Policy Working Group Meeting – May 30th

Photo credit: Paul Gierhart

Introductions – Sign in Sheet

Point Source
Rick Manner Kay Anderson Nick Menninga Albert Cox Randy Stein Alec Davis
Agriculture
Liz Hobart Jennifer Tirey Lauren Lurkins Jean Payne Rodney Weinzierl Dick Lyons
Steve Stierwalt Kris Reynolds Julie Armstrong
Stormwater
Josh Ellis
Drinking Water Supply
Ted Meckes Kevin Culver
University/Technical Assistance Providers
Laura Christianson Paul Davidson
Environmental Groups
Albert Ettinger Carol Hays Jessica Dexter Cindy Skrukrud Caroline Wade
Government
Amy Walkenbach Trevor Sample Warren Goetsch Mike Chandler Gene Barickman

Update on Transition

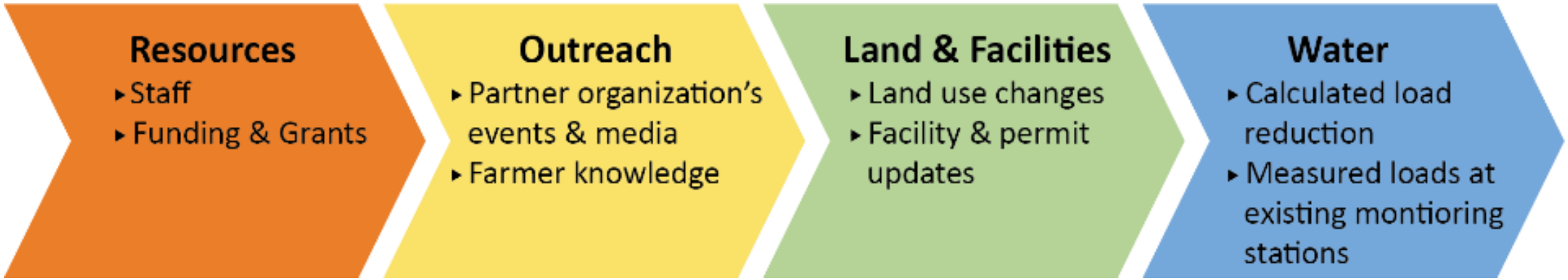
Lisa Merrifield, Illinois Extension
Trevor Sample, Illinois EPA

UNIVERSITY OF ILLINOIS
EXTENSION

Timeline

Date	Action	Committee
Jan-Jun 2018	Data Collection variables and instruments Refined	AWQPF (NASS), AWQPFTC, USWG
Jul- Sep 2018	Collect data from users and agencies	AWQPF (NASS), AWQPFTC, USWG
Oct-Dec 2018	Analyze data	AWQPF (NASS), AWQPFTC, USWG
Jan-Dec 2018	Collect and analyze data necessary to calculate statewide loading estimates	NMC
Jan 31, 2019	All summary data tables, analysis, and stakeholder accomplishment reports due	AWQPF (NASS), AWQPFTC, USWG, PWG, NMC
Mar 31, 2019	1st Draft of 2nd Biennial report due to PWG	Illinois Extension, IDOA, Illinois EPA
Jul 31, 2019	Final Draft of report due to IWRC	PWG, IDOA, Illinois EPA
~Aug, 2019	Biennial Report printed and released	Illinois Extension

Tracking Measures

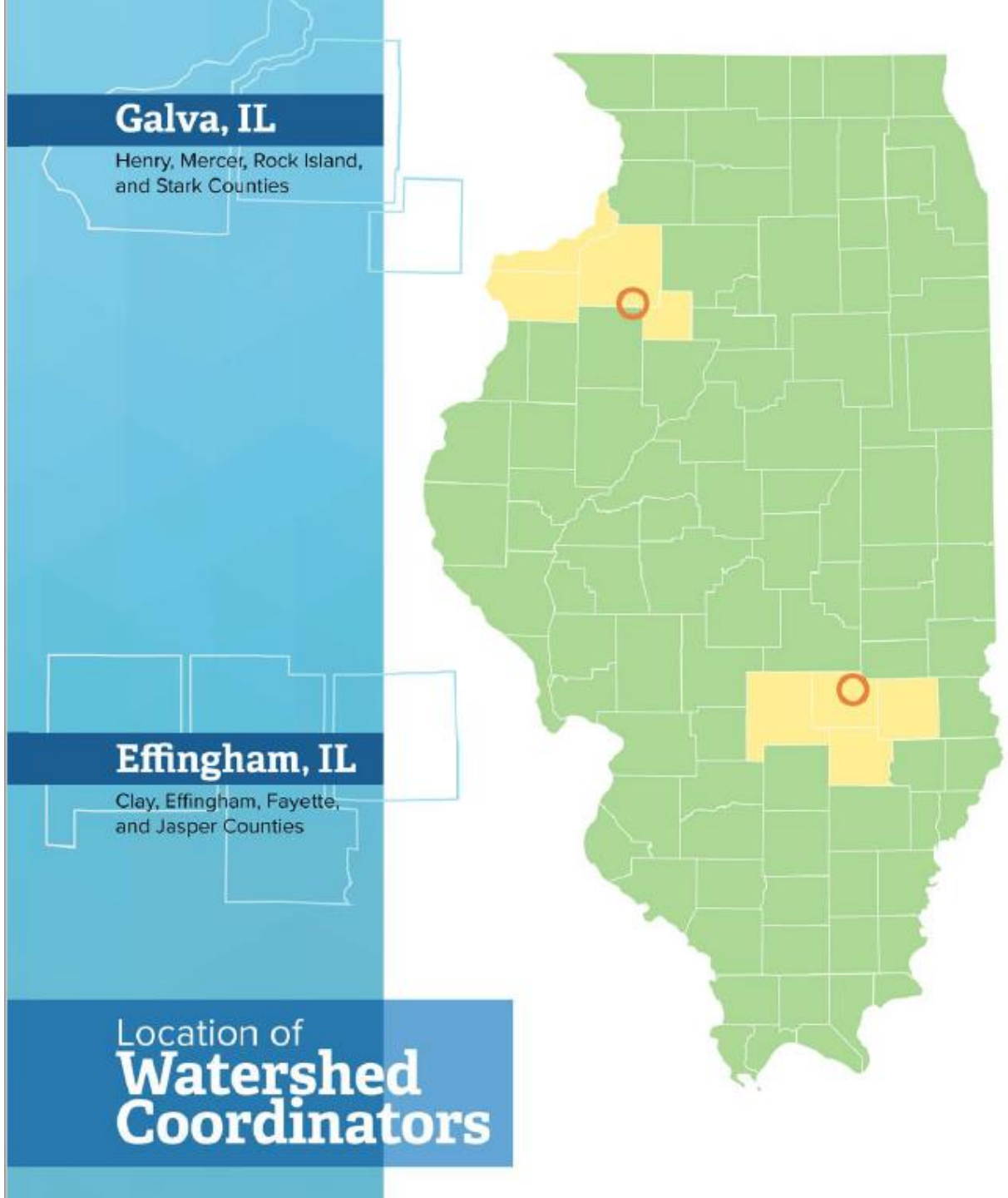


Tracking Measures

Spreadsheet due July 31, 2018

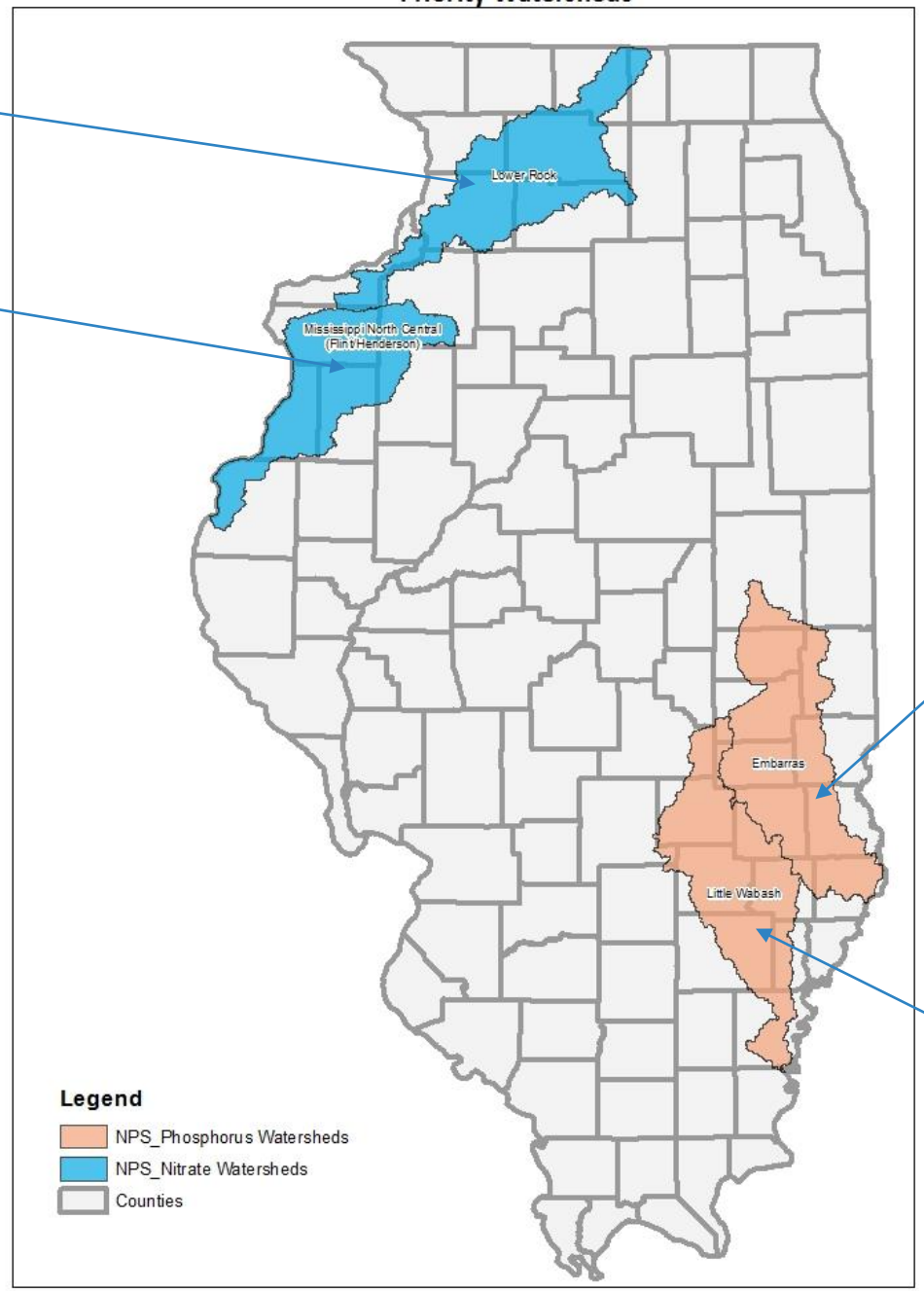
University of Illinois Extension Watershed Coordinators

- Illinois EPA has partnered with University of Illinois Extension to hire two watershed coordinators to work in priority watersheds.
- Provide outreach and technical assistance
- Assist local stakeholders in:
  - Watershed Planning
  - Implementation of Watershed Plans
- Coordinate local initiatives, collaborate with other organizations.


Galva, IL
Henry, Mercer, Rock Island, and Stark Counties
Effingham, IL
Clay, Effingham, Fayette, and Jasper Counties
Location of
Watershed
Coordinators

Lower Rock River

Mississippi North Central (Flint/Henderson)



Embarras River

Little Wabash River

University of Illinois Extension Watershed Coordinators

- **Jennifer Woodyard**-Effingham Watershed Coordinator
  - Focus on Phosphorus loss in the Little Wabash and Embarras watersheds
- **Haley Haverback**-Galva Watershed Coordinator
  - Focus on Nitrate loss in the Mississippi Central and Lower Rock watersheds

University of Illinois Extension Watershed Coordinators

- **Project also includes funding for an Extension Water Quality Science Team.**
- Laura Christianson – Crop Science
- Jonathan Coppess - Ag Econ
- Paul Davidson – Ag and bio engineering
- Cameron Pittelkow – Crop Science
- Maria Villamil – Crop Science
- Suzanne Bissonnette (administrative) - Assistant Dean (IL Extension, director of ag and natural resources programs)
- Reid Christianson – Crop Science

University of Illinois Extension Watershed Coordinators

- **Extension Water Quality Science Team will:**
- Provide technical support from research to Watershed Coordinator.
- Update conservation practice performance in NLRS updates.
- Approve of new conservation practices to be included in the NLRS.

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

Communications Subgroup
Trevor Sample, Illinois EPA

Communications Subgroup

- Established at the November 30th Policy Workgroup Meeting
  - Charge: To ***"educate elected officials, government/professional staff/contractors, business community members and residents throughout Illinois with a clear, coherent message on the Illinois NLRS and opportunities to participate"***
- Met three times via conference call (Jan. 10th, Jan. 24th and Feb. 13th)
- Twelve members, representing all sectors of the PWG
- This PWG Subgroup does not replace the education outreach activities carried out by other established workgroups (AWQPF, USWG, PS-Benchmark)

Communications Subgroup

- Action Item #1
  - Develop a PowerPoint presentation that can be used by all PWG members
    - A common message for all to use when giving NLRS presentations
    - 36 slides discussing our past, present and future
    - Ability to tailor the presentation to fit your audience
      - .pdf on webpage
      - .pptx for all PWG members
      - Can be found at http://www.epa.illinois.gov/topics/water-quality/watershed-management/excess-nutrients/nutrient-loss-reduction-strategy/index

Communications Subgroup

- Action Item #2
  - Develop Legislative letter
    - To inform Illinois legislators about the on-going activities resulting from the development of the Illinois Nutrient Loss Reduction Strategy
    - Signed by Directors Messina and Poe
    - Sent to Legislators on May 4th, 2018
      - Included:
        - Original NLRS document
        - 2017 Biennial Report
        - 2017 Biennial Report fact sheet

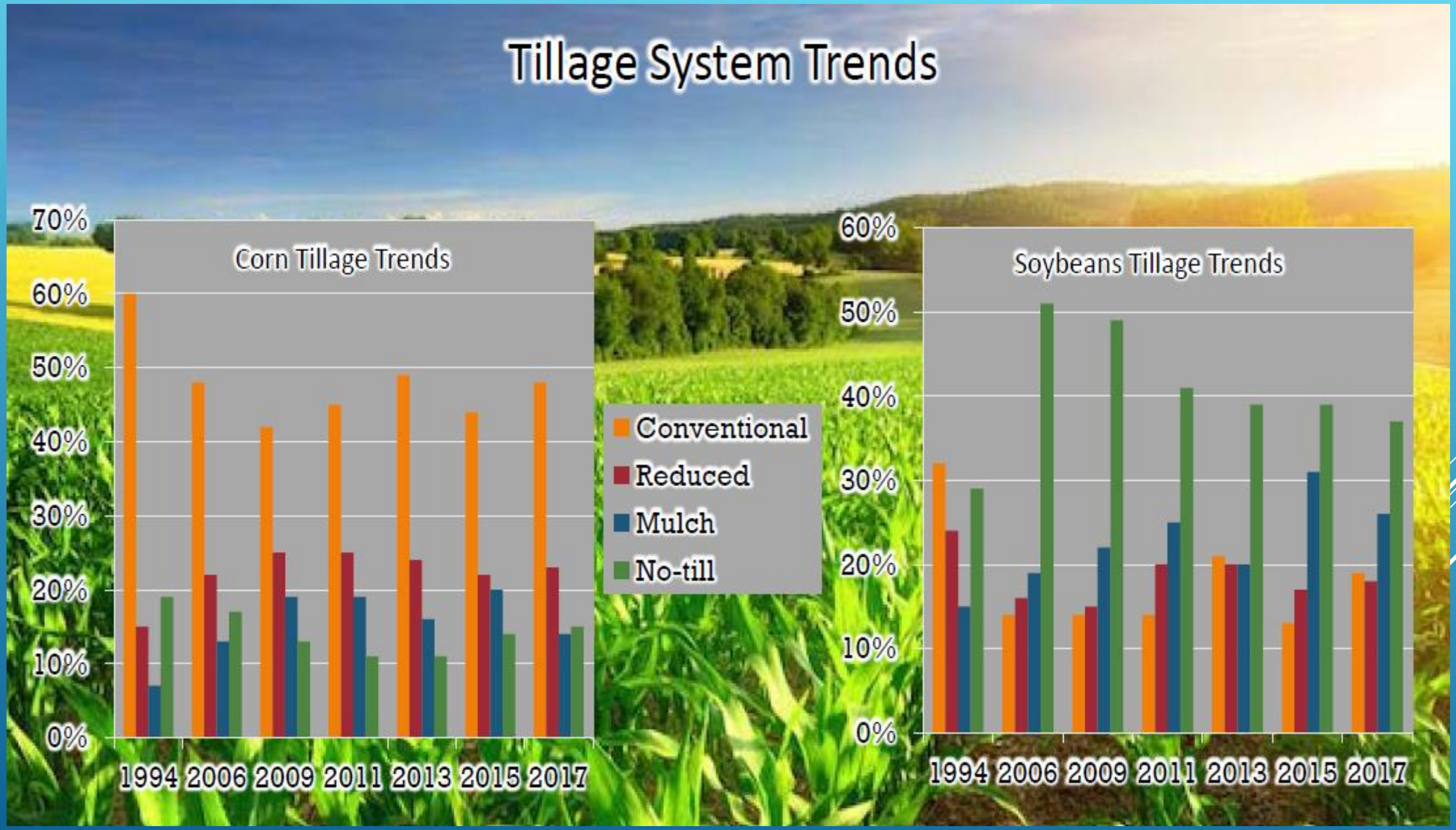
Ag Water Quality Partnership Forum
Warren Goetsch, Illinois DOA

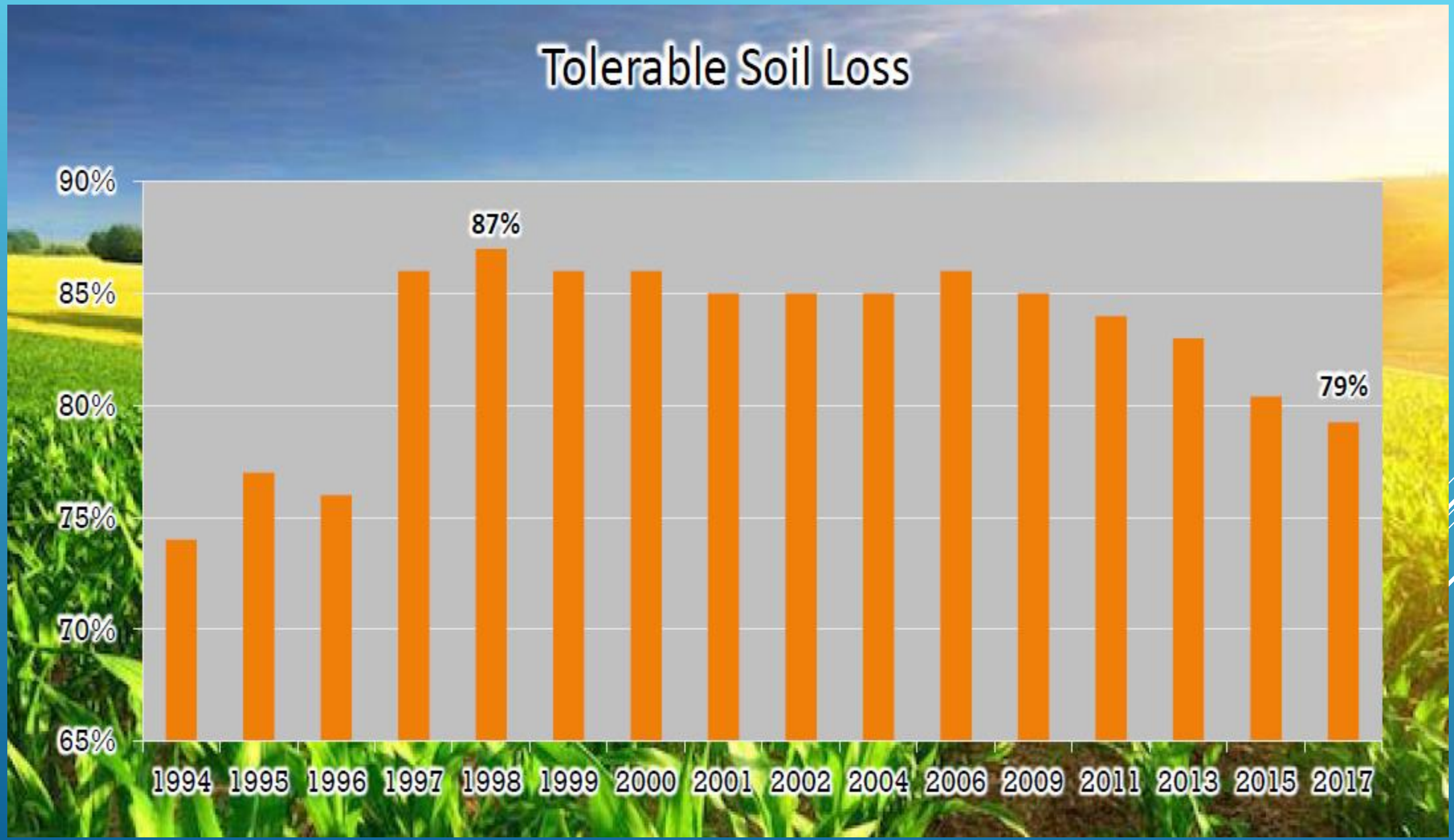
AGRICULTURE WATER QUALITY PARTNERSHIP FORUM

