

STAR ANNUAL REPORT



CROP YEAR 2022



IMPROVING CONSERVATION ONE FIELD AT A TIME

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STAR

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A Letter from the STAR Steering Committee Chair

Why STAR?

Crop Year 2022 marked the fifth year farmers and landowners could utilize STAR to evaluate their field practices. Our STAR team thought it was time to evaluate where we are and start thinking about how STAR may be able to help facilitate conservation adoption and advancement over the next five years.

This conversation caused me to evaluate my personal “Why?” Why am I concerned about clean water and healthy soils? Personally, it bothers me when I see dirty water coming off of our farm fields, eroding our fields and carrying fugitive nutrients into our surface waters.

Lots of Reasons, No Excuses!

As farmers, ranchers and landowners, we have lots of reasons for not implementing practices we know will help address our local resource concerns:

- It costs money.
- I don't have the technical knowledge.
- I don't have the right equipment.
- I will be retiring soon.

When we decide to take personal responsibility for the practices we use, it becomes clear that these “reasons” are really no “excuse” for not taking action on our own farms and ranches to protect our soil and water resources!

STAR: Illuminating the Path to Conservation

STAR can be the beginning of the process – the evaluation tool for every farmer, rancher, and landowner's conservation journey. My dream is that every landowner and operator will take personal responsibility for wisely using and restoring the water and soil resources entrusted to them and have a STAR Rating to prove it!

Sincerely,

Steve Stierwalt
STAR Steering Committee Chair
Champaign County SWCD Board
Chairman & Farmer



STAR Program Overview

In 2016, the Champaign County Soil and Water Conservation District (CCSWCD) began to explore ways to encourage farmers in Champaign County, Illinois to adopt conservation practices identified in research to reduce nutrient losses into waterways in support of the 2015 Nutrient Loss Reduction Strategy (NLRS).

This led to the development of Saving Tomorrow's Agriculture Resources (STAR), an initiative that educates and encourages farmers, ranchers, and landowners to employ conservation management

practices that improve water quality and soil health. STAR evaluates 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 that STAR accurately measures nutrient loss reduction and impacts on natural resources of Illinois. Fields are then ranked on the 5-STAR scale, and participants can receive a sign for their fields to identify their STAR designation. Roughly 10% of fields undergo a verification process to validate their field evaluation.



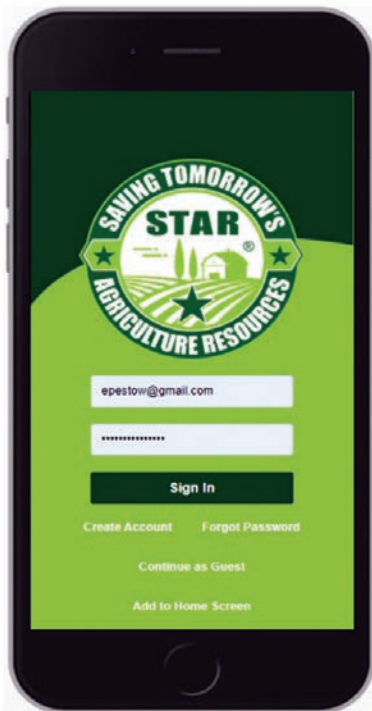
The initiative has been recognized nationally and adopted by SWCDs in Illinois, Iowa, Colorado, Missouri, and Indiana. Illinois STAR's committees, consisting of governmental, nongovernmental, and nonprofit partner organizations and farmers, guide the initiative with its implementation and expansion. These conservation-minded partners make up the following committees to ensure STAR is efficient and effective in its goals to improve water quality in Illinois:

- STAR Steering Committee
- Science Advisory Committee
- Communications Committee
- Market Development Committee
- Training and Education Committee
- Evaluation and Verification Committee
- Outcomes and Alignment Subcommittee of the Science Advisory Committee

We'd like to thank the following partners who serve on committees for their support and work developing, promoting, and implementing STAR:

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





Sign In Page

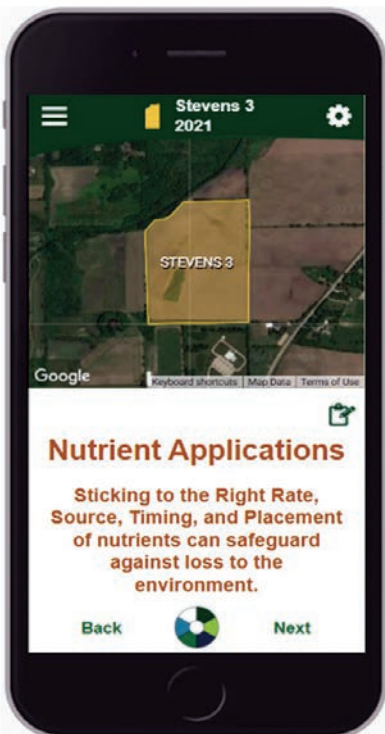
STAR Web App

In July 2021, STAR launched the STAR Web App, offering farmers and landowners an intuitive and simple way to document STAR Ratings for their fields. The STAR Web App is a progressive web application with smart, accessible navigation, the ability to function on both large and small screen devices, and the option to download as an App icon.

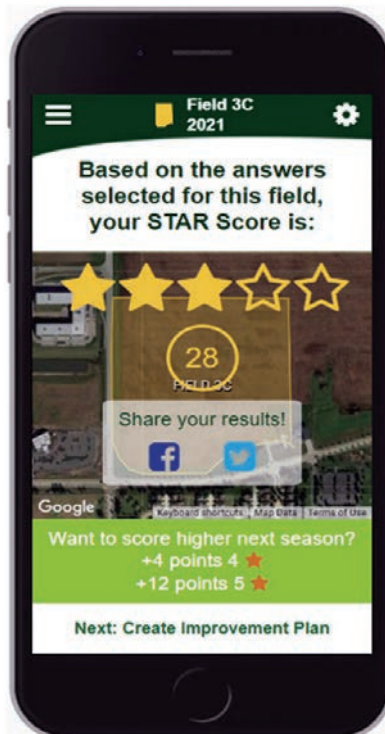
The STAR Web App instantly provides farmers with clear, concise evaluations of their field management. Additionally, it automatically identifies optional practices to increase a field's STAR Rating, providing a clear path to improved STAR Ratings. The App also identifies resources and local technical assistance for implementing the suggested practices.

