



Released July 31, 2024

Illinois Nutrient Loss Reduction Strategy Survey

BACKGROUND AND PURPOSE OF SURVEY

The State of Illinois developed a long-range plan, the Nutrient Loss Reduction Strategy (NLRS), to reduce the 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 practices to minimize the 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 maximize nutrient retention while reducing nutrient loss.

NASS was asked to design and conduct a survey that would establish a baseline set of statistics for the targeted practices in the 2011 crop season. After establishing a baseline, the survey was conducted biannually from 2015 through 2023. The data from the follow-on surveys were gathered to measure the adoption of the targeted practices.

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.

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

SURVEY METHODOLOGY

SAMPLING: NASS staff drew a sample of 1,100 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 2024. A second mailing was sent to non-respondents in March. Following the second mailing, field staff phoned the remaining non-respondents in March and April.

REFERENCE YEAR: The 2023 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 2024.

NITROGEN MANAGEMENT

For the 2023 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 the region of the state in which the corn was planted. The map and cover letter referenced here can be found in appendix B.

In the table below, data for the 2021 and 2023 crop seasons are not directly comparable to results from previous surveys as the data collection process was changed significantly.

Nitrogen Management Strategy	Acres in 2017	Acres in 2019	Acres in 2021	Acres in 2023
Corn acres planted	11,200,000	10,500,000	11,000,000	11,200,000
Corn acres fertilized at MRTN or lower rate	3,730,000	4,240,000	8,360,000	8,880,000



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FERTILIZER APPLICATION STRATEGIES (Nitrification Inhibitors): The survey results showed that farmers used a nitrification inhibitor on 87% of corn acres that were fertilized with anhydrous ammonia, also known as NH3, in the fall or winter.

Nitrogen application including inhibitors on corn acres in Illinois				
	2017	2019	2021	2023
Corn acres planted	11,200,000	10,500,000	11,000,000	11,200,000
Corn acres fertilized in the fall and winter with dry fertilizer blends	N/A	N/A	4,560,000	6,470,000
Corn acres fertilized in the fall and winter with anhydrous ammonia	N/A	N/A	4,020,000	4,800,000
Corn acres fertilized in the fall and winter with nitrification inhibitors	3,550,000	1,460,000	3,410,000	4,160,000
Corn acres fertilized in the spring with any fertilizer. This includes split applications and spring only acres	N/A	N/A	8,250,000	7,700,000
Corn acres fertilized only in the spring with any nitrogen fertilizer	N/A	N/A	4,440,000	2,860,000
Corn acres fertilized in the spring with nitrification inhibitors	2,790,000	2,790,000	3,690,000	3,880,000

FERTILIZER APPLICATION STRATEGIES (Timing of Applications)

Survey results show that 31% of corn acres were fertilized only in the fall or winter. Twenty-six percent of corn acres were fertilized only in the spring, and 43% of acres were fertilized in the fall and spring (split-application technique).

Timing of Fertilizer Applications	2021 corn crop	2023 corn crop
NASS Corn Planted Acres	11,000,000	11,200,000
Acres fertilized only in the fall	2,740,000	3,500,000
Acres fertilized in the spring and fall	3,820,000	4,840,000
Acres fertilized only in the spring	4,440,000	2,860,000



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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 790,000 acres of soybeans and 550,000 acres of corn following a cover crop in 2023. A cover crop is defined as 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.

Cover Crop Practices	Acres
2023 corn acres planted after cover crops	550,000
2023 soybean acres planted after cover crops	790,000
2023 total cover crops	1,440,000
2021 corn acres planted after cover crops	450,000
2021 soybean acres planted after cover crops	890,000
2021 total cover crops	1,390,000
Corn / Soybean acres planted to cover crops after the 2019 crop season on tiled 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 tiled 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 tiled 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 tiled ground.	220,000
Corn / Soybean acres planted to cover crops after the 2011 crop season on non-tiled ground.	380,000



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The NASS survey included a series of general knowledge questions about the Nutrient Loss Reduction Strategy and Best Management Practices (BMP's).

