

Illinois Nutrient Loss Reduction Strategy – NLRs: past, present and future



Photo by Andrew Jenkins, "Water Is" Photo Contest



I ILLINOIS
Extension
COLLEGE OF AGRICULTURAL, CONSUMER
& ENVIRONMENTAL SCIENCES

Key Points

- Overview- Illinois NLRS
- Gulf Hypoxia
- Nutrient Strategy Framework
- Illinois Process
 - Science Assessment
 - Policy Workgroup
 - Priorities & Approach
- Implementation of NLRS
- Biennial Report
- Nutrient Monitoring Council

Strategy Report Adopted & Publicly Released July 21, 2015

<http://www.epa.illinois.gov/topics/water-quality/watershed-management/excess-nutrients/nutrient-loss-reduction-strategy/index>

Establishes 45% Reduction of Nitrogen and Phosphorus

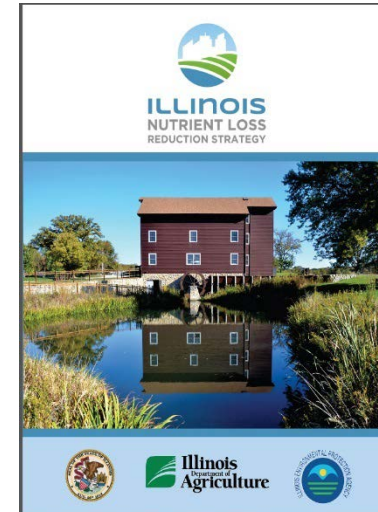
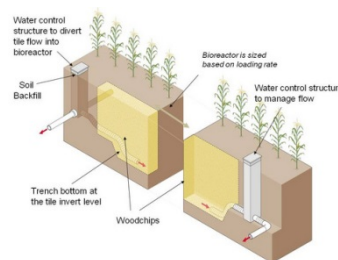
Interim Milestone--2025

- 25% Reduction in Phosphorus Loads
- 15% Reduction in Nitrogen Loads

Addresses:

- nutrient loads from **Point Sources, Urban Stormwater, and Agriculture nonpoint sources**
- Gulf of Mexico hypoxia
- Impacts of nutrients on **local water quality**

Groups established to implement the Strategy



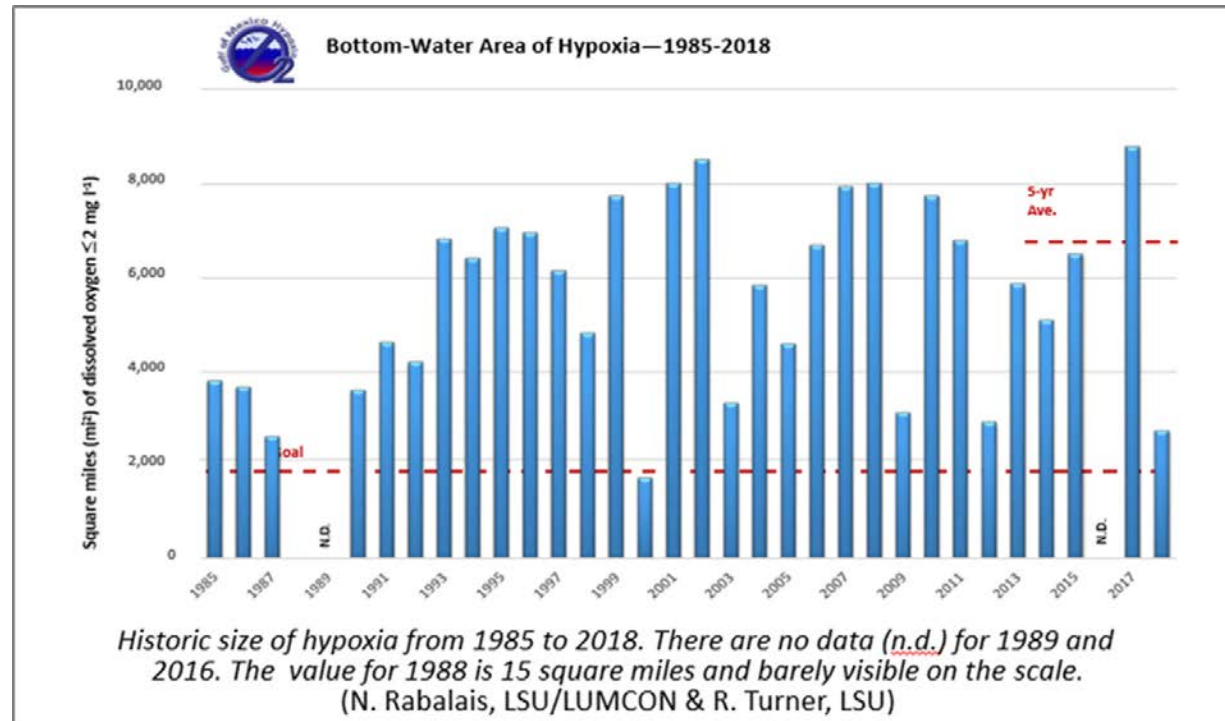
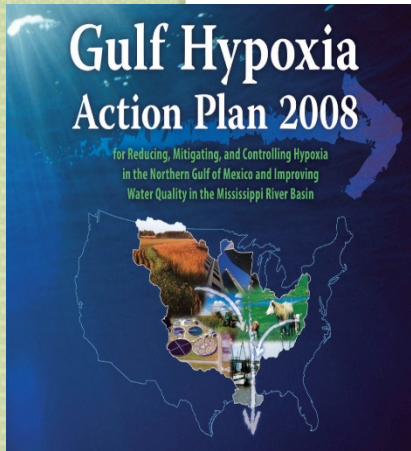
Gulf Hypoxia Task Force Study



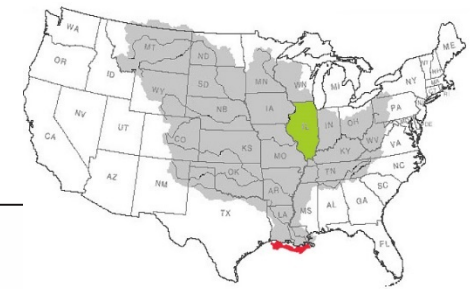
2008

- **GOAL:**

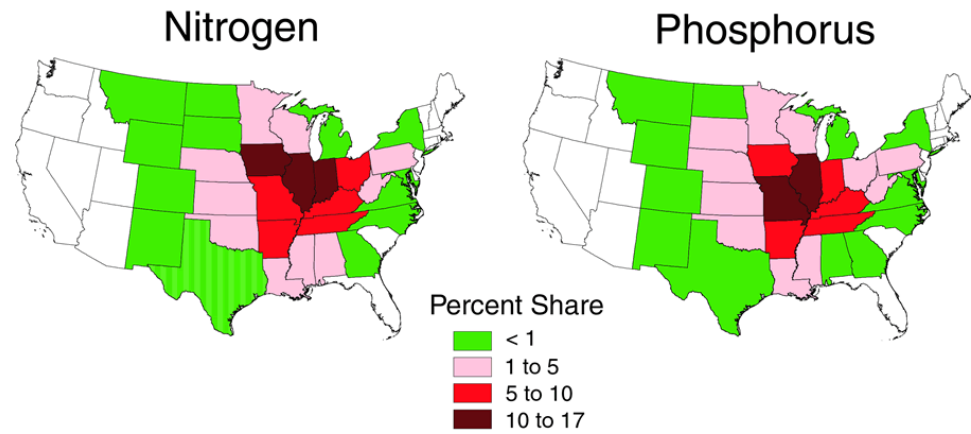
- Reduce Hypoxic Zone to 5,000 Km² (1,930 sq mi)
- Reduce Nutrient Loading to Gulf of Mexico
- Total Phosphorus and Total Nitrogen 45%