The STAR Web App connects farmers to local conservation district staff who equip them with knowledge of conservation management practices. Local STAR Licensees have access to their territory's STAR data to identify farmers for financial programs and track yearly improvement.

Over the course of Crop Year 2022, STAR collected feedback from



Nutrient Management Guidance



STAR Score and Improvement Plan

STAR Participants and STAR Licensees in the previous year to add highly requested features. Enhancements to the STAR Web App include a “Split Fields” capability that allows farmers to define more accurate field boundaries for evaluation. Updated improvement plans now show how many points can be earned in a STAR field form section and provide better information about which field practices are best for conservation.

STAR Collaboration

Over the course of Crop Year 2022, STAR partnered with the following organizations and projects to inform and advance the adoption of conservation practices.

Partners for Conservation Program

The Illinois Department of Agriculture also sees the value of STAR as a means to better track the practices and outcomes of their Partners for Conservation (PFC) program, and as a result, required 2021-2022 PFC cost-share contract holders to fill out a STAR evaluation. Participants filled out 476 STAR evaluations through the PFC program, which is administered through Soil and Water Conservation Districts throughout the state.

Pay-for-Performance Pilot

In partnership with companies in the Midwest Row Crop Collaborative, STAR's Pay-for-Performance program continued in Macon and Douglas Counties. The goal of the pilot is to understand if incentive programs managed through grain buyers (to improve and/or maintain a high STAR Rating) increase farmer participation in STAR.

In July, project partners coordinated to educate farmers about the cash incentive through a more engaged outreach campaign compared to 2021. As a result of these efforts, twice as many farmers enrolled during the eight-week sign up period compared to the previous year. 119 STAR evaluations were submitted for the 2022 Crop Year, with 34 fields qualifying for payments.

Precision Conservation Management Partnership

Prior to Crop Year 2021, Precision Conservation Management (PCM), a STAR-allied conservation program by the Illinois Corn Growers Association, had a Web Portal for online field evaluations as the sole alternative to the paper form. Although STAR now has its own dedicated Web Application, many STAR farmers that are clients of PCM continue to use that Portal to submit their field evaluations. 214 fields were submitted through the PCM Portal for the 2022 Crop Year.

Soil Health Incentive Program (SHIP) Pilot

Ivan Dozier (CCSWCD) and Bill Schleizer (The Delta Institute) featured their work with STAR and SHIP during a breakout session at the National Association of Conservation Districts Annual Meeting in New Orleans in February 2023. The seminar garnered an audience of 50-75 attendees and is set to be reprised at the Association of Illinois Soil and Water Conservation Districts (AISWCD) 75th Annual Meeting in Springfield on Monday, July 17, 2023.



Statewide or regional organizations with values and goals to provide outreach, education, and capacity for conservation programs can qualify to become a STAR Affiliate and administer STAR on a state or regional level. Upon executing a Memorandum of Understanding with STAR, the STAR Affiliate develops a Steering Committee and a Science Committee to pinpoint their local resource concern(s), develop their state's STAR evaluations, and create a structural plan to administer STAR via local technical staff throughout their state or region. The Illinois Steering Committee provides guidance to STAR Affiliates in the development of their state's STAR initiative. It is critical, however, that local experts and farmers play a lead role in advising STAR Affiliates to adapt STAR to their unique eco-regions.

Colorado STAR and Iowa STAR have shared updates below for Crop Year 2022. Also below is an update from Missouri STAR as it plans to launch for Crop Year 2023.

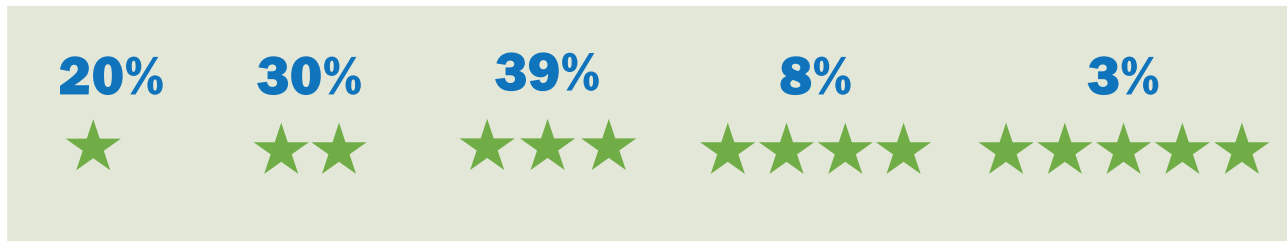


Iowa STAR

The Iowa STAR program, led by the Conservation Districts of Iowa (CDI), is continuing to enroll new participants in the initiative and establishing a firm foothold on state conservation efforts. CDI is working on participation retention strategies for long-term enrollment, and is planning promotional incentives such as free field signs to enrolled farmers that will also spark interest among newcomers. CDI has been working to recruit farm management companies to use

the STAR program as a measurement of conservation practices within their leases. Conversations with farm management companies have been ongoing as CDI continues to onboard additional staff to provide technical assistance to these retailers. Once partnerships are confirmed, CDI is expected to increase Iowa STAR's field coverage in the Midwest by hundreds of thousands of acres over subsequent crop years and become a valuable market evaluation tool.

Iowa STAR Breakdown



Missouri STAR

The University of Missouri Columbia recently received approval for their Climate SMART Project through USDA. The Missouri Association of Soil and Water Conservation Districts (MASWCD) is one of many partners included in this project. MASWCD's

part of the project is to administer the STAR program in Missouri. As soon as the agreement to fund the Climate SMART Project is signed, MASWCD will move forward on starting the STAR program in Missouri.

STAR Affiliates – continued

Colorado STAR

The Colorado STAR Program launched in 2022 as a partnership between the Colorado Department of Agriculture (CDA), Colorado State University, the Natural Resources Conservation Service (NRCS), and many other partners. In Colorado, STAR evaluates 11 different cropping systems and grazing lands for soil health. Colorado's STAR program, grew out of a stakeholder process facilitated by the Colorado Collaborative for Healthy Soils in 2019, involving more than 250 stakeholders and resulting in passage state legislation authorizing and funding the launch of a state soil health program based around STAR. This state funding and additional grant funding have enabled the launch of the first round of the STAR and STAR Plus programs in Colorado.