MEETING SUMMARY
MARCH 12, 2018

- Forum met on March 12th, 2018 in Springfield
  - Topics Covered --
    - Soil Transect Survey
    - FSA Cover Crop Reporting
    - Iowa BMP Mapping Project
    - Method for adding conservation practices to the NLRS and review BMP performance based on NREC findings
    - S.T.A.R. – Saving Tomorrow's Agricultural Resources
    - 2019 NASS Survey

- SWCD staff conduct **windshield** surveys
  - County based; 51,280 points statewide
  - Same data points surveyed; each ½ to 1mile
  - 400 to 500 points over 100 mile transecting route
- Conducted shortly after crop emergence
- Gully erosion reported if treatment needed


Tillage System Trends
Corn Tillage Trends
70%
60%
50%
40%
30%
20%
10%
0%
1994 2006 2009 2011 2013 2015 2017
Conventional
Reduced
Mulch
No-till
Soybeans Tillage Trends
60%
50%
40%
30%
20%
10%
0%
1994 2006 2009 2011 2013 2015 2017


Tolerable Soil Loss
90%
85%
80%
75%
70%
65%
87%
79%
1994
1995
1996
1997
1998
1999
2000
2001
2002
2004
2006
2009
2011
2013
2015
2017

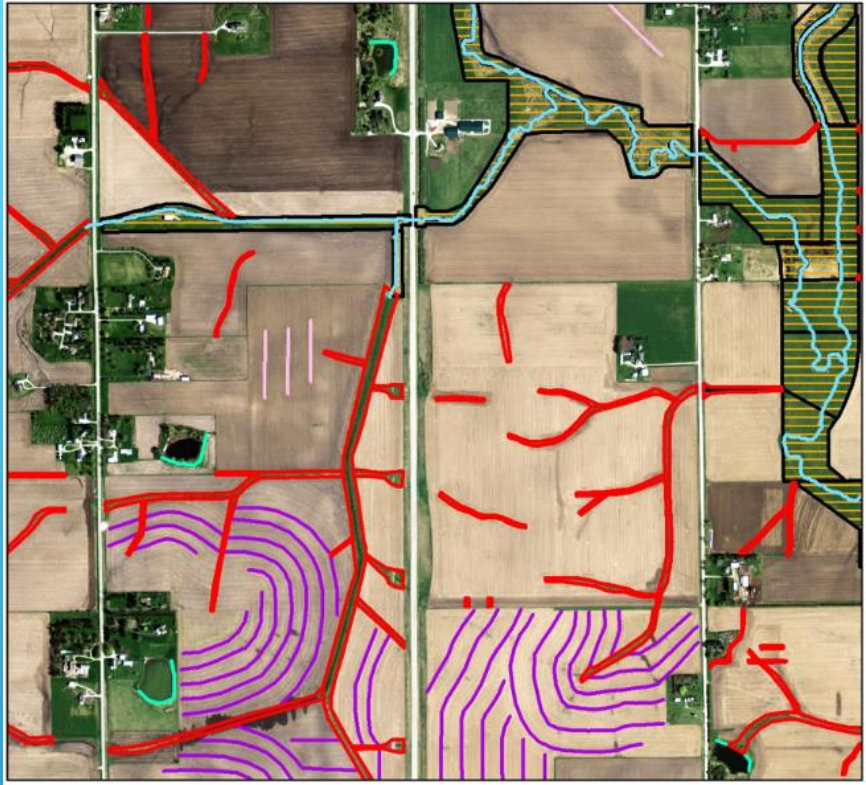
FSA COVER CROP REPORTING

- 2017 BIENNIAL REPORT SHOWED DISCREPANCIES BETWEEN DATA SOURCES FOR COVER CROPS.
- FSA HAS UPDATED THEIR DATABASE FOR REPORTING COVER CROPS.
- BEGINNING IN 2017, COVER CROPS WILL BE CERTIFIED AS:
  - CEREALS AND OTHER GRASSES
  - LEGUMES
  - BRASSICAS AND OTHER BROADLEAVES
  - MIXTURES
- THIS SHOULD PROVIDE MORE ACCURATE DATA ON COVER CROP ADOPTION GOING FORWARD.

EFFORTS TO IMPROVE TRACKING OF STRUCTURAL PRACTICES

- Iowa State University using GIS mapping software to delineate structural practices recommended in the Iowa Nutrient Loss Reduction Strategy.

- Since 2015, student interns have been digitizing practices in watersheds across the state.
- Over 1,400 HUC 12 watersheds have been completed.
- Strong collaboration among funding partners: AmericaView, state government and private industry.



Digitized Conservation Practices in HUC 12 Watershed 0708050905 in Black Hawk County, Iowa

Best Management Practices (NRCS Practice Codes) being digitized:

Contour Buffer Strip - 332	Pond Dam - 378
Grassed Waterway - 412	Stripcropping - 585
Terrace - 600	Water and Sediment Control Basin - 638

NLRS SCIENCE TEAM
DR. LAURA CHRISTIANSON/DR. REID CHRISTIANSON

- **Discussed Iowa's method for adding new conservation practices to their Nutrient Strategy.**
  - **Proposals submitted for consideration once year.**
  - **Must be peer reviewed papers establishing efficacy.**
  - **Needs to include cost of implementing and potential yield impacts.**

- **NLRS Science Team will develop a similar protocol for Illinois.**

S.aving
T.omorrow's
A.griculture
R.esources

About S.T.A.R.

- The Stewardship committee of Champaign County Soil and Water Conservation District have developed a FREE tool to assist farm operators to evaluate their own nutrient loss management practices and to promote "best management practices" on individual fields.

- The S.T.A.R. evaluation system assigns points for each cropping, tillage, nutrient application, and soil conservation activity on individual fields. The rating ranges from 1 to 5 stars.

Trademarked by:
CHAMPAIGN COUNTY Soil & Water CONSERVATION DISTRICT

Next NLRS survey by NASS

Date 3/12/2018

Presented by:
Mark Schleusener

USDA

2017 CENSUS OF AGRICULTURE
YOUR VOICE. YOUR FUTURE. YOUR OPPORTUNITY.

United States Department of Agriculture
National Agricultural Statistics Service

www.agcensus.usda.gov

2019 NASS NLRS SURVEY

- Data collection in early 2019
- Mail, mail again, then by phone
- Results available May 2019.
- Will be included in 2019 Biennial Report

2019 NASS NLRS SURVEY

- Will include more scripted strategies for N applications.
  - Spring N application with nitrification inhibitor
- Several open-ended questions added
  - What else are you doing?
  - Trying to capture new techniques not already in NLRS.

AWQPF SUBGROUP

- **Conclusions**
  - **Tillage data will be included in the next Biennial Report – statewide and by watershed**
  - **Trevor Sample will work with Kim Martin and Natalie Prince to get FSA Cover Crop data for the next Biennial Report**
  - **Iowa is mapping out their BMP adoptions using LIDAR and aerial imagery**
    - **AWQPF will continue to discuss this as an option for Illinois**

AWQPF SUBGROUP

- **Conclusions (continued) --**
  - **Science Team will develop a process to add conservation practices to NLRS**
  - **S.T.A.R. is a free tool to assist farm operators and land owners to evaluate their nutrient loss management practices and promote BMPs**
    - **Developed by Champaign County SWCD's Stewardship Committee**
  - **Next NASS Survey reference year will be 2017, results available in May 2019 and will be included in next Biennial Report**

AWQPF SUBGROUP

- **Next Meeting of AWQPF --**
  - **Date TBD, possibly in August**
- **Tracking Subgroup meeting --**
  - **Date TBD in late June**

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

Improving our water resources with collaboration and innovation

Urban Stormwater Working Group
Josh Ellis, Metropolitan Planning Council

Urban Stormwater Working Group

- Urban Stormwater Working Group
  - Next Call
    - **July 16th**, 2:00 – 3:30pm
  - Next Meeting in Chicago
    - **September** (Date TBA)

- USWG Tracking Subgroup
  - Next Call
    - **June 28th**, 2:00 – 3:00pm

Nutrient Monitoring Council
Gregg Good, Illinois EPA

NUTRIENT MONITORING COUNCIL (NMC)

Update for Nutrient Policy Working Group (5/30/18)

NLRS Workshop: 11/30/17
(9th NMC Meeting) Springfield

10th NMC Meeting: 3/15/18
Springfield

Nutrient Monitoring Council Members (3/15/18)

Illinois EPA
Gregg Good, Rick Cobb

Illinois State Water Survey
Laura Keefer

Aqua Illinois
Kevin Culver

~~**Illinois Natural History Survey**~~
~~Andrew Casper~~ (Need Replacement?)

Illinois Dept. of Natural Resources
Ann Holtrop

Univ. of IL – Dept. of Ag and Bio Eng.
Paul Davidson

Sierra Club
Cindy Skrukrud

MWRDGC
Justin Vick

Illinois Corn Growers Association
Laura Gentry

U.S. Army Corp of Engineers-Rock Island
~~Chuck Theiling~~ Nicole Manasco

U.S. Geological Survey
Kelly Warner

National Center for Supercomputing Apps
Jong Lee

Univ. of IL – Dept. of Nat. Res. & Bio. Studies
Greg McIsaac

NLRS Coordinator – Illinois EPA
Trevor Sample

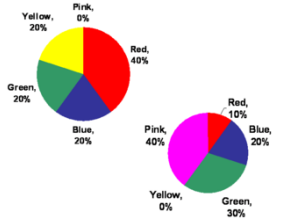
NMC Charges *(Revised 10/26/15)*

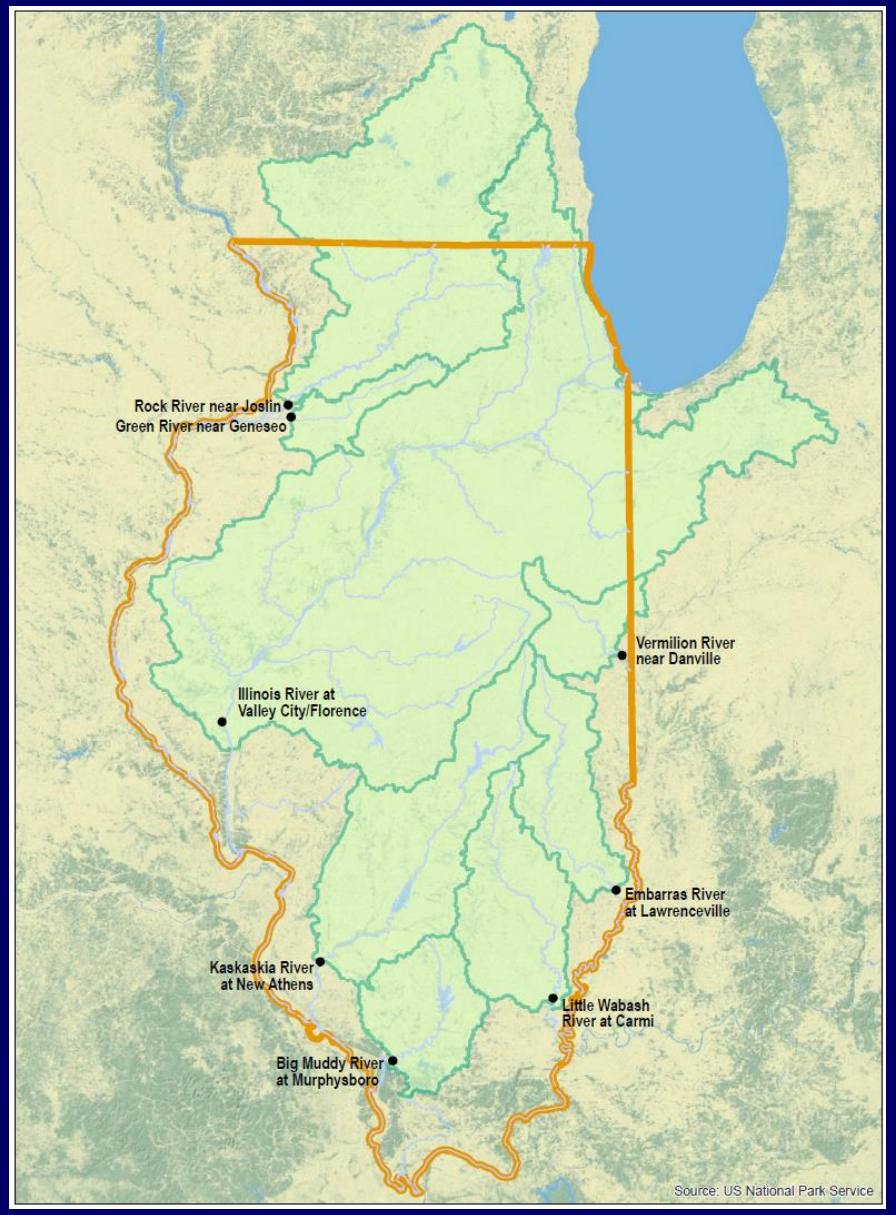
1. Coordinate the development and implementation of monitoring activities (e.g., collection, analysis, assessment) that provide the information necessary to:

   a. Generate estimations of 5-year running average loads of Nitrate-Nitrogen and Total Phosphorus *leaving the state of Illinois* compared to 1980-1996 baseline conditions; and
   b. Generate estimations of Nitrate-Nitrogen and Total Phosphorus loads *leaving selected NLRS identified priority watersheds* compared to 1997-2011 baseline conditions; and
   c. Identify Statewide and NLRS priority watershed *trends in loading over time* using NMC developed evaluation criteria.

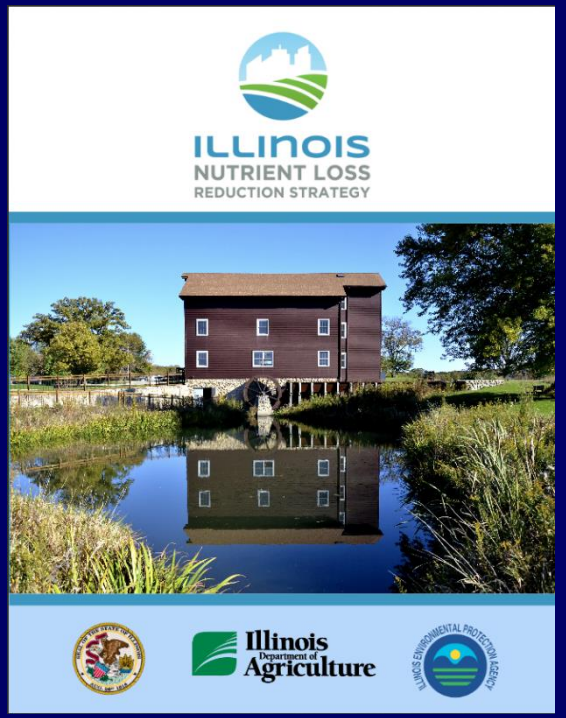
2. Document *local water quality outcomes* in selected NLRS identified priority watersheds, or smaller watersheds nested within, where future nutrient reduction efforts are being implemented (e.g., increase in fish or aquatic invertebrate population counts or diversity, fewer documented water quality standards violations, fewer algal blooms or offensive conditions, decline in nutrient concentrations in groundwater).

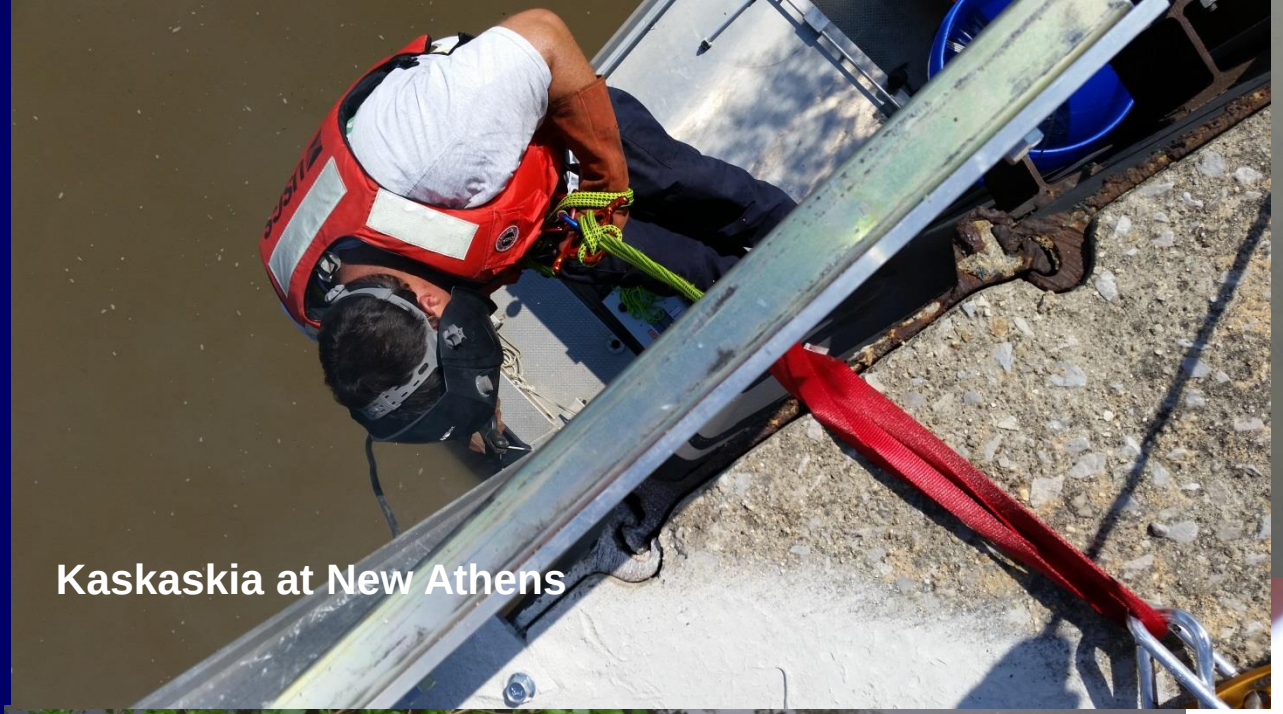
3. Develop a *prioritized list of nutrient monitoring activities and associated funding* needed to accomplish the charges/goals in (1) and (2) above.





