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# Illinois NLRS Policy Working Group

UNIVERSITY OF ILLINOIS URBANA-CHAMPAI



Virtual Meeting November 7, 2024 1-4 PM



### Trevor Sample, Illinois Environmental Protection Agency





Moderator: Joan Cox, Illinois Extension

Technology Assistance: Libby Brasel, Illinois Extension

Meeting minutes: Amanda Christenson, Illinois Extension



# Attendance

Please type your name and affiliation into the chat box.



1:00-1:05 PM (5 min.)	Welcome & Opening Comments Trevor Sample, Illinois Environmental Protection Agency Joan Cox, University of Illinois Extension
1:05- 1:35 PM (30 min.)	<b>The Conservation Effects Assessment Project (CEAP) Cropland Assessment in Illinois</b> Brianna Henry, USDA Natural Resources Conservation Service Q & A
1:35-1:55 PM (20 min.)	<b>Continuous Gage Statewide Nutrient Loads</b> Luis Garcia, United States Geological Survey Q & A
	5-minute break
2:00- 2:20 PM (20 min.)	HUC 8 Loads and Yields Jenny Murphy, United States Geological Survey Q & A
2:20-2:40 PM (20 min.)	Illinois Nutrient Research & Education Council Update Julie Hewitt, Illinois Nutrient Research & Education Council Q & A
2:40-2:55 PM (15 min.)	Ag Retail Survey Update KJ Johnson, Illinois Fertilizer & Chemical Association Q & A
	5-minute break
3:00-3:30 PM (30 min.)	NLRS Dashboard Status Update Joan Cox, University of Illinois Extension Q & A
3:30-4:00 PM (30 min.)	Partner Updates or Open Discussion Q&A



# The Conservation Effects Assessment Project (CEAP) in Illinois

**Brianna Henry** Modeling Team Lead (Acting), NRCS November 7, 2024



FARM PRODUCTION AND CONSERVATION FSA | NRCS | RMA | Business Center



## **CEAP Overview**

### • CEAP is a multi-agency effort led by NRCS to

- quantify benefits of conservation practices and programs
- develop the science base for managing agricultural lands while promoting environmental quality and wildlife





## **CEAP Cropland Assessment**



# **CEAP Farmer Survey**

- 44 pages ~1.5 hour in-person interview
- Covers:
  - All field management for 3 years
  - Tillage
  - Fertilizers and manures
  - Pesticides and pest management
  - Irrigation
  - Conservation practices adopted (not just NRCS)
  - Conservation program participation
  - Operator background, farm income, demographics
  - 1 field per operator only\*

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# **Survey Collection Framework**

- Sampling framework built on the National Resources Inventory (NRI) cropland points (~200,000)
  - ~10% subset for each CEAP survey
- Points statistically weighted for acreage based on the NRI by NRCS and statisticians at lowa State University
  - Based on regional and national crop acreages



# **History of Survey Collection**

### • CEAP I, 2003-2006

- Surveyed only cropland
- 18,691 final sample points modeled in assessment

### Special Emphasis Area Studies, 2011-2013

- Conducted in the Chesapeake Bay, Western Lake Erie/Des Moines, and California Bay Delta
- Surveyed only cropland

### • CEAP II, 2013-2016

- Surveyed cropland, range, and pasture, but final sample points were only cropland
- 11,948 final sample points modeled in assessment

#### • CEAP III, 2024-2026

• Targeting ~20,000 final sample points

CEAP Farmer Survey

Conservation

**Benefits** 



# **Modeled Conservation Benefits**

- Agricultural Policy/ Environmental EXtender (APEX) Model
  - Daily time-step field-scale model, used for cropland primarily (development for grazing purposes)
  - Simulates all the basic biological, chemical, hydrological, and meteorological processes of farming systems and their interactions
  - Actions (farming practices, weather, etc.) simulated daily, outputs summarized annually for CEAP uses
  - Model runs over ~50 years of simulation for each point





# **Modeling Scenarios**

### Baseline

 Management and conservation practice adoption based on survey response

#### No Practice

Cropping systems based on survey response with reduced conservation activity (current technology)

#### Erosion Control and Nutrient Management

 Cropping systems based on survey response with increased erosion control and nutrient management measures added

### Baseline with Cover Crop

• Cover crop added to every point



# **CEAP II Production Regions**

- Il production regions
- Developed based on land use, cropping systems, climate, and conservation practice usage rather than HUC2 watersheds
- All CEAP II reports are based on these regions



# **CEAP II Regional Reports**

Releasing within the month!

Natural Resources Conservation Service

- North Central Midwest (NCM) production region
  - 44% of national cultivated cropland
  - Corn and soybeans accounted for 90 percent of acres
  - Only 2% of acres received <25 inches of annual rainfall
  - 52% of acres were in the low runoff SVI class
  - Most acres had at moderate or high leaching SVI class (40% moderate, 40% high)



## **Conservation Practice Adoption in the NCM**

- Conservation tillage increased to adoption on 74% of acres
- Cover crop adoption increased to 6% of acres
- Conservation crop rotation was similar but high (87% of acres)
- Sediment management levels increased



CEAP I CEAP II



## **Conservation Practice Adoption in the NCM**

- Nutrient management practices were an area for improvement, with:
  - IO% increase in average N application rate
  - 15% increase in average P application rate
  - Incorporation rates decreased slightly
  - Pre-plant applications increased
- As a result, N and P management need levels increased
  - These consider site vulnerability to loss and 4R component



## **Edge-of-Field Losses in the NCM**

			CEAP	II - CEAP I
RESOURCE CONCERN	<b>CEAP I</b> (thousands of tons per year)	<b>CEAP II</b> (thousands of tons per year)	Change (thousands of tons per year)	Change (percent)
Sheet and rill erosion (losses)	295,215	263,819	-31,396	-11
Wind erosion (losses)	87,890	66,805	-21,086	-24
Sediment (losses)	152,594	118,310	-34,284	-22
Surface nitrogen (losses)	366	353	-13	-4
Total phosphorus (losses)	120	127	8	7
Subsurface nitrogen (losses)	1,284	1,517	233	18
Soluble phosphorus (losses)	28	36	7	26
Soil carbon (gains)	11,876	14,227	2,351	20

## **Resource Concerns in the NCM**

RESOURCE	CEAP I		CEAPII		CEAP II - CEAP I	
CONCERN EXCEEDANCE	Acres (thousands)	Percent	Acres (thousands)	Percent	Acres (thousands)	Percent change Relative to CEAP I
Sheet and rill erosion (>T)	18,133	15	16,324	13	-1,809	-10
Wind erosion (>T)	2,653	2	1,875	2	-777	-29
Sediment (>2 t/ac/y)	17,262	14	13,613	11	-3,648	-21
Surface nitrogen (>15lbs/ac/y)	11,518	10	9,039	7	-2,478	-22
Total phosphorus (≥3 lbs/ac/y)	17,799	15	17,141	14	-658	-4
Subsurface nítrogen (>251bs/ac/y)	32,828	27	38,371	31	5,543	17
Soluble phosphorus (>0.5 lbs/ac/y)	31,059	26	40,064	32	9,005	29
Soil carbon (losing)	15,542	13	15,826	13	285	2



## **State Cropland Reports**

- State one-pagers based on CEAP II reporting were developed for use by state NRCS staff
- Covering cropped acreage, vulnerability, practice adoption, and estimated edge-of-field losses
- Published internally as part of the NRCS Integrated Landscape Planning Toolbox (ILPT)
- Reports may be shared with state agencies and partners
  - We recommend working with your state NRCS folks directly where possible!



# **Illinois CEAP Cropland Report**

## Illinois CEAP Cropland Report

**USDA-NRCS** 

2024-05-16

Factor	Illinois	National
Overview (2013-2016)		
Acres of cultivated cropland (million acres)	22.7	315.3
Cover Crop Acres (million acres)	1.01	18.9

- Illinois had 22.7 million acres of cultivated cropland in CEAP II
- A little more than 7% of national acreage
- I.01 million (4 %) of acres in IL used cover crops





# **CEAP II Vulnerability Factors**

Factor	Illinois	National
Vulnerability Factors (2013-2016)		
Average annual precipitation (inches)	40	36
Slopes >2% (% of cropped acres)	31	36
Highly erodible cropland (% of cropped acres)	20	27
Prone to wind erosion (% of cropped acres)	0	1
Prone to surface water runoff (% of cropped acres)	10	11
Prone to leaching (% of cropped acres)	44	29

#### Slightly higher than national precipitation and leaching vulnerability





# **CEAP II Practice Adoption**

Factor	Illinois	National
Conservation Practice Use (2013-2016)		
Mulch till or no-till (% of cropped acres)	78	67
Structural practices for water erosion control:		
Percent of all cropped acres	57	44
Percent of HEL cropland	81	50
Reduced tillage or structural practices (% cropped acres)	89	81
Moderate or Low 590 Nitrogen Need (% cropped acres)	86	88
Moderate or Low 590 Phosphorus Need (% cropped acres)	59	76
N Load incorporated (%)	71	61
P Load incorporated (%)	41	56

#### Strengths:

- Conservation tillage
- Structural practices + on HEL land
- N incorporation
  Opportunities:
- P incorporation