Illinois Contribution



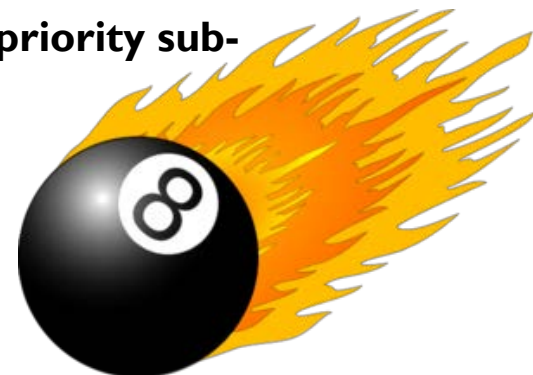
Total Nitrogen				Total Phosphorus			
State	Percent of Total Flux	Cumulative Percent of Total Flux	Delivered Yield (kg km ⁻² yr ⁻¹)	State	Percent of Total Flux	Cumulative Percent of Total Flux	Delivered Yield (kg km ⁻² yr ⁻¹)
Illinois	16.8	16.8	1734.9	Illinois	12.9	12.9	117.4
Iowa	11.3	28.1	1167.2	Missouri	12.1	25.0	89.4
Indiana	10.1	38.2	1806.6	Iowa	9.8	34.8	89.2
Missouri	9.6	47.8	800.5	Arkansas	9.6	44.4	94.6
Arkansas	6.9	54.7	750.1	Kentucky	9.0	53.4	113.4



Nutrient Strategy Elements

2011

- **#1: Prioritize watersheds for nitrogen and phosphorus loading reductions**
- **#2: Set watershed load reduction goals based upon best available information**
- **#3: Ensure effectiveness of point source permits in priority sub-watersheds.**
- **#4: Agricultural Areas**
- **#5: Storm Water (non-MS4) and Septic Systems**
- **#6: Accountability and verification measures**
- **#7: Annual reporting of implementation and biennial reporting of load reductions**
- **#8: Develop work plan and schedule for numeric nutrient criteria development**



Science Assessment to Support An Illinois Nutrient Loss Reduction Strategy

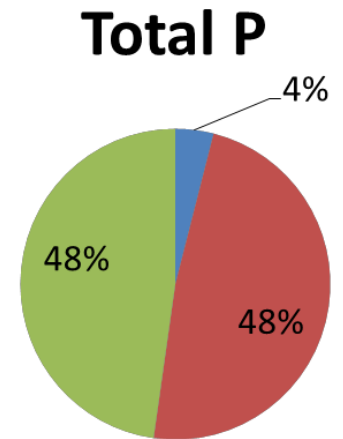
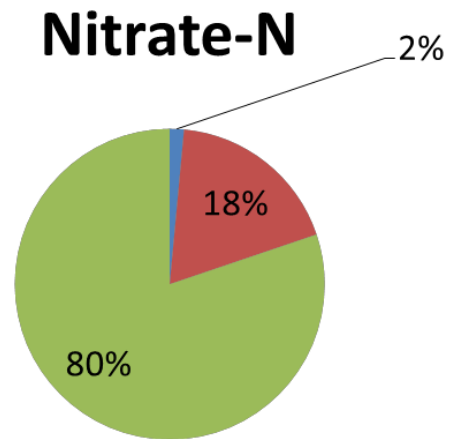
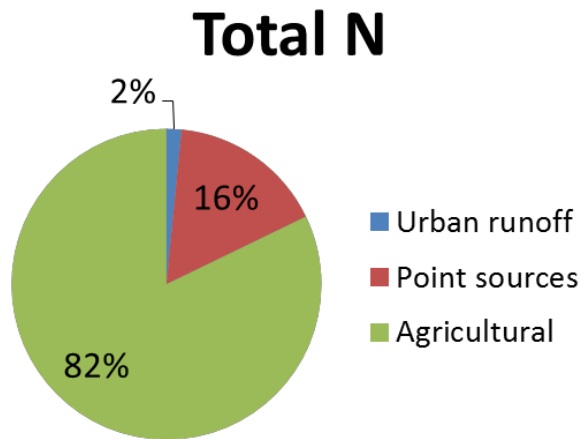
2013

- Mark David
- Greg McIsaac
- George Czapar
- Gary Schnitkey
- Corey Mitchell

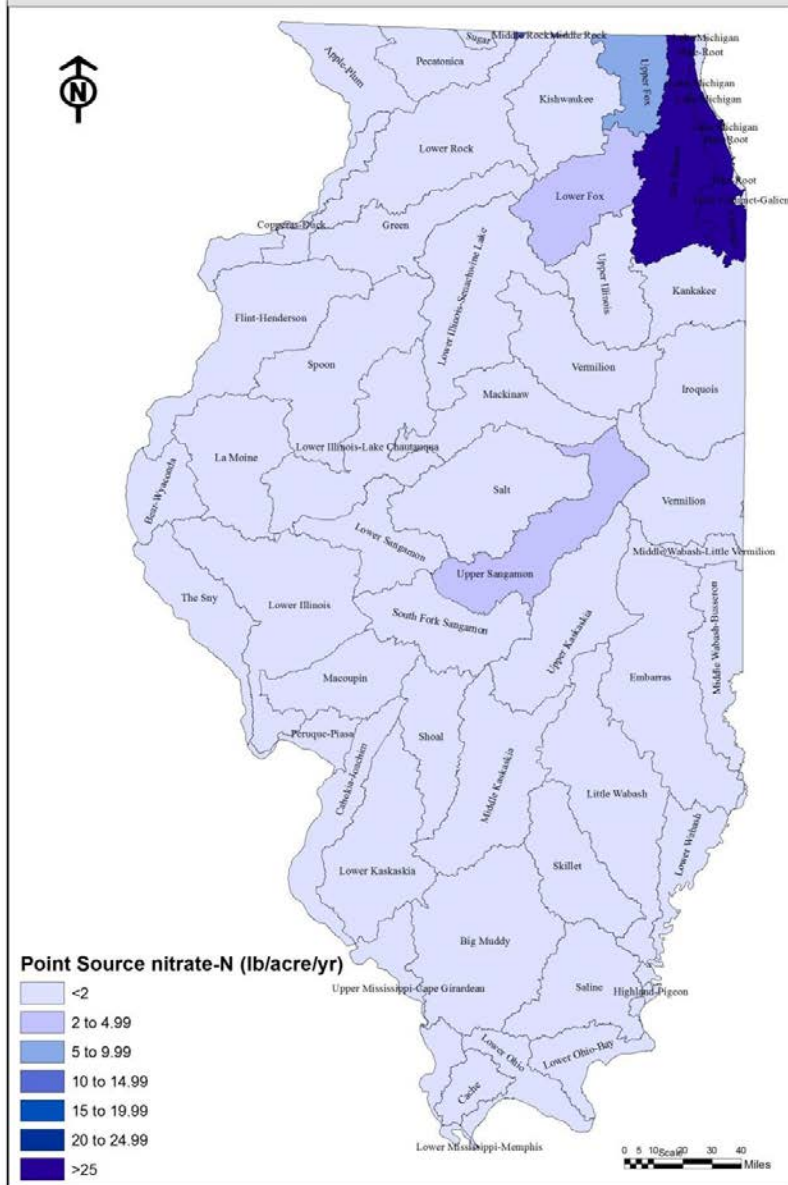
University of Illinois at Urbana-Champaign



