of 2018 and established, which means it must have had some growth before spring planting. According to NRCS Practice Standard Code 340 "established" means the cover crop was planted "in a timely matter and when there is adequate moisture to establish a good stand." Planting dates for the likelihood of "adequate establishment" will vary by the species and geographic location. It is best to use winter hardy species, including annual ryegrass, cereal rye, winter wheat, etc., as these species provide more soil protection and nutrient capture over the winter months and into early spring than winter kill species. Cover Crop Resources: www.mccc.msu.edu/statesprovince/illinois

2019 FAQ Cont.

10. **Section 9:** How do I record my cover crop species? Mark all species of cover crops planted in the fall of 2018. If the cover crop you are utilizing is not listed, write it/them under "Other species." Using more than one species is recommended to increase above-ground and below-ground biodiversity. Additionally, the longer a winter hardy species is actively growing, the more environmental benefits it provides, so we encourage termination of a winter hardy cover crop AFTER spring planting (thus the participant "planted green"). **It is important to note that termination timing is a very important aspect of successful cover crop management** and we recommend utilizing the previously mentioned cover crop resources and/or reaching out to your local SWCD or NRCS office for technical assistance in deciding cover crop mixes and termination strategies appropriate for your operation.

11. **Section 10:** Soil samples should be collected for each field every four years or less. To reduce the uncertainty associated with in-field soil variability and to inform accurate nutrient management decisions, samples should always be taken from the same locations identified via GPS. We encourage spring or summer sampling to provide ample time to incorporate soil analyses into nutrient recommendations for the upcoming crop year. How do I know if my sampling was done with GPS? If your sampling is done by a soil testing or related service firm, it is VERY likely done using GPS. However, the grid or zone sizes should be based on the University of IL Agronomy Handbook: extension.cropsciences.illinois.edu/handbook/

12. **Section 11:** We discourage fall and winter application of nitrogen fertilizers due to an increased risk of nitrate loss from rainfall on fields without an active crop. If applying MAP (11-52-0) or DAP (18-46-0) in the fall, it should be applied before December 1st. In wheat rotations, a top-dress nitrogen fertilizer in February is an exception to the no fall or winter nitrogen recommendation as there is an active crop growing which substantially reduces the risk of nitrate loading to local waterways. However, wheat crops north of I-70 are likely to still be dormant and soils in the region are often frozen well into February, so S.T.A.R. only accepts this practice on fields south of I-70.

13. **Section 11:** If NH_3 (anhydrous ammonia = 82-0-0) is used during the fall through February time period, it should be applied with an inhibitor and when the 4-inch soil temperature is below 50 degrees. Though NOT recommended, if a fall through February NH_3 application is made, it should represent no more than 50% of the total Nitrogen Program.

14. **Section 11:** Manure/Biosolids are best applied in the spring when there is less likelihood of leaching or runoff. If Manure/Biosolids are to be applied in the fall through February time period, it should be injected or broadcast AFTER October 20th and if broadcast, it should be incorporated. Management of such applications should include soil tests to determine exact amounts of nutrients being added by the manure. Research on stabilizers used in conjunction with manure applications is inconclusive and the S.T.A.R. Science Committee does not feel that the use of manure stabilizers is warranted at this time.

15. **Section 12:** From an environmental perspective, it would be best if NO nitrogen fertilizer was applied to any crop because of potential negative consequences to water quality. However, most crops require additional nitrogen inputs. Therefore, nitrogen is best applied in the spring and/or summer, as close as possible to the time the crop will use it, minimizing or eliminating nutrient losses from the field.

16. **Section 12:** Manure/Biosolids applied during the spring or summer should be incorporated if broadcast.

17. **Section 13:** The "total nitrogen program" for a crop should incorporate residual soil nitrogen as well as nitrogen made available from organic matter mineralization. The maximum levels identified for this section are based on the maintenance needs for optimal yield goals in Illinois and should limit losses due to leaching and denitrification. The continuous corn rotation allows higher nitrogen rates due to the maintenance needs of corn following corn versus corn following soybeans.