## **CEAP II Sediment and Nutrient Losses**

Factor	Illinois	National
Sediment and nutrient losses, baseline (average annu (2013-2016)	ial)	
Wind erosion (tons/acre)	0.13	1.62
Sediment due to water erosion (tons/acre)	0.9	0.8
Total nitrogen (pounds/acre)	24.3	29.1
Surface nitrogen (pounds/acre)	3.9	6.6
Subsurface nitrogen (pounds/acre)	20.4	22.5
Total phosphorus (pounds/acre)	1.5	1.8
Soluble phosphorus (pounds/acre)	0.59	0.44

#### Strengths:

- Wind erosion
- Surface N

#### **Opportunities**:

- Soluble P loss
- Subsurface N loss



## **CEAP I - CEAP II Change in Losses**

Factor	Illinois	National
Edge-of-Field Loss Changes Due to Conservation Practice Use: CEAP I (2003-2006) to CEAP II (2013-2016)		
Wind erosion losses per acre (% change)	-21	-16
Sediment loss due to water erosion per acre (% change)	-17	-23
Total nitrogen losses per acre (% change)	-2	8
Surface nitrogen losses per acre (% change)	-7	-4
Subsurface nitrogen losses per acre (% change)	-1	13
Total phosphorus losses per acre (% change)	-2	-3
Soluble phosphorus losses per acre (% change)	13	11
N Load incorporated (% change)	-11	-14
P Load incorporated (% change)	-23	-15

#### Strengths:

- Wind erosion
- Sediment loss

#### **Opportunities**:

- Nutrient incorporation
- Soluble P loss



## **CEAP II Conservation Treatment Needs**

Factor	Illinois	National
Conservation treatment needs (2013-2016)		
Treatment need for one or more resource concerns:		
Cropland with high need (% of cropped acres)	8	10
Cropland with moderate need (% of cropped acres)	51	47
High or moderate need (% of acres)	59	57

- Treatment need is determined by how many resource concern thresholds were met by a point
- Low need: all 8 thresholds met
- Moderate need: 5 7 thresholds met
- High need: fewer than 4 thresholds met





## **CEAP II Resource Concern Thresholds**

Factor	Illinois	National
Conservation treatment needs (2013-2016)		
Acres exceeding threshold by resource concern:		
Sediment loss (>2 t/ac/y) (% or cropped acres)	11	9
Sheet and rill erosion (>T) (% of cropped acres)	13	10
Wind erosion (>T) (% of cropped acres)	0	10
Surface nitrogen loss (>15 lbs/ac/y) (% of cropped acres)	5	11
Subsurface nitrogen loss (>25 lbs/ac/y) (% of cropped acres)	24	28
Total phosphorus loss (>3 lbs/ac/y) (% of cropped acres)	10	13
Soluble phosphorus loss (>0.5 lbs/ac/y) (% of cropped acres)	41	27
Soil carbon (losing) (% of cropped acres)	6	15

# Most extensive needs:

- Soluble P loss
- Subsurface N loss
- Surface N and soil carbon were better for the state than nationally in CEAP II



# Water Quality Benefits Estimator Tool

#### Coming soon!

- Public-facing GIS interface
- Leverages results from CEAP Cropland survey data and alternative scenarios estimates
- Calculates the per-acre edge-of-field nutrient and sediment loss savings associated with suites of conservation practices
- Applies this against annual NRCS conservation practice implementation data to estimate the amount of sediment and nutrients that have been prevented from entering waterbodies





# **CEAP II Open Data Dashboard**

#### Coming soon!

- Public-facing Tableau dashboard
- Leverages results from CEAP Cropland survey data and alternative scenarios estimates
- Allows filtering of CEAP II conservation practice adoption and loss estimate data at the national, production region, state, watershed, and emphasis area levels





# **CEAP III Coming to Your State!**

- NASS enumerators have started contacting producers for the CEAP 3 survey
  - Questionnaire interviews started Nov 1
  - Data will be collected in 2024, 2025, and 2026
- Survey participation is voluntary, but responses help:
  - Tell conservation success stories
  - Inform conservation funding and program policy
  - Provide accountability for taxpayer dollars
- Toolkits with FAQs and talking points were distributed to NRCS Public Affairs staff in all states





A Natural Resources Conservation Service U.S. DEPARTMENT OF AGRICULTURE

# **Questions?**

Brianna Henry, Modeling Team Leader (Acting) Brianna.Henry@usda.gov



Find CEAP Cropland online: <a href="https://www.ncs.usda.gov/ceap/croplands">nrcs.usda.gov/ceap/croplands</a>

FARM PRODUCTION AND CONSERVATION

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## **Science for a changing world** Nitrate and Phosphorus Loads from Illinois Rivers: <u>Preliminary</u> Water Year 2023 Update





Luis Garcia Central Midwest Water Science Center

luisgarcia@usgs.gov

with:



U.S. Department of the Interior U.S. Geological Survey

This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information.

## **Methods**

Monitor changes in nutrient loads from Illinois' eight largest rivers relative to the 1980–96 baseline.

**Baseline**: Water years 1980–1996 estimated by periodic sampling.

*Super Gage*: Continuous water-quality monitoring sites used to estimate loads since 2019.

Illinois nutrient loss reduction strategy:

Since 2017, progress assessed based on the 5-year average loading.

Water year (WY): A water year is the period from October 1 to September 30 and is designated by the year in which it ends; for example, water year 1996 was from October 1, 1995, to September 30, 1996.



Preliminary Information-Subject to Revision. Not for Citation or Distribution.



#### Super gage setup:

-Continuous Streamflow

- -Continuous Water-quality All Sites
  - Nitrate
  - Turbidity
  - Big Muddy, Illinois
    - Dissolved oxygen
    - Temperature
    - Specific Conductance
    - pH

Illinois, Kaskaskia

Dissolved Phosphate





Preliminary Information-Subject to Revision. Not for Citation or Distribution.



**≥USGS** 

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#### **EXPLANATION**





Preliminary Information-Subject to Revision. Not for Citation or Distribution.




#### EXPLANATION



**≥USGS** 





Preliminary Information-Subject to Revision. Not for Citation or Distribution.

Change in Phosphorus Relative to Baseline





Preliminary Information-Subject to Revision. Not for Citation or Distribution.

#### Percentage difference for 2019-2023 by Site



**≥USGS** 

Change in Nitrate Relative to Baseline



**≥USGS** 

Percentage difference for 2019-2023 by Site



Year Range

2013-17

70 -

**≥USGS** 

Average Streamflow Difference Relative to Benchmark

### 5-year average plots of nitrate, streamflow, and total phosphorus



**≊USGS** 

### Water Year (WY) 2023 by the numbers

Relative to the 1980–96 baseline:

- WY23 Loads:
  - Total Phosphorus -11%
  - Nitrate -25%
  - Streamflow -30%
- 5-year mean loads:
  - Total Phosphorus +33%
  - Nitrate -4%
  - Streamflow +18%

A water year is the period from October 1 to September 30 and is designated by the year in which it ends; for example, water year 2023 was from October 1, 2022, to September 30, 2023.



Photograph by U.S. Geological Survey



### Water Year (WY) 2023 by the numbers

Relative to the 1980–96 baseline:

- WY23 Loads:
  - Total Phosphorus -11%
  - Nitrate -25%
  - Streamflow -30%
- 3-year mean loads:
  - Total Phosphorus +6%
  - Nitrate -30%
  - Streamflow -10%

A water year is the period from October 1 to September 30 and is designated by the year in which it ends; for example, water year 2023 was from October 1, 2022, to September 30, 2023.



Photograph by U.S. Geological Survey



### Flow normalized (FN) values

- FN values are outputs from the EGRET-WRTDS model
- Flow varies over time due to rain, snowmelt, human activity, etc.
  - This change in flow changes values of concentration
  - Makes comparing concentrations from different locations/years difficult
- FN concentrations and loads remove flow-related variability
  - Equation:  $E[C_{fn}(T)] = \int_{0}^{\infty} w(Q,T) \cdot f_{Ts}(Q) dQ$
  - Enables comparison of years with varying flow conditions



User Guide to Exploration and Graphics for RivEr Trends (EGRET) and dataRetrieval: R Packages for Hydrologic Data

Chapter 10 of Section A, Statistical Analysis Book 4, Hydrologic Analysis and Interpretation





**≥USGS** 

### Flow normalized (FN) values

- Bayesian model used to compute state loads
  - incorporates in situ sensor data to inform model
  - does not output FN values
- State loads have been estimated using various methods
  - different outputs to data which can not all be handled equally
  - data would need to be 'harmonized' (involved process)
- How values would compare is unknown
  - Time investment for method development



Scientific Investigations Report 2021–5092





### **Illinois loading to Gulf of Mexico**

- IL data from multiple sources and computed using different models
- Gulf of Mexico (GoM) values only being computed through WY22
  - Loads from one site that are computed using WRTDS
- Comparison not a 1:1 relationship
  - Downstream processes might also affect IL loadings reaching Gulf of Mexico



- IL:GoM ratio for WY22
  - 1:5 Nitrate
  - 1:10 Phosphorus
  - Likely <u>over</u>-estimates
- SPARROW model
  - Gives overview of entire Midwest loading to Gulf of Mexico