NOTE: While the reference year for the most recent survey was the 2023 crop season, the survey questions were asked to producers in 2024. And on the previous survey, the general knowledge questions were asked to producers in early 2022.

General Knowledge Questions					
Knowledge in 2024	Not at all knowledgeable	Slightly knowledgeable	Somewhat knowledgeable	Knowledgeable	Very knowledgeable
	Percent of Respondents				
Nutrient Loss Reduction Strategy	22.2%	29.6%	28.4%	13.8%	6.0%
MRTN strategy	18.5%	22.5%	33.0%	16.7%	9.3%
Wood chip bioreactors	61.3%	20.2%	12.1%	4.3%	2.1%
Constructed Wetlands	36.5%	27.1%	18.8%	14.4%	3.2%
Cover crop management	14.3%	25.4%	31.3%	18.9%	10.1%
Saturated Buffers	39.0%	26.1%	21.5%	10.1%	3.3%
Knowledge in 2022	Not at all knowledgeable	Slightly knowledgeable	Somewhat knowledgeable	Knowledgeable	Very knowledgeable
	Percent of Respondents				
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%



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Appendix A (survey questionnaire)

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY SURVEY

OMB No.0535-0273
Approval Expires: 5/31/2025
Project Code: 483
Survey ID: 3879
FIPS: 17



United States
Department of
Agriculture



NATIONAL
AGRICULTURAL
STATISTICS
SERVICE

USDA/NASS - Illinois
Heartland Region
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St. Louis, MO 63132-1547
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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 2018, 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 0535-0273. 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 2023. 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 2023.

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

1. Of all land operated in 2023, how many acres were:	Tile Drained	Non-tile Drained	TOTAL
a. acres planted to corn?	115	118	114
b. acres planted to soybeans?	125	128	124
c. other acres of cropland?	135	138	134
d. Total cropland?	105	108	104



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Section 2 - Nutrient Management

Please consider your nutrient applications in preparation for the 2023 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 2023 and all the Nitrogen applications to those 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)

2023 ACRES
202

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

2. Of the total CORN ACRES in 2023, please record the acres fertilized with the strategies listed below. EXCLUDE manure applications.

Please consider all the acres of CORN your operation planted in 2023, and all the fertilizer your operation applied for that crop.

a. How many CORN acres were fertilized with dry fertilizer blends containing Nitrogen in the fall and winter preceding 2023?

CORN ACRES
215

b. How many CORN acres were fertilized with Anhydrous Ammonia during the fall and winter preceding 2023?

216

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

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

d. How many CORN acres were fertilized with 100% of your operation's needs during the spring of 2023 (spring only Nitrogen applications)?

219

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

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
350

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

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
701

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



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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

ACRES

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

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 2023 crop?

2023 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?
EXCLUDE double-crop soybeans planted after winter wheat cash crop.

402

SECTION 5 - GENERAL KNOWLEDGE

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

1. What is your level of knowledge of:

- a. The Illinois Nutrient Loss Reduction Strategy?
b. Maximum Return to Nitrogen (MRTN) strategy?
c. Wood chip bioreactors?
d. Constructed Wetlands?
e. Cover crop management (species selection, planting dates, termination strategy, etc.)?
f. Saturated buffers?

CODES

- 1 - Not at all knowledgeable
2 - Slightly knowledgeable
3 - Somewhat knowledgeable
4 - Knowledgeable
5 - Very knowledgeable

ENTER CODE

517

506

508

518

519

520



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4

SECTION 6 - Other Techniques

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

1 ☐ Yes - Continue 3 ☐ No - Go to Conclusion

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

ACRES
PRACTICES USED

a. Specify:

810

801

b. Specify:

811

802

c. Specify:

812

803

Conclusion: Contact Information

Operator Email:

Operator Phone:

9909	9917 Check to receive results by email ☐	9918 ()	check if cell phone ☐
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Operation Email: (if different from above)

Operation Phone: (if different from above)

9937	9920 Check to receive results by email ☐	9938 ()	check if cell phone ☐
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Respondent Name:

Respondent Phone (if different from above)