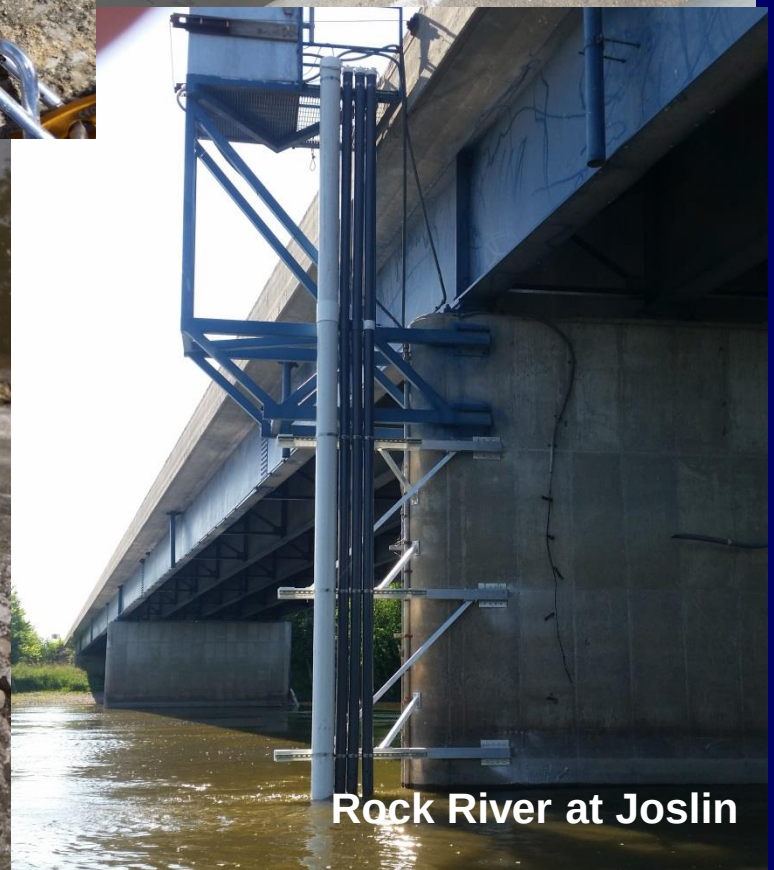
8 USGS/IEPA Super Gages - ~ 75% of Illinois land area




Kaskaskia at New Athens


Little Wabash
at Carmi


Green River at Geneseo


Rock River at Joslin

Provisional normalized annual load for nitrate, total phosphorus, and suspended sediment for each site that the data and (or) regression equations were provisionally adequate.

Normalized annual loads are computed from the period of data available data for each site. Normalized load values were derived from at least one year's worth of data during the period August 2015 through January 2017.

TBD; Insufficient data to determine the annual load or yield.

	Nitrate		Total Phosphorus		Suspended Sediment	
Stream name	Annual load (lb)	Annual yield (lb/acre)	Annual load (lb)	Annual yield (lb/acre)	Annual load (ton)	Annual yield (ton/acre)
Illinois River at Florence/Valley City	215,220,950	12.5	21,020,287	1.2	4,340,965	0.3
Embarras River at Lawrenceville	17,427,920	11.7	1,961,336	1.3	809,448	0.5
Big Muddy River at Murphysboro	2,339,032	1.7	1,310,602	0.9	279,837	0.2
Green River near Geneseo	11,614,829	18.1	338,962	0.5	162,462	0.3
Rock River near Joslin	83,426,545	13.7	TBD	TBD	TBD	TBD
Little Wabash River at Carmi	TBD	TBD	2,571,015	1.3	730,403	0.4
Kaskaskia River at New Athens	12,957,382	3.9	TBD	TBD	758,746	0.2
Vermilion River near Danville	TBD	TBD	TBD	TBD	TBD	TBD

Indicates highest yield

Indicates lowest yield

USGS

In Addition to the 8 Original Super Gage Sites, We Now Have……

- 9th Super Gage at Joliet, Rte. 53 on the Des Plaines River
  - *MWRD funded for D.O, Chlorophyll, and Nutrients*
- Marseilles, Starved Rock, and Peoria Pools on the Illinois River
  - *Illinois EPA funded for D.O. and Chlorophyll*

Inaugural NLRS Workshop

(November 28-30, 2018)

- Purpose
  - To celebrate two years of NLRS progress and release of the First Biennial Report (August 2017)
  - Encourage communication and collaboration with ALL involved

NLRS Workshop Sessions

- Day 2 Plenary Sessions
  - Session A: Policy Working Group: Perspectives on NLRS Implementation (Lauren Lurkins)
  - Session B: Tracking BMP Adoption

    (Trevor Sample)
  - Session C: Next Slide
  - Session D: Research Plenary (Brian Miller)

Session C: Monitoring Nutrient Loads and Water Resource Outcomes – Progress, Opportunities, and Challenges

Moderator: Gregg Good, IEPA

Session C: Monitoring Nutrient Loads and Water Resource Outcomes (Gregg Good)

- Gregg Good – Introduction to Session C and NMC
- Kelly Warner – Super Gage Network
- Paul Terrio – 1st Year Results (nutrients and sediment)
- Greg McIsaac – Assessing Long-Term Changes in Loads and Comparison of Different N Load Estimation Methods
- Jong Lee – Great Lakes to Gulf (NLRS Portal birth)
- Gregg Good – Monitoring Challenges for Estimating Nutrient Loads and Developing WQ Standards
- Panel Discussion – Take Questions, Hear Comments, Discuss Future Needs

Session C Wrap Up For NLRS Policy Working Group: Monitoring Nutrient Loads and Water Resource Outcomes – Progress, Opportunities, and Challenges

Gregg Good, IEPA (11/30/17)

Discussion of Future Needs

- USGS Super Gage Network
  - 8 base sites (IEPA) and 1 added site at Joliet (MWRD)
  - Site on the Kankakee in Indiana
  - Need for a site on the Rock River in Wisconsin?
  - Need to keep the Super Gage Network going for an additional 5 years after 2020 - $2,000,000+?
  - Is there an interest in outfitting all Super Gages with chlorophyll probes? If so, who has the funds?

- Who will do what Dr. Mark David and Dr. Greg McIsaac have been doing for us for free? (Charge: generating 5-year running average loads of N and P leaving the state compared to 1980-1996 baseline conditions, and estimations of N and P leaving priority watersheds compared to 1997-2011 baseline conditions)

Discussion of Future Needs

- Great Lakes to Gulf – Illinois NLRS Site Suggestions
  - What data sets to load into the observatory?
  - Recommendations on how to depict data?
  - Nutrient Monitoring Council members will be asked for their input.

- Documenting Water Quality Outcomes – a lot of the data are being collected at priority watersheds (e.g., chemical, physical, biological, loads), but pulling the data together and documenting results (good or bad) is a big endeavor.

Great Lakes to Gulf Observatory
A Place to Deposit, Organize, and Integrate NLRS Data and Information

Jong Lee, Ph.D. jonglee1@Illinois.edu

National Center for Supercomputing Applications

University of Illinois at Urbana-Champaign

@ Nutrient Monitoring Council, 03/15/2018

Great Lakes to Gulf
VIRTUAL OBSERVATORY

What is the Great Lakes to Gulf Virtual Observatory?

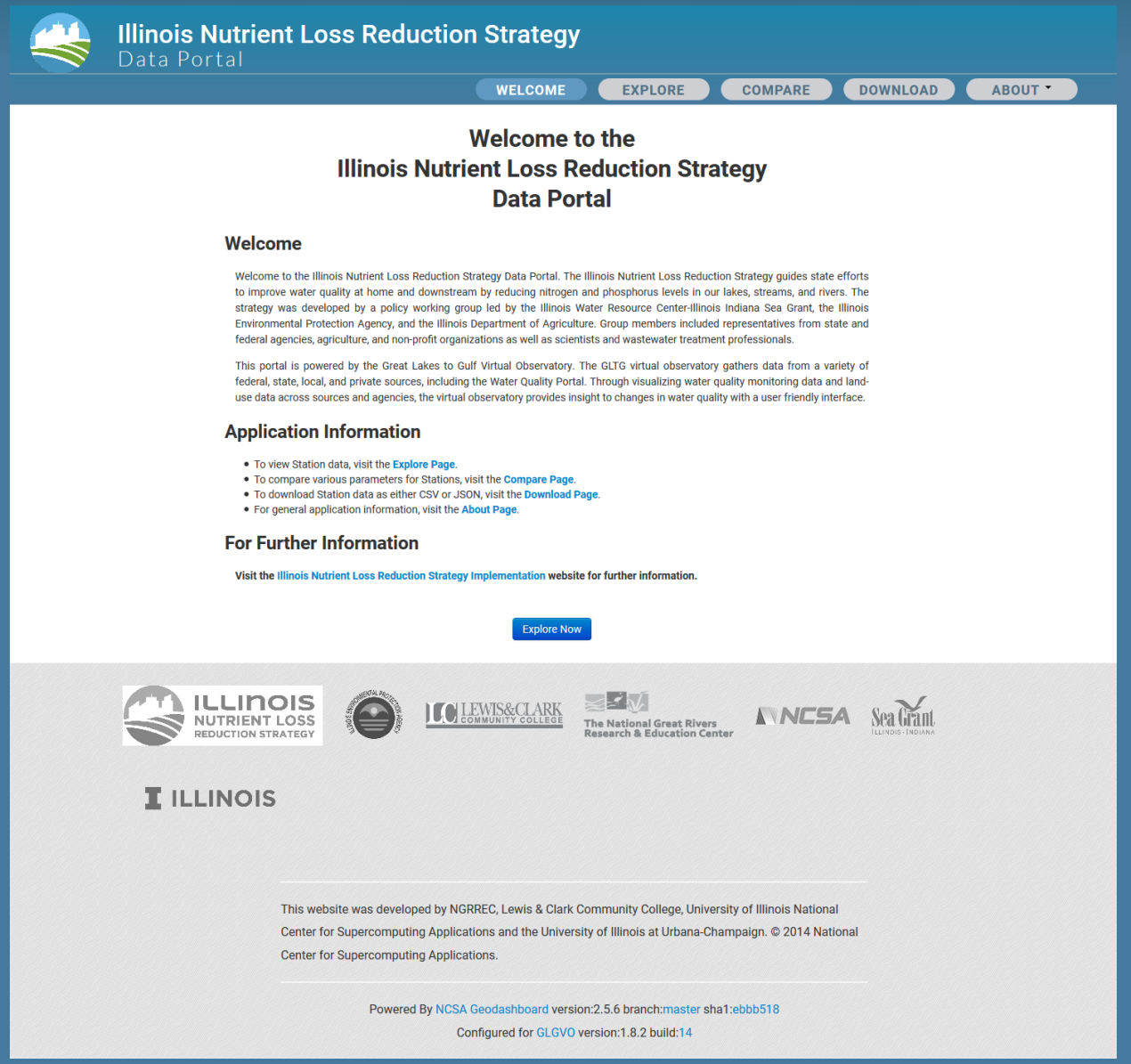
- The GLTG Observatory is a geospatial application that *integrates water quality data from multiple sources to visualize nutrient pollution and water quality conditions* in the Mississippi River watershed, and includes other information related to these conditions.

- The online interactive application *provides users with tools to explore, analyze and compare water quality data* from the Mississippi River and its tributaries.

Great Lakes to Gulf
VIRTUAL OBSERVATORY

Development of IL NLRS Data Portal

(https://Illinois.greatlakestogulf.org)



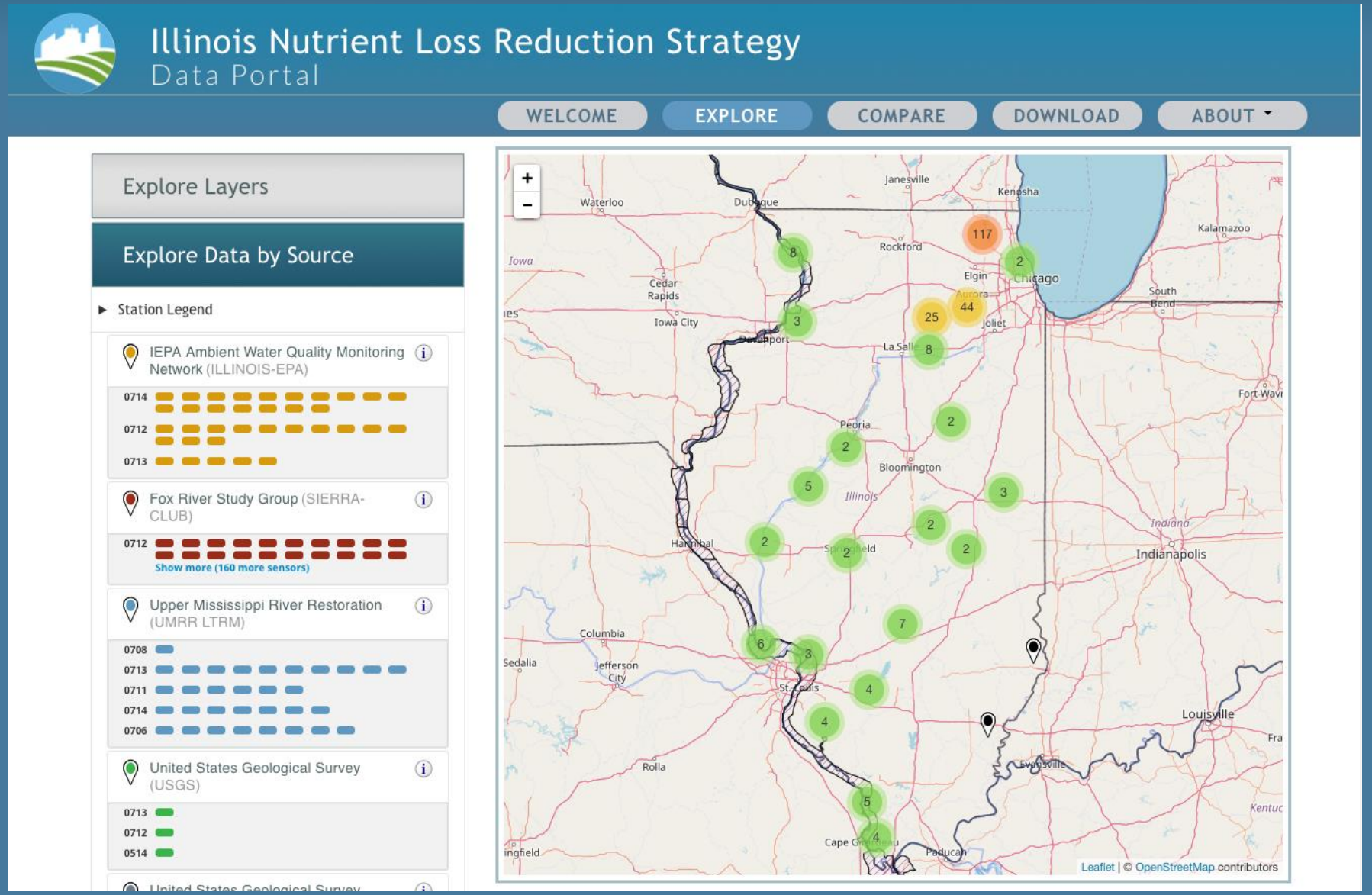
Initial Data

- Great Rivers Ecological Observation Network (GREON)
- IEPA Ambient Water Quality Monitoring Network (AWQMN)
- Data from Fox River Study Group
- Data from Upper Mississippi River Restoration
- USGS
- USGS – Super Gages

Initial GIS Layers

- River network
- HUC2, 4, 8 boundaries
- US State boundaries
- Total Annual Nitrogen from Point Sources by HUC8 (avg. 2007-2014)
- Avg. Annual Nitrogen Fertilizer Inputs for 1997 to 2006
- EPA Impaired Stream Segments (303d, related to nutrients)

Explore Data

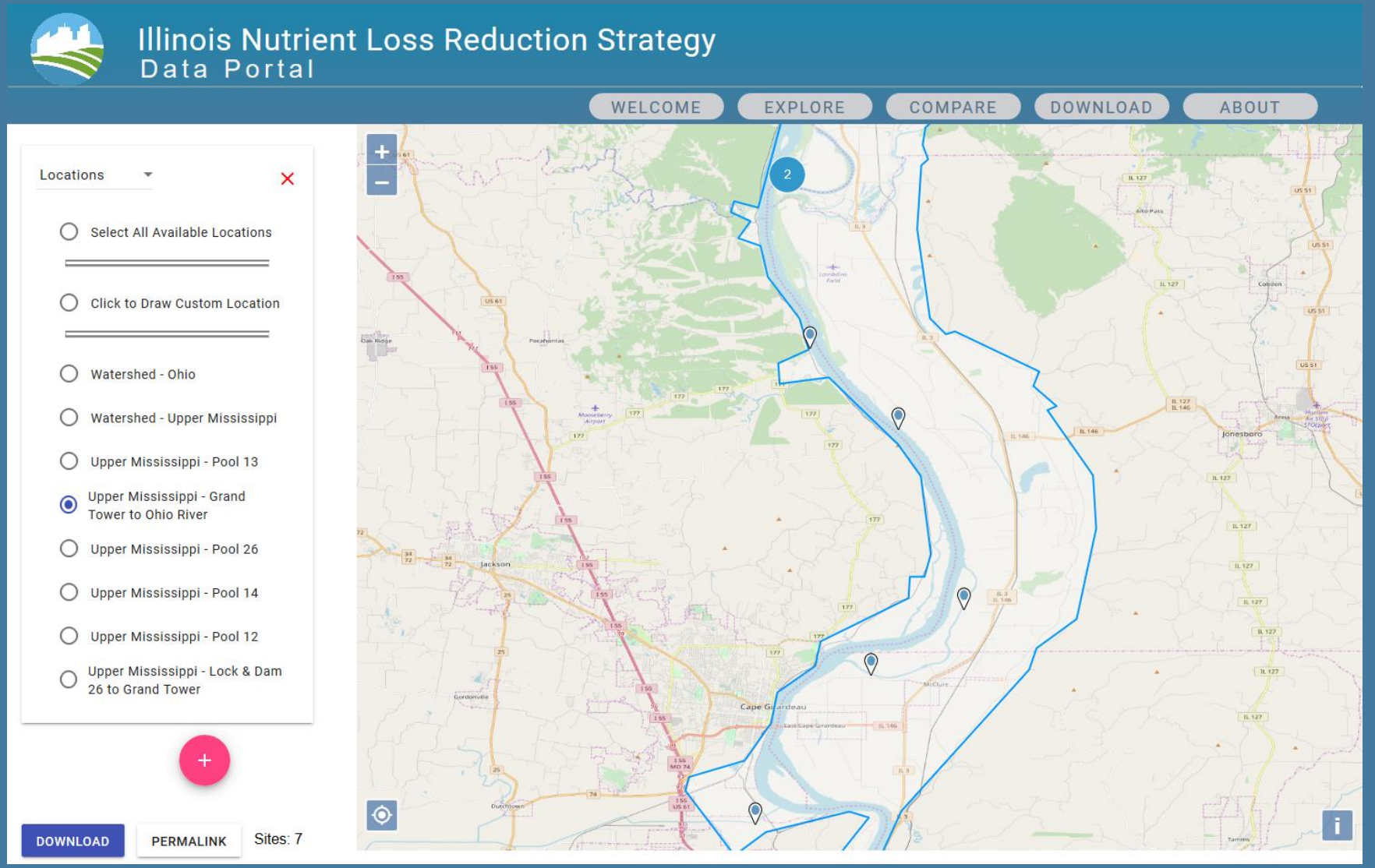


Great Lakes to Gulf
VIRTUAL OBSERVATORY

Compare Data

Great Lakes to Gulf
VIRTUAL OBSERVATORY

Download Data



How to Bring Your Data to the Portal

- Contact: jonglee1@Illinois.edu
- If you have web service and access specification,
  - GLTG team can harvest automatically and regularly from the web service
  - E.g. USGS, EPA STORET
- If you have static file such as Excel, CSV, etc.,
  - Please send the files to GLTG team - we will parse and load to the portal
  - E.g. Fox river data, UMRR data
- Regardless of how data is available,
  - GLTG team needs to understand the data specifications, metadata, parameter, units, etc.
  - It may requires cross-walk among similar parameters.

