



# Illinois Nutrient Loss Reduction Strategy Survey

Released August 5, 2022

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## **BACKGROUND AND PURPOSE OF SURVEY**

The state of Illinois developed a long-range plan, called the Nutrient Loss Reduction Strategy (NLRS), to reduce loss of nutrients from agricultural fields (non-point sources) and to address urban runoff (point sources). The agricultural portion of that plan was focused on reducing loss of nitrogen and phosphorous through leaching and runoff. The plan recommends a list of cultural practices that producers are encouraged to adopt or expand, to preserve nutrients in their fields and reduce loss of nutrients.

NASS was asked to design and conduct a survey that would establish a baseline set of statistics for some of those practices in the 2011 crop season. In addition, the initial survey was designed to measure those same cultural practices for the 2015 crop season. The survey has been repeated, with very few changes, to gather updated statistics for 2017, 2019, and 2021.

## **ACKNOWLEDGEMENTS**

The staff of NASS would like to thank the Illinois Nutrient Research Education Council (NREC) that provided the funding for this project as part of their research and education outreach.

In addition, several members of the Illinois Farm Bureau were helpful with designing and testing the updated questionnaire for the 2021 season.

NASS statisticians would also like to thank all the producers that responded to the survey.

## **SURVEY METHODOLOGY**

**SAMPLING:** NASS staff drew a sample of 1,095 Illinois farms with at least 100 acres of cropland and less than 5,000 acres of cropland.

**DATA COLLECTION:** NASS mailed questionnaires and return envelopes to producers in February 2022. A second mailing was sent to non-respondents in March. Following the second mailing, field staff phoned the remaining non-respondents in April.

**REFERENCE YEAR:** The 2021 crop season was the reference year for nearly all the survey questions. The General Knowledge questions are referenced to the time of the interview, in early 2022.

## NITROGEN MANAGEMENT

For the 2021 survey, respondents were provided a map of Illinois with Maximum Return To Nitrogen (MRTN) rates for three regions in Illinois. Each region had MRTN rates for corn-after-corn acres and corn-after-soybean acres. Producers were asked to report the number of corn acres they fertilized at or below the MRTN rate for their region of the state. See appendix.

NOTE: In the table below, data for the 2021 crop season are not directly comparable to results from previous surveys as the data collection process was changed significantly.

<b>Nitrogen Management Strategy</b>	<b>Acres in 2017</b>	<b>Acres in 2019</b>	<b>Acres in 2021</b>
Corn acres planted	11,200,000	10,500,000	<b>11,000,000</b>
Corn acres fertilized at MRTN or lower rate	3,730,000	4,240,000	<b>8,360,000</b>
Other industry-approved techniques	7,750,000	8,470,000	<b>N/A</b>

**FERTILIZER APPLICATION STRATEGIES (Nitrification Inhibitors):** The survey results showed that farmers used a nitrification inhibitor on 85% of corn acres that were fertilized with anhydrous ammonia in the fall or winter. For anhydrous ammonia used in the spring, that ratio was 83%.

<b>Nitrification inhibitors on corn acres</b>			
	<b>2017</b>	<b>2019</b>	<b>2021</b>
Corn acres planted	11,200,000	10,500,000	<b>11,000,000</b>
Corn acres fertilized in the fall and winter with dry fertilizer blends	N/A	N/A	<b>4,560,000</b>
Corn acres fertilized in the fall and winter with fall and winter NH3 acres	N/A	N/A	<b>4,020,000</b>
Corn acres fertilized in the fall and winter with nitrification inhibitors	3,550,000	1,460,000	<b>3,410,000</b>
Corn acres fertilized in the spring with any fertilizer. This includes split applications and spring only acres	N/A	N/A	<b>8,250,000</b>
Corn acres fertilized only in the spring with any fertilizer	N/A	N/A	<b>4,440,000</b>
Corn acres fertilized in the spring with nitrification inhibitors	2,790,000	2,790,000	<b>3,690,000</b>

## FERTILIZER APPLICATION STRATEGIES (Timing of Applications)

Survey results show that nearly 25% of corn acres were fertilized only in the fall or winter. Forty percent of corn acres were fertilized only in the spring, and 35% of acres were fertilized in the fall and spring (split-application technique).

