Illinois Nutrient Loss Reduction Strategy Nutrient Workshop – November 13, 2018 ACES Library, Urbana IL

TIME	SESSION	ROOM
10:00-11:00 am	OPEN PLENARY SESSION Welcome <i>George Czapar</i> SERA-46 Update <i>Amanda Gumbert</i>	Monsanto Room
11:00-Noon	BREAKOUT SESSIONS Agriculture Water Quality Partnership Forum Urban Stormwater Working Group	Monsanto Room Sims Room (first floor)
Noon-1:30 pm	LUNCH	On own
1:30-4:00 pm	POLICY WORKING GROUP	Monsanto Room
4:30-6:00 pm	RESEARCH SHOWCASE	Heritage Room (first floor)





Illinois Nutrient Loss Reduction Strategy Workshop

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NLRS is a science-based partnership effort



Collaboration with stakeholders Expanding education and outreach Helping identify research needs Helping leverage additional funding



Illinois legislature: Food and Agriculture Act, 1995



Strategic Research Initiatives - 1998

Food Safety

Water Quality

Information Systems and Technology

Rural Community Development

Swine Odor and Waste Management









United States Environmental Protection Agency

FPA

Office of Water 4304 EPA 822-B-00-017 December 2000

Ambient Water Quality Criteria Recommendations

Information Supporting the Development of State and Tribal Nutrient Criteria

How to develop nutrient standards that are protective of water quality, but are also realistic and achievable?

C-FAR Strategic Research Initiative Water Quality









Topics

Overview					
External Competitive Grants Program					
Strategic Research Initiatives (SRIs)					
Research Calendar					
Research Focus Areas					
Research Portfolios					
Research Reports					
Research Partners					



"We are fortunate to have such an important effort underway in the region," said Jo Lynn Traub, Water Division director for the United States Environmental Protection Agency. "The C-FAR effort is making a major contribution to the work of developing scientifically defensible nutrient water quality criteria for the surface waters in Region 5."

2007 Water Quality Nutrient Standards Forum

The Illinois Council on Food and Agricultural Research (C-FAR) sponsored an educational forum on the latest research in Illinois water quality on Tuesday, October 23 at the University of Illinois at Springfield. The forum focused on the impact of multiple factors affecting Illinois surface waters.

To better understand the role agriculture and other factors play in influencing the quality of Illinois' rivers, streams, and lakes, researchers from across the state have collaborated in a multidisciplinary, multi-institutional research effort funded by the State of Illinois via C-FAR. In 2003, C-FAR established its water quality strategic research initiative focused on improving the research base to aid in the State of Illinois' development of nutrient standards for the surface waters of Illinois.



Water quality forum attendees



C-FAR Chairman Alan Puzey welcomes attendees

The following are presentations from the forum:

Introduction - Dr. George Czapar, Water Quality SRI Leader, University of Illinois Extension

<u>Spatial and Temporal Relationships between Biotic Integrity of Illinois Streams, Dissolved</u> <u>Oxygen, and Nutrients</u> - Dr. Mark David, Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign

<u>Effects of Phosphorus Mediated Through Algal Biomass in Illinois Streams</u> - Dr. Walter Hill, Aquatic Ecology, Illinois Natural History Survey

<u>Headwater Stream Primary Production Dynamics - Nutrient Limitation and the Potential</u> <u>Role of Sediment Derived Nutrients</u> - Dr. William Perry, Biological Sciences, Illinois State University

The Impact of Sediments on the Potential Bioavailability of Phosphorus in Illinois Streams - Dr. Michael Machesky, Watershed Science, Illinois State Water Survey

C-FAR work helped secure additional USDA projects



Embarras River Watershed Project - Wetlands & Bioreactors









Illinois Council on Best Management Practices

Illinois Corn Growers Association Illinois Farm Bureau Illinois Fertilizer and Chemical Association Illinois Pork Producers Association Illinois Soybean Checkoff Board Syngenta Crop Protection University of Illinois Extension

Assist and encourage adoption of best management practices (BMPs) to protect and improve water quality in Illinois



The Illinois Nutrient Loss-Reduction Strategy

Consider best management practices and make changes that fit your family farm.