In 2022, CDA partnered with 16 conservation districts to launch the STAR Plus program, providing financial and technical assistance to 124 farmers and ranchers as they implement new practices on one field over three years and consider adopting them across their operation.

Producers engaged in STAR Plus have implemented new best management practices (BMPs) across 24,473 acres (not including rangelands) and have received \$442,693 in incentive payments. Other outcomes include soil health research led by Colorado State University, creation of educational materials and decision support tools, regional STAR events and local field days, and production of a documentary film series.

The feedback about the STAR program has been tremendously positive, both from participants and conservation district staff. CDA has also secured \$25 million in funding from the USDA Climate-Smart Commodities program to expand the STAR Plus program statewide, develop the STAR Rating System for the Rocky Mountain West, and develop STAR as a national conservation framework.

CDA specialist evaluating soil health on a field.





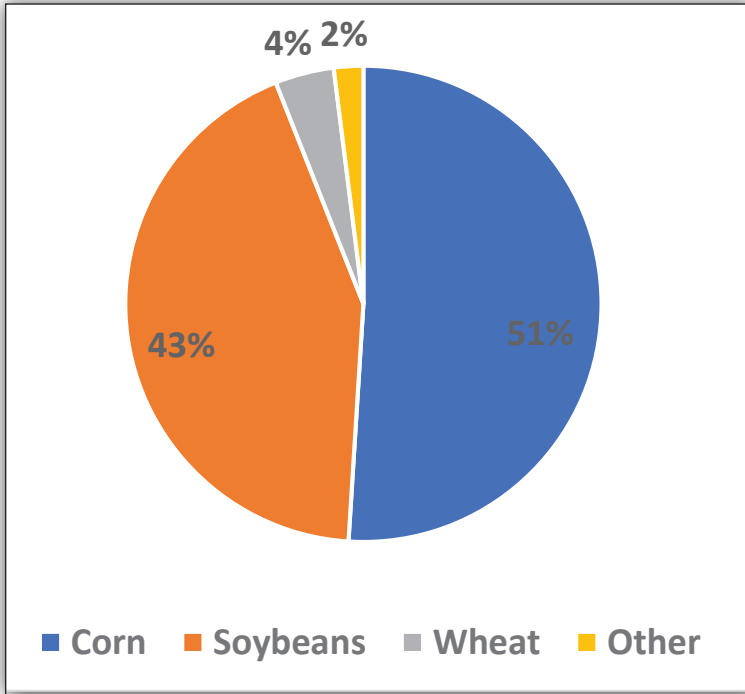
STAR Activities

Education and outreach are vital components of STAR. In addition to the important presentations promoting the value of the STAR program, STAR staff hosted several presentations focused on soil health management systems throughout the year. STAR is committed to supporting education for farmers on conservation practices known to provide effective nutrient loss reductions while also increasing on-farm resiliency. The following table provides a summary of STAR presentations conducted throughout the 2022 Crop Year, including introductions to the STAR program, educational content on conservation practices, and messages promoting the STAR program to farmers.

Date	STAR Presentations and Displays	Location	Attendees
2/18/2022	RFD Radio Interview	Radio	6,000
2/23/2022	STAR & REGAIN Interview	Virtual	30
3/4/2022	Intro to STAR (Oregon)	Virtual	5
3/7/2022	Intro to STAR (Marquis)	Virtual	7
3/7/2022	Intro to STAR (LaForge Implement Co)	Virtual	4
3/8/2022	WILL Ag Outlook Meeting	Covington, IN	200
3/22/2022	Intro to STAR (Utah)	Virtual	4
3/23/2022	Intro to STAR (NASDA)	Virtual	6
3/24/2022	CCSWCD Tool Shed Meeting	Homer, IL	60
4/4/2022	Soil Health Champs & STAR	Virtual	20
7/19/2022	CY21 STAR Updates- Summer Training Conference	Springfield, IL	100
9/14/2022	IDOA SWCD 2022 Regional Meetings - Mt Vernon	Virtual	50
9/15/2022	IDOA SWCD 2022 Regional Meetings - Mendota	Virtual	25
9/15/2022	4R Field Day	Hammond, IL	100
9/19/2022	IDOA SWCD 2022 Regional Meetings - Springfield	Springfield, IL	75
12/2/2022	Bi-State Crops Meeting at the Beef House	Covington, IN	150
1/26/2023	WYXY Classic 99.1 Radio Interview	Radio	12,000
1/25-1/26/2023	Midwest Ag Expo	Gifford, IL	450
Total Reach:			19,290

Results Overview

2022 Fields by Row Crop



What Does a Top-Rated Field Look Like?