# **Questions?**

Luis Garcia Central Midwest Water Science Center

luisgarcia@usgs.gov







# Nutrient Loads and Yields Across Illinois Watersheds (HUC8s)

Nutrient Loss Reduction Strategy, Policy Working Group Meeting November 7, 2024 (virtual)

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U.S. Department of the Interior U.S. Geological Survey

Jenny Murphy, Brock Kamrath, Hannah Podzorski, Lindsey Schafer

# Scope of effort

**Time periods** 1997–2011, 2012–2017, **2018–2022** 

# Loads & yields [total, point, nonpoint]

- \* Nitrate+Nitrite, as N (NO3)
- \* Total phosphorus (TP)
- \* % dissolved phosphorus (DP)
- \* Water yields



### Ambient sites & load estimation



# Illinois Environmental Protection Agency (IEPA) ambient sites





### Water quality data sources



Water Quality Portal (WQP) Recent Samples from \*IEPA Legacy IEPA Data from \*STORET

**\*Illinois Environmental Protection Agency (IEPA)** \*STOrage and RETrieval (STORET) Data Warehouse

## Example of water quality time series

Water Quality: 03345500

#### **Embarras River at Ste. Marie, Illinois**



# Weighted Regressions on Time, Discharge, and Season (WRTDS)





# Weighted Regressions on Time, Discharge, and Season (WRTDS)



# Weighted Regressions on Time, Discharge, and Season – Kalman Filter (WRTDS-K)



### Data release contents: Ambient site loads

Estimation of Annual and Monthly Loads of Nitrate + Nitrite, Total Phosphorous, and Dissolved Phosphorus in Illinois for Water Years 1974 to 2022



#### Dates

 Publication Date :
 2024

 Start Date :
 1974

 End Date :
 2022

#### Citation

Hannah L. Podzorski, Jennifer C. Murphy, Brock J. Kamrath, Lindsey A. Schafer, 2024, Estimation of Annual and Monthly Loads of Nitrate + Nitrite, Total Phosphorous, and Dissolved Phosphorus in Illinois for Water Years 1974 to 2022: , https://doi.org/10.5066/xxxxxxx.

#### Summary

This data release contains data in support of "XXXXXXXX" (Kamrath and others, 2025). It contains input and output data used to estimate Total Nitrate + Nitrite, Dissolved Phosphorous and Total Phosphorous loads for sites in Illinois from 1974 to 2022.

The input data includes "input-data\_WQ.csv", which contains water quality data for Total Nitrate + Nitrite, Dissolved Phosphorous and Total Phosphorous. The water quality data comes from 1) the Water Quality Portal (WQP), 2) the Illinois Environmental Protection Agency (IEPA), and 3) the Environmental Protection Agency (EPA) STORET warehouse. The WQP includes the most complete record of U.S. Geological Survey and IEPA water quality samples. The most recent IEPA water quality samples, which are not yet in the WQP, were provided directly from IEPA. Legacy IEPA data that is housed via the EPA STORET warehouse was used to fill in any gaps in the data record. See the Entity and Attribute section for details.

#### Map »



#### Communities

USGS Data Release Products #

#### Associated Items

#### % Associate an Item

Tags



## HUC8 load and yield computations



## Ambient loads $\rightarrow$ Incremental HUC8 loads



# Ambient loads $\rightarrow$ Incremental HUC8 loads



# Ambient loads $\rightarrow$ Incremental HUC8 loads



### **Compute HUC8 loads and yields**

- Total (riverine)
- Point source
- Nonpoint source

# **2018–2022 HUC8 yield summary** [preliminary]



### 2018–2022 Incremental **yields**

Top 5: Nitrate (NO3)

Chicago Des Plaines

Upper Illinois

Kankakee

Vermillion



### **≥USGS**

### 2018–2022 Incremental **yields**

**Top 5: NO3** 

Chicago Des Plaines

Upper Illinois

Kankakee

Vermillion

Top 5: Total phosphorus (Total P) Chicago Des Plaines Upper Sangamon

The Sny

Cahokia-Joachim







### Point source contributions



### Point source contributions



# Nitrate yields

2018–2022 average annual





### Total Phosphorus yields

2018–2022 average annual



**≥USGS** 

## Water yields

### 2018–2022 average annual






Changes over 3 periods [preliminary]

> 1997–2011 = Baseline 2012–2017 2018–2022 = Recent (this update)



# Change in NO3 yields

#### **Direction of change:**

Baseline to Recent

#### Number of HUC8s

	NO3	ТР
Decrease	18	
Increase	23	
Stable (+/- 5%)	6	

Change in yield

(lbs/acre/year) between 1997–2011 to 2018–2022





# Change in TP yields

#### **Direction of change:**

Baseline to Recent

#### Number of HUC8s

	NO3	ТР
Decrease	18	10
Increase	23	31
Stable (+/- 5%)	6	6

Change in yield

(lbs/acre/year) between 1997–2011 to 2018–2022

























More questions? jmurphy@usgs.gov

## **Forthcoming products**

- Data release of ambient site loads
- Data release of HUC8 incremental loads and yields
- Report describing status and changes across Illinois watersheds



## **Illinois NREC**

Update to the NLRS Policy Working Group 11/7/24





## **NREC Review**

- 1. Who we are and what we do.....
- 2. Investments to date





Research that meets the agronomic, economic, and environmental needs of Illinois farms.

## **Current Priorities**

Address the Agronomic, Economic, and Environmental Aspects of production agriculture practices meant to reduce nutrient loss from Illinois fields.





## **Research Priorities**

- Continued studies on Nmanagement SYSTEMS and efficiency of N use
- Continued Cover Crop systems research
- Conservation Cover Rotation
- P-management systems

- Impact of weather intensity on nutrient loss
- Watershed approaches to nutrient management systems
- Research proposals that go beyond the "known" into more innovative (novel, inventive, original) and forward-looking research.



#### Current and NEW Research Projects

## **NEW Projects for 2025**

	Institution	PI	Project Title
UI	Pa	ulson	Economic Analysis of NREC Projects Involving Farm Management Practices: From Trial Plots to Commercial-scale Adoption
UI	Ma	argenot	Optimizing cover crops and wheat to reduce nitrogen and phosphorus surface run-off losses in southern Illinois
UI	ıol	nes	Using On-farm Precision Experiments in a Data-intensive Approach to Systems Management of Cover Crops and Nitrogen Fertilizer
SIU	Sa	deghpour	Next Generation Cover Cropping in Corn-Soybean Rotation to Improve Farm Benefits and Decrease Environmental Losses in South and Central Illinois: Phase II
UI	Rh	oads	Evaluating the effectiveness of streambank stabilization for nutrient loss reductions: Over 20 years of Illinois evidence
UI	Yu		Scaling up conservation agriculture by growing cover crops ahead of soybean and moving fall fertilizer nitrogen application to spring
UI	Ma	argenot	On-farm and farmer-led: an expanded tile monitoring network for informing nutrient loss reduction practices and outcomes in north-central Illinois
UI	Bh	attarai	Weather extremes and nutrient loss in Illinois: synthesis and modeling



#### What's Next?



#### Mark Your Calendar

Thursday February 13, 2025 Investment Insights Live Champaign, IL



## Thank you

Julie Hewitt Executive Director Illinois NREC

# **Illinois Ag Retail Survey**







#### MISSION

Working to assist and encourage adoption of best management practices (BMPs) to protect and enhance natural resources and the sustainability of agriculture in Illinois.



## DATA COLLECTION



Regional liaisons to meet in person with the ag retailers and carry out the random selection protocols and collect survey information



Survey info collected by inputting it into an online survey form maintained on a private, secure server by INREC



Data collection period runs from December through March



Advantage of utilizing trained staff is it eliminates need for 3<sup>rd</sup> party audits of data collection at ag retailer level, which also eliminates the need to record farmer names and locations for audit purposes

## DATA SECURITY & CONFIDENTIALITY



INREC has a private server and data security consultant



No personal information from farmers or retailers (name, location) is input into system, so even in event of a hack there would be no confidential information available

## STATISTICAL SAMPLING

Statistical sampling protocols are provided by Iowa State University Center for Survey Statistics & Methodology

150 ag retailer locations are randomly selected across Illinois

The randomly selected locations are stratified across the nine crop reporting districts based on each area's percentage of row crop acres

10 farmers are randomly selected to survey per location, and for each farmer one farm field is randomly selected to collect survey info

Goal of at least 500 samples collected to be statistically representative of state



#### 150 sampled Retailers



#### 150 sampled Retailers



Customer and Farm Field Selection Procedure Each retail location is assigned a set of random parameters to use for selecting 10 fertilizer customers. Only customers who purchase fertilizer inputs should be selected for the survey. If you land on a customer that doesn't purchase fertilizer inputs, skip that customer and move on to the next until 10 fertilizer input customers are selected. The following parameters are what the sampling instructions include:

- Name Contains the first letter of the last name of the customer for identifying the starting point. This is just the starting point to proceed alphabetically from and is not the only surname to be sampled.
- Section Contains a value of "high" or "low"
- Direction 1 North, South, East, West
- Direction 2 North, South, East, West

## SAMPLING FREQUENCY

Total Fertilizer Customers	Sampling Frequency from Starting Point							
<50	Every 5th Customer							
50-99	Every 10th Customer							
100-199	Every 20th Customer							
200+	Every 30th Customer							

### **Carry Out Sampling Until 10 Customers Have Been Selected**



#### Anonymous Data Collection Opt Out

I do not want to help demonstrate agriculture is taking an active role in water quality in Illinois and making progress towards the Nutrient Loss Reduction Strategy. Please exclude any data related to land I farm from the anonymous data set being used to show agriculture's statewide progress.