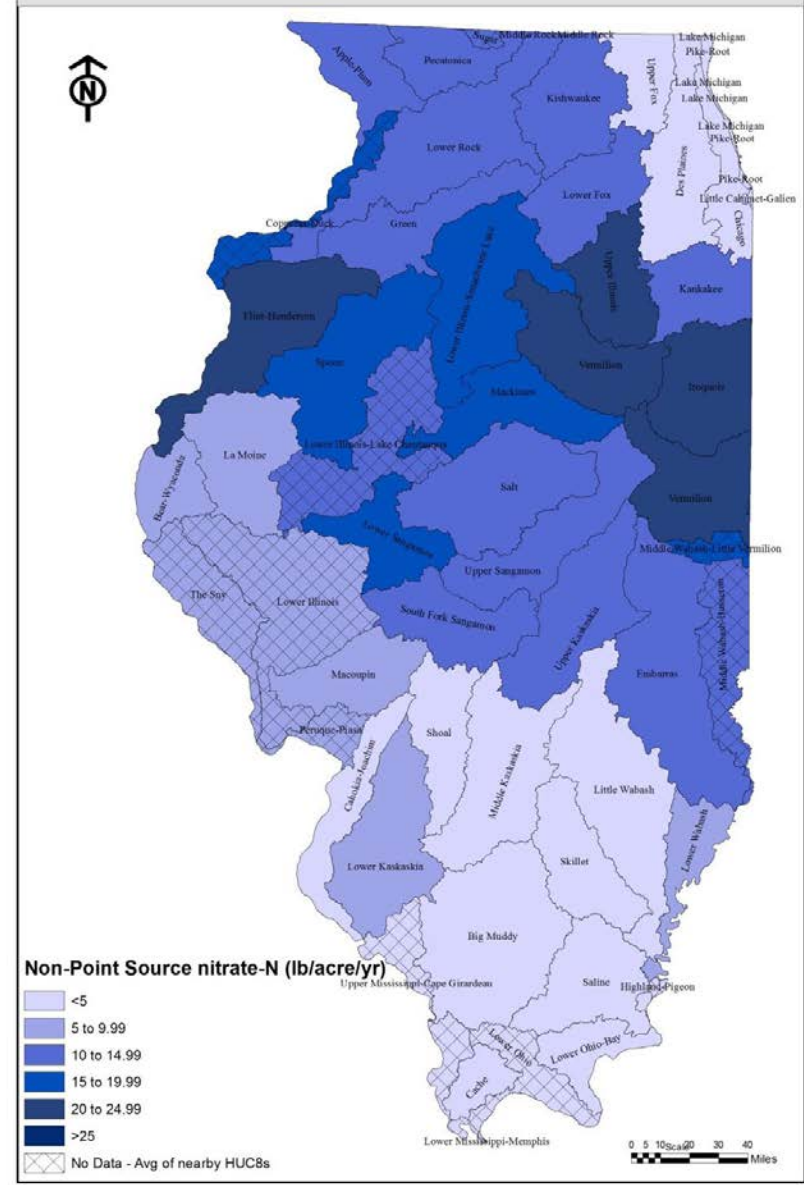
Illinois Nutrient Sources



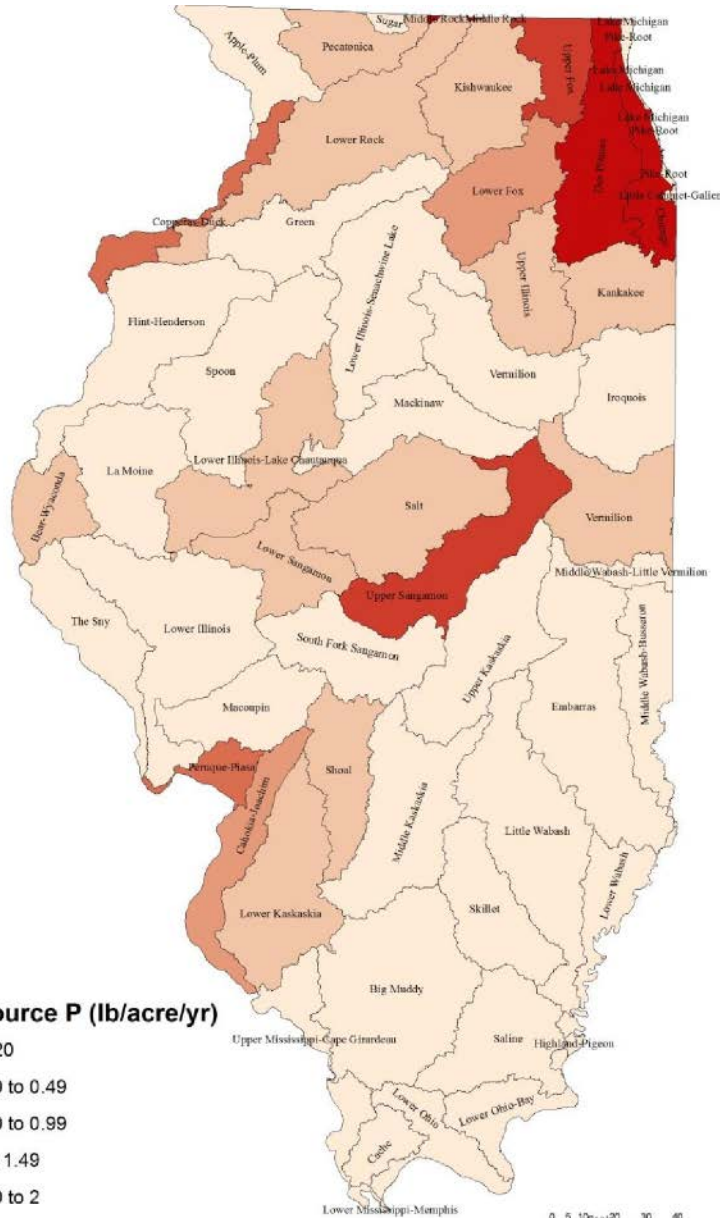
HUC8 Point Source nitrate-N Yields



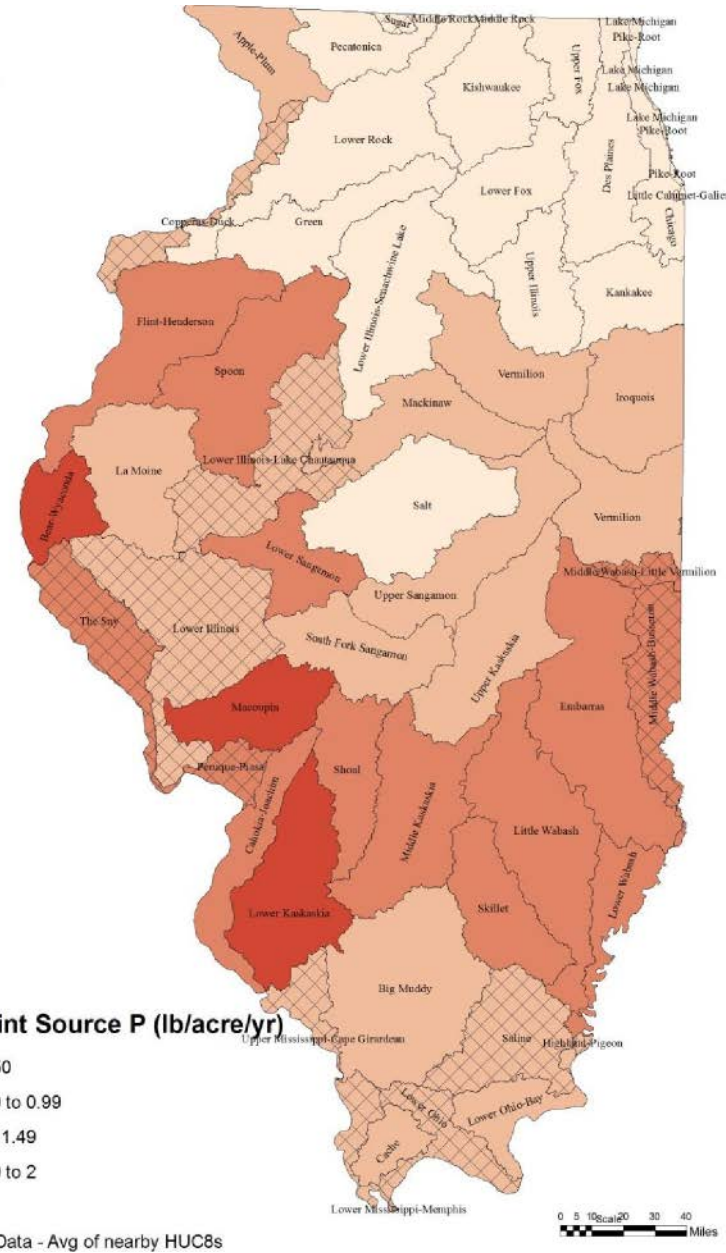
HUC8 Non-Point Source nitrate-N Yields



HUC8 Point Source P Yields



HUC8 Non-Point Source P Yields

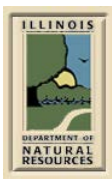


• Policy Working Group Participation

Agriculture



Government



Point Source



BNWRD

Public Works-stormwater, PWS



Environment/Conservation

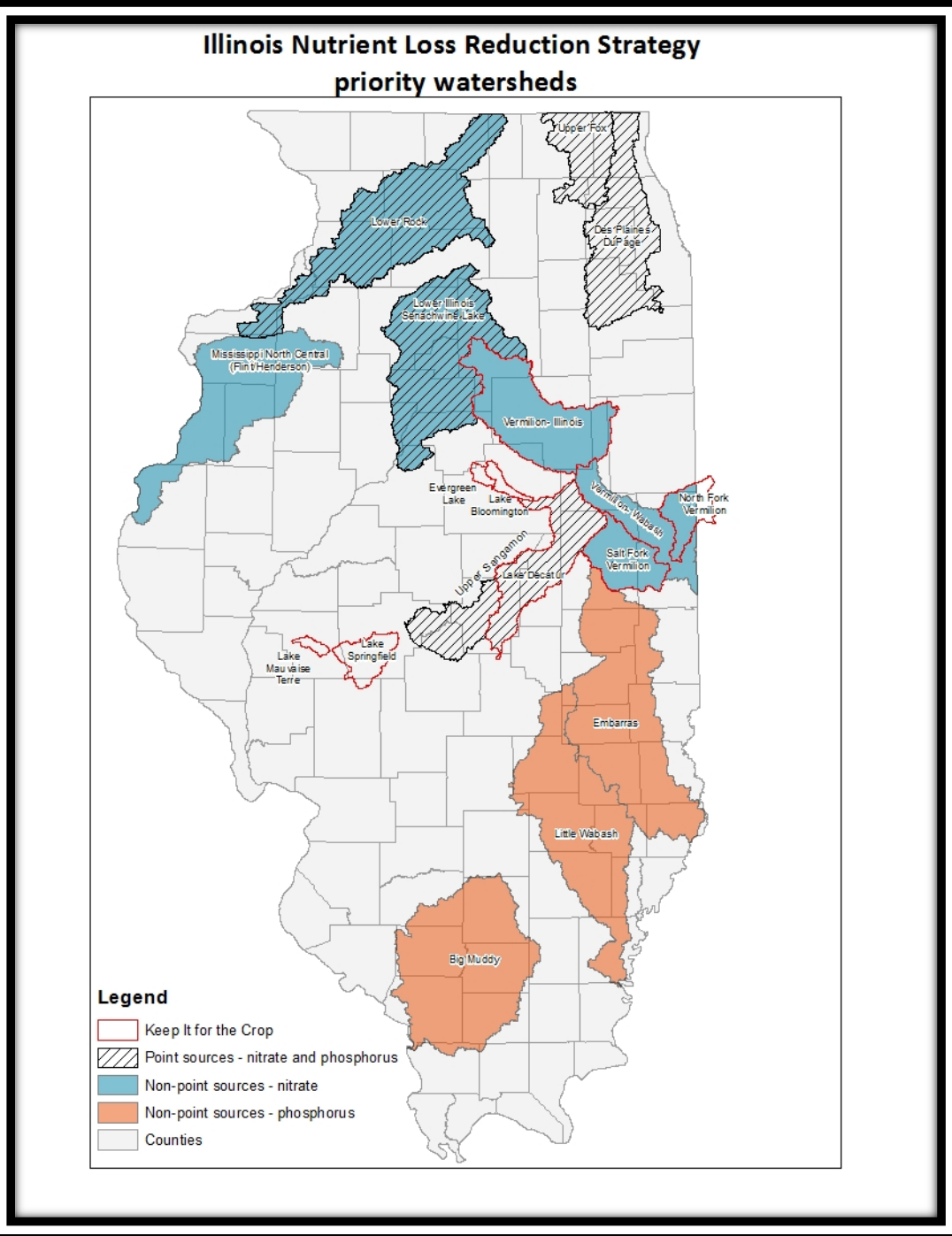


2015

NLRS- Priority Watersheds

Prioritized by:

- Total loads (N or P)
- Local water quality concerns
- watershed planning





ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Improving our water resources with
collaboration and innovation

2015

- The Illinois Nutrient Loss Reduction Strategy (Illinois NLRs or the strategy) is a framework for using science, technology, and industry experience to assess and reduce nutrient loss to Illinois waters and the Gulf of Mexico. The strategy will direct efforts to reduce nutrients from point and non-point sources in a coordinated, primarily voluntary, and cost-effective manner.



ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Strategy Report

Publicly Released July 21, 2015

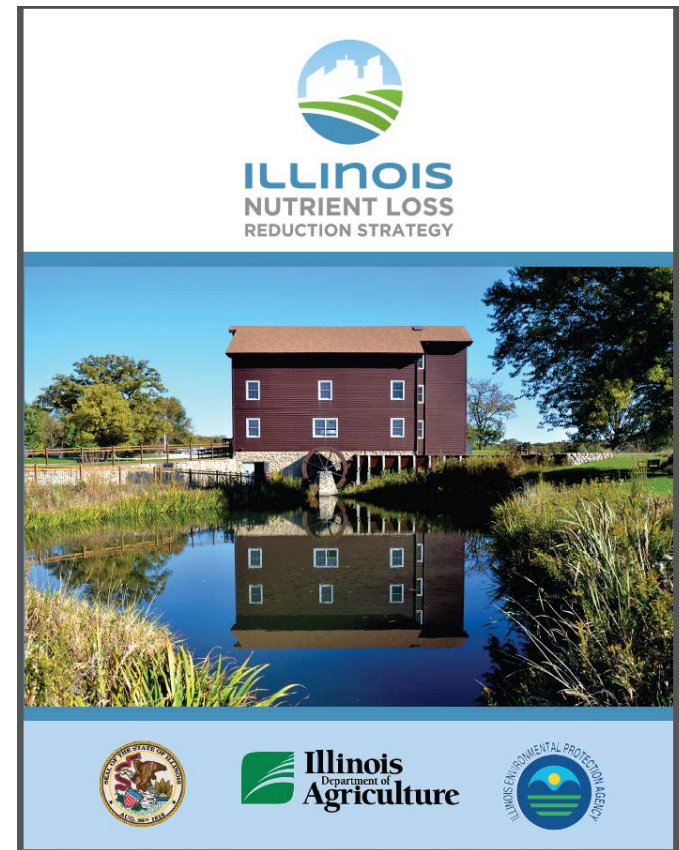
Establishes **45% Reduction** of Nitrogen and Phosphorus

