2026 NREC Funded Research Projects
See the end of this document for objectives for newly funded projects

Project Title	Institution	Principal Investigator	2026 Project Budget
New for 2026			
Illinois Soil-Test Phosphorus and Potassium Calibration Using a 4R (Source, Rate, Timing, and Placement) Approach	UI	Jones	$161,822
Enhancing Nitrogen, Phosphorus, and Sulfur Management in Winter Wheat-Soybean Double Crop Systems in a Regional Context Across Illinois	UI	Jones	$112,211
Towards Illinois NLRS 2.0: Developing a fine-resolution and statewide watershed inventory of nitrogen and phosphorus budgets to inform targeted conservation in Illinois (Illinois Watershed N&P Inventory Project)	UI	Peng	$118,660
Assessing the interaction of sulfur and nitrogen on corn yield and nitrogen use efficiency in Illinois	UI	Preza Fontes	$115,759
Addressing Corn Nitrogen Management Risks in Illinois through Comprehensive Agronomic and Economic Research and Outreach	UI	Jones	$212,972
Reducing nitrate-N losses by managing phosphate fertilizers: right time, right source – and right nitrification inhibitor?	UI	Margenot	$45,250
System-based management to improve corn and soybean yields following cover crops	UI	Preza Fontes	$144,439
Harnessing polyphosphate-accumulating microbes to mitigate phosphorus losses from Illinois agroecosystems	UI	Kent	$176,043
Quantifying the “how much”, “how old”, and “for how long” of legacy sediment P in Illinois riverine systems for accurate targets and effective management on P loss reductions	UI	Zhou	$160,000
Ongoing Projects			
Economic Analysis of NREC Projects Involving Farm Management Practices: From Trial Plots to Commercial-scale Adoption	UI	Paulson	$23,656

Optimizing cover crops and wheat to reduce nitrogen and phosphorus surface run-off losses in southern Illinois	UI	Margenot	$74,047
Using On-farm Precision Experiments in a Data-intensive Approach to Systems Management of Cover Crops and Nitrogen Fertilizer	UI	Jones	$102,583
Next Generation Cover Cropping in Corn-Soybean Rotation to Improve Farm Benefits and Decrease Environmental Losses in South and Central Illinois: Phase II	SIU	Brevik	$221,640
Evaluating the effectiveness of streambank stabilization for nutrient loss reductions: Over 20 years of Illinois evidence	UI	Rhoads	$49,694
Scaling up conservation agriculture by growing cover crops ahead of soybean and moving fall fertilizer nitrogen application to spring	UI	Yu	$285,000
On-farm and farmer-led: an expanded tile monitoring network for informing nutrient loss reduction practices and outcomes in north-central Illinois	UI	Margenot	$92,801
Beyond cereal rye: evaluating synergies and tradeoffs of winter legumes and brassica cover cropping systems in Illinois	UI	Preza Fontes	$206,107
The implementation of innovative practices for dry dams/WASCoBs to address water quality concerns in southern Illinois row-crop agricultures	SIU	Schoonover	$192,911
Evaluating the impacts of fall-applied controlled-release N fertilizer on N use efficiency, soil water quality, GHG emissions, and grain yield in a strip-till corn cropping system	UI	Preza Fontes	$122,203
Enhancing cover crop establishment and spring decomposition to benefit no-till corn/soybean production	UI	Below	$79,149
A missing piece of the Illinois phosphorus puzzle: quantifying statewide streambank erosion in inform effective nutrient loss reduction strategy	UI	Margenot	$167,623.50
Updating Illinois phosphorus and potassium soil test recommendations for the 21st century	UI	Margenot	$150,916
Assessing Illinois WASCoB's - water quality, legacy P and sediment trapping	SIU	Schoonover	$135,994
Evaluating streambank and in-stream erosion as a source of P and sediment in two agricultural watersheds	SIU	Schoonover	$133,532
Impact of Timing of Cover Crop Termination on Water Quality and Soil N and P: Phase Two of a Long-term Cover Crop and Tillage Study in Southern Illinois	SIU	Williard	$199,810
Managing the maize microbiome for sustainable nutrient retention in Illinois agricultural soils	UI	Kent	$218,737
C-S rotation with wheat to improve water quality, etc.	SIU	Sadeghpour	$186,411.75
Capitalizing on 150 Years of Soil Samples to Determine Legacy P and Improve Water Quality in Illinois	UI	Margenot	$151,133.25
Nitrogen Rate Research & NREC Project Partnership	IFCA	Schaefer	$429,812
Integrating tillage, soil carbon dynamics, and tile nitrate loss (Eric Miller)	UI	Yu	$202,585.50

The effect of cover crops on surface water quality: A paired watershed experiment in the Lake Bloomington watershed	Purdue	Armstrong	$209,896
Evaluating nutrient loss reduction strategies: longer rotation with cover crops and bioreactor (Miller Project)	UI	Yu	$222,880

Project Objectives of Newly Funded Projects

Illinois Soil-Test Phosphorus and Potassium Calibration Using a 4R (Source, Rate, Timing, and Placement) Approach	UI	Jones

Objectives:

1. Developing regional soil-test and plant tissue P and K interpretations for soybeans and corn using modern soil testing methods.
2. Providing calibrated P and K fertilizer rate guidelines based on 4R components and system-level factors (e.g., tillage, cover cropping, rotation).
3. Developing criteria for farm-specific economic and agronomic risk considerations based on ROI probabilities.