Most Common 5-STAR Practices



90%

Applied P at or below removal rates



91%

Planted a winter hardy cover crop



81%

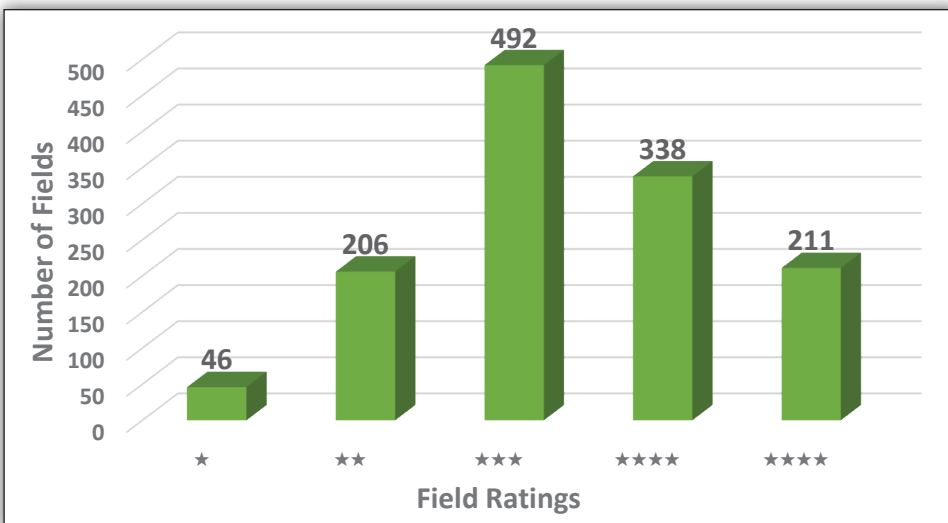
Under no-till or strip-till management



83%

Corn fields did not apply fall N

Distribution of 2022 STAR Ratings



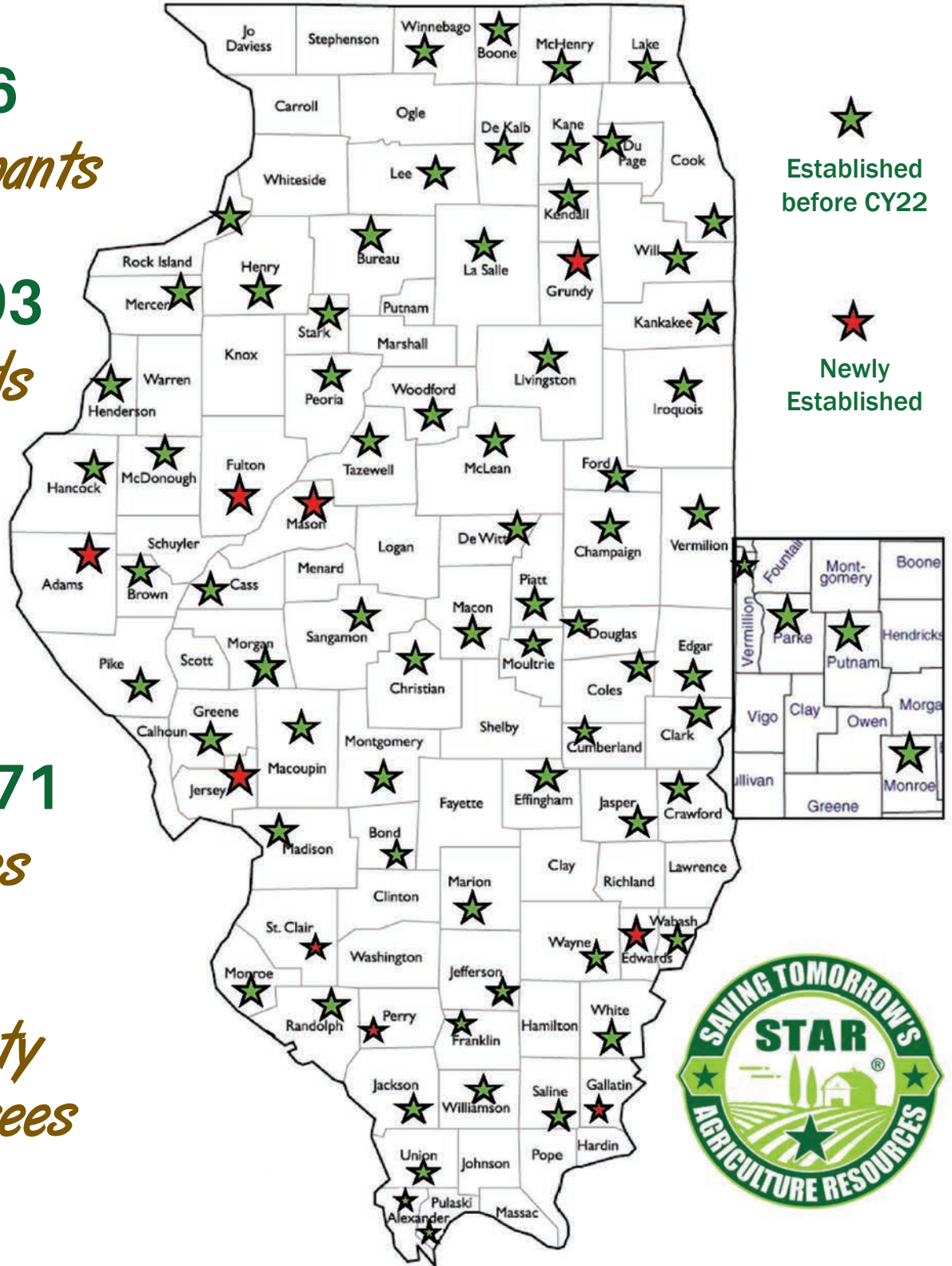
Illinois STAR Licenses

476
Participants

1,293
Fields

86,871
Acres

80
County Licensees



Soil Sampling & Nutrient Management

37%

Fields with a nutrient management plan

78%

Fields with P & K at or below removal rates

41%

Fields were soil sampled in the spring or summer

29%

Fields with > 75% of total N program applied in spring



66%

Corn fields did not receive any fall N applications

47%

Fields with N applied at or below the suggested MRTN rate

28%

Fields with > 25% of total N program applied as a side or top-dress application

Cover Crops & No-Till

36%

Cover crop planted fields used winter hardy species

57%

Soy fields under no-tillage or strip till management

48%

Corn fields under no-tillage or strip till management



58%

Fields did not perform any fall tillage

17%

Fields were planted "green"

Estimated Environmental Outcomes for Illinois Farmers

These results capture the estimated conservation outcomes for producers for a single crop year and can be used to inform field management plans, as well as partner program development aimed at supporting producers along their conservation journeys. Outcomes can also be utilized by participating counties to tell their soil and water conservation success stories. Estimated outcomes are intended as a communications and insight tool only. While they can be used for narrative claims, these estimates are not suitable for corporate reporting or reporting for ecosystem services markets.

Nutrient Losses Avoided by STAR Farmers in Illinois

34,224 lbs

of NO₃-N loss avoided from applying at or below suggested MRTN rate

2,507 lbs

of Phosphorus loss avoided from applying at or below removal rates

The Use of No-Till and Strip Till by STAR Farmers in Illinois

Accounted for keeping
19,322 tonnes
of greenhouse gas emissions
out of the atmosphere for one year.

Accounted for retaining
44,489 tons
of sediment in the field,
and out of Illinois waterways

Accounted for
11,258 lbs
of phosphorus kept in the field



The Use of Cover Crops by STAR Farmers in Illinois

Accounted for keeping
8,448 tonnes
of greenhouse gas
emissions out of the
atmosphere for one year

Accounted for retaining
28,425 tons
of sediment in the field,
and out of Illinois waterways

Accounted for
5,158 lbs
of phosphorus
kept in the field

Accounted for
73,793 lbs
of NO₃-N kept in the field

CY22 STAR Awards

Numerous players in the agricultural community assist growers daily with their conservation goals. The STAR Steering Committee was happy to recognize four stakeholders that went above and beyond to promote STAR in 2022 to their peers, customers, and the larger community.