Interim Milestone--2025

- 25% Reduction in Phosphorus Loads
- 15% Reduction in Nitrogen Loads

Addresses nutrient loads from **Point Sources**, **Urban Stormwater**, and **Agriculture nonpoint sources**

Groups established to implement the Strategy



NLRS Committee Structure

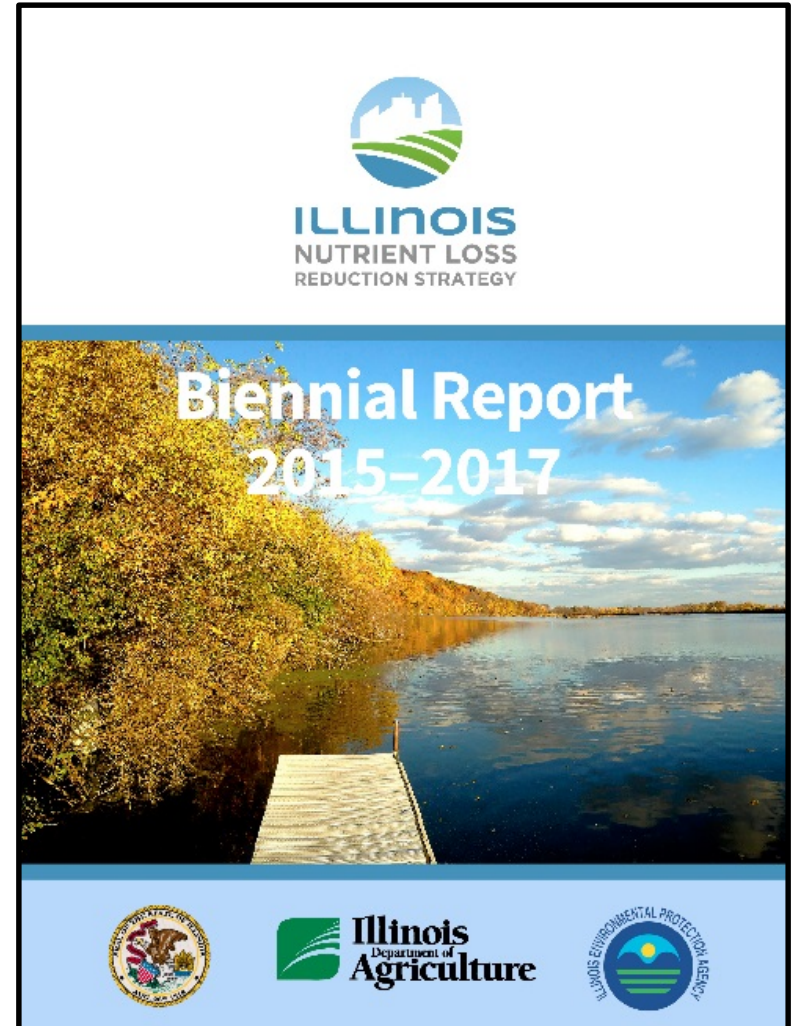
- Six working committees
 - **1. Policy Working Group**
 - 1.a Communications Subgroup
 - 2. Agriculture Water Quality Partnership Forum
 - 2.a AWQPF Technical Subgroup
 - 3. Urban Stormwater Working Group
 - 4. Benchmark Working Group
 - 4.a Point Source
 - 5. Nutrient Monitoring Council
 - **6. Nutrient Science Advisory Committee**



Biennial Report 2015 - 2017

2017

- Released August 2017
- Documents NLRs activities and progress towards goals



Tracking Measures

Resources

- ▶ Staff
- ▶ Funding & Grants

Outreach

- ▶ Partner organization's events & media
- ▶ Farmer knowledge

Land & Facilities

- ▶ Land use changes
- ▶ Facility & permit updates

Water

- ▶ Calculated load reduction
- ▶ Measured loads at existing monitoring stations

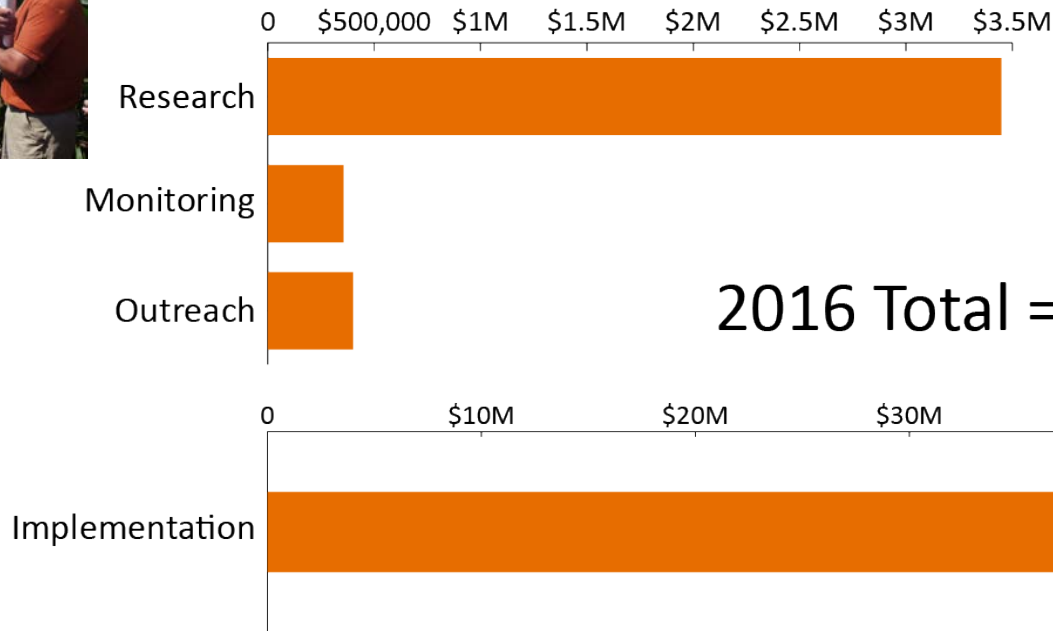


Agricultural Resources

Resources

- ▶ Staff
- ▶ Funding & Grants

2016- 89 staff engaged in NLRs implementation.