Enhancing Nitrogen, Phosphorus, and Sulfur Management in Winter Wheat-Soybean Double Crop Systems in a Regional Context Across Illinois	UI	Jones

Objectives:

1. Providing updated nitrogen fertilization guidance for Illinois farmers.
2. Assessing integrated nitrogen (N), phosphorus (P), and sulfur (S) management strategies to maximize profitability and minimize environmental losses.
3. Monitoring soil and plant nutrient status to improve understanding of nutrient dynamics.
4. Delivering actionable research findings to Illinois farmers.

Towards Illinois NLRS 2.0: Developing a fine-resolution and statewide watershed inventory of nitrogen and phosphorus budgets to inform targeted conservation in Illinois (Illinois Watershed N&P Inventory Project)	UI	Peng

Objectives:

1. Developing HUC-12 scale N and P budgets.
2. Analyzing spatiotemporal variations in N and P input-output relationships.
3. Identifying hotspot watersheds for targeted conservation.
4. Conducting outreach and extension activities.
5. Supplying results to the Illinois NLRS Dashboard.

Assessing the interaction of sulfur and nitrogen on corn yield and nitrogen use efficiency in Illinois	UI	Preza Fontes

Objectives:

1. Assessing S effects on corn yield and N use efficiency.
2. Field trials will be conducted at 6-8 sites in Illinois over three years.
3. Treatments will include various N and S rates in a randomized complete block design.

4. Data collection will involve soil and plant sampling, nutrient analysis, and yield measurements.
5. Outreach strategy includes presentations at extension events and publication in peer-reviewed journals.

Addressing Corn Nitrogen Management Risks in Illinois through Comprehensive Agronomic and Economic Research and Outreach	UI	Jones

Objectives:

1. Refining regional N fertilizer use guidance using on-farm trials.
2. Integrating 4R components with system-level characteristics like tillage, rotation, and cover cropping.
3. Addressing assumptions about soil N transformation and corn N uptake.
4. Demonstrating adaptive N management options through economic risk analysis and outreach.
5. Providing a final report with economic analysis.

Reducing nitrate-N losses by managing phosphate fertilizers: right time, right source – and right nitrification inhibitor?	UI	Margenot

Objectives:

1. Quantifying nitrate-N losses from fall vs. spring-applied MAP/DAP.
2. Evaluating biennial vs. annual DAP applications.
3. Assessing nitrification inhibitors (N-Serve® and Centuron®) for reducing nitrate-N losses.
4. Testing cover crops for mitigating fall-applied DAP losses.
5. Differentiating fertilizer-derived vs. native soil nutrient losses.
6. Co-quantifying P losses via subsurface drainage tiles.

System-based management to improve corn and soybean yields following cover crops	UI	Preza Fontes

Objectives:

1. Assessing impacts of tillage systems and cover crop planting methods on performance.
2. Evaluating alternative cover crop species and mixes.
3. Determining effects of tillage, planting methods, and species on yields.
4. Identifying optimum nitrogen rates for cover crop systems.
5. Analyzing economic implications of cover crop integration.
6. Communicating results through outreach and extension programs.
7. Providing a final written report addressing all objectives.

Harnessing polyphosphate-accumulating microbes to mitigate phosphorus losses from Illinois agroecosystems	UI	Kent

Objectives:

1. The overall objective is to determine if microbial processes can be managed to enhance phosphorus retention.
2. Specific objectives include evaluating PolyP prevalence, management influences on PolyP accumulation, and comparing phosphorus losses in field experiments.
3. The rationale highlights the urgent need for phosphorus conservation due to limited global supplies and increasing phosphorus loading into drainage systems.
4. The project addresses critical gaps in understanding PAOs in agroecosystems and proposes proactive nutrient management strategies.

Quantifying the "how much", "how old", and "for how long" of legacy sediment P in Illinois riverine systems for accurate targets and effective management on P loss reductions	UI	Zhou

Objectives:

1. Quantifying sediment P storage in streams, rivers, lakes, and floodplains.
2. Assessing sediment P release rates to surface waters.
3. Identifying sediment origins (streambanks, agricultural fields, non-agricultural fields).
4. Determining sediment age and residence time in waterways.
5. Estimating downstream mobility of P-bearing sediments.
6. Developing statewide estimates of sediment legacy P storage and release.
7. Identifying opportunities for in-channel conservation practices.
8. Integrating findings into the Illinois Nutrient Loss Reduction Strategy (NLRS).