Partners of the Year: Helen VanBeck, Jerry Costello II

Helen VanBeck is the Midwest Program Specialist with American Farmland Trust and a coordinator of the Illinois Sustainable Ag Partnership. In Crop Year 2022, Helen led the process for calculating environmental outcomes of the STAR program, enabling STAR to communicate the positive, tangible improvements to water quality and climate impacts that are a result of STAR farmers using conservation practices on the landscape.

Jerry Costello II is the Director of the Illinois Department of Agriculture (IDO), and a former member of the Illinois House of Representatives. IDOA's Partners for Conservation Program uses STAR as an evaluation tool, enrolling 476 fields for the 2022 Crop Year. This addition significantly contributed to STAR's conservation goals, and shows the appetite for conservation programming in IL!

Farmer of the Year: Rick and Kathy Kaesebier

Rick and Kathy Kaesebier are corn and soy farmers operating in Logan County. In CY22, their farm enrolled 8 fields that totaled 300 acres. 100% of those fields were rated 5-STARs, an exemplary feat for STAR farmers.



Kathy and Rick Kaesebier

Licensee of the Year: Jefferson County Soil & Water Conservation District

Jefferson County SWCD demonstrated the importance of local staff working with their farmers to deliver conservation services and assistance. Their support made STAR a huge success in Jefferson County, enrolling 40 fields covering 1,400 acres in 2022.



Helen VanBeck



Jerry Costello II



Stacy Helm (Left), Clark Witges (Middle), Trevor Alexander (Right)

Meet the Illinois STAR Team

David Nguyen, AISWCD Illinois STAR Coordinator - Champaign, IL

David is the Illinois STAR Coordinator, directly employed by the Association of Illinois Soil and Water Conservation Districts (AISWCD). David leads Illinois STAR support, conducts annual report data analysis, grant reviews, progress reports, and event engagements. His prior work history includes technical lab projects regarding aquatic invasive species, inclusive conservation among underserved communities, and sustainable GMO crops, providing a multi-disciplinary skillset for contemporary environmental issues. He is a Champaign local, having received his Bachelor of Science in Natural Resources and Environmental Sciences (NRES), with a minor in Spatial and Quantitative Methods in NRES at the University of Illinois at Urbana-Champaign.



David Nguyen

Bruce Henrikson, STAR Assistant Coordinator - Mahomet, IL

Bruce was raised on a small grain and livestock farm near Springfield and has been married to his wife Deb for 46 years. He finished a Master's in vocational education at the University of Illinois in 1974 and became an Agriculture Instructor at Parkland College in 1975, primarily teaching marketing and agribusiness management. In 1985, Bruce resigned from Parkland to become a farm marketing consultant but he missed teaching, so he was rehired at Parkland in 1989. He became the Chair of the Business & Agri-Industries Department at Parkland in 2003 and retired in June of 2016. Bruce began working part-time for the CCSWCD in March of 2017. He has continued to serve many roles with STAR including giving presentations and representing STAR at various conferences and meetings, serving on several committees, helping with various communication efforts with Illinois licensees and other states, and continues to help procuring and distributing STAR field signs.



Bruce Henrikson



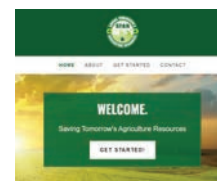
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IL STAR – 2022 Field Form

For office use:

Points: _____

STARs: _____



“If you can’t measure it, you can’t improve it.” - Peter Drucker

Farmer/Owner Information:

1. Name: _____ Email: _____
 Phone: (____) _____ - _____ Street/City/Zip: _____
 2. Field name: _____ 3. 2022 Crop: _____ 4. Acres: _____
 5. County: _____ 6. Sec/Township/Range: _____
 7. Owner: _____ 8. Is this field tile-drained? Yes No

I understand this field may be randomly selected for verification. To the best of my knowledge, this information is correct. I also agree to the Terms of Use and Privacy Policy, as posted on the www.starfreetool.com website.

Signature: _____ Date: _____

IMPORTANT - Before proceeding, please review these instructions. Accurate responses will help ensure your field is awarded the correct point total and STAR Rating.

- This form documents field activities beginning immediately after harvest in 2021 and concluding with 2022 harvest.
- Read every item under each category. More than one selection is possible, but sometimes no items will be selected.
Example of multiple selections from the Cover Crops section- You planted a cover crop mix of cereal rye and tillage radish. You would select “Winter hardy- single species” and “Winter kill- single species.”
- Completely read each statement. Several have more than one qualifier that needs to be met.
Example from the Spring Tillage section- “Any full width operation, limited to a single pass, where no fall tillage was performed.”

First, tell us a little bit about the field you have selected.

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

- | | |
|---|--|
| <input type="checkbox"/> Saturated Buffer | <input type="checkbox"/> Conservation Plan that reduces sheet/rill erosion to “T” |
| <input type="checkbox"/> Bioreactor | <input type="checkbox"/> Nitrogen rate study conducted |
| <input type="checkbox"/> Constructed Wetland | <input type="checkbox"/> You attended a soil health or nutrient management meeting or field day within the last year |
| <input type="checkbox"/> Terraces/Contours/WASCOBs | <input type="checkbox"/> Nutrient management plan and/or field is under CCA advisement |
| <input type="checkbox"/> Grass Filter Strip/Riparian Buffer | <input type="checkbox"/> Enrolled in Federal/State/Local Conservation Program |
| <input type="checkbox"/> Grass Waterway | <input type="checkbox"/> Completed the 2021 STAR evaluation for this field |
| <input type="checkbox"/> Pollinator Planting (a ½ acre minimum) | |
| <input type="checkbox"/> Windbreak | |

Now let’s establish a crop history for this field.

10. Crop Rotation- use an “X” to indicate the 5-year crop history on this field.

Crop	2022	2021	2020	2019	2018
Corn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soybean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Small Grain: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hay/Forage: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example: A field has been in corn/soybean rotation for over a decade. In 2022 it was planted to corn. Place an “X” adjacent to corn for the years 2022, 2020, 2018. Soybean would have an “X” for 2021, 2019. If your crop is not listed, i.e. Grain Sorghum, write your crop on the line and mark “X” in the year(s) planted. Do not record cover crops here.