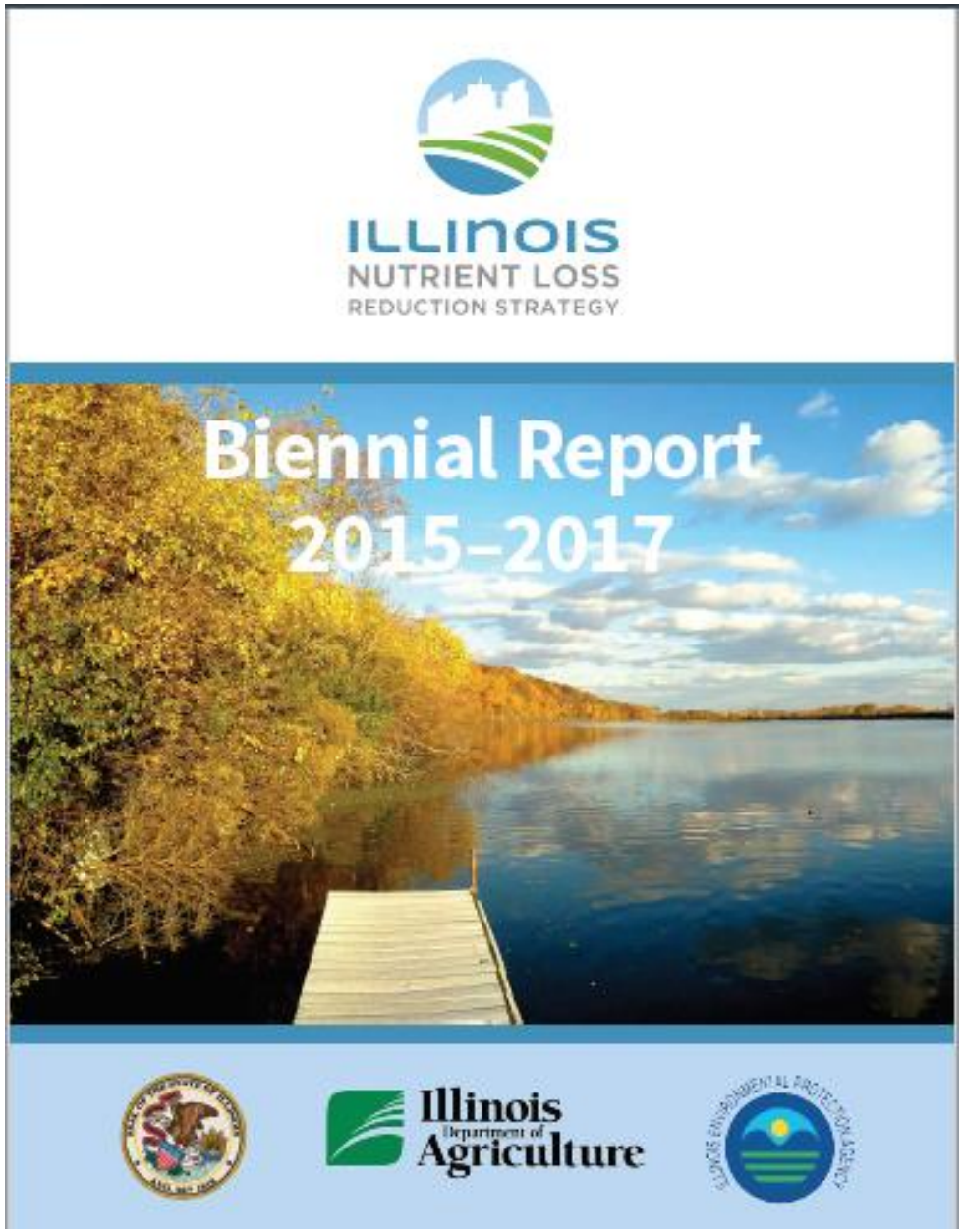
New Collaboration with the University of Illinois Extension

Trevor Sample

- NLRS Watershed Coordinators
- NLRS Science Team

QUESTION/DISCUSSION:

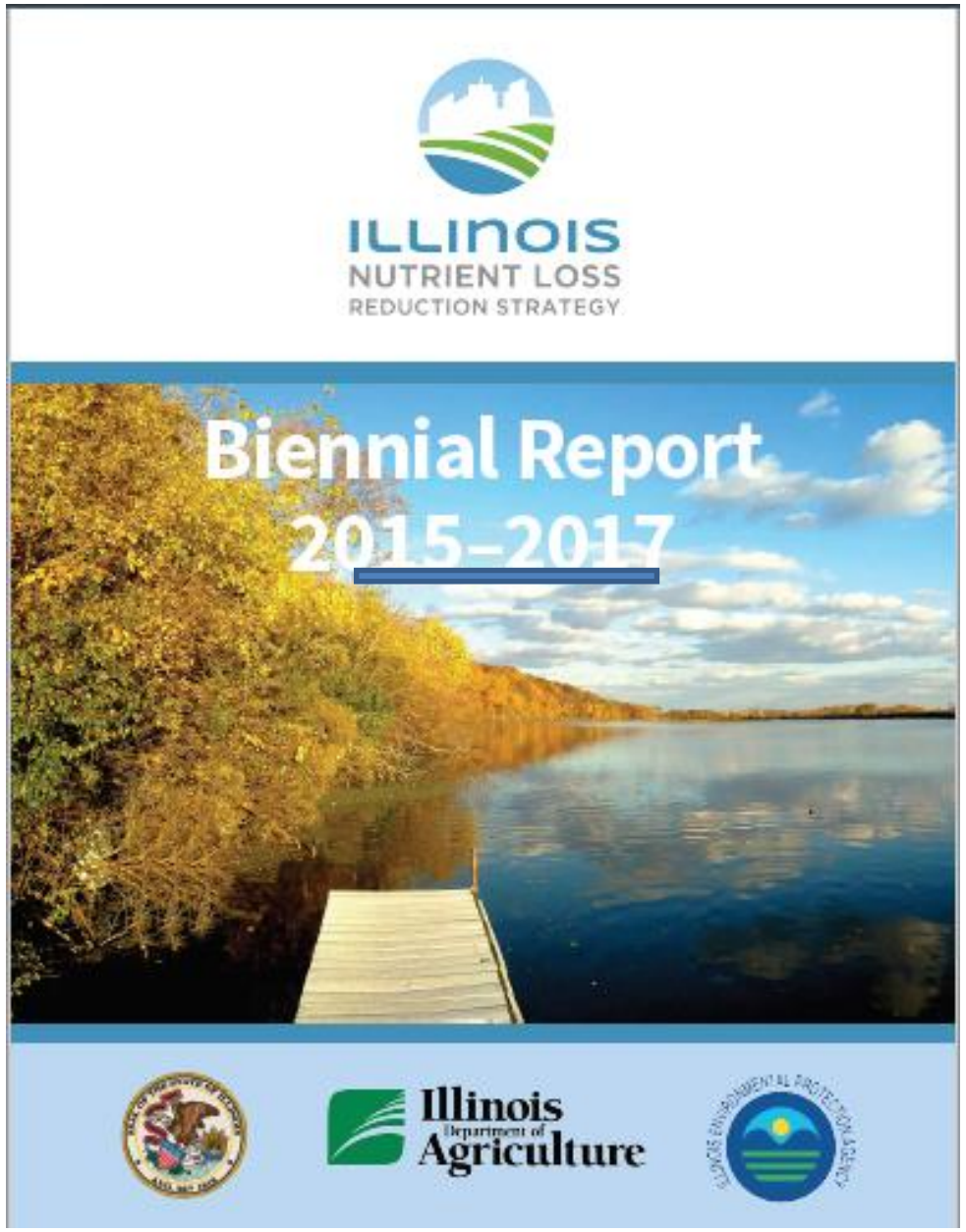
What future opportunities might there be for interaction between the Watershed Coordinators and the NMC?



First Biennial Report: August 2017

What did we say?

- *Goals*
  - 5-year average loads of N and P compared to 1980-1996 baseline conditions.
  - Estimates of N and P leaving selected priority watersheds compared to 1997-2011 baseline conditions.
  - Trends over time.
- *Accomplishments*
  - USGS 8-Station Super Gage Network.
  - Additional Super Gage at Joliet.
  - Identified nutrient monitoring throughout the state.
  - Priority Watershed Nutrient Monitoring Plans

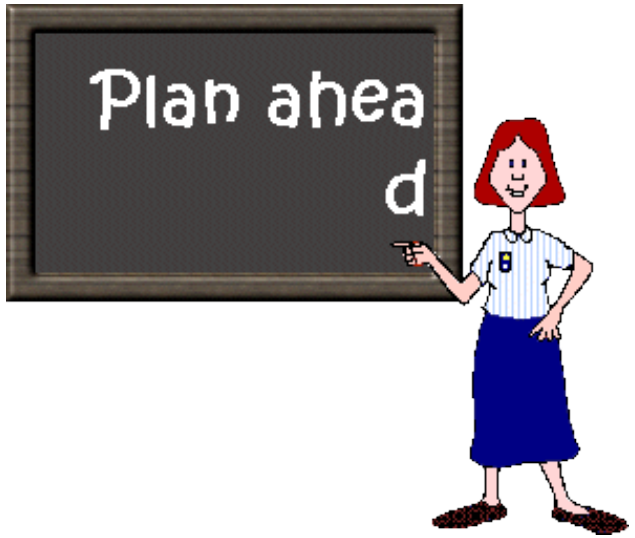


Second
Biennial Report
Due: Fall 2019

It's now: March '18
Report Thru: December '18
Report Due: August '19

What's the Goal for the Next NMC Summary?

- Reiteration of NMC Charges
- NMC Activities Summary
- USGS Statewide Super Gage Annual Loadings Summaries?
- McIsaac/David Statewide Summaries?
- Priority Watershed Loading Summaries?
- Trends?
- Other?



USGS Happenings and Updates

Kelly Warner

- USGS Reorganization – “Central Midwest Water Science Center” (IL, MO, IA)
- USGS Video on Continuous Monitoring
- Super Gage Update
- USGS Mississippi River Basin Nutrient Story Map
- Congressional Briefing – Nutrients in the UMR Basin

Next NMC Meetings

- *August 29, 2018 (in Urbana)*
- *???*
- *???*

NSAC Update
Paul Terrio, USGS

Recommendations for Numeric Nutrient Criteria for Illinois Streams and Rivers

Prepared by:
Illinois Nutrient Science Advisory Committee

Prepared for:
Illinois Environmental Protection Agency
and
Illinois Nutrient Loss Reduction Strategy

1. Introduction

1.1 Brief review of effects of nutrient loading in streams and rivers

1.2 Previous efforts to derive nutrient criteria in Illinois

1.3 Summary of literature review conducted for NSAC by TetraTech

2. NSAC's Approach and Methods to Developing Nutrient Criteria Recommendations for Illinois' Rivers and Streams

2.1 Formation of the NSAC

- 2.1.1 NSAC's charge and scope

2.2 NSAC's approach

- 2.2.1 Literature review
- 2.2.2 Conceptual Model development
- 2.2.3 Stressor-response was preferred approach
- 2.2.4 Other lines of evidence on which NSAC relied

2.3 Data compilation

- 2.3.1 Description of IEPA data
- 2.3.2 Consideration of data from stakeholders
- 2.3.3 Consideration of data from sources outside Illinois

2.4 Data analysis

- 2.4.1 US EPA support and contracting Tetra Tech for statistical analyses and modeling

3. Key Decisions and Rationale

3.1 Decision to rely exclusively on IEPA data for stressor-response analyses

3.1.2 Decision to use seasonal geometric means for chl-a and nutrients

3.2 Decision to use ecoregions

3.3 Decision to pursue a combined criteria approach

3.4 Tetra Tech workplan 1 for stressor response relationships and results

3.5 Tetra Tech workplan 2 and results

3.6 Decision to classify streams as wadeable and non-wadeable

3.6.1 Analysis of stream order / drainage area

3.6.2 Tetra Tech final workplan and results

3.7 How did go from Tetra Tech stressor-response approach to lines of evidence approach

3.7.1 Evaluation of Conceptual Models in light of Tetra Tech analyses

3.7.2 Rationale for combining ecoregions into NSAC North and South for wadeable streams

3.7.3 Statewide approach for rivers

4. Recommendations for Wadeable Streams

4.1 NSAC recommended numeric criteria for TN and TP for both ecoregions

4.2 Response variable criteria recommendations

4.3 Wadeable stream considerations

4.3.1. Lack of periphyton data prevented an ecologically valid stressor-response approach for wadeable streams

4.3.2. Habitat (in-stream and riparian) was a strong factor for fish and invert IBI values

5. Recommendations for Non-wadeable Streams and Rivers

5.1 NSAC response variable recommendation for sestonic chl-a

5.2 NSAC recommended statewide numeric criteria for TN and TP

5.3 Non-wadeable streams and rivers considerations (points to emphasize)

6. **Recommendations for Future Efforts**

7. **Literature Cited**

8. **Appendices**

A. Framework Document

B. Tetra Tech workplan 1

C. Tetra Tech preliminary results

D. Tetra Tech workplan 2

E. Tetra Tech results

F. Tetra Tech final workplan

G. Tetra Tech final results and ROC analysis review

H. Final IEPA dataset file

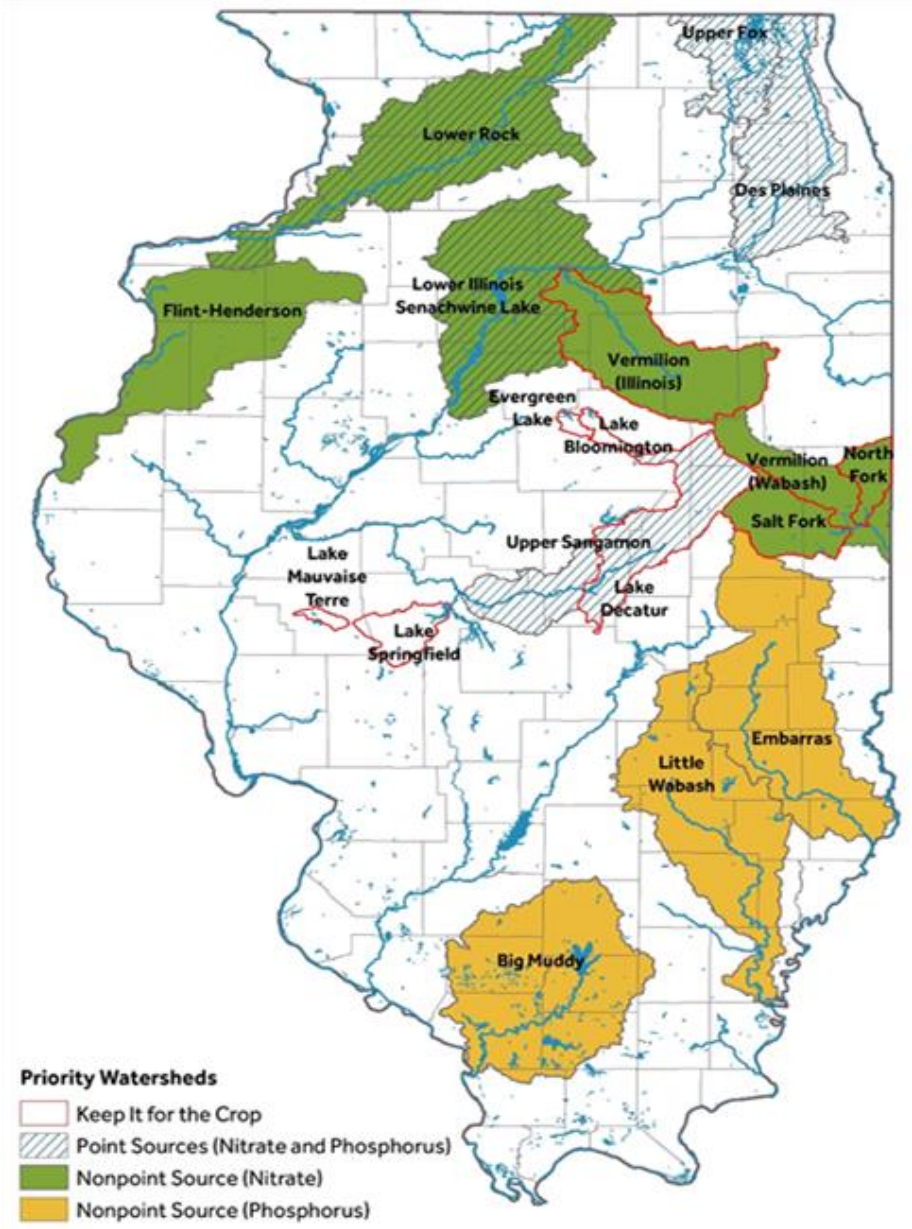
BREAK

Delta Institute: NLRS Policy Briefs Review

Ryan Smith, Delta Institute

MARKET DRIVERS FOR THE ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

delta institute



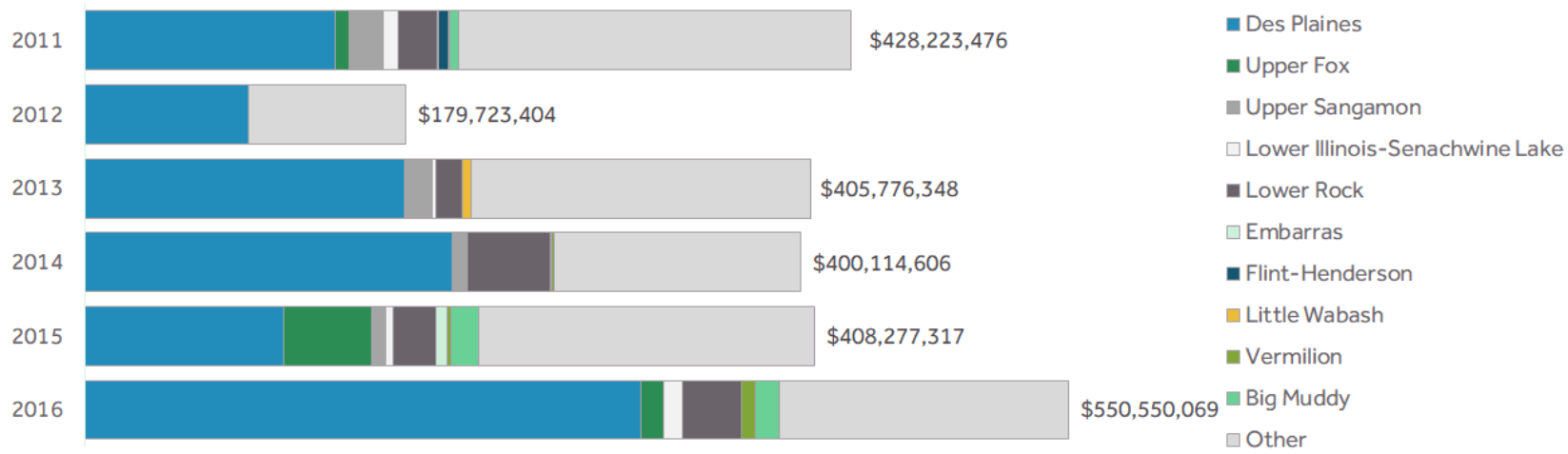
delta institute

OVERVIEW

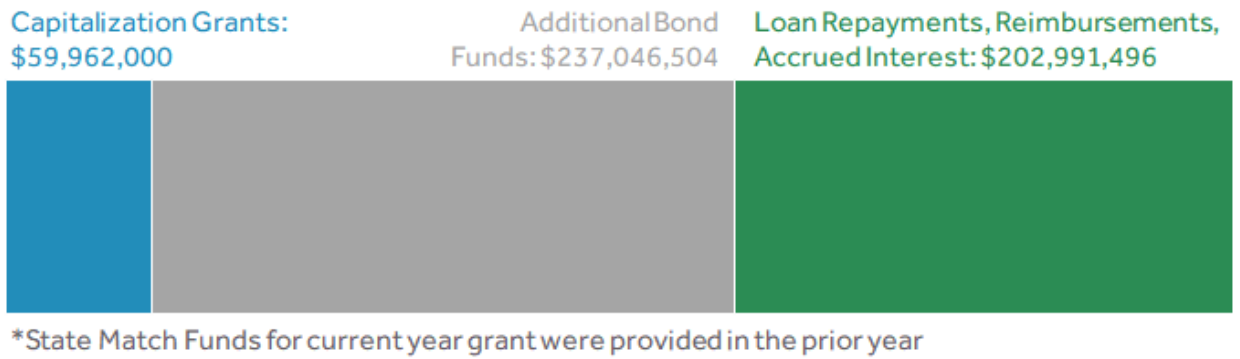
- State revolving funds
- Watershed protection utility
- Pay for performance
- Supply chain partnerships
- Consumer demand
- Land valuation
- Financing soil health
- Lease agreements
- Risk mitigation innovation
- Investors and materiality

delta institute

REALIGNING THE STATE REVOLVING FUND PROGRAM



Composition and amount of the State Fiscal Year 2018 Water Pollution Control Loan Program fund, totaling $500M.