TEST YOUR

This program was designed to engage farmers in the nutrient and water quality issues facing agriculture b providing information on possible nutrient losses from their production operations. The sensors are being provided in part by IL Corn and the Zea Mays Foundation They are meant to provide a way for farmers and landowners to confidentially test their water (tile, ditch, stream) for nitrate nitrogen. By comparing their own water testing results to other known concentrations and research results, farmers can begin to understand their own impact on water quality and consider management practices which may reduce their losses. These results are simply a snapshot in time of ambient nutrient levels in water collected from tile drainage, surface runoff or nearby streams. Nutrient levels in runoff water can vary greatly depending on the time of year, temperature, rainfall and in-field practices. A measurement of flow (the volume of water leaving a site) would also be needed to determine the total nutrient loading into a waterbody and

HOME > TAKE ACTION > CURRENT PRIORITIES > PROTECTING OUR ENVIRONMENT > WATER QUALITY



Water Quality

Illinois farmers are stepping up to improve water quality in Illinois. Since before the release of the Protecting Our Environment Illinois Nutrient Loss Reduction Strategy (NLRS) through two years of implementation, to now, Protecting Our Environment our members are educated about the issue and Overview making improvements for the benefit of Illinois Water Quality and our neighbors downstream. Livestock This was evident in the first biennial report of th NLRS. The report described actions taken by stakeholders within three sectors: agriculture, point sources (like wastewater treatment plants **Developing IFB Policy** and urban areas **Building Partnerships**



What's Your Strategy?

SAMPLING INSTRUCTO

nearly \$55 million in NLRS research, outreach, implementation and monitoring. This number does not include farmer efforts outside of state and federal cost-share programs, of which we know there are many. In 2016 alone, almost 39,000 people were reached through various outreach events geared at farmers and the agricultural community. IFB partnered with the Nutrient Research & Education Council and USDA's National Agricultural Statistics Service to survey farmers in Illinois about their use of conservation and best management practices for water quality. Survey results show increased adoption of both in-field and edge-of-field practices since 2011. The NLRS Science Assessment was updated and found that nitrate-nitrogen loads decreased during that time by 10 percent when compared to baseline 1980-1996 load data.

Illinois Farm Bureau plays a significant role in education and outreach on this important topic. Since 2015, Illinois Farm Bureau and county Farm Bureau leaders have shared the NLRS message with more than 8,500 farmers, landowners and agricultural



Spring 2018 BULLETIN

Our Mission: To promote and implement the 4Rs of nutrient stewardship (right source, right place, right time, right rate) to minimize environmental impact, optimize harvest yield and maximize nutrient utilization.

IN THIS EDITION:

- 2018 IFCA & NREC Projects Underway
- Strip Freshener Program to Promote Reduced Tillage
- Lake Springfield Watershed Project-Continued!
- Nitrogen Research Results & Outreach

2018 NREC PROJECTS FOCUS ON NITROGEN & WATER QUALITY

For the last several years, IFCA has been involved in many projects that are funded through NREC (the Nutrient

Research and Education Council). All of the projects are aimed at keeping nutrients in the field through improved utilization using the right source, rate, time and place. Dan Schaefer and Jason Solberg utilize a leased tractor, GPS tracking systems, fertilizer toolbars and soil sampling services to perform and document this work, and share the data collected with University researchers for their analysis.



In 2018, IFCA is assisting university researchers with five NREC funded projects:

IFCA puts in a spring '18 N treatment in Rockport, IL

1. Douglas County Nitrogen Management Systems in Tile Drained Fields: (testing field tile for N losses in different nitrogen management environments in a corn/soy rotation and with and without cover crops)

- 2. Evaluating INLRS Activities, Piatt County: (evaluating the effectiveness of N rates, cover crops, and bioreactors in corn/soy/wheat rotation)
- 3. Comprehensive Corn Nitrogen Research Program: (implementing on-farm statewide N Rate trials to develop up to date Maximum Return to Nitrogen (MRTN) recommendations for Illinois farmers)

4. Tracking Soil N & Availability (studying the movement and uptake of N in the soil throughout the growing season and over various environmental conditions to determine how to better predict and manage N movement)

5. Cereal Rye Ahead of Corn: Evaluating Nitrogen Catch & Release: (studying effective cover crop termination timing and evaluating the N sequestration and release in a corn system)

https://www.ifca.com/4R/Reports

https://www.ilcorn.org/priority-issues/water-quality

https://www.ilfb.org/take-action/current-priorities/protecting-our-environment







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Topics
Water Quality
Watershed Management
Excess Nutrients