2016 Total = \$54,834,638

Point Source Resources*

Resources

- ▶ Staff
- ▶ Funding & Grants

Nutrient Loss Reduction-related Activity	Dollars
Feasibility Studies and other Research	\$513,442
Capital Improvement	\$36,904,000
Total	\$37,417,442



**Represents less than 7%
of all major facilities, how can
these dollars be tracked to
reflect the investments being
made???**

Stormwater Resources

Resources

- ▶ Staff
- ▶ Funding & Grants

- 22 Illinois communities accessing utility fees
- \$24 million for 22 communities



Agriculture Outreach

AGRICULTURE OUTREACH HIGHLIGHTS

Outreach

- ▶ Partner organization's events & media
- ▶ Farmer knowledge



1,100

NLRS Roadshow Attendees
in 2015



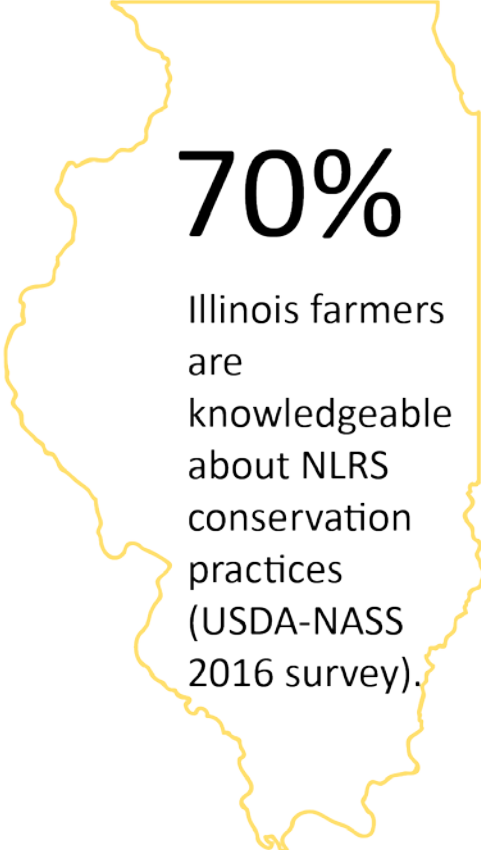
64,000

Automated Phone Calls to
Farmers



38,852

Agriculture Outreach in 2016



70%

Illinois farmers
are
knowledgeable
about NLRS
conservation
practices
(USDA-NASS
2016 survey).

Outreach

- ▶ Partner organization's events & media
- ▶ Farmer knowledge

Point Source Outreach*

	Number of Events	Attendance
Outreach (fliers, tours, community education)	17	484
Field Days	1	8
Workshops	15	343
Conferences	7	528
Total	40	1,363

2016 data



Represents less than 7% of all major facilities, how can these activities be tracked to reflect the investments being made???

Stormwater Outreach

Outreach

- ▶ Partner organization's events & media
- ▶ Farmer knowledge

- MS4 Permits- 440
 - Outreach component
- Urban Stormwater Working Group list of outreach materials
 - Appendix B



Agriculture Implementation

Land & Facilities

- ▶ Land use changes
- ▶ Facility & permit updates



Wetland cells

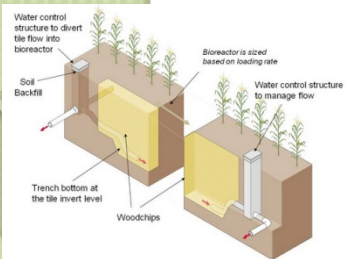


Cover crop



Side dressing nitrogen

Wetlands, Buffers, Perennial/Energy Crops



FSA BMP (acres)		
BMP (acres)	2011	2015
Cover	768	11,064
CRP Wetlands	57,463	45,790
CRP Buffers	145,813	279,534
Perennial/Energy/Pasture	985,531	1,524,379

IDNR CREP Easements-Statewide BMP (acres)		
BMP (acres)	2011	2015
Wetlands	483	22,609
Buffers	202	17,893
Perennial/Energy	81	6,043

Illinois Natural Resource Conservation Service Statewide Wetland Reserve Program/ Wetland Reserve Easements Program

	2011	2012	2013	2014	2015	TOTAL
Wetland Easements	19	12	8	7	3	49
Total Wetland Acres	1788	1420	469	305	396	4378

Illinois EPA Section 319 Grant- IEPA

Illinois EPA Section 319 Grant		2002-2011			
AGRICULTURE	Acres	Nitrogen Load Reduction (lbs/year)	Phosphorus Load Reduction (lbs/year)	Total Suspended Solids Load Reduction (lbs/year)	Sediment Load Reduction (tons/year)
Conservation Tillage (329)	9998	47169	23691		21461
Cover and Green Manure Crop (340)	3924	14827	1190		955
Filter Strip (393)	8	1360	725		567
Nutrient Management (590)					
Wetland Restoration (657)	936	5028	2103	248227	1542
TOTAL	-	68,384	27,709	248,227	24,525

Illinois EPA Section 319 Grant		2011-2015			
AGRICULTURE	Acres	Nitrogen Load Reduction (lbs/year)	Phosphorus Load Reduction (lbs/year)	Total Suspended Solids Load Reduction (lbs/year)	Sediment Load Reduction (tons/year)
Conservation Tillage (329)	734	3913	2005		1798
Cover and Green Manure Crop (340)					
Filter Strip (393)	13882	329813	167170		106748
Nutrient Management (590)	107061	109915	54325		36522
Wetland Restoration (657)	464	2,760	1668	619968	6868
TOTAL	-	446,400	225,168	619,968	151,936

Point Source Implementation

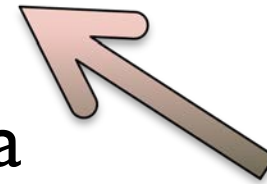
Land & Facilities

- Land use changes
- Facility & permit updates

- Point Sources account for:
 - 18% of nitrate load
 - **48% of phosphorus load**



- Initial focus is on phosphorus reduction through permit limits on major wastewater treatment facilities
- Nitrogen is being introduced as a monitoring requirement at major facilities

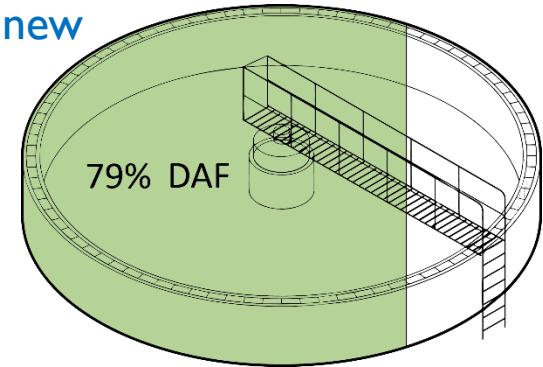


- 220 Major Municipal Facilities in Illinois
- Major = at or over 1 million gallons discharged per day

Permit Limits-

- 1.0 mg/L Total Phosphorus
- Nitrogen monitoring
- Optimization Study
 - A plan to optimize operations to achieve the lowest TP possible with existing equipment
- Feasibility Study
 - Evaluation of technology-based treatment alternatives to meet 0.5mg/L and 0.1mg/L TP
 - Includes economic and timeline studies for each alternative

Currently under new requirements



Major facilities only



Watershed Approach to Point Source Permitting- nutrients

- Nutrient Assessment Reduction Plan (NARP), new requirement under all permit renewals for majors discharging into an impaired water