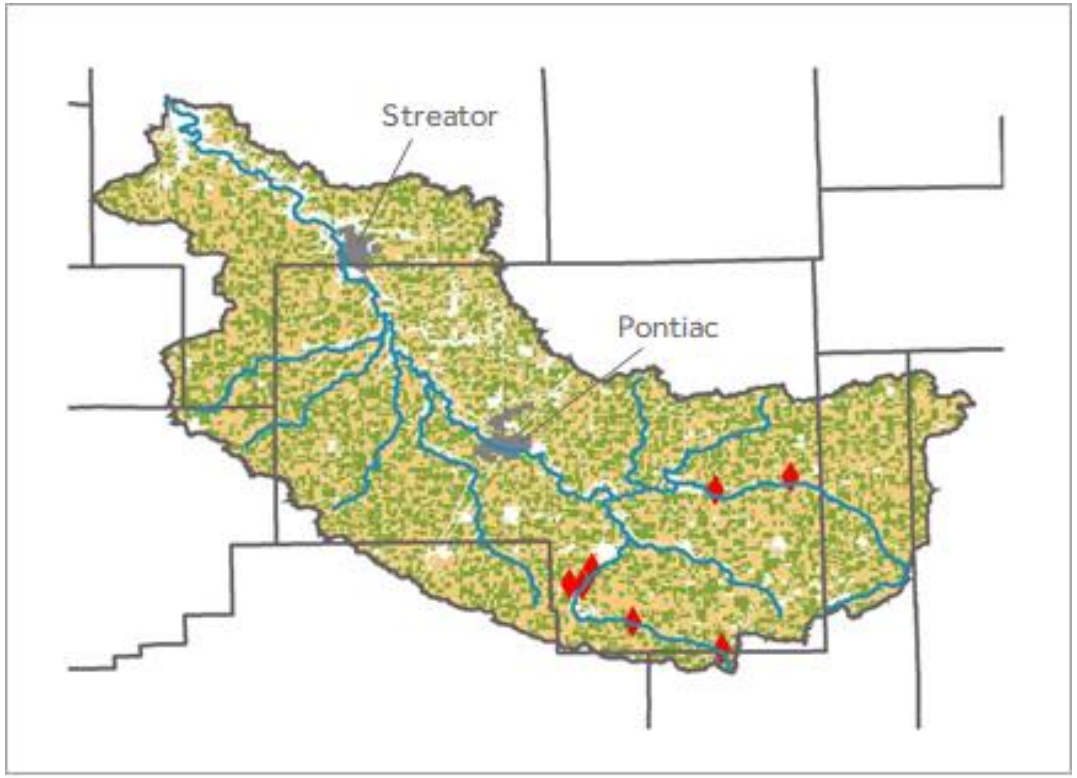
DATA: Illinois EPA, Water Pollution Control Loan Program; Delta Institute independent analysis

delta institute

USING THE PAY-FOR-PERFORMANCE APPROACH

delta institute

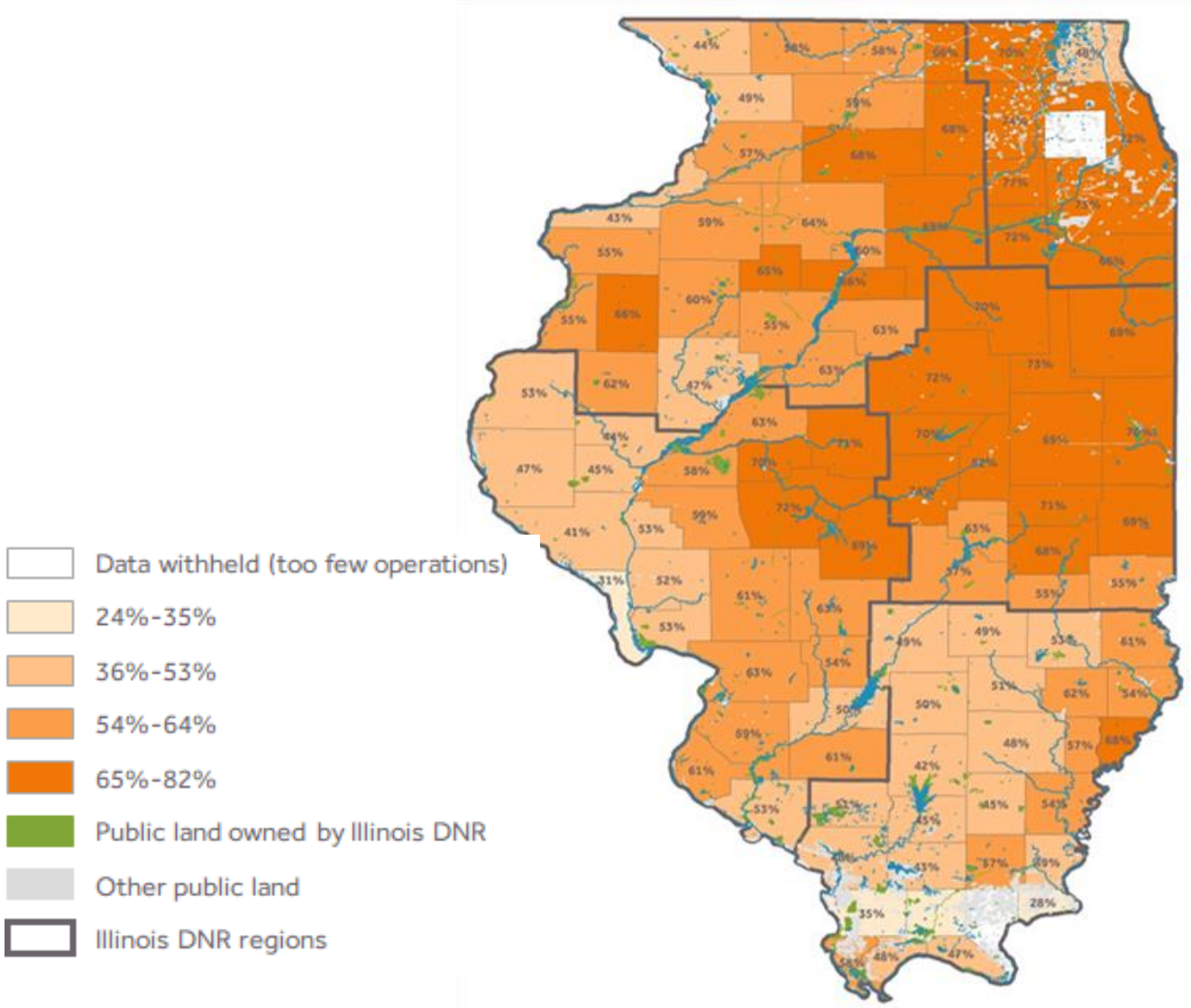
USING THE PAY-FOR-PERFORMANCE APPROACH



DATA: USGS-NWISMapper, 2017; USDA-NASS, Cropland Data Layer, 2017

delta institute

LAND TENURE AND LONG TERM CONSERVATION



DATA: USDA-NASS Census Data, 2012; Delta Institute independent analysis

delta institute

LAND TENURE AND LONG TERM CONSERVATION

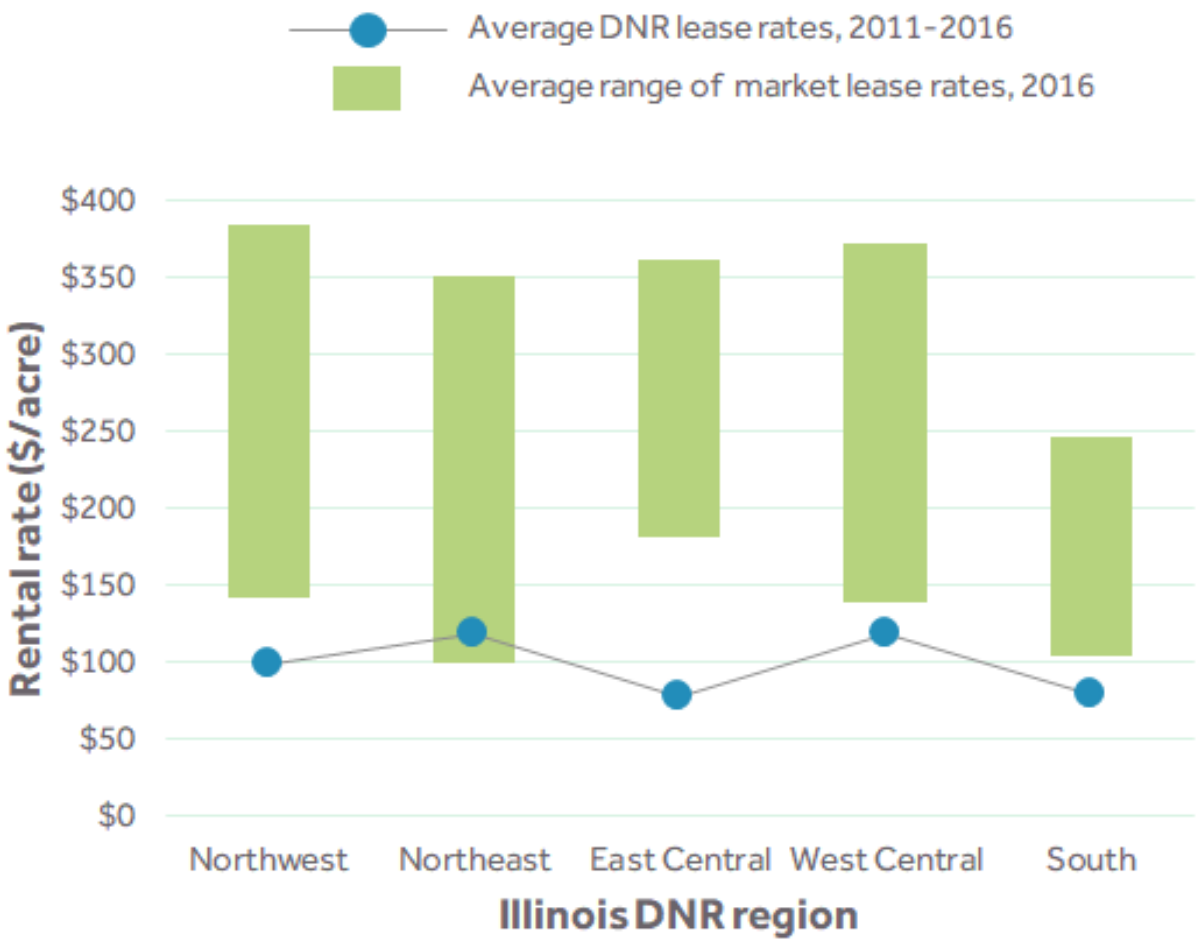
Public land leased for farming in IL (numbers approximate)

	Organization Type	Total Ag Acres	# of Organizations
	Conservation District	6,485	4
	County	2,115	1
	Forest Preserve District	16,685	11
	SWCDs	50	2
County Total		25,335	18
	Township	452	4
	Utility	5,375	1
Local Government Total		5,827	5
	State Agency	34,704	2
	University	16,828	4
State Total		51,532	6
Grand Total		**82,694**	**29**

delta institute

DATA: Delta Institute independent analysis

RATES AND OTHER LEASE CONDITIONS



DATA: Illinois Society of Professional Farm Managers and Rural Appraisers (ISPFMRA), 2016; Illinois DNR, Farm Lease Program 2011-16; Delta Institute independent analysis

delta institute

DISCUSSION & QUESTIONS

delta institute

Science Assessment

Trevor Sample, Illinois EPA
Greg McIsaac, University of Illinois

2019 NLRS Progress Report: Nitrate-N and TP Loads

Gregory McIsaac, Associate Professor Emeritus
University of Illinois at Urbana Champaign

Adjunct Research Scientist
Agricultural Watershed Institute

Which river loads should we update?

- Statewide loads based on 8 major river systems?
- 39 HUC 8 Watersheds?
- Estimate point and non-point yields by HUC 8
- Estimate point and non-point yields by 8 major river basins?

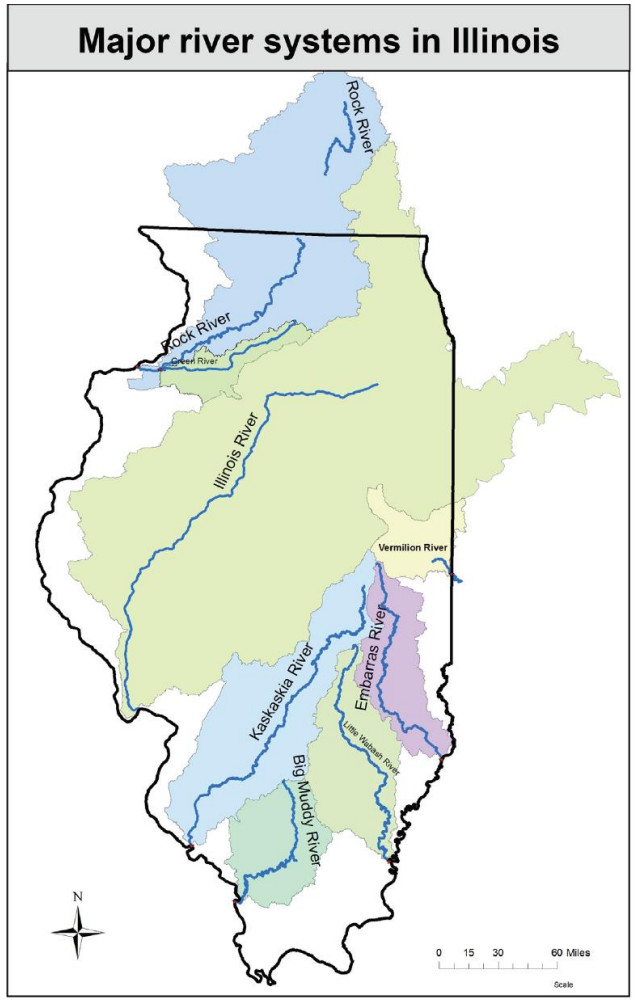


Figure 3.1. The eight major river systems used in estimating state nutrient loads. Note that gaging stations are upriver from the state boundary, so the estimated area is smaller.

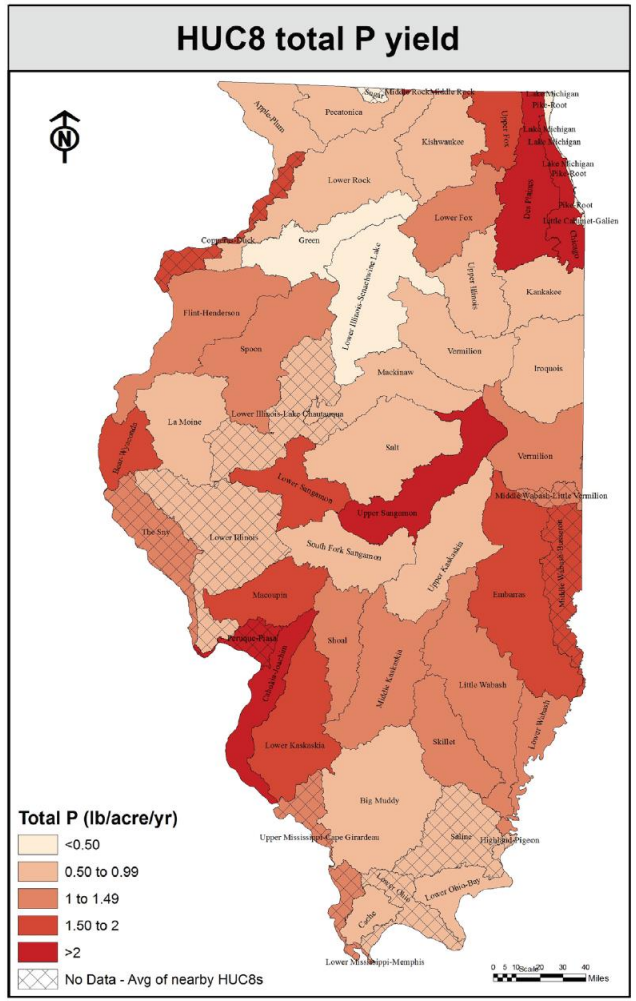


Figure 3.14. Total phosphorus yields by HUC8 in Illinois.

Previously Estimated Loads

- Statewide Nitrate and TP based on 8 major rivers
  - Baseline period 1980-96
  - Post-baseline 1997-2011
  - Post-baseline updated in 2017 to include 2012-15

- HUC 8s
  - post-baseline 1997-2011, but with limited concentration samples in 2007-8
  - Point source input estimates (~2011)
  - Non-point source load = estimated load – point source inputs

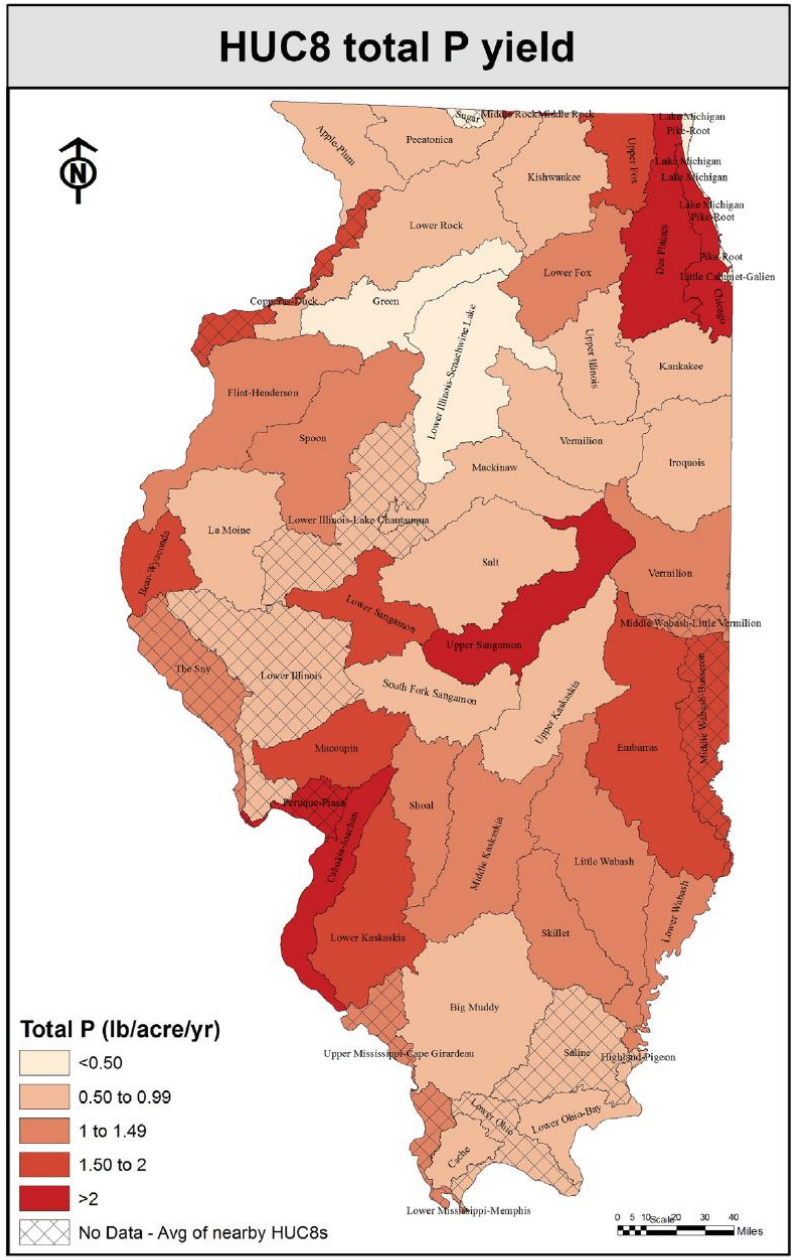


Figure 3.14. Total phosphorus yields by HUC8 in Illinois.