Your company has been selected to participate in collecting accurate, science-driven data to show progress made by Illinois agriculture towards meeting the Illinois Nutrient Loss Reduction Strategy. In order to help tell our story, your participation is critical.

This survey was formed to measure and demonstrate environmental progress of Illinois agriculture. The survey is supported by: Illinois Fertilizer & Chemical Association, Illinois Farm Bureau, Illinois Corn Growers Association, Illinois Soybean Association, Illinois Pork Producers, Illinois Beef Association, the Illinois Council on Best Management Practices (ICBMP) and the Illinois Certified Crop Adviser Program.

The Illinois nutrient loss reduction goals for 2025 are quickly approaching, and pressure from Illinois legislature, regulatory agencies and stakeholders to document progress made within the state is mounting. Acquiring anonymous data straight from grower records from our ag retailers will provide our industry the ability to track practice adoption levels and quantify nutrient loss reductions achieved. This system allows us to tell our own story of progress and fortify why the current voluntary agricultural framework is vital, opposed to additional regulations. In order to do this, we need you help.

#### What is the Illinois Ag Retail Survey?

In the months of February and March, regional liaisons will travel the state and visit with retail locations that were randomly selected. After scheduling a meeting date and time with the retail location, the liaison will arrive and perform a random sampling protocol to acquire anonymous data from your records related to agricultural practices from ten grower/customer records. The protocol is designed to be efficient and is estimated to take under an hour.

The protocol ensures that **no personal information related to the grower is ever recorded**. All data collected is anonymous to the liaison and is stored on external private data servers designed and maintained to provide the highest level of physical and electronic data security. Data servers used are housed in a privately secured underground facility at an undisclosed location and uses one of the most sophisticated encryption standards currently available. The protocol used for the survey ensures that farm sample sites that are surveyed are assigned a reference number. <u>This means that no farm locator or identifier data will leave with the liaison or be stored with the actual data from the farm</u>.

Despite no personal information or location information reported from the grower, the survey still requires grower consent to use their information. The liaison will provide letters for the retailer to share with their grower customers who were selected for the survey. These letters explain the importance of the survey and why participation is so important. <u>There will also be an "opt-out" sheet along with the letter that the</u> grower can sign and return if they decide they do not want to participate.

We encourage you to reach out with any questions regarding the **Illinois Ag Retail Survey** by calling the *IFCA* office at 309-827-2774. We understand how busy both you and your customers are and appreciate your time and cooperation regarding this very important program. Your participation will help maintain flexibility and freedom for Illinois ag retailers and growers to operate in the capacity required as we move forward.



Dear Illinois Grower,

Your local ag retailer is helping measure agriculture's progress toward the environmental goals of the Illinois Nutrient Loss Reduction Strategy (INLRS). A limited set of information from your records was chosen at random to be included in the anonymous data set. The random sampling protocol only records if certain practices are being used, but not where or who. All information collected is grouped into an anonymous data set and no personal or location specific data is shared with anyone.

This survey is supported by the Illinois Fertilizer & Chemical Association, Illinois Farm Bureau, Illinois Corn Growers Association, Illinois Soybean Association, Illinois Pork Producers, Illinois Beef Association, the Illinois Council on Best Management Practices (ICBMP) and the Illinois Certified Crop Adviser Program.

#### Why is this survey necessary?

The Illinois nutrient loss reduction goals for 2025 are quickly approaching, and pressure from Illinois legislature, regulatory agencies and stakeholders to document progress made within the state is mounting. Acquiring anonymous data straight from grower records from our ag retailers will provide our industry the ability to track practice adoption levels and quantify nutrient loss reductions achieved. This system allows us to tell our own story of progress and fortify why the current voluntary agricultural framework is vital, opposed to additional regulations.

#### Privacy

All data collected is stored on external private data servers designed and maintained to provide the highest level of physical and electronic data security. Data servers used are housed in a privately secured underground facility at an undisclosed location and uses one of the most sophisticated encryption standards currently available. The protocol used for the survey ensures that farm sample sites that are surveyed are assigned a reference number. <u>This means</u> that no farm locator or identifier data will leave with the liaison or be stored with the actual data from the farm.

Any questions regarding the Illinois Ag Retail Survey, please call the *IFCA office* at 309-827-2774. Your participation will help maintain flexibility and freedom for Illinois agriculture to operate in the capacity required as we move forward. If you wish to have your anonymous data excluded from the data set, complete the enclosed postcard and drop it in the mail. Once received, your information will be excluded from the data set and will no longer be used to help show progress Illinois agriculture is making toward the Nutrient Loss Reduction Strategy.







All questions are for the selected field for Crop Year 2023																
1	Token #															
2	Field Size		(acres)													
3	Field Owned/Cash Rented or Crop Share?	Owned/Ca	wned/Cash Rented			Crop Share										
4	Total acres farmed across entire operation	on		(асі	res)											
5	County field is in:						(county)	)								
6	Predominant land use for field in 2023	Corn		Soybean W		Wheat Other										
7	Current crop rotation for this field	Corn/Co	rn	Co	orn/Soy	/	Corr	n Corn	rn Soy Soy Wheat Corn			'n	Other			
8	Were cover crops present on this field in	fall of 2022	?	Yes			No		Don	n't Know						
9	If yes, was there a winter hardy cover cro	op present?	Ye	s, single	species	s Y	es, used v	within	cover cr	op mix	No, Wi	inter	Kill Only	Do	n't Know	
10	Indicate <b>fall</b> tillage practice prior to 2023 planting	corn		No-till			Strip-till		< 3" 1	tillage de	epth	> 3" tillage depth		epth	N/A	
11	Indicate <b>spring</b> tillage practice prior to 20 planting	023 <b>corn</b>		No-till			Strip-till	trip-till < 3" tillage o			pth > 3" tillage dept			pth	N/A	
12	Indicate <b>fall</b> tillage practice prior to 2023 planting	soybean		No-till			Strip-till < 3" tillag		tillage de	depth > 3" tilla		' tillage de	illage depth			
13	Indicate <b>spring</b> tillage practice prior to 20 planting	023 <mark>soybear</mark>		No-till		Strip-till		ill	< 3" tillage depth 3		>	> 3" tillage depth		N/A		
14	Indicate <b>fall</b> tillage practice prior to 2023 planting	wheat		No-till		< 3"	< 3" tillage depth		> 3" tillage depth		N/A					
15	Soil sampling performed to determine so	il P levels?		Yes			No	o Don't K		ínow						
16	If yes, what was the date of the last soil t	est?				(date)			_							
17	If soil test was performed, was test taker	using GPS?		Yes		No							_			
18	What was the last soil test values for:	p⊦	:			Р	1:			К:	í:					
19	For P1 results, what lab method was the	P1 reported	?	P Bray P1			Melich-3		Olsen			Other				
20	For P1 recommendation, are you utilizing phosphorus removal rates of .37 P205 fo	g the 2017 r r corn and .	17 revised UI Ind .75 for soybeans			Yes			No		Don't Knc		v			
21	ls commercial (inorganic) P applied to thi field?	s	Yes			No		Do	Don't Know							
22	If yes, what was the source of P? In Ibs/acre, what is the rate of the product?	MA	ΛP	P DAP			Other:						(lbs/acre)			acre)
23	If using a liquid suspension P, what is the source? What was the product rate per a	acre?	(source)					ource)	(rate per acre)							
24	Is commercial (inorganic) P applied to this field using VRT?	Y	/es		No		Dor	n't Kno	w							
----	--	---	------------------------	-----------------	-------	--------------------	----------------	--------------	---------------------------------	-----------	---------	----------	------------			
25	If yes, was a zero rate used or a base rate?	z	Zero	В	ase											
26	If a base rate was used, what was the sou What was the product rate per acre?	rce?				_		(so	urce)		(rat	te per a	cre)			
27	Was the P application for a single year spread or a 2-year (piggy-back) spread?	Sing	le	2-Yea	ar											
	If 2023 field is in soybean, go back to previous year for last corn crop for nitrogen questions.															
28	Was commercial nitrogen applied for the corn crop using VRT?	Yes	s	No		Doi	n't Know									
29	Was NH3 applied to this field in the fall?	Yes	s	No		Doi	n't Know									
30	If fall NH3 was applied, was an EPA labeled nitrification inhibitor used? (N-Serve, Centuro)	was an EPA bitor used? N-Serve Centuro		iro	Other	:				None						
31	What N application timing was used for the corn crop?	Fall Spi		Spring Preplant		At planting In-cro		crop/Sidedre	Sidedress (Mark all that apply)		)					
32	For any N sources used in spring preplant or sidedress, was an EPA labeled nitrification inhibitor used? (N-Serve, Centuro, Instinct)	N-Ser	rve	Instin	ct		Centuro Other:			None						
33	What was the combined N rate per acre, including N from ammoniated phosphoru	s?				(rate)										
34	Was the total N rate for the fieldYesdetermined using the MRTN calculator?Yes		Yes	No												
35	What manure fertilizer sources are used? Manure Not U		re Not Usec	ł	Beef		Dai	ry	Liqu	uid Swine	Poultry	,	Don't Know			
36	If manure was used, was the N and P used commercial N or P application recommen	l to make dations?		Yes			No	D	on't Know							
37	Is the field covered in a recognized Manure Management Plan?		Yes		No		Don't K	(now								
38	If manure was applied, was it:		Broadcast Incorpora	w/o tion	Bro	oadcast corpora	and ted	In	jected	Irri	gated	Don	i't Know			