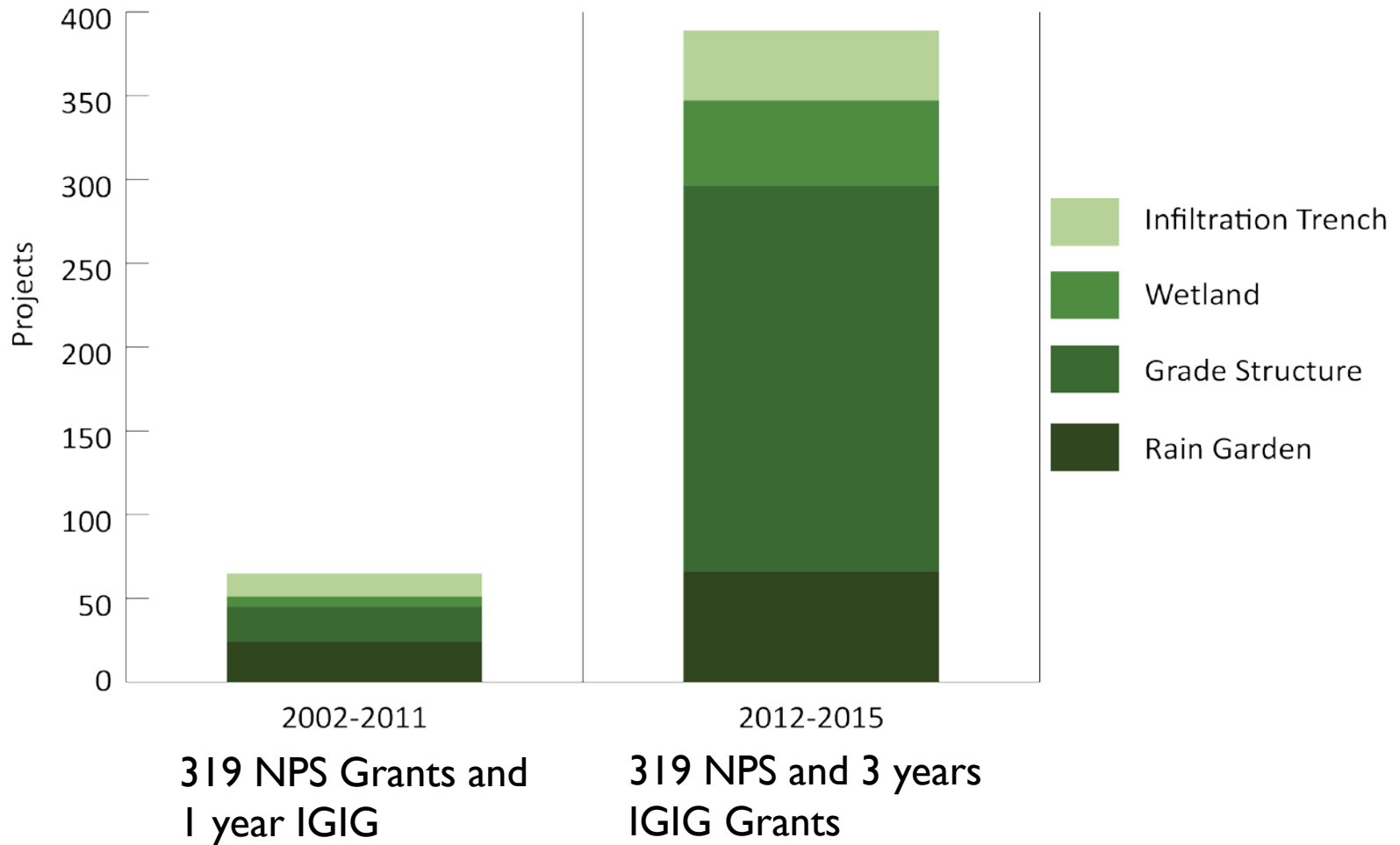
- One plant = one NARP
- Several plants working under a watershed approach = one NARP



Stormwater Implementation

Land & Facilities

- ▶ Land use changes
- ▶ Facility & permit updates



2016

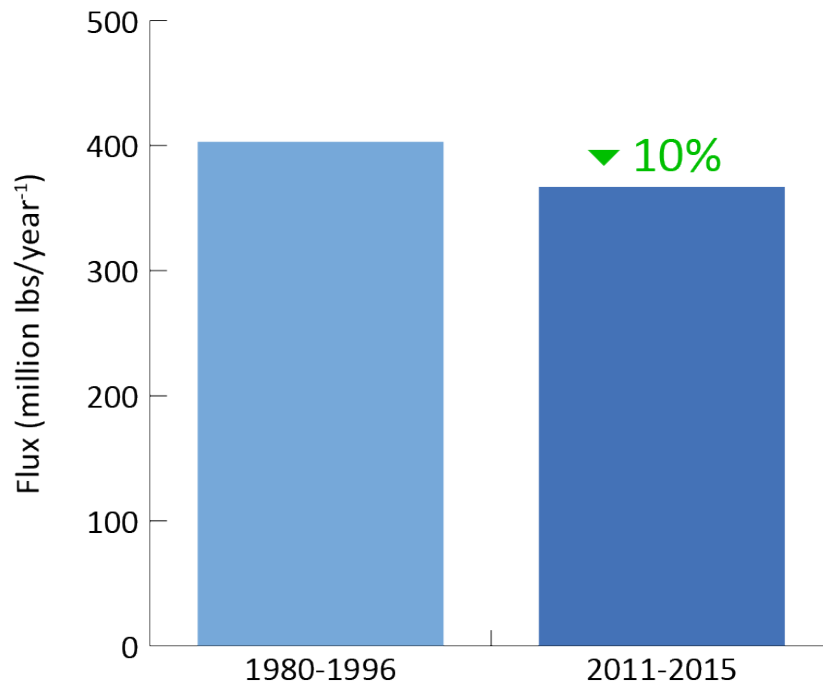
Science Assessment- update

Water

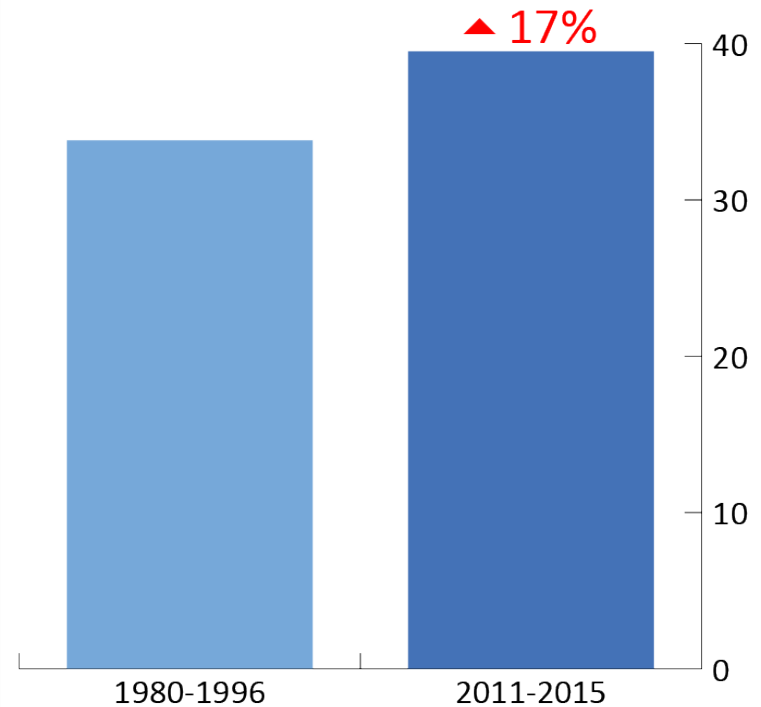
- ▶ Calculated load reduction
- ▶ Measured loads at existing monitoring stations



Nitrate-Nitrogen



Total Phosphorus



Science Assessment- update

Comparing 1980-1996 to 2011-2015 data
in 8 major Illinois Rivers



Nitrate losses are decreasing

“likely due to improved agricultural N balances”