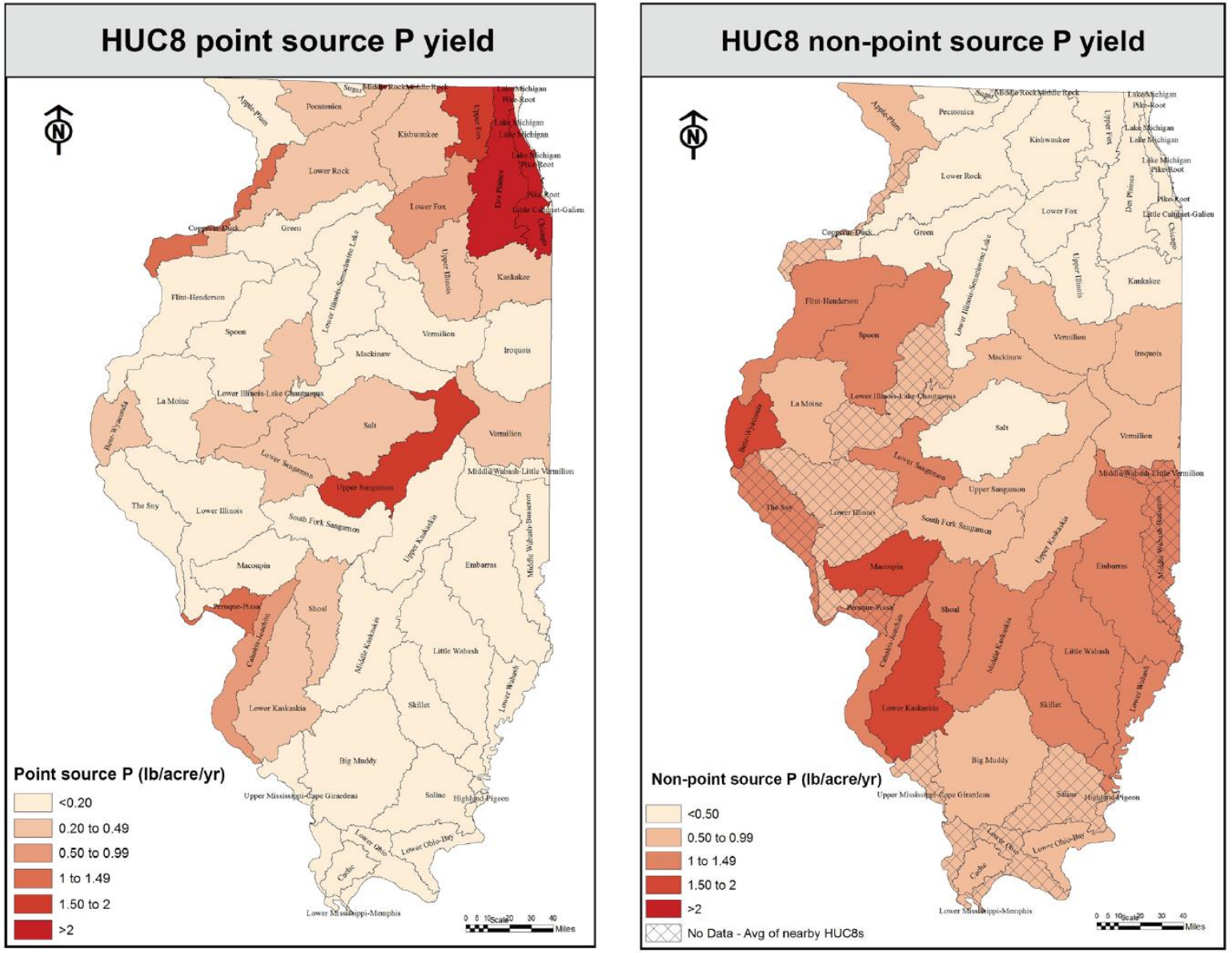


Figure 3.15. Point and non-point source total phosphorus yields by HUC8 in Illinois.

Annual Load Estimation Methods Used in NLRS

Load = concentration x discharge

USGS provides daily discharge

IEPA and USGS provide sample concentrations approximately monthly

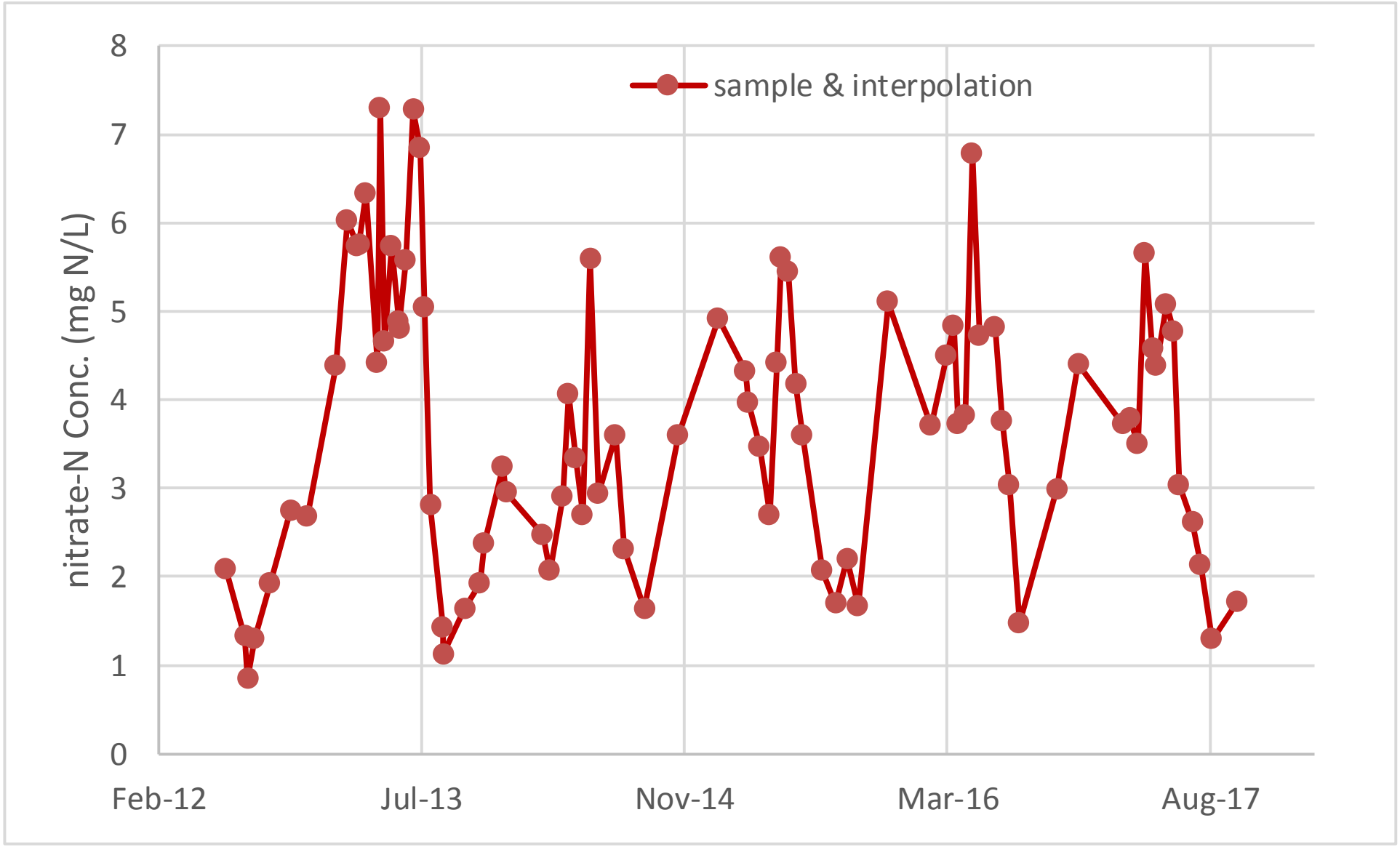
Need to estimate daily concentrations between observed concentrations

Nitrate: Linear Interpolation

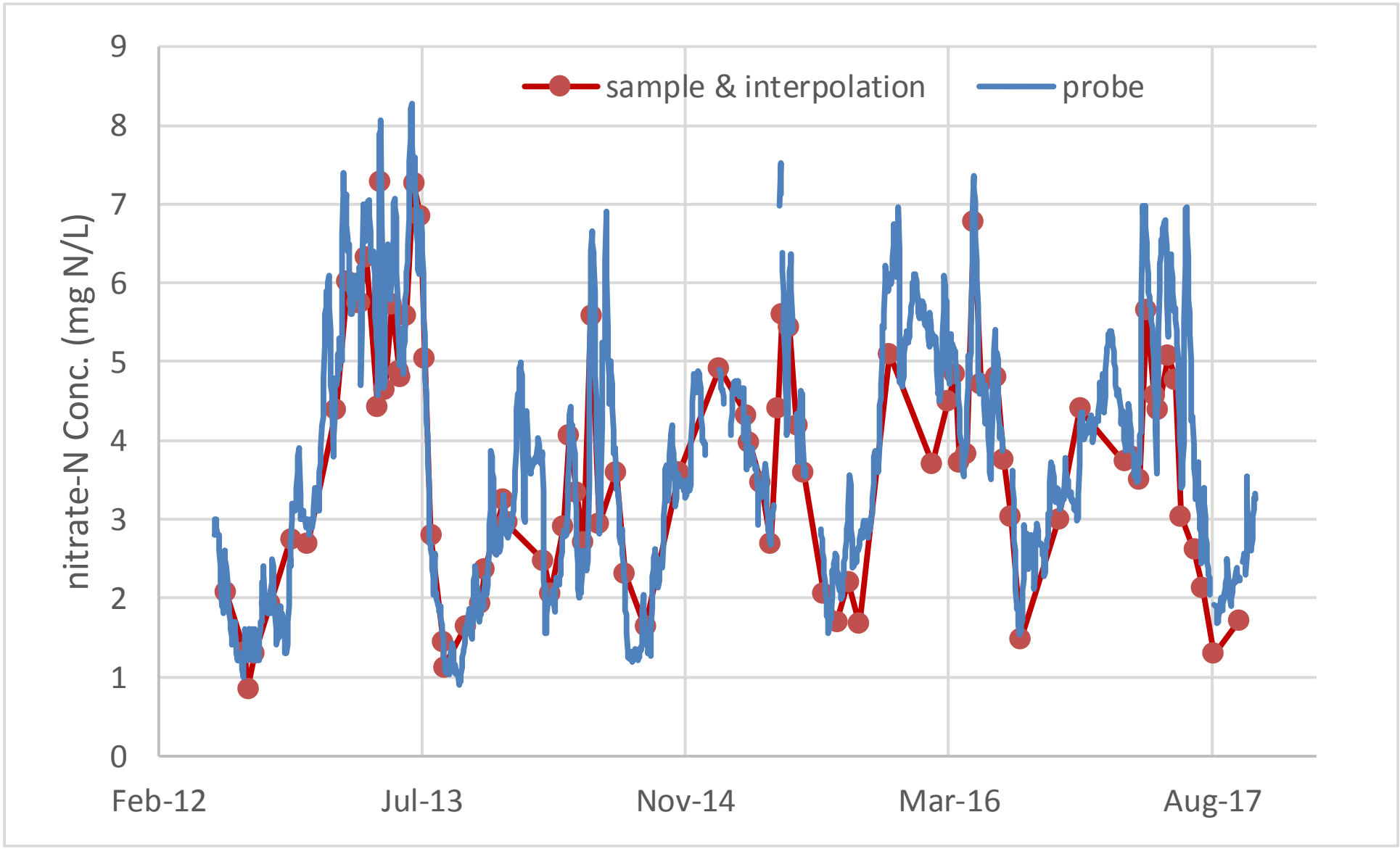
Phosphorus: Weighted Regressions on Time, Discharge and Seasonality (WRTDS)

Daily nitrate-N estimations of concentration by linear interpolation

Measured Nitrate-N concentrations ( )and linearly interpolated values at “Valley City” 2012-17

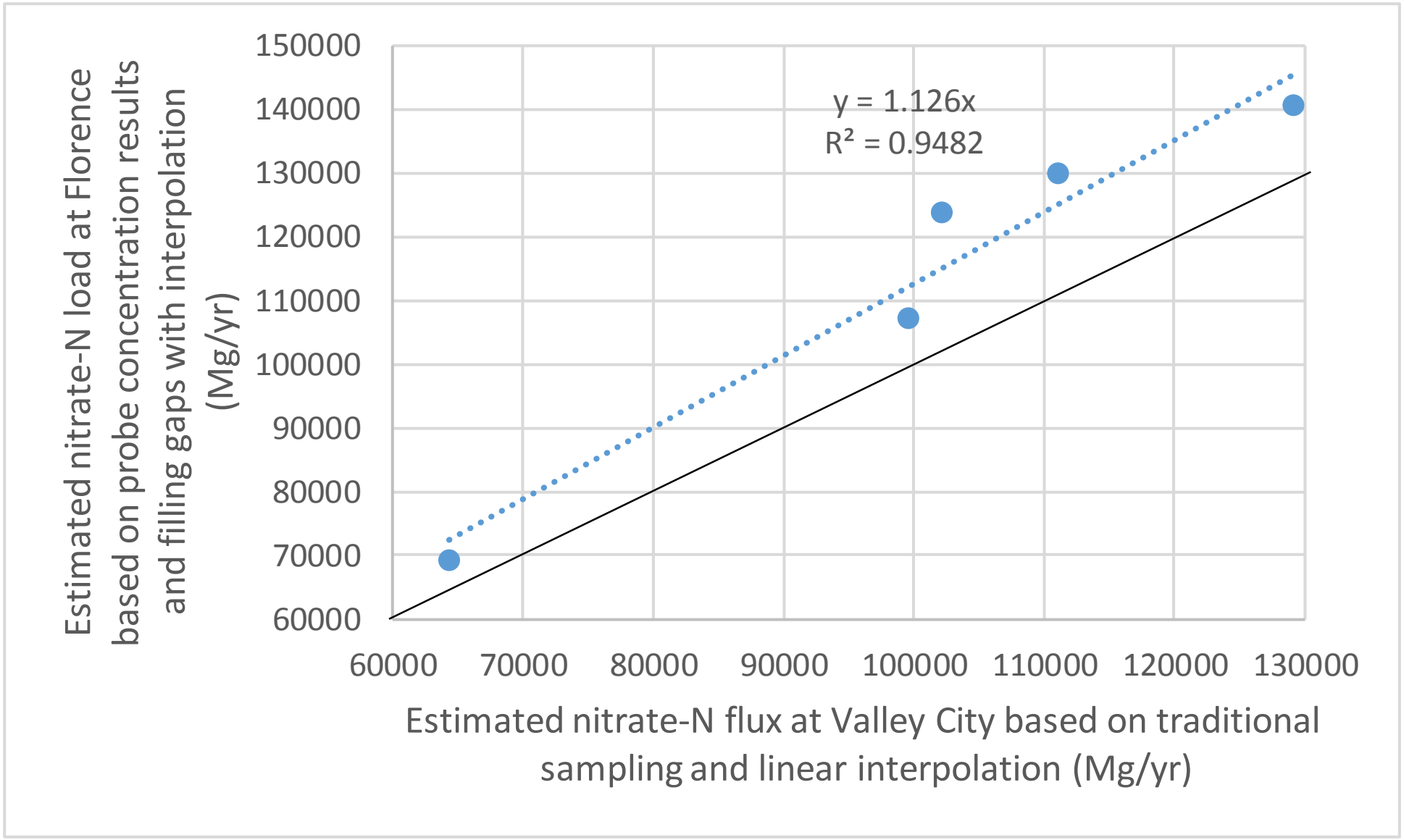


Daily mean Nitrate-N concentrations at Florence (probe) and measured and interpolated values at “Valley City”



Estimated annual nitrate-N loads at “Valley City” and Florence 2013-2017

From traditional sampling methods and linear interpolation, vs. continuous probe measured concentrations



There is a need to harmonize loads calculated from traditional sampling with loads calculated from continuous probe measurements.

Phosphorus concentrations tend to be highly variable with flow (more so than nitrate)

- WRTDS estimates daily concentrations based on the relationships between observed concentrations and discharge, season, and trends over time.
- Estimates annual loads and “flow normalized” loads
- Recommended dataset > 200 concentration observations (~22 years of IEPA data)
- Including more recent concentration data will probably cause some small changes in the previous load estimates, presumably improvements because they will be based on a larger dataset.

Advantages of updating HUC 8 load values

- ~6 additional years of concentration data
- Closer to recommended 200 observations for WRTDS
- Evaluate changes over time
  - 1997-2006 vs 2009-2017 (there was very limited sampling in 2007-8).
- Opportunity to better synchronize point source inputs with river load estimates

Time Required for Alternative Updates

- 8 major rivers with traditional method and super station data: 1 month (@ 50% time)
- Same as above + point and non-point update: 1 month* (@ 50% time)
- Update 39 HUC 8s: 4 months (@ 50% time)
- Update 39 HUC 8s with point and non-point yields: 4 months* (@ 50% time)

*Assuming point source data will be provided by Trevor Sample. If Greg McIsaac works independently to update the point source data with the help of IAWA, it will require an additional month at 50% time.