<b>Timing of Fertilizer Applications, 2021 crop</b>	
NASS Corn Planted Acres	11,000,000
Acres fertilized only in the fall	2,740,000
Acres fertilized in the spring and fall (split applications)	3,820,000
Acres fertilized only in the spring	4,440,000

## PHOSPHOROUS

<b>Reductions in phosphorus applications</b>		2017 Acres	2019 acres	2021 acres
Tile-drained acres	Acres where phosphorus application rates were reduced since 2011	4,440,000	7,410,000	<b>6,210,000</b>
Non tile-drained acres	Acres where phosphorus application rates were reduced since 2011	2,150,000	3,800,000	
<b>Tile-drained acres</b>				
Tile-drained acres	Acres where placement of phosphorus applications were moved from broadcast to subsurface or banding	1,530,000	1,440,000	<b>1,080,000</b>
Non tile-drained acres	Acres where placement of phosphorus applications were moved from broadcast to subsurface or banding	280,000	870,000	

When asked about the reasons for reducing phosphorous applications, producers gave the responses below:

- Changes to the Illinois Agronomy Handbook removal rates were cited as the reason for phosphorous reductions on nearly 2 million acres.
- Soil test results were cited as the reason for reductions on nearly 4.6 million acres.
- Other reasons, including cost, were cited as reasons for reductions on just over 2 million acres.

NOTE: The questionnaire allowed for producers to cite several reasons for reducing phosphorous applications.

<b>Reasons for reducing phosphorus applications</b>	2017 Acres	2019 Acres	2021 Acres
The Illinois Agronomy Handbook removal rates for phosphorus were updated	2,390,000	4,460,000	<b>1,940,000</b>
Soil test information	4,520,000	9,470,000	<b>4,570,000</b>
Other reasons, including cost	2,420,000	5,030,000	<b>2,010,000</b>

## COVER CROPS

The NASS survey included questions on usage of cover crops prior to planting corn and soybeans. The questionnaire instructed respondents not to count double-crop soybeans planted after a winter wheat cash crop.

Results show that farmers planted 450,000 acres of corn after cover crops in 2021, and 890,000 acres of soybeans after cover crops.

<b>Cover Crops</b>	<b>Acres</b>
<b>2021 corn acres planted after cover crops</b>	<b>450,000</b>
<b>2021 soybean acres planted after cover crops</b>	<b>890,000</b>
<b>2021 total cover crops</b>	<b>1,390,000</b>
Corn / Soybean acres planted to cover crops after the 2019 crop season on tilled ground.	930,000
Corn / Soybean acres planted to cover crops after the 2019 crop season on non-tiled ground.	480,000
Corn / Soybean acres planted to cover crops after the 2017 crop season on tilled ground.	290,000
Corn / Soybean acres planted to cover crops after the 2017 crop season on non-tiled ground.	420,000
Corn / Soybean acres planted to cover crops after the 2015 crop season on tilled ground.	490,000
Corn / Soybean acres planted to cover crops after the 2015 crop season on non-tiled ground.	630,000
Corn / Soybean acres planted to cover crops after the 2011 crop season on tilled ground.	220,000
Corn / Soybean acres planted to cover crops after the 2011 crop season on non-tiled ground.	380,000

## TILED ACRES

<b>Tiled Acres in 2021</b>	
Corn	7,020,000
Soybeans	6,150,000
Other crops	390,000
Total Cropland	13,560,000

The NASS survey included a series of general knowledge questions about the Nutrient Loss Reduction Strategy and best management practices (BMPs).

NOTE: While the reference year for the most recent survey was the 2021 crop season, the survey questions were asked to producers in 2022. And on the previous survey, the general knowledge questions were asked to producers in early 2020.

<b>General Knowledge Questions</b>					
<b>Percent of Farms reporting in 2022</b>	<b>Not at all knowledgeable</b>	<b>Slightly knowledgeable</b>	<b>Somewhat knowledgeable</b>	<b>Knowledgeable</b>	<b>Very knowledgeable</b>
Nutrient Loss Reduction Strategy	20.3	24.8	36.7	15.7	2.5
MRTN strategy	16.2	14.9	37.9	25.0	6.0
Wood chip bioreactors	68.6	14.7	11.1	4.8	0.8
Constructed Wetlands	35.5	32.3	21.7	8.2	2.3
Cover crop management	15.9	20.6	35.3	22.2	6.0
Saturated Buffers	33.8	23.5	25.4	14.3	3.0
<b>Percent of Farms reporting in 2020</b>	<b>Not at all knowledgeable</b>	<b>Slightly knowledgeable</b>	<b>Somewhat knowledgeable</b>	<b>Knowledgeable</b>	<b>Very knowledgeable</b>
Nutrient Loss Reduction Strategy	26.9	29.9	20.7	10.7	11.8
MRTN strategy	30.2	29.0	17.6	14.7	8.5
Wood chip bioreactors	54.7	17.2	14.4	11.5	2.2
Constructed Wetlands	42.1	20.5	16.5	17.9	3.0
Cover crop management	9.1	24.7	27.7	26.1	12.4

## ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY SURVEY

OMB No. 0535-0218  
 Approval Expires: 11/30/2023  
 Project Code: 483  
 Survey ID: 3879  
 FIPS: 17



USDA/NASS - Illinois  
 Heartland Region  
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Please make corrections to name, address, and ZIP Code, if necessary.