### What Does the Data Reveal?

- A total of 922 fields were surveyed, exceeding the sample size goal of 500 fields.
- Both small and large farms participated in the survey with the median size of field and farm operation being 77 acres and 1000 acres.
- Total cropland declined 568,088 acres
- Corn increased 357,098 acres
- Soybean decreased 1,116,186 acres
- Wheat increased 190,000 acres



- Corn fertilizer N rate averaged across the state was 197 lbs/A with 85% of the fields under a corn-soybean crop rotation.
- <u>Maximum Return To Nitrogen (MRTN)</u> use for determining fertilizer N rate increased to 18% from 12% in 2022. The MRTN calculator provides a method to calculate nitrogen application guidelines based on selected prices of nitrogen and corn directly from recent research data.
- Entire application of fertilizer N occurring in the fall decreased to 16% (21% in 2022). Entire application of fertilizer N occurring in the spring preplant was 27%.
- Split fertilizer N <u>applied as spring preplant and side-dress was 16%</u>.
- Anhydrous ammonia application in the fall was 54% with 97% use of a nitrification inhibitor.

## Phosphorus

- Soil sampling to determine P levels was 86% and commercial P applied was 83%.
- Variable Rate Technology (VRT) of fertilizer P was 43%.
- Fertilizer P application occurring annually was 61%.
- Fertilizer P rate for Mono-ammonium phosphate (MAP) and di-ammonium phosphate (DAP) were 151 and 156 lbs/A (non-VRT acres).

## Summary Note

The survey results verify that farmers are using fertilizer rates consistent with the recommendations in the University of Illinois Agronomy Handbook. Additionally, survey results indicate continued farmer adoption of conservation efforts such as cover cropping.

Thank you for your time.

Questions??

KJ Johnson President Illinois Fertilizer and Chemical association <u>kj@ifca.com</u> / 217-369-1669 NLRS Dashboard Overview and Development Update

Joan Cox, University of Illinois Extension



- Steering Committee is working with National Great Rivers Research and Education Center and the U of I National Center for Supercomputing Applications.
- Will use Illinois portal on the Great Lakes to Gulf Virtual Observatory platform.
- This will replace the Biennial Reports.



https://greatlakestogulf.org/



 Data will be updated annually, and an Executive Summary will be completed each year.



Annual Executive Summary

Static text and data

REDUCTION STRATEGY

 Static text & data displays will showcase narrative science assessment reports & sector information.



#### **Progress Toward Goals**

The total phosphorus loads since 2021 have decreased below the interim 25% reduction goal set for 2025

Facilities are continually optimizing processes to reduce nutrient losses. Further nutrient loss reductions are anticipated when all facilities achieve lower phosphorus discharge limits of 1.0 mg/L and, eventually, 0.5 mg/L Eventually, point source sector nutrient losses will be well below the overall, long-term goal of a 45% reduction in phosphorus losses.



Major Municipal Facilities Industrial and Minor Municipal Facilities 'Estimated future phosphorus point source load

 Partner data & simplified narratives will continue to be accessible.

#### STATEWIDE LOADS

#### Wastewater Treatment Facilities Loads and Reductions

Wastewater treatment facilities fall into three classes of facilities: Major Municipals, Minor Municipals, and Industrials. Facilities discharge millions of pound of nutrients per year. Most nutrient loads come from major municipal facilities due to the population sizes that these facilities serve.



Static narrative and data display

 Interactive maps/data dashboards to select data temporal and spatially, to query and download data.





- Great Lakes to Gulf
  - <u>https://greatlakestogulf.org/#/</u>
- Iowa Dashboard
  - <u>https://nrstracking.cals.iastate.edu/tracking-iowa-nutrient-reduction-strategy</u>
- Minnesota Dashboard
  - https://www.pca.state.mn.us/air-water-land-climate/reducing-nutrients-in-waters
  - <u>https://public.tableau.com/app/profile/mpca.data.services/viz/Long-termStreamTrends/Pollutantconcentrations</u>
  - <u>https://public.tableau.com/app/profile/mpca.data.services/viz/CWAA-Bestmanagementpracticesbywatershed/Bestmangementpracticesbywatershed</u>



# Data collection & timeline



Data collection

Continue to gather all previously reported logic model data from all partners in all sectors (**Dec. 2024 solicitation**)

- 1. Resources and outreach spreadsheets for 2024 data
- 2. Partner program and project narratives updates or new 2023-24
- 3. Land and facilities data 2023-24
- 4. Water metrics 2024

Will gather new data from sector partners during 2024-25 (for interactive maps)

- 1. Land and facility spatial & temporal data collection (2011-2022 by HUC 8s , HUC 12s, &/or county)
- 2. Water metrics spatial & temporal data collection (1980 2024)



# Questions about data solicitations?



# Tentative Timeline – Development Tasks

	2024	2024	2024	2025	2025	2025	2025	2025	2025	2025	2025
	Oct	nov	dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Development Tasks											
homepage/navigation	Development	Development	Mockup due								Mockup due
point source content	Development	Development	Development	Mockup due							Mockup due
research			Development	Development	Mockup due						Mockup due
partnership accomplishments			Development	Development	Mockup due						Mockup due
water metrics			Development	Development	Development	Mockup due - USGS only	Mockup due				Mockup due
urban stormwater content				Development	Development	Mockup due - Urban stmwater only			Mockup due		Mockup due
agricultural content						Development	Development	Mockup due - AWQPF only	Mockup due		Mockup due



# Tentative timeline – Stakeholder input

1		2024	2024	2024	2025	2025	2025	2025	2025	2025	2025	2025
2		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
3	Stakeholder Voice											
4	PBC (Performance Benchmark Committee)	focus group - Oct 22 meeting	Use and Homepage /navigation/subpage mockup survey Nov 4-14	Review finalized homepage mockup	Review Mockup point source subpage static + interactive dashbbord	Review: static research, partnership accomplishments mockup		Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
5	Point Source members		focus group, Use and Homepage /navigation/subpage mockup survey Nov 4-14	Review finalized homepage mockup	Review Mockup point source subpage static + interactive dashbbord	Review: static research, partnership accomplishments mockup		Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
6	PWG (Policy Working Group)	)	focus group -Nov 7 meetig, Use and Homepage /navigation/subpage mockup survey Nov 4-14	Review finalized homepage mockup	Review Mockup point source subpage static + interactive dashbbord	Review: static research, partnership accomplishments mockup		Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
7	USGS loads experts				focus group	Review: static research, partnership accomplishments mockup	Review: water mockup - USGS only (static + interactive dashboard)	Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
8	USWG (Urban Stormwater Working Group)		Use and Homepage /navigation/subpage mockup survey Nov 4-14			focus group	Review: urban stormwater mockup (static and interactive dashboard)	Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
9	AWQPF (Agricultural Water Quality Partnership Forum)		Use and Homepage /navigation/subpage mockup survey Nov 4-14				focus group	Review: water mockup (static + interactive dashboard)	Review ag mockup (static + interactive dashboard)	Review ag and urban mockup (static + interactive dashboard)		Test final prototype
10	Comm. (Communication Subgroup)		Use and Homepage /navigation/subpage mockup survey Nov 4-14	Review finalized homepage mockup	Review Mockup point source subpage static + interactive dashbbord	Review: static research, partnership accomplishments mockup		Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
11	Marketing teams reviews (Steering agencies)		Use and Homepage /navigation/subpage mockup survey Nov 4-14	Review finalized homepage mockup	Review Mockup point source subpage static + interactive dashbbord	Review: static research, partnership accomplishments mockup		Review: water mockup (static + interactive dashboard)		Review ag and urban mockup (static + interactive dashboard)		Test final prototype
12	Steering Agency Director reviews											
13	Multiple stakeholders					Review prototype to-date				Review prototype to-date		

# Final Stretch – Oct. to Dec. 2025

October – final prototype testing by NLRS Steering and steering Agency marketing teams

November – Steering Agency Director reviews

December – launch dashboard

Oct. – Dec. marketing planning and execution

# **Design and Development Roles**

**Core design team:** Steering Committee, Illinois Extension, National Great Rivers Research & Education Center, University of Illinois National Center for Supercomputing Applications

**User input (novice-, primary- & advanced-user types):** Participation in working groups, surveys, prototype testing, marketing and communications planning



# Questions?



## Performance Benchmark Committee 10/22/24 meeting

### Design discussion

### Co-creation and the new landscapes of design

Elizabeth B.-N. Sanders & Pieter Jan Stappers

https://doi.org/10.1080/15710880701875068

PUBLISHED ONLINE: 24 June 2008

#### Figure 2 of 6

Figure 2. The front end of the design process has been growing as designers move closer to the future users of what they design.