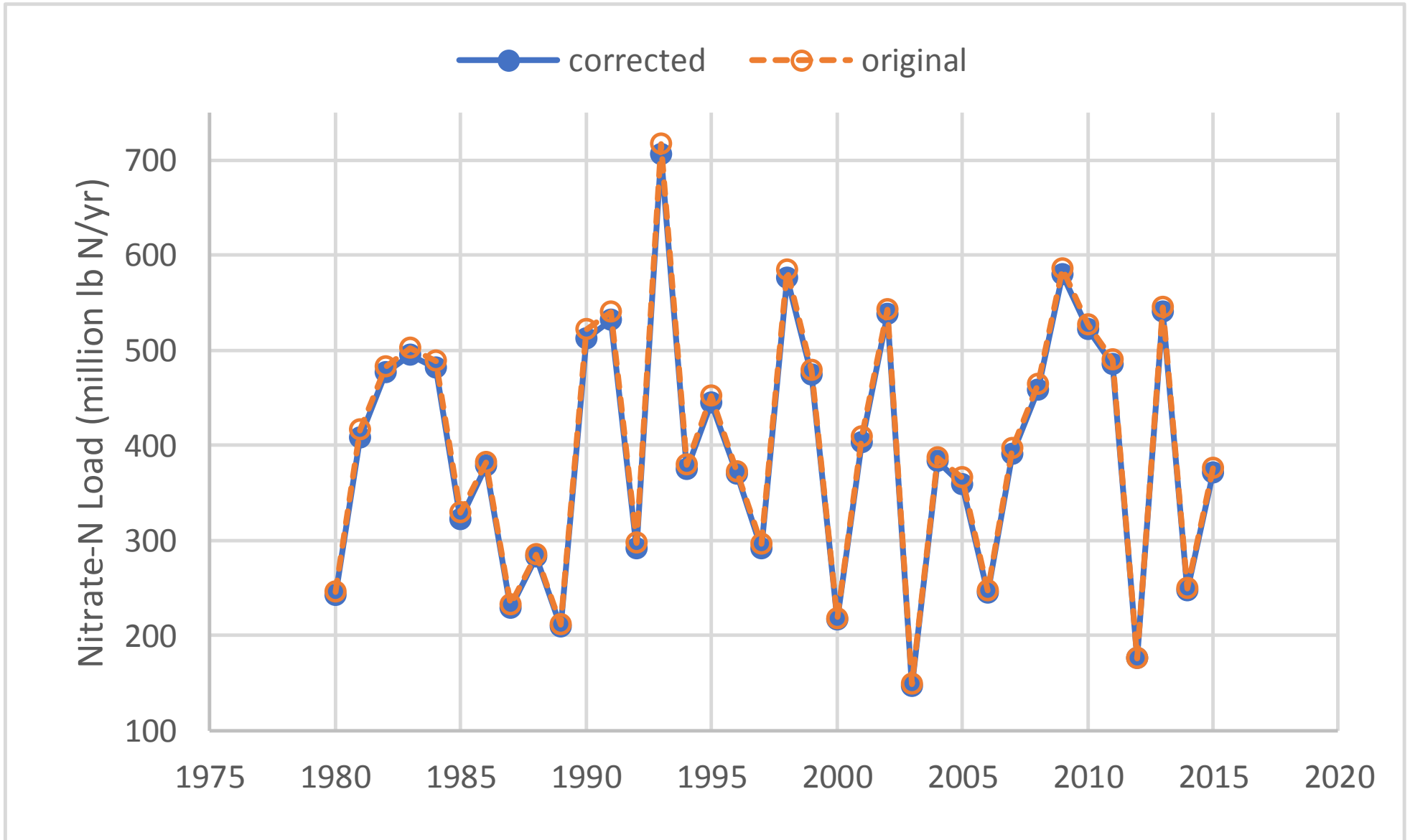
Small error in previous estimates of statewide loads

Table 3.3. River systems, location and station number of discharge and water quality data, drainage area, and fraction of drainage area in Illinois used in estimating export of nitrogen and phosphorus by surface water from Illinois.

River system	Gage location	USGS station number	Drainage area (sq. mi)	Fraction in Illinois (percent)
Rock	Joslin	05446500	9,549	46
Rock	Rockton	05437500	6,362	
Green	Geneseo	05447500	1,003	100
Illinois	Valley City	05586100	26,743	~~93~~ → 85
Kaskaskia	Venedy Station	05594100	4,393	100
Big Muddy	Murphysboro	05599500	2,169	100
Little Wabash	Carmi	03381500	3,102	100
Embarras	Ste. Marie	03345500	1,516	100
Vermilion	Danville	03339000	1,290	~~100~~ → 92.6

corrected values

Original and Corrected Statewide Nitrate-N Loads



Original and Corrected Statewide Total P Loads

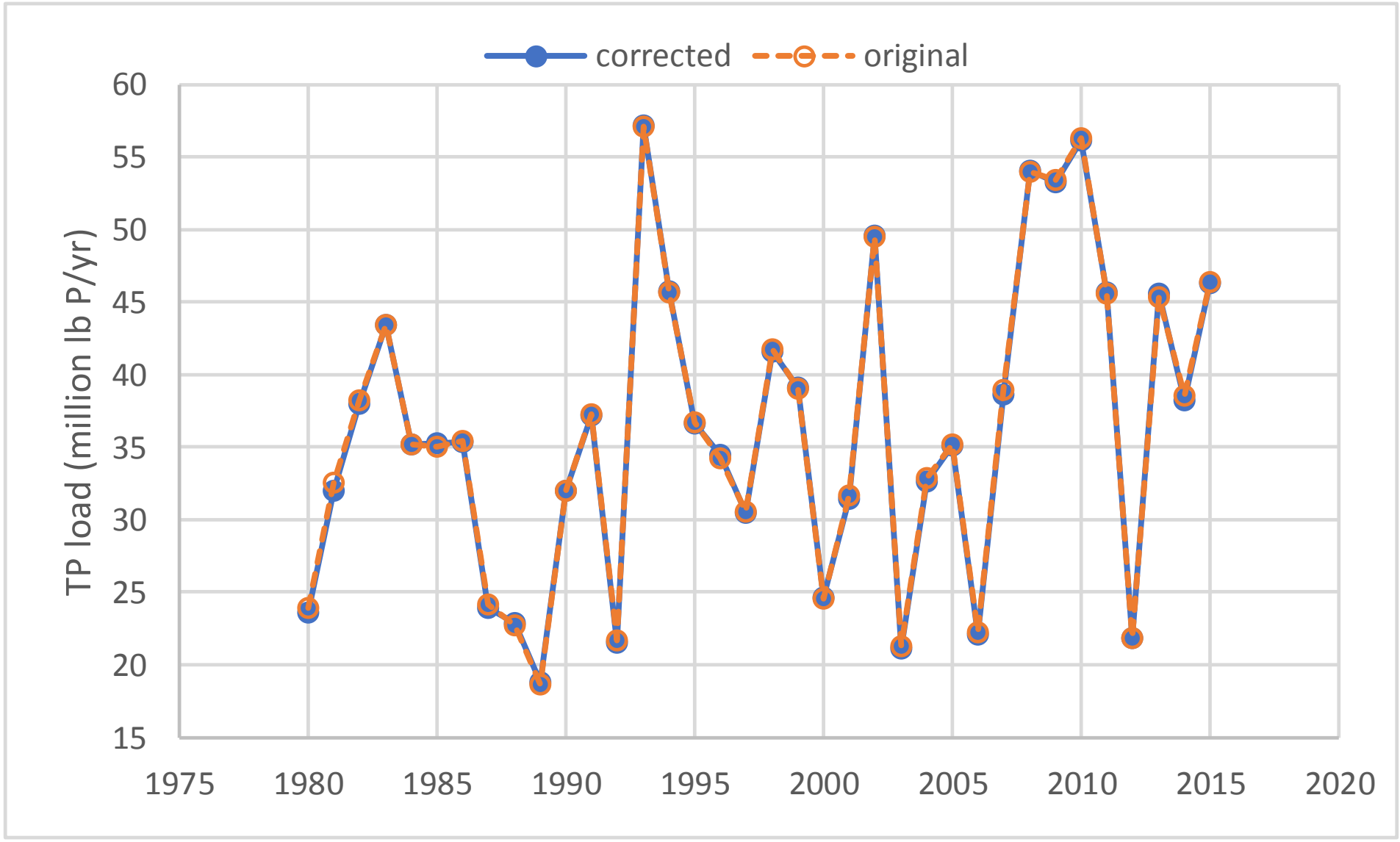


Table 3.4. Water, nitrate-nitrogen, total nitrogen, DRP, and total phosphorus loads for Illinois for 1980-1996 and 1997-2011, along with David and Gentry (2000) estimates as a comparison. Point source loads are also shown as well as point sources as a percent of the recent loads.

	Water	Nitrate-N	Total N	DRP	Total P
	10^{12} ft^3 yr^{-1}	million lb yr^{-1}			
David and Gentry (2000)	1.6		538		31.3
1980-1996	1.7	~~404~~ → 397	527	15.4	~~34~~ → 33.9
1997-2011	1.72	~~410~~ → 404	536	18.5	~~37.5~~ → 37.4

These corrected Total P loads were calculated using 1980-2011 concentrations in WRTDS. When re-calculated using 1980-2015 concentrations, the 1980-96 load was 33.7 and the 1997-2011 load was 38.4, which are probably more accurate estimates, because load estimates with WRTDS are increasingly uncertain at the beginning and end of the data record. The availability of the 2012-15 data improved the 1997-2011 estimates.

Illinois Nutrient Loss Reduction Strategy page 3-10

Suggested edits to the Biennial Report page 9:

"~~Total~~ Estimated annual nitrate-nitrogen losses leaving Illinois ~~from the eight major rivers~~ in 2011–2015 were ~~10~~ 8 percent less than losses during the 1980 to 1996 baseline period (Figure 3.1). "

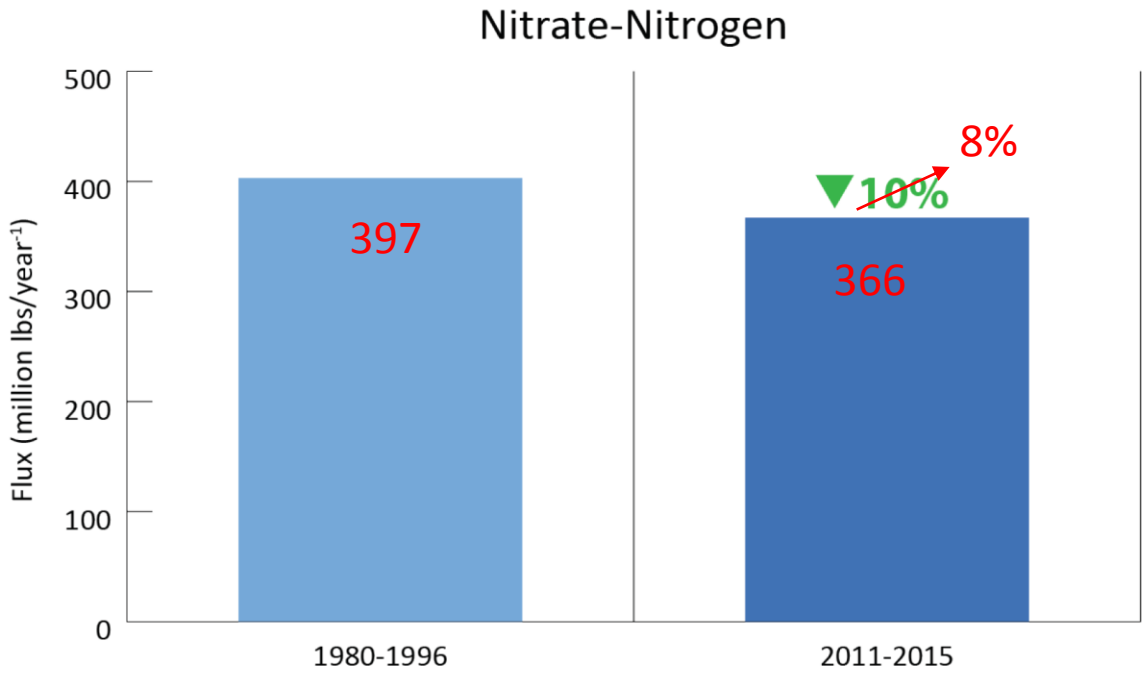


Figure 3.1. Comparison of nitrate-nitrogen flux in eight major Illinois rivers from 1980–1996 to 2011–2015

These losses are not the sum of the loads from the eight major rivers, but an estimate of the losses from the state as a whole based on losses from the eight major rivers.

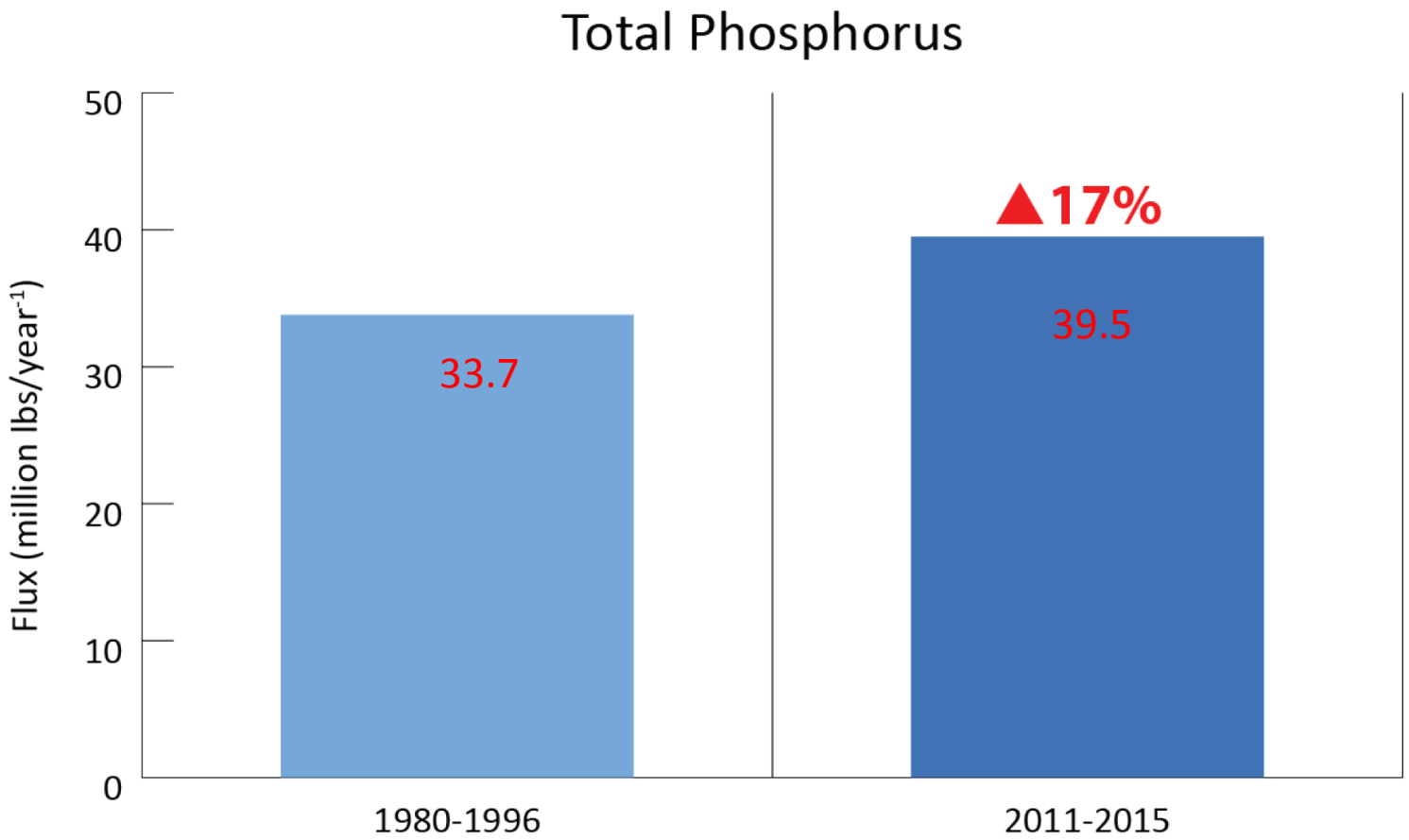


Figure 3.2. Comparison of total phosphorus flux in 8 major Illinois rivers between 1980-1996 and 2011-2015

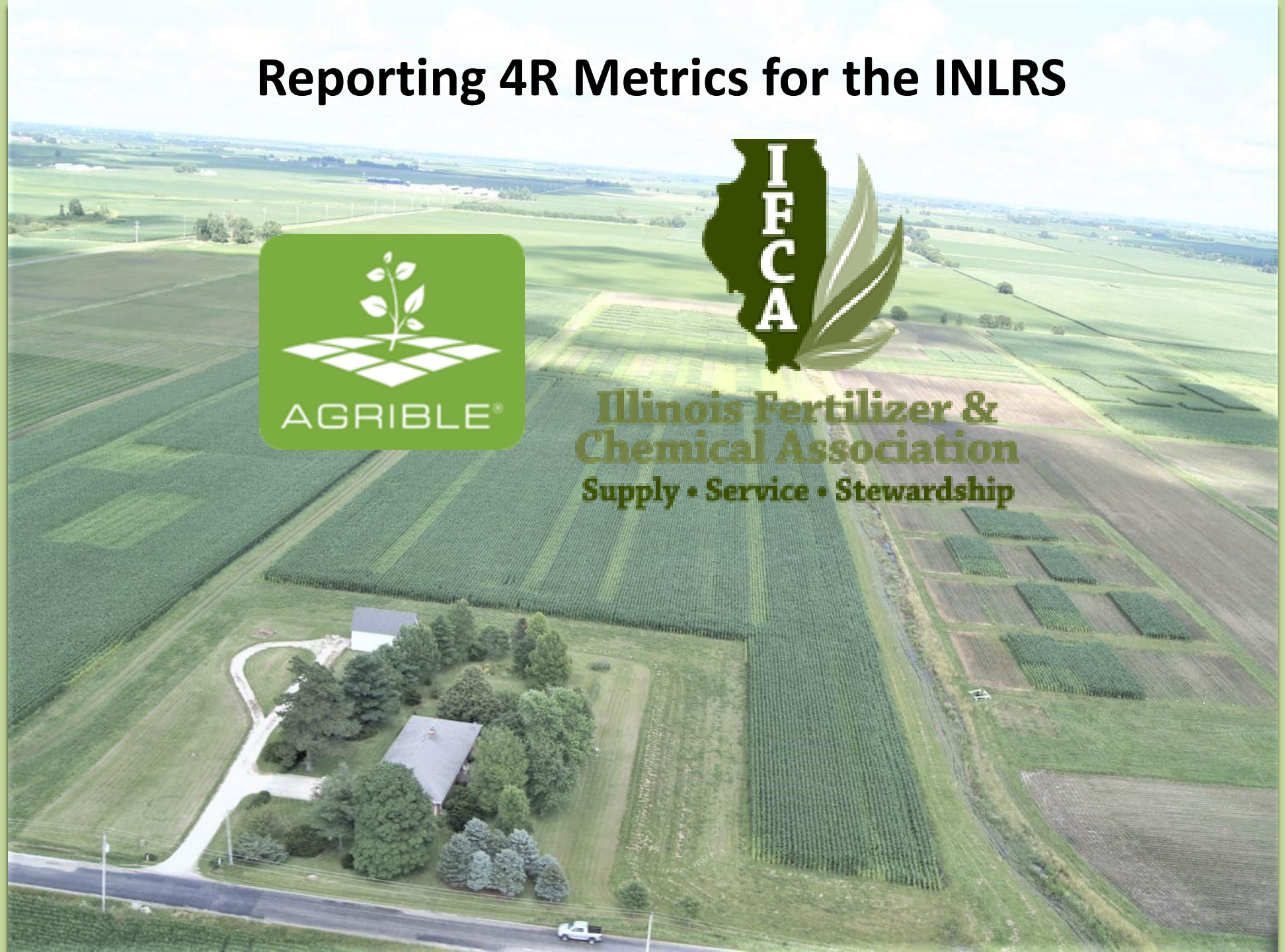
The estimated TP load for 1980-1996 changed slightly from the estimate appearing in the NLRS because the additional concentration and flow data (2011-2015) modifies the relationships that WRTDS uses to estimate loads.