The information you provide will be used for statistical purposes only. Your response will be kept confidential and any person who willfully discloses ANY identifiable information about you or your operation is subject to a jail term, a fine, or both. This survey is conducted in accordance with the Confidential Information Protection and Statistical Efficiency Act of 2016, Title III of Pub. L. No. 115-435, codified in 44 U.S.C. Ch. 35 and other applicable Federal laws. For more information on how we protect your information please visit: <https://www.nass.usda.gov/confidentiality>. Response is voluntary.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB number is 0535-0218. The time required to complete this information collection is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

### SECTION 1 - CROPLAND ACRES

Please report your total cropland acres on all the land you operated in 2021. Also, provide a breakdown of acres with tiling and without tiling. NOTE: TILE DRAINED acres refers to acres drained by clay tiles, perforated plastic pipes, and pattern tile systems.

Please report your operation's total cropland acres on all the land you operated including a breakdown of acres with tile drained and non-tile drained in 2021.

Notes: TILE DRAINED acres refers to acres drained by clay tiles, perforated plastic pipes, and pattern tile systems.

1. Of all land operated in 2021, how many acres were:	Tile Drained	Non-tile Drained	TOTAL
a. Acres planted to corn? .....	115	116	114
b. Acres planted to soybeans? .....	125	126	124
c. Other acres of cropland? .....	135	136	134
d. Total cropland? .....	105	108	104

**SECTION 2 - NUTRIENT MANAGEMENT**

Please consider your nutrient applications in preparation for the 2021 crop season. Review the enclosed map of Illinois and the table of Nitrogen application rates. The goal is to gather the number of CORN acres your operation fertilized AT or BELOW the Maximum Return to Nitrogen (MRTN) rate for the area.

Consider the total CORN acres in 2021 and all the Nitrogen applications to those acres:

2021 ACRES

1. On how many CORN acres did your operation use the University of Illinois Recommended total Nitrogen rate (also known as Maximum Return to Nitrogen - MRTN) or LESS than that rate? (refer to the attached map and chart) .....

202
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a. What influenced your operation's decision in determining the total Nitrogen rate (e.g. fertilizer provider, crop consultant, farm management software, etc.) List all that apply.

210

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2. Of the total CORN ACRES in 2021, please record the acres fertilized with the strategies listed below.

EXCLUDE manure applications.

Please consider all the acres of CORN your operation planted in 2021, and all the fertilizer your operation applied for that crop.

CORN ACRES

a. How many CORN acres were fertilized with dry fertilizer blends containing Nitrogen in the fall and winter preceding 2021? .....

215
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b. How many CORN acres were fertilized with Anhydrous Ammonia during the fall and winter preceding 2021? .....

216
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i. Of those acres fertilized with Anhydrous Ammonia in the fall and winter, on how many acres did your operation fertilize using a nitrification or urease inhibitor? .....

217
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c. Of the operation's total CORN acres, how many acres were part of a split-application, where some of the Nitrogen was applied in the spring and some in fall or winter (split application acres)? .....

218
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d. How many CORN acres were fertilized with 100% of your operation's needs during the spring of 2021 (spring only Nitrogen applications)? .....

219
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e. Of all the acres your operation fertilized in the spring with Nitrogen, including split application acres and spring only acres, on how many acres did your operation fertilize using a nitrification or urease inhibitor? .....

220
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**SECTION 3 - PHOSPHORUS APPLICATIONS and REASONS for REDUCING**

1. Did your operation reduce PHOSPHORUS applications since 2011?

Yes - Continue      No - Go to Section 4

ACRES

a. On how many acres has your operation reduced phosphorus applications since 2011? .....

350
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2. What influenced your operation's decision in reducing phosphorus applications:

a. The Illinois Agronomy Handbook removal rates for phosphorus were updated in 2017?

Yes - Continue      No - Go to page 3, question 2b

ACRES

i. On how many acres did your operation reduce phosphorus applications because of the Illinois Agronomy Handbook? .....

701
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**SECTION 3 - PHOSPHORUS APPLICATIONS and REASONS for REDUCING, Continued**

2b. Soil test information?

- Yes - Continue       No - Go to question 2c

1. On how many acres did your operation reduce phosphorus applications because of the soil test results? ..... ACRES  
702

2c. Other reasons, including cost: Please list below.