Total P losses have increased

“possibly due to increased population/flow
and some (most) facilities upgrades hadn't come
on line at that time”

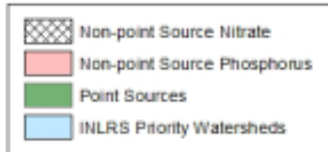
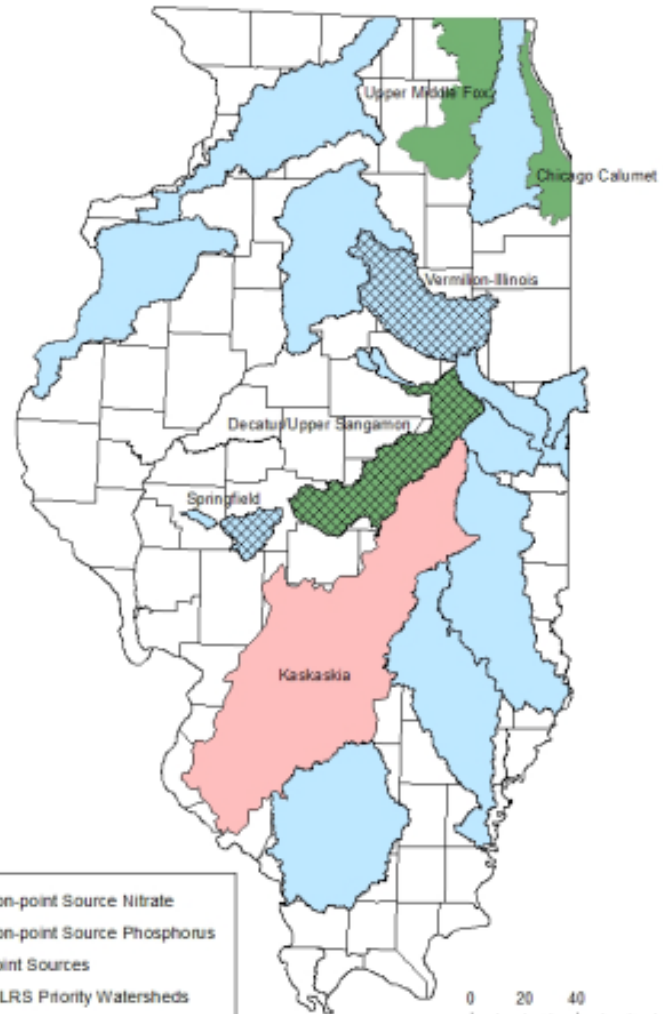
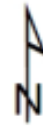
Nutrient Monitoring Council

Candidate watersheds for nutrient monitoring plan development.

2016



NMC Revised Watershed Map

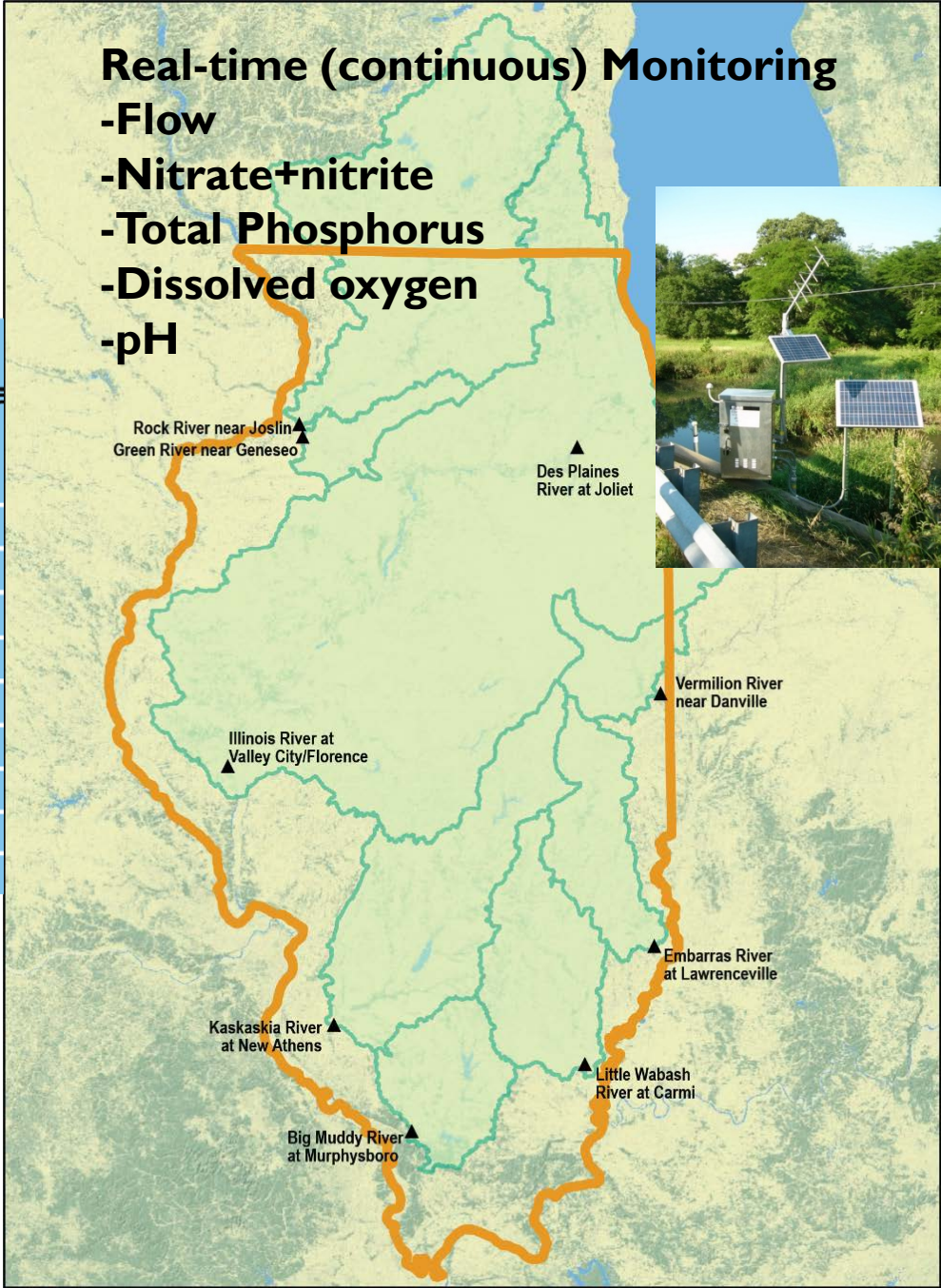


2017

Statewide Nutrient Export Loading Network

Stream Name	Location	Station Drainage Area in Illinois only, in mi ²
Rock River	Joslin	3,973
Green River	Geneseo	1,000
Illinois River	Florence	22,631
Kaskaskia River	New Athens	5,189
Big Muddy River	Murphysboro	2,168
Vermilion River	Danville	1,199
Embarras River	Lawrenceville	2,348
Little Wabash River	Carmi	3,102
Des Plaines River	Joliet	1,502

Basins cover almost 75% of the land area in the state



NLRS...

- How can you help protect and restore Illinois waters from nutrient losses?

Contact Information...

- Illinois Environmental Protection Agency
 - Trevor Sample, trevor.sample@Illinois.gov
- Illinois Department of Agriculture
 - Warren Goetsch, warren.goetsch@Illinois.gov
- University of Illinois- Water Resources Center
 - Eliana Brown, brownl2@Illinois.edu