Optimally, producers would follow the guidelines of the "Corn N-Rate Calculator" that is a part of the NRCS 590 Nutrient Management standards and specifications, found at this link: http://cnrc.agron.iastate.edu. The Corn N-Rate Calculator uses current corn and nitrogen prices to calculate the MRTN (Maximum Return to Nitrogen), but is NOT required for the S.T.A.R. program. Participants should also consider using the 4R Principles (Right Source, Right Rate, Right Time, and Right Place) when making nutrient decisions. More details can be found here: www.nutrientstewardship.com/4rs/4r-principles/

2019 FAQ(Cont'd)

18. **Section 13:** Adding NO phosphorus to fields would help meet the water quality goals of the Illinois Nutrient Loss Reduction Strategy. However, if phosphorus is applied, either in the fall or spring, it is best to follow soil test recommendations and to be banded subsurface. Triple Super Phosphate is much better than MAP or DAP as it does not add the complexity of additional nitrogen. As stated earlier, it is also best to apply phosphorus and potassium based on soil testing, but it is reasonable to replace those nutrients using estimated removal rates.

19. **Section 13:** If any fertilizer containing nitrogen or phosphorus, including manure, is broadcast on either frozen ground OR on snow covered ground, that would be **VERY BAD** both from an economic and environmental perspective. Applying fertilizers to frozen or snow-covered ground should be avoided because that practice **DRASTICALLY** increases the likelihood of loss, particularly via surface run-off.

20. **Section 14:** Rotating crops helps to improve above-ground and below-ground diversity. Ideally, a field would never have more than two continuous years of a crop (one exception would be continuous forage). Incorporation of a winter hardy or perennial crop into a corn/soy rotation offers several benefits including, but not limited to, improved soil structure, increased organic matter, greater diversity of soil biology, and reduced nutrient loss. A perennial forage crop also is considered a cover crop. The "Other" crop could be milo, sunflowers, canola, etc.

21. **Section 15:** Minimal soil disturbance is recommended. Ideally, everyone would implement conservation tillage or no-till systems to keep soils covered and minimize soil loss due to wind and water erosion. We acknowledge that fertilizer tool bars are likely to be low disturbance (unless it is a shank-type) and we consider these applications (with the shank-type exception) equivalent to no tillage. Strip-till systems are acceptable as they limit soil disturbance compared to full-width tillage systems, but should NEVER be used on Highly Erodible Land, as the strips become a pathway for gullies to form. Any full width tillage on soybean stubble should be avoided! If a cover crop is planted or manure is applied in the fall, a shallow tillage operation to incorporate has some benefit, but is still considered one tillage pass. Use of a strip freshener in the spring is considered the same as strip tillage, again with the assumption it is NOT Highly Erodible Land. Tillage done in small areas of a field, such as rut repair, is not considered part of a routine tillage system and is outside the scope of the S.T.A.R. Program.

22. **Section 16:** This section includes several recommended practices to reduce nutrient and soil loss in addition to the in-field management practices that the S.T.A.R. Program prioritizes. Items should be checked only if applicable to the individual field being evaluated. The first eight items on the list should only be checked if they are still functioning as intended.

- Having a "Conservation Plan" is good, but checking this item assumes it is working well enough to reduce sheet and rill erosion to the point that the field has reached the "T" goal. The soil loss tolerance rate (T) is the maximum rate of annual soil loss that will permit crop productivity to be sustained economically and indefinitely on a given soil. Erosion is considered greater than T if either the water (sheet and rill) erosion or the wind erosion rate exceeds the T rate.
- "Attended soil or nutrient management meeting/field day" may have been any meeting that includes some discussion or recommendations related to soil, nutrient use, or cover crops, including field days, no matter the length of time. It should have been within the past year at the time of completing the form and counts for every field evaluated.
- "A written nutrient management plan" is often completed with the help of a retailer or private consultant and does not have to be an NRCS 590 plan. S.T.A.R. recognizes it is best if the person helping with any advice is a Certified Crop Advisor.
- "Enrolled in a Federal, State, or Local Conservation Program" includes CSP, EQIP, PCM or others.
- "Completed S.T.A.R. Form in 2018" is to be checked only if it was done for this specific field.

Appendix

S.T.A.R. Structure