710

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

1. If other reasons, on how many acres did your operation reduce phosphorus applications?..... ACRES  
703

3. Has your operation changed the placement of phosphorus to move from broadcast to subsurface application or banding application?

- Yes - Continue       No - Go to Section 4

a. On how many acres did your operation change placement of phosphorus from broadcast to subsurface or banding? ..... ACRES  
351

**SECTION 4 - COVER CROPS**

COVER CROPS refers to crops including grasses, legumes and forbs planted for conservation purposes, including erosion control, improving soil structure, moisture, and nutrient content, increasing beneficial soil biota, or providing habitat for insects, pollinators and wildlife.

1. On how many acres did your operation plant cover crops preceding the 2021 crop? ..... 2021 ACRES  
400

a. Of those acres, how many acres utilized cover crops prior to CORN? .....  
401

b. Of those acres, how many acres utilized cover crops prior to SOYBEANS? .....  
402  
 EXCLUDE double-crop soybeans planted after winter wheat cash crop. ....

**SECTION 5 - GENERAL KNOWLEDGE**

For these next questions please enter the code that best describes your level of knowledge.

	CODES	ENTER CODE
1. What is your level of knowledge of:		
a. The Illinois Nutrient Loss Reduction Strategy? .....	1 - Not at all knowledgeable 2 - Slightly knowledgeable 3 - Somewhat knowledgeable 4 - Knowledgeable 5 - Very knowledgeable	517
b. Maximum Return to Nitrogen (MRTN) strategy? .....		508
c. Wood chip bioreactors? .....		508
d. Constructed Wetlands? .....		518
e. Cover crop management (species selection, planting dates, termination strategy, etc.)?.....		519
f. Saturated buffers? .....		520

**SECTION 6 - OTHER TECHNIQUES**

1. Does this operation use any other practices to reduce nutrient losses from your fields?

- 1  Yes - Continue      2  No - Go to Survey Results

2. What practices are you using? Please list/explain below

		ACRES PRACTICES USED
810	a. Specify: _____ _____	801
811	b. Specify: _____ _____	802
812	c. Specify: _____ _____	803

**Survey Results:** To receive the complete results of this survey on the release date, go to: [nass.usda.gov/results](http://nass.usda.gov/results)

To have a brief summary emailed to you, please enter your email address:

1005 \_\_\_\_\_

Comments related to the information you reported:

\_\_\_\_\_  
\_\_\_\_\_

**Contact information**

Operation Email: (if different from above)

Operation Phone:

9937 _____	9938 _____ (_____) _____	check if cell phone <input type="checkbox"/>
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Respondent Name:

Respondent Phone: (if different from above)

9912 _____	9911 _____ (_____) _____	check if cell phone <input type="checkbox"/>	9910	MM	DD	YY
			Date: _____			

This completes the survey. Thank you for your help.

**OFFICE USE ONLY**

Response	Respondent	Mode	Enum.	Eval.	Change	Office Use for POID					
1-Comp 2-R 3-Inst 4-Office Hold 5-R - Est 6-Inst - Est 7-Off Hold - Est	9901 1-Op/Mgr 2-Spouse 3-Acc/Bkpr 4-Partner 9-Other	9902 1-PAI (Mail) 2-PAT1 (Tel) 3-PAPI (Face-to-Face) 6-Email 7-Fax 19-Other	9903	9908	9900	9985	9980 _____				
Optional Use											
							9921	9907	9908	9906	9918
S/E Name _____											



February 2022

As the Chairman and Illinois Farm Bureau representative on the Illinois Nutrient Research and Education Council (NREC), I want to congratulate you for being selected to provide important information on behalf of Illinois farmers.

By way of background, the Illinois Nutrient Loss Reduction Strategy (NLRS) was developed by the Illinois Environmental Protection Agency (IEPA), the Illinois Department of Agriculture (IDOA), and a multi-stakeholder Policy Working Group (PWG). The initial NLRS was released in July 2015 and is a framework for leveraging existing programs to optimize nutrient loss reduction while promoting collaboration, research, and innovation among the private sector, academia, non-profits, wastewater treatment agencies, the agricultural sector, and state and local government.

The primary NLRS goals are to reduce annual loading of nitrate-nitrogen and total phosphorus to the Mississippi River and address the impacts on local water quality. The ultimate goal is to achieve 45 percent loss reductions in both nitrate-nitrogen and total phosphorus with the interim loss reduction goals of 15 percent nitrate-nitrogen and 25 percent total phosphorus by 2025.