Illinois Nutrient Loss Reduction Strategy Implementation

The Illinois Nutrient Loss Reduction Strategy guides state efforts to improve water quality at home and downstream by reducing nitrogen and phosphorus levels in our lakes, streams, and rivers. The strategy lays out a comprehensive suite of best management practices for reducing nutrient loads from wastewater treatment plants and urban and agricultural runoff. Recommended activities target the state's most critical watersheds and are based on the latest science and

EXCESS NUTRIENTS

Nutrient Summit

Additional support from Illinois EPA

Illinois Nutrient Loss Reduction Implementation: Coordination of Watershed Scale Programs and Development of Agricultural Water Quality Team

August 1, 2007 through June 30, 2022



Agricultural Water Quality Team



Laura Christianson Crop Sciences



Jonathan Coppess Agriculture and Consumer Economics



Paul Davidson

Agricultural and Biological Engineering



Reid Christianson Crop Sciences



Suzanne Bissonnette

Agriculture and Natural Resources



George Czapar Crop Sciences



Maria Villamil **Crop Sciences**



Crop Sciences



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Current Research

Important News

Upcoming Events



ILLINOIS

Extension

COLLEGE OF AGRICULTURAL, CONSUMER & ENVIRONMENTAL SCIENCES



SERA-46

Land Grant Universities Working Collaboratively with the Hypoxia Task Force

Amanda Gumbert, University of Kentucky Beth Baker, Mississippi State University, Co-Chair







2017



Source: https://gulfhypoxia.net/research/shelfwide-cruise/?y=2017

SERA-46

Land-grant University Extension & Research

2017: 22,720 km² (8,776 mi²/5.6m ac); largest size measured to date since the standardized mapping cruises began in July 1985. *Source: Nancy Rabalais (LUMCON)*



2018



2018: 2,720 sq. miles (1.7m acres); slightly larger than state of Delaware, well below projected estimate of 6,570 sq. miles.



Too Much of a Good Thing





Image: http://canacopegdl.com/keyword/plant-macronutrients.html



Image: https://emojiisland.com/products/poop-emoji-icon







Science-based Goal

Coastal Goal

By 2035, reduce 5-year running average size of the Gulf hypoxic zone to 5,000 km²

Interim Target

20% reduction of nitrogen and phosphorus loading by 2025

Bottom-water Area of Hypoxia (D.O. $\leq 2 \text{ mg/L}$)



25,000 20,000 15,000 5,000 6 Goal 7 G





Role of Land Grant Universities (LGUs) in U.S.



Morrill Act, 1862

Teach such branches of learning as are related to agriculture and the mechanic arts.

Hatch Act, 1887

Provide federal funds to state land grant colleges to create agricultural research facilities.

Smith Lever Act, 1914

Provide education to adults off-campus that is relevant, understandable and practical.



What is SERA-46?



- <u>Southern Extension and Research Activities committee number 46.</u>
- Formal USDA National Institute of Food and Agriculture (NIFA) and land-grant university funded committee designed to promote multistate, research and extension activities.
- Created to operationalize a non-funded Cooperative Agreement between the Hypoxia Task Force and land-grant university Extension and Experiment Stations in the North Central and Southern Regions of the United States







USDA-NIFA coordinates multistate efforts via regional committees

Strong linkage/coordination with Hypoxia Task Force





SERA-46 Goal

Promote effective implementation of science-based approaches to nutrient management/conservation that reduce nutrient losses to the environment.





Priorities for Collaborative Work

Developed May 2015 Revised September 2017

Three Focus Areas

- 1. Strengthening Networks
- 2. Conservation Systems Research and Outreach
- 3. Monitoring and Tracking of Progress







<u>Conservation Systems Research and Outreach #1</u> - Assist in the optimization of cover crop practice performance.

Nutrient & Sediment Loss from Farm Fields

90+ samples in 2018 • 20 rain events

With the data collected we know how much water leaves the field in each event, and how much sediment & nutrients are lost in each event. Data provides information about conservation effectiveness and information for improved infield management of soil and water. The goal is improve in-field management practices to conserve water, improve soil health, and document farmer environmental stewardship.