SCIENCE ASSESSMENT OPTIONS

- 8 major rivers with traditional method and super station data
- 8 major rivers with point and non-point update
- Update 39 HUC 8s
- Update 39 HUC 8s with point and non-point yields
- Other

Agrible 4R Metrics Project
Jean Payne, IFCA

Reporting 4R Metrics for the INLRS



IFCA's Mission Statement: **To assist and represent the crop production supply and service industry while promoting the sound stewardship and utilization of agricultural inputs**

1,100+ members statewide including:

- Ag Retailers
- Fertilizer, Pesticide & Seed Manufacturers & Distributors
- Equipment Suppliers
- Transporters

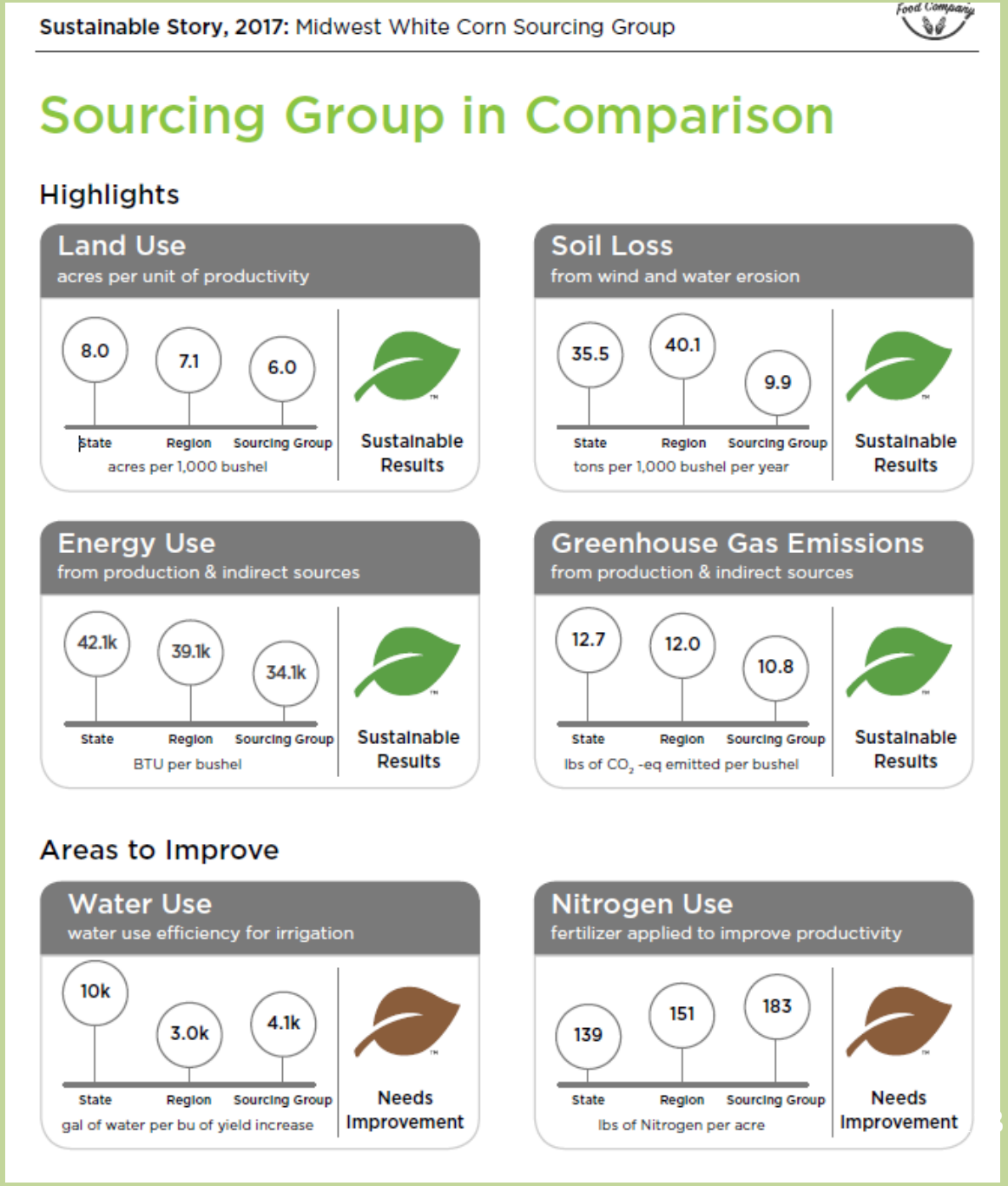
About Agrible

Agrible is headquartered in Champaign, Illinois. They provide real-time information and services for growers and ag retailers to help improve decision making on field work and enable users to gather data from their operations to report on sustainability trends for the supply chain.

Agrible's science-based platform gives users field-level insights to help them make decisions for their ag operation that are proactive, not reactive.

Agrible's System Can Generate Individual Reports for Participating Ag Retailers and Aggregate the Information for the INLRS.

The platform will also sync with the Field to Market Sustainability Program.



Basic Tenants of the 4R Metric Program

- Agrible will build a web-based reporting platform for IFCA; ag retailers will voluntarily utilize the program for each facility they operate. IFCA is financing the program and retailers will also pay to participate.

- The system will draw primarily from retailer's existing inventory and billing systems for fertilizer sales to minimize workload on the retailers.

- The information gathered will be based on a location's custom applied acres in their market territory.

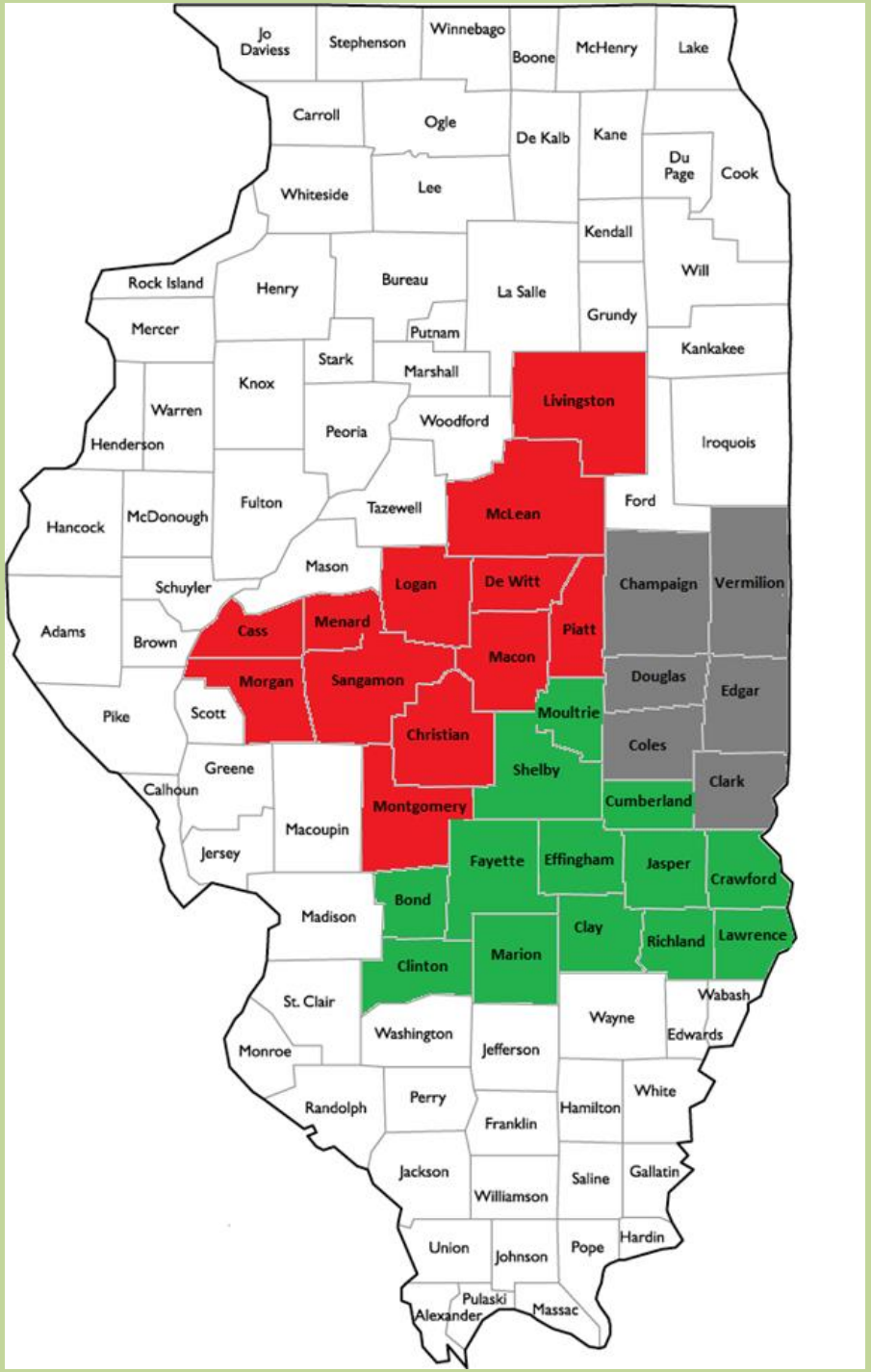
4R Fertilizer Application Practices

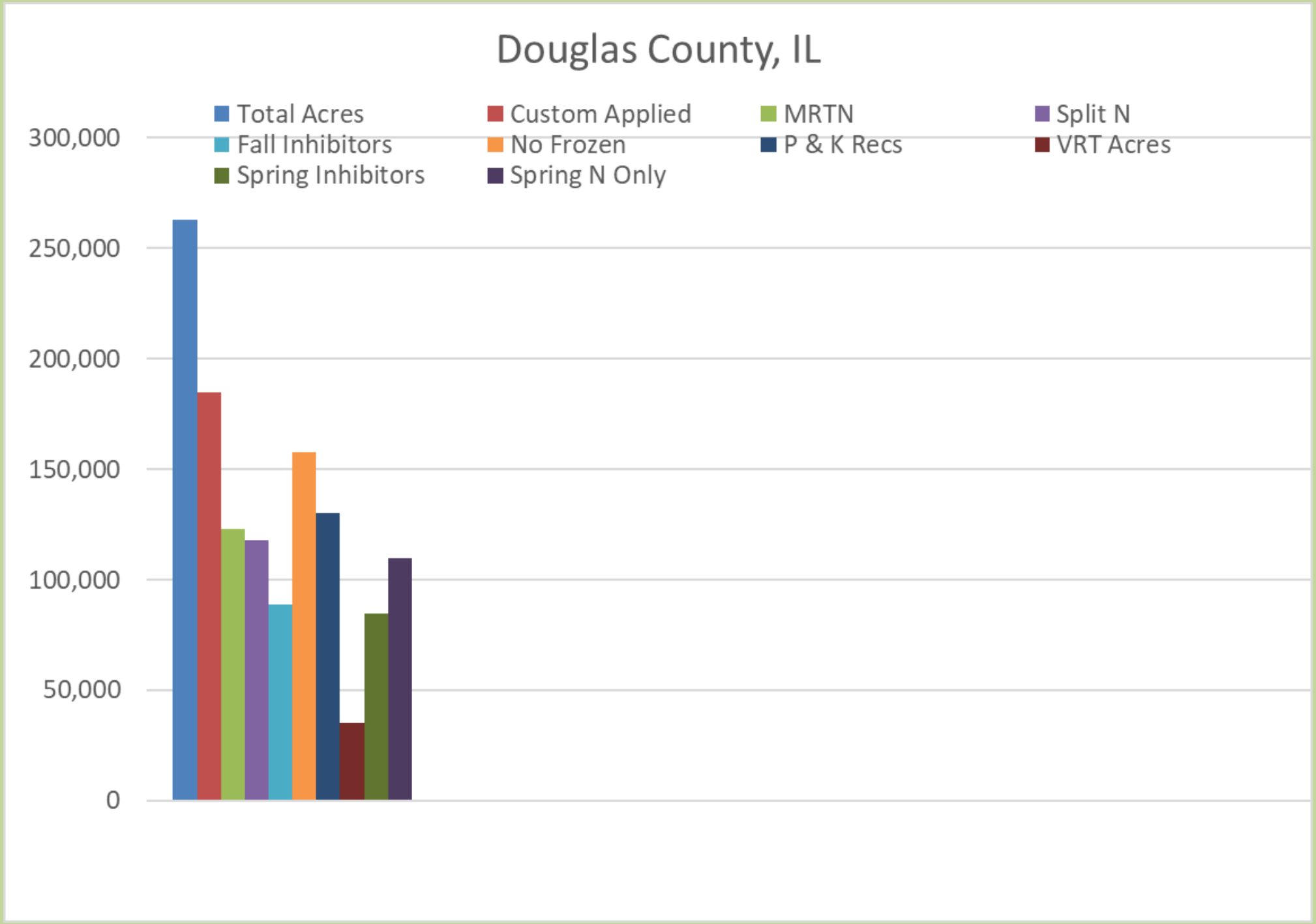
Based Primarily on Custom Applied Acres to Track:

- Adoption of the MRTN for Nitrogen Applications to Corn
- Evidence of Split Nitrogen Applications & Movement to Spring
- Acres Managed with Variable Rate Applications
- Use of Labeled Nitrification Inhibitors (Fall & Spring N)
- Fall Nitrogen Applied At Appropriate Soil Temperatures
- Fertilizer Applied to Frozen or Snow Covered Ground
- Routine Soil Testing for P Levels & Applied at UI Rates

Pilot Program Fall 2018

- Working with 3 large ag retailers to test the platform
- 50 retail locations in four priority watersheds (Decatur, Bloomington, Springfield, Embarras)




Douglas County, IL
Total Acres
Custom Applied
MRTN
Split N
Fall Inhibitors
No Frozen
P & K Recs
VRT Acres
Spring Inhibitors
Spring N Only
300,000
250,000
200,000
150,000
100,000
50,000
0

Other Elements of the 4R Metrics Program

- 4R Nutrient Management Specialists will Verify the Reports
- We can compare fertilizer sales data from IDA with retailer reports to evaluate trends
- The on-line platform is under development
- Testing with the 3 Retailers in December 2018
- Goal is to Provide Fall Nitrogen 4R Metrics for Next Biennial Report
- Farmers can also volunteer to report their applied acres

Twitter and Social Media
Kate Gardiner, Illinois Extension

Why Use Twitter?

- Study by University of Alberta suggests good research promoted through social media gets more citations
  - Promoting NLRS on social media can lead to increased awareness and adoption of BMPs

> *The good papers that get pushed on social media are what end up on people's minds and eventually as PDFs in their reference manager.*
>
> **Clayton Lamb**

Source: https://www.folio.ca/how-social-media-helps-scientists-get-the-message-across

How to Best Get Your Message Across

- Use pictures!
  - Tweets with photos attached get more engagement from viewers
  - Access free stock photos on sites like Pexels, Unsplash, and Pixabay or or use your own!

How to Best Get Your Message Across

- Incorporate relevant hashtags like #NLRS & #4ILWaters
  - You can search hashtags and see all relevant tweets

Illinois Fertilizer & Chemical Association - IFCA @ILFERTCHEM · Apr 24

IFCA partners with Agrible to capture ag retailer progress in implementing the 4Rs on Illinois acres. Read about it here: bit.ly/2KbJ0mB The goal is to show progress on the IL Nutrient Loss Reduction Strategy. #4r #fertilizer #nitrogen #agresearch #nitrogen #**NLRS** #ag

Laura Christianson @IL_DrainDrop · 2 Nov 2016

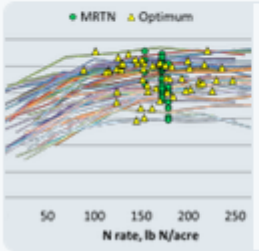
Thanks for the infographic @ISUANR! We need to keep "chippin" away for our nutrient strategies. #CleanWaterWednesday **#4ILWaters**

ISU ANR Extension @ISUANR

Wondering what a #woodchip #bioreactor is? This infographic may help!

Illinois NREC @IllinoisNrec · Apr 13

The University of Illinois has updated the N Rate Calculator based on research done by Emerson Nafziger and supported by @ILFERTCHEM #plant18 #nitrogen **#nlrs**



N Rate Calculator Updated

Last month (March 2018) we used data from 2017 N rate response trials to update the N rate calculator that provides best-estimate N rate guidelines for different...

bulletin.ipm.illinois.edu

Partners Who Have Twitter

American Farmland Trust

AQUA

150 YEARS CITY WATER LIGHT AND POWER SPRINGFIELD, IL

Downers Grove Sanitary District

ENVIRONMENTAL LAW & POLICY CENTER

GMK

ILLINOIS ASSOCIATION OF DRAINAGE DISTRICTS IADD

ILLINOIS PRODUCT Illinois Department of Agriculture©

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

ILLINOIS FARM BUREAU Farm. Family. Food.™

IFCA Supply Service Stewardship

ILLINOIS CHAPTER Land Improvement Contractors of America LICA

Illinois Nutrient Research & Education Council

pork Illinois Pork Producers. Generations of Commitment.

MISSISSIPPI RIVER COLLABORATIVE

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

prairie rivers network

ABE at Illinois

ILLINOIS Extension

★ Shining Stars in NLRS Twitter ★

IL Farm Bureau

- Promote upcoming NLRS educational events
- Provide NLRS updates

Illinois Farm Bureau @ILFarmBureau · 22h

Learn about the latest #covercrop research and more at upcoming @IllinoisNrec field day. bit.ly/2JgG3Uj

Illinois Farm Bureau @ILFarmBureau · 3h

Women farmland owners, mark your calendars for Lake Springfield Watershed meeting. Learn about nutrient stewardship, water standards, BMPs and more. bit.ly/2LHGQfl

Illinois Farm Bureau @ILFarmBureau · May 24

Variety of approaches, partnerships help IFB make progress toward nutrient stewardship goals. bit.ly/2KT0c03 #NLRS @ILFBPres

★ Shining Stars in NLRS Twitter ★

MWRD

- Shares lots of photos
- Ties NLRS and stormwater into community events

MWRD @MWRDGC · May 14

Open house and tours are this Saturday, rain or shine 9 am-noon. Pick one or more of our water reclamation plants to see how we clean water!
#InfrastructureWeek2018 #timetobuild

Gregg Goslin @GreggGoslin

@MWRDGC is hosting an open house and tour of their water reclamation plants on Saturday from 9 a.m. to noon. This event is open to all ages, and participants are invited to take home compost or an oak sapling to plant. Don't...

MWRD @MWRDGC · May 14

Please limit your use of water before and during rain storms. We need the capacity in the sewers to hold combined used #water and stormwater #OverflowAction

MWRD @MWRDGC · May 14

Rain garden at Skinner North Elem School completed in nick of time today compliments of @RepDannyDavis @ChicagoWater @ChiPubSchools, #mwrd VP Barbar McGowan, Natalie Cook of Donohue, Julia Bunn of Spirited Gardner, Principal Katie Magnuson & team #TimeToBuild #InfrastructureWeek

★ Shining Stars in NLRS Twitter ★

Laura Christianson

- Engages with others
- Ties NLRS, or bioreactors, into many topics

Follow @IllinoisNLRS on Twitter

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY

Following

Illinois Nutrient Loss Reduction Strategy

@IllinoisNLRS Follows you

MW Pesticide Action, **Jennifer Woodyard**, and **13 others** follow

Our goal is to improve water quality both at home and downstream. Est. 2015.

go.illinois.edu/nlrs

79 Following **81** Followers

Tweets Tweets & replies Media Likes

Illinois Nutrient Loss Reduction Strategy @IllinoisNLRS · Apr 27

Did you know trees help protect our rivers from nutrient runoff?

Riparian buffers consisting of trees and shrubs along waterways reduce erosion, slow flood waters, cool the water for fish, and filter nutrient runoff. #ArborDay

18 25

“Water Is” Photo Contest

Illinois photographers are invited to share photos that capture what water means to them, their communities, and the state

Entries due **July 31, 2018**

For more information, visit

go.Illinois.edu/WaterIs2018

Implementation of NLRS Goals

Caroline Wade, The Nature Conservancy

Fall Workshop and Upcoming Committee Meetings

Lisa Merrifield, Illinois Extension

Save the Date!

Fall Policy Working Group Meeting

November 13th, 2018

University of Illinois
ACES Library
1408 W. Gregory Dr.
Urbana, IL 61801

Upcoming Meetings

- NMC
  - August 29th, Meet in Urbana
- NSAC
  - June 14th, Conference Call
- USWG
  - July 16th, Conference Call
  - September (Date TBD), Meet in Chicago
- USWG Tracking Subgroup
  - June 28th, Conference Call