The NLRS PWG is expected to report its progress to the public every two years via a Biennial Report, the first of which was released in July 2017, followed by a second report in November 2019, and a third in September 2021. An important part of the Biennial Report is the attached National Agricultural Statistics Service (NASS) survey that can help demonstrate implementation of various nutrient reduction best management practices (BMPs) on the land in a statistically valid manner over a long period of time. In addition to funding important nutrient research, NREC also prioritizes tracking the adoption and implementation of BMPs, and provides the funding for the NLRS NASS survey on behalf of Illinois farmers. **Without the NASS survey, the full story of Illinois farmers' efforts across the state to improve water quality cannot accurately be told.**

Illinois farmers have been making tremendous strides at voluntarily implementing BMPs that make sense for both their farms and the environment. Please take a few minutes to document your own progress toward the NLRS goals. Thank you for your time and attention to this priority issue for Illinois agriculture.

For more information on the NLRS, see <https://tinyurl.com/Illinois-NLRS>

Sincerely,

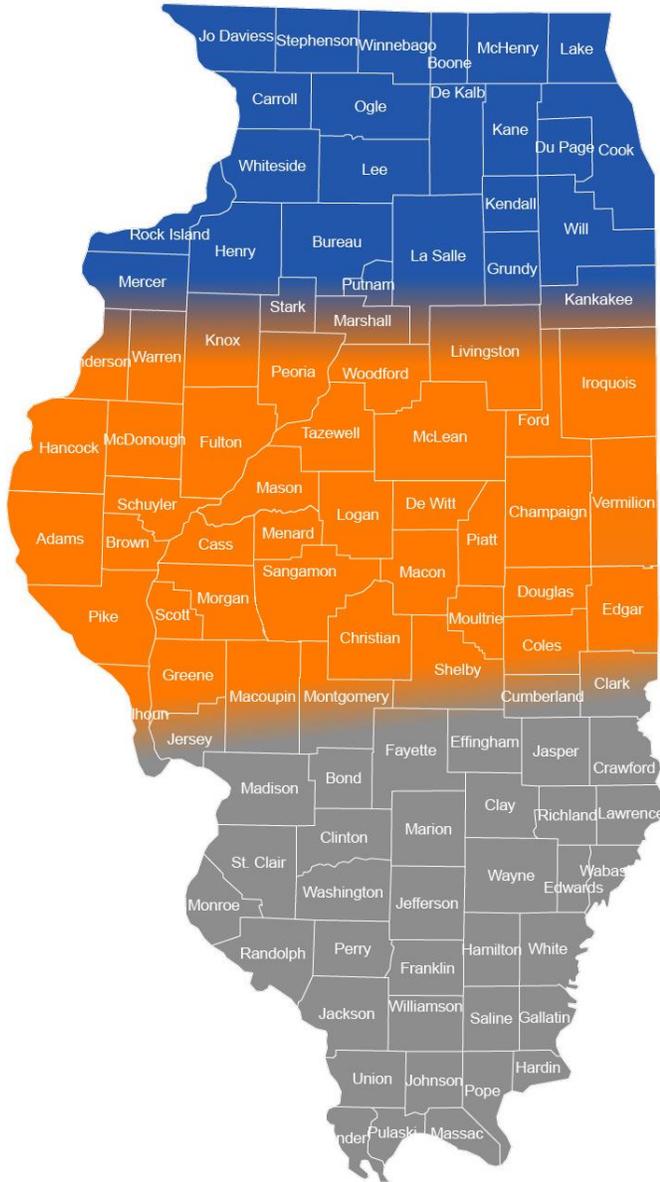
A handwritten signature in black ink that reads "Jeff Kirwan". The signature is written in a cursive style.

Jeff Kirwan  
Chairman, Illinois Nutrient Research and Education Council  
District 3 Director, Illinois Farm Bureau



**Please utilize this map and chart to answer Question 1 under Section 2: Nutrient Management.**

Maximum Return to Nitrogen (MRTN) is the Nitrogen rate where the economic net return to Nitrogen application is maximized. The MRTN rates below are calculated based on an extensive network of trials conducted across Illinois. The rates are updated each year and become the recommended Nitrogen rates from the University of Illinois. The corn nitrogen rate calculator website is available at the following URL: [cnrc.agron.iastate.edu](http://cnrc.agron.iastate.edu)



**Illinois Corn N-Rate Calculator Output for 2021**

IL REGION	ROTATION	MRTN
NORTH	Soy/Corn	187
	Corn/Corn	222
CENTRAL	Soy/Corn	195
	Corn/Corn	214
SOUTH	Soy/Corn	215
	Corn/Corn	215