11. Cover Crops (Summer 2021-Spring 2022)- Established with NRCS guidelines (must have some growth):

- Winter hardy- single species
- Winter hardy- 2 or more species
- Winter kill- single species
- Winter kill- 2 or more species
- Cover crop was terminated AFTER spring 2022 cash crop planting

Discussion: Time period varies slightly here. Any cover crops established in 2021 either prior to harvest or after a summer crop was harvested count. Examples: aerial application into standing corn or drilling after wheat harvest. Wheat is not considered to be a cover crop.

12. Soil Sampling- Use the previous 4-year field history:

- Not sampled in the last 4 years
- Sampled every 4 years or less
- Spring or Summer sampled
- Fall sampled
- GPS sampled (by grid or zone)

***Discussion:** Here is a great example of why you should read every item in each category. If a respondent simply marked "Sampled every 4 years or less" they may have missed points if they didn't indicate when the field was sampled or if GPS was used.*

Almost done. The next category is tillage practices broken down into Fall 2021 and Spring 2022 categories.

13. Fall Tillage- Starting after harvest of the 2021 crop:

- No tillage or low disturbance fertilizer toolbar
- Strip tillage on field classified as non-HEL
- Shank type fertilizer bar and no other tillage performed
- Any full width operation not exceeding a 3" depth
- Any full width operation exceeding a 3" depth
- Any full width operation on soybean stubble

***Discussion:** With numerous possibilities for soil preparation, we elected to keep the options fairly simple. No tillage and strip tillage are easily definable. Full-width tillage can be tricky. In the fall, focus on the depth of machine operation and also note if soybean residue was tilled. In the spring, how many passes were made and was fall tillage performed?*

14. Spring Tillage- 2022 field operations:

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

Finally, your nutrient management strategies are a large component of your overall score. Like tillage, we've broken these into two sections defined by specific time periods. A third section reviews activities that may have occurred at any time during the crop year being reviewed.

15. Nutrient Management (Fall 2021 – February 2022):

- No Nitrogen was applied in this time frame other than MAP or DAP
- Wheat topdress
- MAP or DAP was applied before December 1st
- NH₃ was applied when the soil temperature was below 50 degrees, and amounted to no more than 50% of the total Nitrogen program, and included an inhibitor
- Manure/Biosolid injected or applied and incorporated when soil temperature was below 50 degrees.
- Manure applied, not incorporated

16. Nutrient Management (March 1st - Summer 2022):

- No Nitrogen was applied in this time frame AND no prior Fall 2021-February 2022 Nitrogen other than MAP or DAP
- Spring/Summer nitrogen application(s) amounted to 50% - 74% of the total N Program (from all sources)
- Spring/Summer nitrogen application(s) amounted to at least 75% of the total N Program (from all sources)
- In-season N application (top or sidedress) was at least 25% of the total N Program (from all sources)
- Manure/Biosolid injected or applied and incorporated
- Manure applied, not incorporated

17. Additional Nutrient Activities:

- Total Nitrogen applied on corn that followed a different crop was 181 to 200 lbs./acre,
OR corn-on-corn was 201 to 220 lbs./acre
- Total Nitrogen applied on corn that followed a different crop was 180 lbs. or LESS/acre,
OR corn-on-corn was 200 lbs. or LESS/acre
- Phosphorus and/or Potassium application based on removal rates and/or soil samples (may mean zero applied)
- At least 50% of total applied phosphorus was banded subsurface
- Used Triple Super Phosphate (0-45-0)
- Used Variable Rate Technology application
- Any fertilizer source containing Nitrogen or Phosphorus was broadcast on *frozen* or *snow-covered* ground

Illinois STAR FAQ

Instructions, definitions, and frequently asked questions: 2022 Crop Year

General STAR

What is the definition of STAR's Crop Year?

STAR is focused on improving in-field management and sets our Crop Year to capture all field preparation activities starting after harvest and including any pre-plant and in-season activities up to harvest. The STAR program year runs from July 1st, 2022 when the new field form is released through January 31st, 2023.

Why is my contact information needed?

Once your field is rated, you may be selected for verification. Also, we will contact you with your results and offer a field sign to display your rating.

How do I order a field sign?

Contact your local STAR Rep using the "Contact" page on our website or email info@starfreetool.com. You can also request a field sign through the STAR Web App. A post is not provided with the STAR sign.

Who will know my STAR rating(s)?

While we strongly encourage participants to post field signs to display STAR ratings, your ratings are confidential and will not be shared with anyone but you. Field-level practice data will be aggregated for use in tracking STAR participation and program outcomes on a state/county basis once personal identifiable and specific location data have been removed. Please see our Terms of Use and Privacy Policy on our website for more information.

How will my answers be verified?

The STAR Coordinator will use random sampling to identify up to 10% of the fields submitted. A set of "Verifiers" will contact the randomly selected participant(s) to confirm the use of the practices identified on their Field Form. The verification process will occur in Feb-March 2023. Potential items and information that may be requested from participants are on our website.

STAR Web App:

How do I log in?

Go to www.starfreetool.com and navigate to the STAR Web App link to launch the app in your browser. If you don't have an account, click "Create Account." If you do have an account, log in using your email and password.

What happens if I forget my password?

Utilize the "forgot password" button on the log in page to walk through the steps to reset your password.

I need to change my email/contact information, what do I do?

Contact info@starfreetool.com. In your message, please let us know all details of your request.

Who do I contact for assistance?

For STAR Web App support, contact info@starfreetool.com. If you'd like local conservation assistance, check our website's contact page for a list of STAR County Contact and send them an email or give them a call! If your county is not a licensed STAR County, contact info@starfreetool.com.

Why should I create an account instead of filling out a PDF field evaluation form?

Creating an account in the STAR Web App is a fast, simple way to enter your information. It will save in your account for proceeding years, so you can copy answers to other fields each year you participate. The STAR Web App provides instant STAR Rating results, walks you through steps to increase your STAR Rating, provides resources for improvement, and allows you to share results on social media!

Should I mark something on each section of the field evaluation form?

Yes, it is very important to mark all applicable activities in each section. Separate forms should be completed for each field you would like rated.

Why am I asked to sign and date the Field Form?

Your signature acknowledges that you have completed the form as accurately as possible and that you understand your field may be randomly selected for verification.