	Sediment (lb/ac)			Nitrogen (lb/ac)			Phosphorus (Ib/ac)		
	Mean	Median	Max	Mean	Median	Max	Mean	Median	Max
Cover Crop	314	106	4241	0.59	0.19	6.0	0.69	0.23	7.9
No Cover	472	122	6340	1.0	0.44	5.7	0.94	0.4	4.8





Photo courtesy Mississippi State University



<u>Conservation Systems Research and Outreach #2</u> Translate science in tile drained areas into accessible information for states to adopt into policies to address nutrient use and movement, particularly with corn and N.







<u>Conservation Systems Research and Outreach #4</u>-Work in partnership with American Society of Agronomy's Certified Crop Advisor (CCA) program.

- Collaboration with state CCA boards to update performance objectives to include hypoxia
- Providing training opportunities in Soil and Water Conservation competency area that includes state nutrient-related regulations and strategies for reducing nutrient losses





<u>Monitoring and Tracking Progress #3</u> – Using Social Indicators and Civic Engagement to Advance Nutrient Reduction Efforts

Delivery

- Civic Engagement workshop May 2018
- Established an information hub: Human Dimension in Water https://h2o.ssrc.msstate.edu/





<u>Conservation Systems Research and Outreach #3</u> – Create a network of watershed practitioners and farmer leaders to strengthen the effectiveness of nutrient management strategies.





Photo courtesy University of Kentucky

Watershed Leadership Summit 2018







https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/farmbill/rcpp/? cid=stelprdb1254130



Watershed Leadership Summit 2018



- Needs Identified
 - Network of watershed project successes
 - Watershed coordinator certification program/professional development effort
 - More precision tools for targeting conservation practice implementation
 - More communication



- Outcome
 - Network of watershed leaders

Watershed Leadership Summit 2019

• Long Beach, MS



Image: https://www.fema.gov/media-library/assets/images/106443







Farmer and Farm Advisor Leadership Needs Assessment

Rebecca Power (University of Wisconsin) and Jamie Benning (Iowa State University)





Purpose

- Characterize farmer and farm advisor leadership in watershed management
- Identify successful methodologies for fostering farmer-led watershed initiatives
- List existing leadership training programs for watershed practitioners, farmers and farm advisors
- Identify geographical, content and pedagogical gaps in existing educational programs

Methods

- Literature Review
- Program Scan
- Interviews



Farmer Watershed Leadership

Peer-to-peer Decision-making

- Recruiting other farmers
- BMP
 demonstrations
- Mentoring

- Consultation
- Serving on advisory groups
- Assisting watershed staff
- Informing goal setting

Watershed Leadership

- Formal leadership role
- Defining goals and strategies
- Directing resource distribution

Level of Engagement





General Observations



- Farmers and farm advisor leadership is critical for watershed management
- Farmer leadership in watershed initiatives is not new
- Concept is not yet widespread
- There are currently no learning networks dedicated to farmer-led watershed initiatives
- A platform or forum for sharing experiences and ideas may be beneficial to farmers and supporting organizations
- Some level of financial, technical, material, or educational support will be required for most farmer-led watershed projects



Continued Work

- MARB Nonpoint Sources Nutrient Reduction Measurement Framework
- Facilitate dialogue between SERA-46 members and state HTF members
- Cross-MARB communication of science directly to state agencies for translation into their nutrient reduction policies and programs









Future Efforts and Needs



- Expand farmer-led watershed leadership efforts.
- Expand economics shared priority around on-farm economic tools, costs, and benefits.
- Expand research and education on multifunctional agricultural landscapes that provide a broad suite of societal and ecosystem services.





Funding







Valuable Collaborations



- State and Federal agencies represented by Hypoxia Task Force membership
- Direct farmer and farm advisor interaction
 - Extension audiences
- State Departments of Agriculture
 - Some states have records of success
 - Iowa State University a resource for science, research, technology, on-farm practices
- Other multi-state committees
 - SERA-17, NC-1190, etc.





For More Information

http://northcentralwater.org/sera-46/

https://www.epa.gov/ms-htf/hypoxia-task-forcepartnerships



Thank You!





BREAKOUT SESSIONS

AWQPF Monsanto Room (stay here)

USWG Sims Room (upstairs)