9912	9911 ()	check if cell phone ☐	9910 MM DD YY Date: / /
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This completes the survey. Thank you for your help. The results will be available on the release date at: nass.usda.gov/results

Comments related to the information you reported:

OFFICE USE ONLY									
Response		Respondent		Mode		Enum.	Eval.	Change	Office Use for P.O.D.
1-Comp	9901	1-Op/Mgr	9902	1-PASI (Mail)	9903	9908	9900	9985	9989
2-R		2-Spouse		2-PATI (Tel)					
3-Inac		3-Acct/Skpr		3-PAPI (Face-to-Face)					
4-Office Hold		4-Partner		6-Email					
5-R - Est		9-Other		7-Fax					
6-Inac - Est				19-Other					
7-Off Hold - Est									
S/E Name									9921 9907 9908 9906 9916



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Appendix B (cover letter and MRTN map)



February 2024

As the Chairman and Illinois Corn Growers' 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 additional reports in November 2019, September 2021, and November 2023. 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 <http://tiny.cc/Illinois-NLRS>

Sincerely,

Don Guinnip

Chairman, Illinois Nutrient Research and Education Council



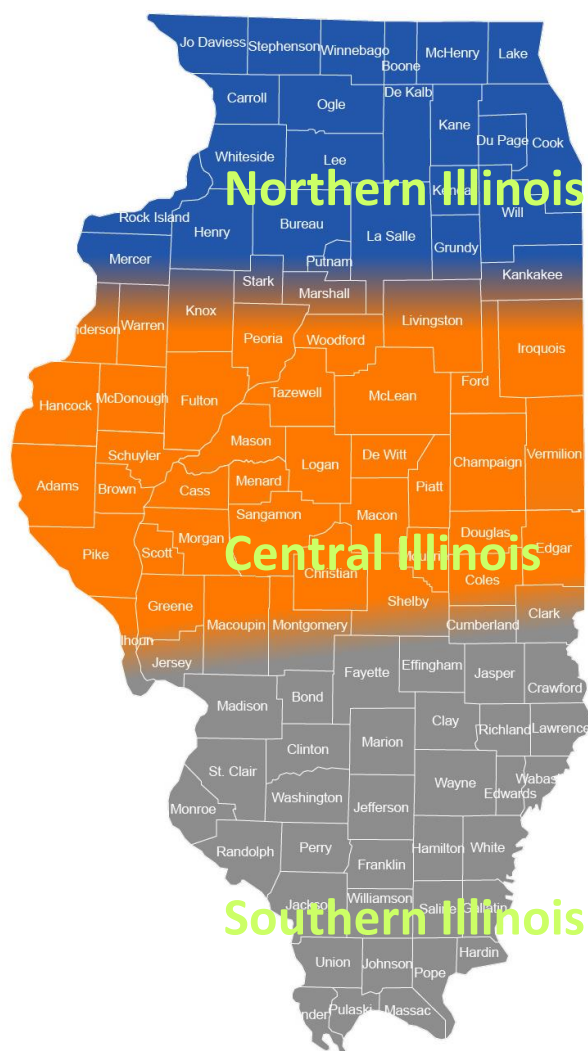


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Please utilize this map and chart to answer Question 1 under Section 2: Nutrient Management.

Maximum Return to Nitrogen (MRTN) is the nitrogen rate where the economic net return to N application is maximized. The MRTN rates below are calculated based on an extensive network of trials conducted across Illinois and prevailing prices for N fertilizer and corn. The maximum rates shown are near the upper end of MRTN guideline rates, calculated using corn prices (from spring 2023) of \$6.00 to \$6.50 per bushel and N prices of \$0.60 to \$1.00 per unit (lb. of actual N.) The corn nitrogen rate calculator website is available at the following URL: <https://www.cornratecalc.org/>



Region	Crop rotation	Maximum rate (lb. N), 2023
Northern Illinois	Corn following soybean	180
	Corn following corn	205
Central Illinois	Corn following soybean	185
	Corn following corn	200
Southern Illinois	Corn following soybean	200
	Corn following corn	200