Sanders E, Stappers PJ. Co-creation and the New landscapes of Design. CoDesign. 2008;4:5– 18. <u>https://doi.org/10.1080/15710880701875068</u>.

# Phases of development cycle (example)



Ospina-Pinillos, L., Davenport, T., Ricci, C., & Milton, A. (2018). Developing a Mental Health eClinic to Improve Access to and Quality of Mental Health Care for Young People: Using Participatory Design as Research Methodologies. Journal of medical Internet research, 20(5), e118. <a href="https://doi.org/10.2196/jmir.9716">https://doi.org/10.2196/jmir.9716</a>

# An adapted Bridging Exercise



Prykucki, B. (2016, December 29). *The bridge can help you get from here to there*. Michigan State University Extension. <u>https://www.canr.msu.edu/news/the\_bridge\_can\_help\_you\_get\_from\_here\_to\_there</u>

Vavoula, G.N., Sharples, M. Future technology workshop: A collaborative method for the design of new learning technologies and activities. *Computer Supported Learning* **2**, 393–419 (2007). https://doi.org/10.1007/s11412-007-9026-0 Bridging Session Part 1: Visioning the Future of NLRS Updates



## Brainstorm prompt

Imagine that you are far in the future and that the tools we use in our everyday lives have evolved and changed.

Consider any type of gadget, prop, or new technology that could help you learn about Illinois NLRS updates.

### What types of activities are you performing to get NLRS information? What types of technologies are supporting you?

Materials are available at tables for drafting mockups and taking notes. 15 minutes small groups, then 15 minutes share-out

# Visioning Results

- Real-time environmental data monitoring and data display
- GIS mapping display of spatial data
  - o By county
  - By HUC 12
  - o BY HUC 8
  - $\circ$  By Illinois major watershed
  - o By legislative district
  - o By drainage district
  - $\circ$  Other spatial resolution? (please describe)
- Drone technology
- Mobile technology
- Stakeholder engagement
  - Education and outreach
  - o Technical services
- Policy maker engagement
- Raw data accessibility
- Data stories
- Citizen science and local involvement

### USGS real-time data

https://dashboard.waterdata.usgs.gov/ app/nwd/en/

USGS | National Water Dashboard

Access river level and other water information and weather conditions in your neighborhood! A map viewer showing real-time river level and water data collected at U.S. Geological Survey observation...

# Bridging Session Part 2: Now Primary Report Uses

**Focus Group Activities** 

□ Handout Self-Reflections (10 min)

□ Small Group Discussions (10 min)

□ Share out (15 min)



# Biennial Report is used to:

- 1. inform new grant proposals
- 2. guide funding allocations
- 3. support future research
- 4. guide development of products or programming
- 5. maintain field awareness and support policy decisions
- 6. allocate resources for stakeholder partnerships
- 7. ? defend policy proposals and decisions (new)
- Handout Self-Reflections (10 min)
- Small Group Discussions (10 min)
- Share out (15 min)

University of Illinois Extension. (2022). "NLRS Biennial Report Partner Survey Results". *Policy Working Group Meeting Minutes September 1, 2022.* Illinois Nutrient Loss Reduction Strategy Policy Working Group. https://illinois.zoom.us



# NLRS Report Utilization

### Water Quality Information

- 1. Statewide water quality baseline and progress tables (Ch 3, Figures 3.2, 3.3)
- 2. Major rivers water quality 5-year average loads compared with baseline (Ch 3, Figures 3.4, 3.7)
- 3. Major rivers water quality changes in loads over time compared to baseline (Ch3, Figures 3.5, 3.8)
- 4. Sources contribution by sector (2015 Original Strategy, Figure 3.2)
- 5. N and P goals alongside baseline and progress loads (CH 1, Figure 1.1)
- 6. N and P goals alongside baseline and progress loads (Ch 2, Figure 2.1)

### Agriculture Information

- 7. Agriculture Resources Investment (CH 4, Figure 4.1)
- 8. A full list of agriculture government programs (Ch 4)
- 9. A full list of agriculture nongovernment programs and projects (CH 4)
- 10. Agriculture Implementation scenarios and progress (Figures 8.3-8.6)
- 11. Agriculture implementation scenarios practice, features, and data source details (Tables 8.2-8.5)
- 12. Agriculture conservation practice reduction efficiency values (Ch 3, Table 3.8)
- □ 13. NASS data tables in (Ch 4, Tables 4.14 21)
- 14. Narratives for government agriculture programs described in Ch 4
- 15. Partner narratives for nongovernment agriculture programs and projects (Appendix E)

### Point Source Information

- 16. Point Source Resources Investment (Ch 5, Figure 5.2, Table 5.1)
- 17. A full list of point source government programs (CH 5)
- 18. A full list of watershed groups programs and projects (CH 5)
- 19. Point Source loads baseline and progress (Ch 8, Figure 8.7)
- $\hfill 20.$  Narratives for government point source programs described in Ch 5
- 21. Partner narratives for nongovernment point sources (watershed groups) (Appendix E)

### Urban Stormwater Information

- 22. Urban Stormwater Resources Investment (Ch 6, Figure 6.1)
- 23. A full list of Urban Stormwater government programs and projects (TOC, CH 6)
- 24. A full list of Urban Stormwater nongovernment programs and projects (CH 6)
- 25. Narratives for government urban stormwater programs described in Ch 6
- 25. Partner narratives for nongovernment urban stormwater programs and projects (Appendix E)

### Research

26. Future needs – nutrient research (Adaptive Management text in CH8)

### Survey open Nov. 4-14

# Results

How do you typically SEARCH for information in the NLRS report?

Please check all methods that apply to you for both print and digital formats.

Print copy: Table of Contents

Print copy: Flip through pages

O Print copy: Other method (Please describe.)

Digital copy: Table of Contents

Digital copy: hyperlinked Table of Contents

Digital copy: scroll through pages to find what I need

Digital copy: Search function (e.g. press Control+F)

O Digital copy: Navigation Pane/Bookmarks

O Digital Copy: Other method (Please describe.)

Once you have found useful information in the report, how do you GATHER or TRANSFER it for your own use?

Please select all applicable methods for both print and digital formats.

Print copy: physical bookmarking

Print copy: making photocopies

Print copy: paraphrasing text

O Print copy: Other method of gathering or transfering information (Please describe.)

Digital copy: Snag It/Snipping tool/screenshot

Digital copy: copy/paste

Digital copy: paraphrase text

O Digital copy: Other method of gathering or transfering information (Please describe.)

### Survey open Nov. 4-14

I do not gather or transfer information.

# Bridging Session Part 3: The Gap – getting to the near future



# Brainstorm prompt

Think about the current tasks and processes you identified in the previous Bridging Session (NOW).

What are some ideas you have for a future dashboard interface and functionality that could help you get the information you need?

Be precise about what you are imagining as ways to get the information you need.

Edit existing homepage, subpage, and navigation mockup OR make your own

5 minutes self, 10-minutes share-out

open Nov. 4-14



Aockup link





### Interactive Dashboards

Go straight to the interactive dashboards. This is placeholder text. Tsdkjnkwlkefwlkefkwngkwengkwdmvwleknwkenwlkengwlgnwkgnwk engwklengwlkrngwklrgnwkrgnlrkgnwkrgnwklgnwlkrngkrngwklrgnwr.

Is this Interactive Dashboards section wanted on the homepage?

### About the Illinois Nutrient Loss Reduction Strategy?

The Illinois Nutrient Loss Reduction Strategy, NLRS, is a statewide, collaborative effort working to reduce the amount of nutrients, particularly nitrogen and phosphorus, in Illinois waterways.

Illinois is one of 12 states that have developed nutrient strategies as members of the Mississippi River/ Gulf of Mexico Watershed Nutrient Task Force, also known as the Hypoxia Task Force.



#### Water Dashboard

Urban Stormwater Dashboard

Agriculture Dashboard

Point Source Dashboard

Survey open Nov. 4-14





Survey open Nov. 4-14





Illinois Environmental Protection Agency

Illinois Extension

Option A: Keep top navigation as shown in the Mockup: Agriculture, Point Source, Urban Stormwater

Overview Water Quality	Agriculture	Urban Stormwater	Point Source	Research	Partners
---------------------------	-------------	------------------	--------------	----------	----------

Option B: Use the phrases Agriculture Nonpoint Source, Wastewater Point Source, Urban Stormwater Nonpoint Source

Overview Qua	er Agriculture lity Nonpoint Source	Urban Stormwater Nonpoint Source	Wastewater Point Source	Research	Partners
--------------	--	-------------------------------------	----------------------------	----------	----------

Option C: Use the phrases Agriculture Nonpoint, Wastewater Point, Urban Stormwater Nonpoint

Overview Qu	Agriculture Vality Nonpoint	Urban Stormwater Nonpoint	Wastewater Point	Research	Partners
-------------	--------------------------------	------------------------------	---------------------	----------	----------

Option D: Use the phrases Nonpoint Source and Point Source. Then, when the user clicks "Nonpoint Source", they see 2 dropdown menu choices: Agriculture, Urban Stormwater.