Field Evaluation Form Questions:

Section 9 - Conservation and Management Practices

This section includes several recommended practices to reduce nutrient and soil loss in addition to the in-field management practices that STAR 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 being implemented in such a way that reduces sheet and rill erosion to “T.” 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 water (sheet and rill) erosion or wind erosion rate exceeds the T.
- “Attended soil or nutrient management meeting/field day” may have been any meeting that includes some discussion or recommendations related to soil, nutrient use, tillage, 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. STAR 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 NRCS programs such as CSP and EQIP, state programs such as PFC, and

local programs such as Precision Conservation Management (PCM).

- “Completed 2021 STAR Form” is to be checked only if it was completed for this specific field.

Section 10 - Crop Rotation

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 or hay). Incorporation of a winter hardy crop, such as wheat, 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. The “Other” crop could be milo, sunflowers, canola, etc.

Section 11 - Cover Crops

A cover crop credited for the 2022 Crop Year must have been planted and established in the late summer or fall of 2021, 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, 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

Section 11 - Cover Crops

How do I record my cover crop species? Check the category that applies to your cover crops. If you planted cereal rye, mark “Winter hardy single species.” If you planted cereal rye and clover, mark “Winter hardy – 2 or more species.” If you planted cereal rye and radish, mark “Winter hardy – single species” and “winter kill single species.” It should be noted

that planting more than one species will encourage additional above and below ground biodiversity that may offer distinct soil health benefits when compared to single species.

Section 11 - Cover Crops

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 on cover crop mixes, seeding rates, planting guidelines, and termination strategies appropriate for your operation.

Section 12 - Soil Sampling

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 likely done using GPS. The grid or zone sizes should be based on the University of IL Agronomy Handbook: extension.cropsciences.illinois.edu/handbook/

Section 13 & 14 - Fall and Spring Tillage

Minimal soil disturbance is recommended. No-till systems keep the soil covered and minimize soil loss due to wind and water erosion. We acknowledge that fertilizer toolbars 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 also 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 when possible. 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 STAR.

Section 15 - Fall/Winter Nutrient Management

We discourage fall and winter application of fertilizers due to an increased risk of nutrient 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 application in February or early March with an active crop growing reduces the risk of nitrate loading to local waterways.

Section 15 - Fall/Winter Nutrient Management

If NH₃ (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 Fahrenheit. Though not recommended, if a fall through February NH₃ application is made, it should represent no more than 50% of the total Nitrogen program.

Section 15 - Fall/Winter Nutrient Management

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, they should be injected or broadcast when the soil temperature is below 50 degrees Fahrenheit and if broadcast, they should be incorporated. Management of such applications should include soil tests to determine exact amounts of nutrients being added. Research on stabilizers used in conjunction with manure applications is inconclusive and the STAR Science Advisory Committee does not feel that the use of manure stabilizers is warranted at this time.

Section 16 - Spring/Summer Nutrient Management

While some crops require additional nitrogen inputs to sustain yields, limiting nitrogen applications can significantly improve downstream water quality. Nitrogen is best applied in the spring and/or summer, as close as possible to the time the crop will use it, minimizing nutrient losses from the field.

Section 16 - Spring/Summer Nutrient Management

Manure/Biosolids applied during the spring or summer should be incorporated if broadcast.

Section 17 - Additional Nutrient Activities

The “total nitrogen program” for a crop should incorporate residual soil nitrogen, nitrogen made available from organic matter mineralization, and nitrogen applied from all sources in the Crop Year. The maximum levels identified for this section are based on the maintenance needs for optimal corn yield goals in Illinois and should help to offset and/or 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 STAR. 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/.

Section 17 - Additional Nutrient Activities

Limiting phosphorus applications will help meet the water quality goals of the Illinois Nutrient Loss Reduction Strategy. If phosphorus is applied, either in the fall or spring, it is best to follow soil test recommendations and apply subsurface. Triple Super Phosphate is better than MAP or DAP as it does not add the complexity of additional nitrogen. As stated earlier, it is best to apply phosphorus and potassium based on soil testing, but it is reasonable to replace those nutrients using estimated removal rates. Additionally, utilizing Variable Rate Technology (VRT) is economical and environmentally friendly and allows for the placement of fertilizer where it's needed.

Section 17 - Additional Nutrient Activities

Any fertilizer containing nitrogen or phosphorus, including manure, that is broadcast on either frozen or snow-covered ground increases the likelihood of loss, particularly via surface run-off, and should be avoided.



Methodology for Calculating Environmental Outcomes of the STAR Initiative in Illinois

Developed and written by Emily Bruner, Ph.D., 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 (STAR) Initiative are estimated utilizing the data sources, tools and equations listed below. All reported metrics are calculated on a per-practice basis and are meant to provide an estimate of practice-level performance; therefore, such equations are not additive.

Data Sources

- Acres enrolled in STAR in Illinois: Champaign County Soil & Water Conservation District (CCSWCD)
- GHG reductions in Carbon Dioxide Equivalents (CO₂e) 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
- 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>

Nutrients

Non-point Source (NPS) Nitrate-N (NO₃-N) and Total Phosphorus (TP) Load Reductions

County-level Agricultural NPS NO₃-N and TP Loads are 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 (NO₃-N and TP) to the county scale using the following equations:

- Equation 1: 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
- Equation 2: 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)
- Equation 3: Annual County NPS Load (lbs/yr) = Sum of Annual Load from Non-irrigated Cropland Acres in each HUC8 per County (lbs.) by county
- Equation 4: Average County NPS Loading (lbs/ac-yr) = Annual County NPS Load (lbs/yr) / Non-irrigated Cropland Acres in each county
- Equation 5: Annual County NPS Load Reduction (lbs/yr) from Cover Crops = (Average County NPS Loading (lbs/ac-yr) (b) * Acres of Cover Crops enrolled in STAR per County) * NLRs Nutrient Removal Efficiency of Cover Crops
- Equation 6: Annual County NPS 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 STAR per County) * NLRs Nutrient Removal Efficiency of changing conventional tillage to conservation tillage or no-till
- Equation 7: 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 STAR per County) * NLRs Nutrient Removal Efficiency of P application rate reduction
- Equation 8: Annual County NPS 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 at or below MRTN

enrolled in STAR per County) * NLRS Nutrient Removal Efficiency of reducing N application rate

Assumptions:

(a) Negative values for NPS NO₃-N 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 STAR methodology, where negative NPS NO₃-N 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 NO₃-N 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 and Lower Illinois.