Overview Water Quality Nonpoint Sou	Point Source	Research	Partners
--	--------------	----------	----------

Option E: Place the words Agriculture, Wastewater, and Urban Stormwater under boxed areas that highlight the two types, such as "Nutrients from Nonpoint Sources" and "Nutrients from Point Sources".

	Water	Nutrients from	Nonpoint Sources	Nutrients from Point Sources		
Overview	Quality	Agriculture	Urban Stormwater	Community & Industry	Research	Partners

Survey open Nov. 4-14
# Subpage Layout



open Nov. 4-14

### Interactive Map (a.k.a., Data Dashboard)

Four interactive dashboards will be available to accommodate NRLS data.

Example: Point Source interactive map query options include:

- Nutrient: Filter data by nitrogen (N) or phosphorus (P).
- Watershed: Select data by hydrologic unit codes (HUC 12, HUC 8).
- Year: Access data from specific years.
- Facility: Search by individual facilities.
- Load: Examine nutrient load data.
- Concentration: Analyze data based on nutrient concentration levels.
- Effluent Flow: Review wastewater effluent flow rates.

For inspiration and comparison, explore Minnesota's NLRS interactive data dashboards to see examples of how they present and query options.

MN Wastewater loading by facility MN Wastewater effluent flow and nutrients

#### Dashboards will be linked from homepage.

#### Interactive Dashboards

Go straight to the interactive dashboards. This is placeholder text. Tsdkjnkwlkefwlkefkwngkwengkwdmvwleknwkenwlkengwlgnwkgnwk engwklengwlkrngwklrgnwkrgnlrkgnwkrgnwklgnwlkrngkrngwklrgnwr.



Is this Interactive Dashboards section wanted on the homepage?

Water Dashboard

#### Agriculture Dashboard

Point Source Dashboard Urban Stormwater Dashboard

#### Dashboards will also be linked from subpages.



Survey open Nov. 4-14

## Other early mockups PBC discussion & conclusions

- 1. Partner Programs and Projects
- 2. Future Strategic Actions for each sector
- 3. Adaptive Management and Measuring Progress
- 4. Research

### Partner Program and Projects Narratives

Partners content should be accessible from:

- "Partners" subpage
- Each sector's subpage (ag, point source, urban stormwater)

#### **Programs and Projects Supporting Agricultural Nutrient Reduction**

The following programs and projects support Illinois NLRS agricultural sector goals.

Non-Governmental Organization Programs and Projects

- 4R Field Day
- 4R Metrics Survey
- 5-Year Soil Health Transition
- Carbon and Ecosystem Market Resources and Programs
- Edge-of-Field Partnership for Saturated Buffers
- Edge-of-Field Partnership for Woodchip Bioreactors
- Farm Gate
- Illinois Ag Retailer Survey
- Illinois Farm Bureau NLRS Priority Watershed Work
- IFCA-supported NREC Projects
- Illinois Buffer Partnership
- Illinois Cover Crop Initiative
- Illinois Cover Crop Programs
- Illinois Grazing Lands Coalition
- Illinois Sustainable Ag Partnership
- ILSoyAdvisor
- Keep it 4R Crop
- Mackinaw River Program
- Nitrogen Rate Trials
- Nutrient Research & Education Council
- Nutrient Stewardship Grant Program
- Post Application Coverage Endorsement
- Partnerships with Drinking Water Suppliers and Wastewater Treatment Plants

- Perennial Bioenergy Crop Diversification Project
- Precision Conservation Management
- Soil and Water Outcomes Fund
- STAR Conservation Evaluation Tool
- Sustaining Our Future: A Farm Family Story
- Tree Buffer Program
- Upper Macoupin Creek Watershed Partnership
- Vermilion Headwaters Watershed Partnership
- Water Supply & Industry Partnerships
- Water Testing Initiative

#### go.Illinois.edu/NLRS

Appendix E: Partner Updates
 Agriculture
 Point Source
 Urban Stormwater

### "Partners" subpage mockup

Overview	Working Groups	Agricultur	e NGOs	Urban Stormwater NGOs		Watershed Groups
Many non-governmental organizations help producers establish practices and strategies to reduce nutrient losses across Illinois. The following section highlights updates provided by 39 NGOs for this NLRS Biennial Report. These are programs and projects that are new, have undergone significant changes, or have noteworthy updates. Some programs and projects are dedicated to education, outreach, and networking and may include opportunities for free services or cost-sharing. Some are professional communities of practice, while others are dedicated to research and education. Illinois made substantial progress on these initiatives, thanks to numerous partnerships and their leveraged resources.		<ul> <li>Non-Governmental Organization Programs and Projects</li> <li>4R Field Day</li> <li>4R Metrics Survey</li> <li>5-Year Soil Health Transition</li> <li>Carbon and Ecosystem Market Resources and Programs</li> <li>Edge-of-Field Partnership for Saturated Buffers</li> <li>Edge-of-Field Partnership for Woodchip Bioreactors</li> <li>Farm Gate</li> <li>Illinois Ag Retailer Survey</li> <li>Illinois Farm Bureau NLRS Priority Watershed Work</li> <li>IFCA-supported NREC Projects</li> <li>Illinois Cover Crop Initiative</li> <li>Illinois Cover Crop Programs</li> <li>Illinois Grazing Lands Coalition</li> <li>Illinois Sustainable Ag Partnership</li> <li>ILSoyAdvisor</li> <li>Keep it 4R Crop</li> <li>Mackinaw River Program</li> <li>Nitrogen Rate Trials</li> <li>Nutrient Research &amp; Education Council</li> <li>Nutrient Stewardship Grant Program</li> <li>Post Application Coverage Endorsement</li> <li>Partnerships with Drinking Water Suppliers and Wastewater Treatment Plants</li> </ul>			Perennial Bioenergy Crop Diversification Project Precision Conservation Management Soil and Water Outcomes Fund STAR Conservation Evaluation Tool Sustaining Our Future: A Farm Family Story Tree Buffer Program Upper Macoupin Creek Watershed Partnership Vermilion Headwaters Watershed Partnership Water Supply & Industry Partnerships Water Testing Initiative	
				0	<ul> <li>go.Illinois.edu/NLRS</li> <li>Appendix E: Partner Updates</li> <li>Agriculture</li> <li>Point Source</li> <li>Urban Stormwater</li> </ul>	

## Agriculture subpage mockup

Overview	Resources	Outreach	Land a	nd Facilities	Programs & Projects	Adaptive Management	Interactive Map
Many non-governmental organizations help producers establish practices and strategies to reduce nutrient losses across Illinois. The following section highlights updates provided by 39 NGOs for this NLRS Biennial Report. These are programs and projects that are new, have undergone significant changes, or have noteworthy updates.			Non-Governmental O 4R Field Day 4R Metrics Survey 5-Year Soil Health Trat Carbon and Ecosystem Edge-of-Field Partners Edge-of-Field Partners Farm Gate Illinois Ag Retailer Sur Illinois Farm Bureau N	Drganization Programs and Project nsition In Market Resources and Programs ship for Saturated Buffers ship for Woodchip Bioreactors twey NLRS Priority Watershed Work	•ts • Perennial Bioenergy Crop • Precision Conservation M • Soil and Water Outcomes • STAR Conservation Eval • Sustaining Our Future: A • Tree Buffer Program • Upper Macoupin Creek W • Vermilion Headwaters W • Water Supply & Industry • Water Testing Initiative	o Diversification Project Management & Fund Muation Tool . Farm Family Story Watershed Partnership Matershed Partnership Partnerships	
Some pro to educat may inclu or cost-sh communi are dedic Illinois ma initiatives and their	ograms and p tion, outreac ide opportur naring. Some ties of practi ated to resea ade substant s, thanks to n leveraged re	rojects are d h, and netwo lities for free are professio ce, while oth arch and educ ial progress o umerous par esources.	edicated orking and services onal ers cation. on these therships	<ul> <li>IFCA-supported NRE</li> <li>Illinois Buffer Partners</li> <li>Illinois Cover Crop Ini</li> <li>Illinois Cover Crop Pro</li> <li>Illinois Grazing Lands</li> <li>Illinois Sustainable Ag</li> <li>ILSoyAdvisor</li> <li>Keep it 4R Crop</li> <li>Mackinaw River Progra</li> <li>Nitrogen Rate Trials</li> <li>Nutrient Research &amp; E</li> <li>Nutrient Stewardship O</li> <li>Post Application Cove</li> <li>Partnerships with Drin</li> </ul>	IC Projects ship itiative ograms Coalition Partnership am Education Council Grant Program rage Endorsement sking Water Suppliers and Wastewater Treat	go.Illinoi • Appendix E: • Agricultur • Point Sou • Urban Sto	is.edu/NLRS Partner Updates re rce rce rce rce rce rce rce

### **Future Strategies**

Should be accessible from each subpage (water, ag, point source, urban stormwater)

Should be general and abridged in each Annual Executive Summary

#### **Future Strategic Actions**

Most major municipal facilities required to develop a Nutrient Assessment Reduction Plan, NARP, must submit it to Illinois EPA by December 31, 2023, while the remainder are due December 31, 2024. The Illinois EPA will then review and incorporate elements of the NARP into each facility's next National Pollutant Discharge Elimination System, NPDES, permit renewal. Each NARP will be implemented through the NPDES permitting program and may include more stringent effluent limits and compliance timelines.

By the end of 2024, all major municipal facilities will have determined the type of phosphorus or nutrient removal technologies in which they plan to invest to meet a monthly geometric mean of 0.5 mg/L total phosphorus concentration in their effluent. As wastewater facilities continue to invest in nutrient removal technology, total phosphorus loads — and in some cases, total nitrogen loads — are expected to continue to decrease.

Tracking efforts for this report included submissions of resource and outreach information from 11 of 211 municipal facilities in Illinois. The NLRS team will continue to connect with facilities to encourage participation to help improve tracking of resources and outreach across the state.

- 2023 NLRS Biennial Report, Chapter 5 Point Sources



### Adaptive Management and Measuring Progress Chapter

Should be accessible from:

- "Adaptive Management & Monitoring Progress" subpage
- Each sector's subpage (ag, point source, urban stormwater)



state of water quality in Illinois and outlines recommendations for strat eev adjustments to new technologie and practices based on current data as well as emerging research and policies to achieve Nutrient Loss Reduction Strategy, NLRS, goals. The NLRS first outlined the use of adaptive management in the 2019 Biennial Report to be in alignment with the 2008 Gulf Hypoxia Action Plan. The NLRS Performance Benchmark Committee helps inform adaptive management goals and has developed interim milestones and ultimate objectives. As new research emerges and new practices and technologies develop, the most effective approaches for reaching these goals may also change. Adjustment to the strategy, such as those outlined in this chapter, will help NLRS stakeholders increase the

adoption of practices that help reach Illinois wate

quality goals

Practices known to reduce nitrogen and phosphorus loads have continued to be adopted in both the agricultural and point source sectors.

**Chapter 8 outlines** 

Illinois water quality

recommendations for adjusting

the Nutrient Loss Reduction

Strategy based on emerging

research and policies to improve



Practices known to reduce nitrogen and phosphorus loads have continued to be adopted in both the agricultural and point source sectors. However, reaching the NLRS water quality goals for Illinois will require greatly scaledup implementation of mutrient loss reduction practices, especially from the non-point sectors.

Illinois NLRS Biennial Report: Adaptive Management and Measuring Progress I 2023 [19



### "Adaptive Management" subpage mockup

Overview	Water Monitoring	Agriculture	Point Sources	Urban Stormwater	Watershed-based Planning	
AI NLRS pa technolo research goals. Wastewn Major m to reduc Achievir mainten installin technolo targetin also dec treatme underta projects through Impleme costs. F comply greater o exponer Climate Which in strong, i impacts address moment actions	APTIVE MANAGEMENT AND MEASI there southing recommendations for strategories and practices based on current data and policies to achieve Nutrient Loss Redu- ter Treatment Facility Upgrades unicipal wastewater treatment plants are ingound in the phosphorus pollution and meet other NP grades to expensive a significant construction can be approved by strategies is phosphorus reduction and meet other NP grames and the facilities that are required to whith NPDES permit limits beyond 0.5 mg/L to osts per pound of phosphorus reduction, at tally to remove the final pounds of any pole change is leading to more frequent and integrases nutrient loss. This makes it increases mediate actions to manage nutrients effect of climate change are promising, translation untoward climate adaptation policy and remains a significant long-term challenge.	URING PROGRESS gy adjustments to new is well as emerging uction Strategy, NLRS, hypesting billions of dollars DES permit limits. a upgrades and continuous is upgrades and continuous is upgrades and continuous will incur substantially is the costs increase tutant. nt and Practices ense rainfall in Illinois, ingly important to take cotively and mitigate the federal commitments to ang the recent political esources into practical				

### Point Source subpage mockup

Overview	v Resources	Outreach	Land and Facilities	NARPs	Programs & Projects	Adaptive Management	Interactive Map
NLF tecl ress goa Was Maj to re Ach mai inst tecl targ also trea und proj thro Clim Clim whi stro cos con grea exp Clin Clim	ADAPTIVE MANAGEMEI S partners outline recommen- inologies and practices based arch and policies to achieve N s. tewater Treatment Facility Upgr- or municipal wastewater treat duce phosphorus pollution ar ieving these reductions often I netenance challenges, even aft alling new nutrient removal inologies. Notably, strategies eting phosphorus reduction ca decrease nitrogen levels. As the demand for funding ugh loans or grants remains hi lementing NARPs adds further s. Facilities that are required to ply with NPDES permit limits ter costs per pound of phosphonentially to remove the final p the change is leading to more ch increases nutrient loss. This nate change is leading to more ch increases nutrient loss. This nates of climate change are pro- nentum toward climate adapt to no remains a significant long	NT AND MEASURING dations for strategy adjus on current data as well a lutrient Loss Reduction S ades ment plants are investing nd meet other NPDES per eads to expensive upgrad er an m gh. o beyond 0.5 mg/L will incu- toorus reduction, as the or bounds of any pollutant. utrient Management and P frequent and intense rai is makes it increasingly im age nutrients effectively i recent state and federal of omising, translating the re- ation policy and resource eterm challenge.	PROGRESS tments to new s emerging trategy, NLRS, billions of dollars mit limits. des and continuous reflectenetion Divide to substantially basts increase ractices mfall in Illinois, iportant to take and mitigate the commitments to accent political is into practical				

### Research **Types** in the biennial report

1. NLRS Science Assessment research since 2015

- Water metrics (N & P loads and yields)
- Other water quality
- Ag scenario
- New ag conservation practices recommended
- 2. NGO research highlighted in partner programs & projects
  - Agriculture
  - Watershed groups
  - Stormwater sector



#### CHAPTER 3 Science assessment update



**d** 

A

	Nitrate-Nitrogen and Total Phosphorus River Loads	25
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	U.S. Geological Survey Illinois River Basin Integrated Water Science	46
	Next Generation Water Observing Systems	46
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	Illinois NLRS Science Team Proposed Practice Decisions	48
	Water and Sediment Control Basins	48
	Floodplain Wetlands	49
	Updated Phosphorus Loss Reduction Efficiency for Constructed Wetlands	49
	Updated NLRS Agriculture Conservation Practices List	

# Research 25

#### Research database

2023 NLRS report

- 1. Nitrate-Nitrogen and Total Phosphorus River Loads 🚽
- 2. Nitrate-Nitrogen Loads in the Illinois Portion of the Rock River Basin
- 3. Summary of Spatial and Temporal Variation in Phosphorus Loads in the Illinois River
- 4. A Missing Piece of the Illinois Phosphorus Puzzle:
   Quantifying Statewide Streambank Erosion to Inform Effective Nutrient Loss Reduction Strategy
- U.S. Geological Survey Illinois River Basin Integrated Water Science (Next Generation Water Observing Systems and Integrated Water Availability Assessments )
- 6. Illinois NLRS Science Team Proposed Practice Decisions (WASCOBs, Floodplain Wetlands, Updated P loss reduction efficiency for constructed wetlands)

ilter by NLRS	Filter by theme				
Update Year	Water quality				
2025	Nitrogen				
2024	Phosphorus				
<mark>2023</mark>	Agricultural conservation practice				
2021	Agricultural implementation scenario				
2019	Other theme 1				
2017	Other theme 2				
2015					



#### Research dashboard

Other than Partner Programs and Projects, could highlight NGO research in another way?

Iowa Nutrient Research Center hosts a self-submit webpage where partners fill a form to populate a research profile including a mapped location. https://www.cals.iastate.edu/inrc <u>/map/all</u>.

Not sure how this would work for statewide research?

#### Map - All Locations lowa Water Quality Research Map – Project Submission Form

To submit a project for potential inclusion on the INRC Water Quality Research Man, complete the following form. Projects that have some aspect of water quality research in the state of Iowa will be considered for inclusion. Please email this form, along with a picture for the map, to INRC Program Coordinator Malcolm Robertson at malcolmr@iastate edu

Iowa Nutrient Research Center

Submitter Information (Not to be included on website Emai



Funders

The Iowa Water Quality Research Map is designed to highlight water quality-related research throughout the state of Iowa. Projects include, but are not limited to, research funded by the lowa Nutrient Research Center through lowa State University, the University of lowa and the University of Northern Iowa. To submit a project for potential inclusion, please fill out the Water Quality Research Map - Project Submission Form

COVID-19 Restrictions: During the pandemic, research projects located on lowa State University Research Farms are not open to visitors.



# Questions?

#### Additional ideas to share?



#### NOW OPEN – ALL FEEDBACK WELCOME

#### NLRS Dashboard Survey Nov. 4- 14, 2024

https://illinois.qualtrics.com/jfe/form/SV 7PpK6 m4yyuZElAq Policy Working Group Partner Updates

If you have an update, please type "update" in the chat box.



# Next Working Group Meeting

Ag Water Quality Partnership Forum Technical Subgroup Meeting (Virtual) Tuesday, December 10 from 10 am – Noon

Contact NLRS@Illinois.edu if you have any comments or questions.

Thank you



#### Contact NLRS@Illinois.edu

if you have any comments or questions.