(b) An estimate of 30% was used for both NPS NO₃-N and TP removal efficiencies

Sediment

Non-point Source (NPS) Sediment Load Reductions

- Equation 9: Annual Sediment Load Reductions from Cover Crops (tons/yr) = (Average sediment load per acre (tons/ac-yr, average of erosion rate estimates from corn and soy fields from the 2017 and 2018 IDOA tillage transect surveys)* Acres of Cover Crops enrolled in STAR per County) * Sediment Removal Efficiency of Cover Crops provided by literature (c)
- Equation 10: Annual Sediment Load Reductions from No-till/Strip-till (tons/yr) = (Average sediment load per acre (ton/ac-yr, average of erosion rate estimates from corn and soy fields from the 2017 and 2018 IDOA tillage transect surveys) * Acres under No-till / Strip-till Management enrolled in STAR per County) * NLRS Nutrient Removal Efficiency of changing conventional tillage to conservation tillage or no-till (d)

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.

- (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 9.
- (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 10.

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 downloading the COMET-Planner dataset:

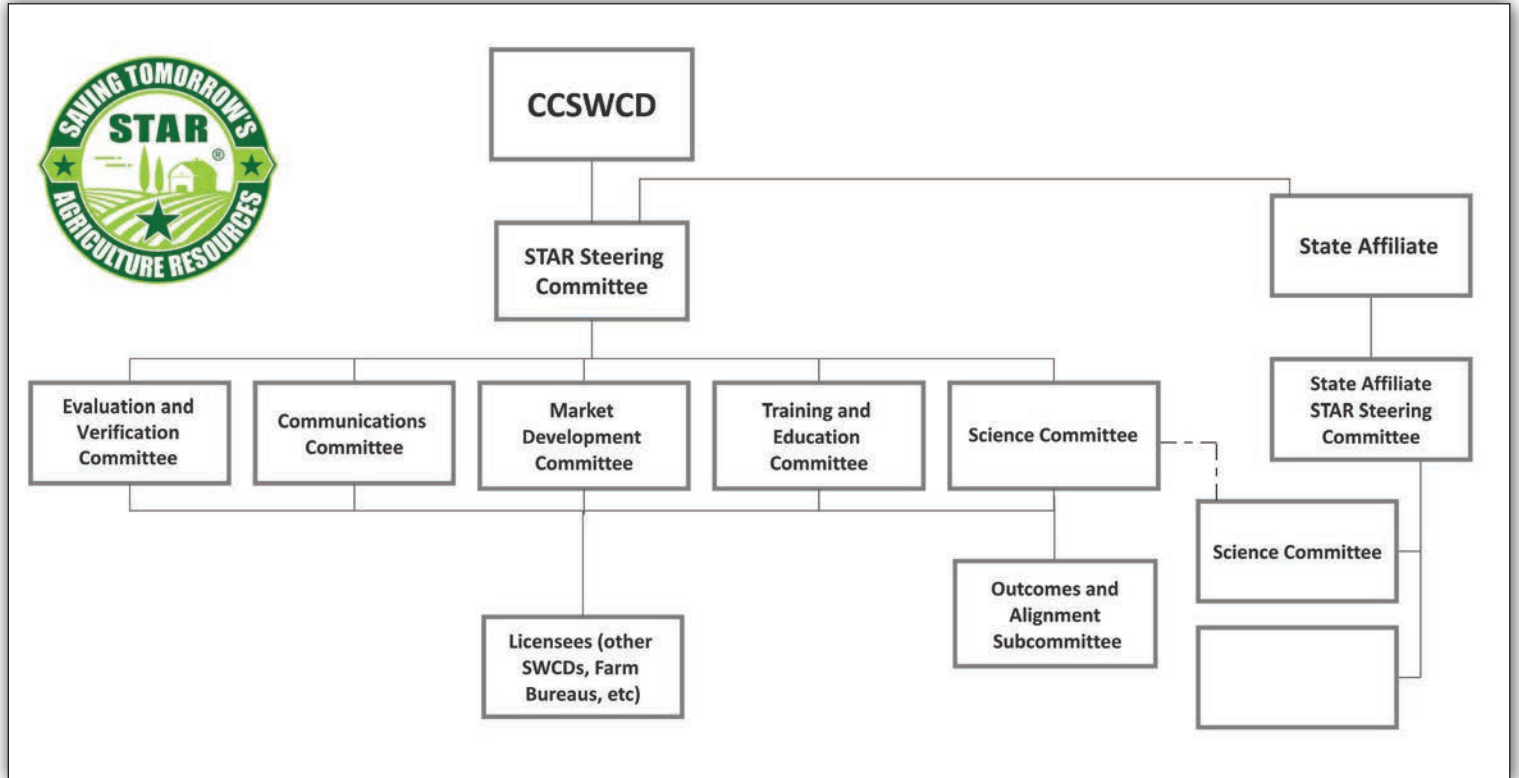
- Amy Swan, Mark Easter, Adam Chambers, Kevin Brown, Stephen A. Williams, Jeff Creque, John Wick, Keith Paustian. 2022. COMET-Planner Dataset, Version 3.0, Build 1, and COMET-Planner Report: Carbon and Greenhouse Gas Evaluation for NRCS Conservation Practice Planning. A companion report to www.comet-planner.com. Downloaded at www.comet-planner.com on 06 April 2023.

The dataset provides per acre emission reduction coefficients (ERC) by county for adopting NRCS conservation practices identified as having greenhouse gas mitigation and/or carbon sequestration benefits on farms and ranches. Several cropland conservation practices have different ERCs for irrigated and non-irrigated croplands. The 2022 STAR Field Form does not capture a field's irrigation status. So, the outcomes were calculated using the average ERC per county weighted by the number of irrigated and non-irrigated cropland acres in each county (obtained from the 2017 US Census of Agriculture, Volume 1, Chapter 2: State Level Data, Tables 10 and 1, respectively). It was assumed that cover crops were non-legume cover crops.

The 2022 Crop Year is the first time STAR's estimated outcomes for Carbon Sequestration and Greenhouse Gas Emissions accounted for irrigated cropland acres; previous years assumed non-irrigated cropland for all acres.

In September 2022, COMET-Planner launched a new version of the tool, updating the reduction coefficients used in their estimations. STAR's reported outcomes for the 2022 Crop Year were calculated to reflect this update.

2022 STAR Structure




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