The Metropolitan

Water Reclamation District

of Greater Chicago

WELCOME
TO THE JUNE EDITION
OF THE 2015
M&R SEMINAR SERIES

BEFORE WE BEGIN

- PLEASE SILENCE CELL PHONES OR SMART PHONES
- QUESTION AND ANSWER SESSION WILL FOLLOW PRESENTATION
- PLEASE FILL EVALUATION FORM
- SEMINAR SLIDES WILL BE POSTED ON MWRD WEBSITE (www. MWRD.org: Home Page ⇒ Reports ⇒ M&R Data and Reports ⇒ M&R Seminar Series ⇒ 2015 Seminar Series)
- STREAM VIDEO WILL BE AVAILABLE ON MWRD WEBSITE (www.MWRD.org: Home Page ⇒ MWRDGC RSS Feeds)

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Experience: - *Division of Water Pollution Control, Bureau of Water , Illinois EPA, Springfield, IL*

He oversees water pollution control permitting, water quality standards and mine pollution control permitting programs.

- *Division of Legal Counsel, Illinois EPA*,

Deeply involved with all aspects of the water pollution control programs for 10 years in the division

Education: M.S. in Engineering, Southern Illinois University, Carbondale, IL

J.D., Southern Illinois University School of Law, Carbondale, IL

ILLINOIS NUTRIENT LOSS REDUCTION: CURRENT ACTIVITIES, FUTURE DIRECTIONS

MWRD Seminar

Sanjay Sofat
Illinois EPA

June 26, 2015

Two water quality issues related to nutrients:

- Impacts to Illinois rivers, lakes, streams
- Contribution to Gulf of Mexico Hypoxia:
  - 20% of N that reaches Gulf
  - 11% of P that reaches Gulf
- Illinois Nutrient Loss Reduction Strategy designed to address local WQ and Gulf Hypoxia

Illinois Nutrient Loss Reduction Strategy

Policy work group made up of various stakeholders including

- Wastewater treatment works representatives
- Environmental advocate organizations
- Agricultural organizations
- State & federal government representatives
- University of Illinois researchers

Met monthly over a 12-month period beginning in the summer of 2013

Illinois Nutrient Loss Reduction Strategy

Science Assessment – Dr. Mark David, et al.

- Describes current conditions
- Identifies critical watersheds
- Identifies agricultural practices and nutrient losses by major land resource area (MLRA)
- Lists possible point source reductions with resulting cost estimates
- Outlines possible non-point source nutrient losses with cost estimates
- Lists statewide scenarios with associated costs
- Conclusions

Illinois Nutrient Loss Reduction Strategy

Three subcommittees with representatives from numerous interest groups –

- Agricultural non-point sources
- Urban point source
- Urban non-point sources

- Met various times to draft specific strategy chapters

Illinois Nutrient Loss Reduction Strategy

Goals and Milestones

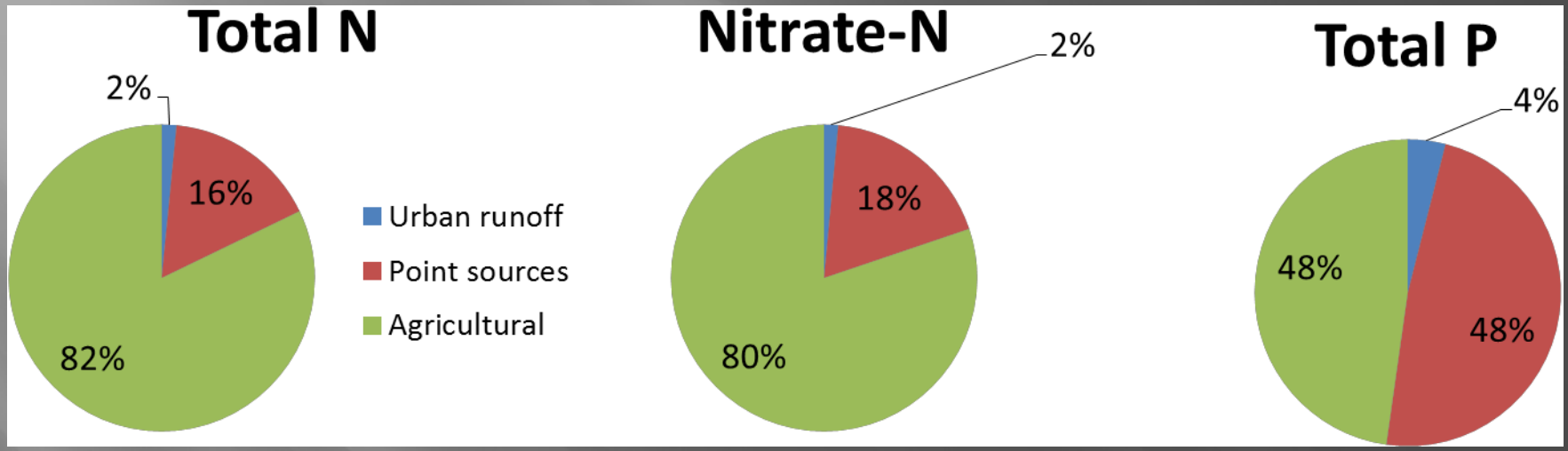
Milestones

- Nitrate-nitrogen 15% by 2025
- Phosphorus 25% by 2025

HYPOXIA GOAL - 45% reduction in the annual loading of nitrate-nitrogen and phosphorus compared to 1980-1996 (baseline conditions)

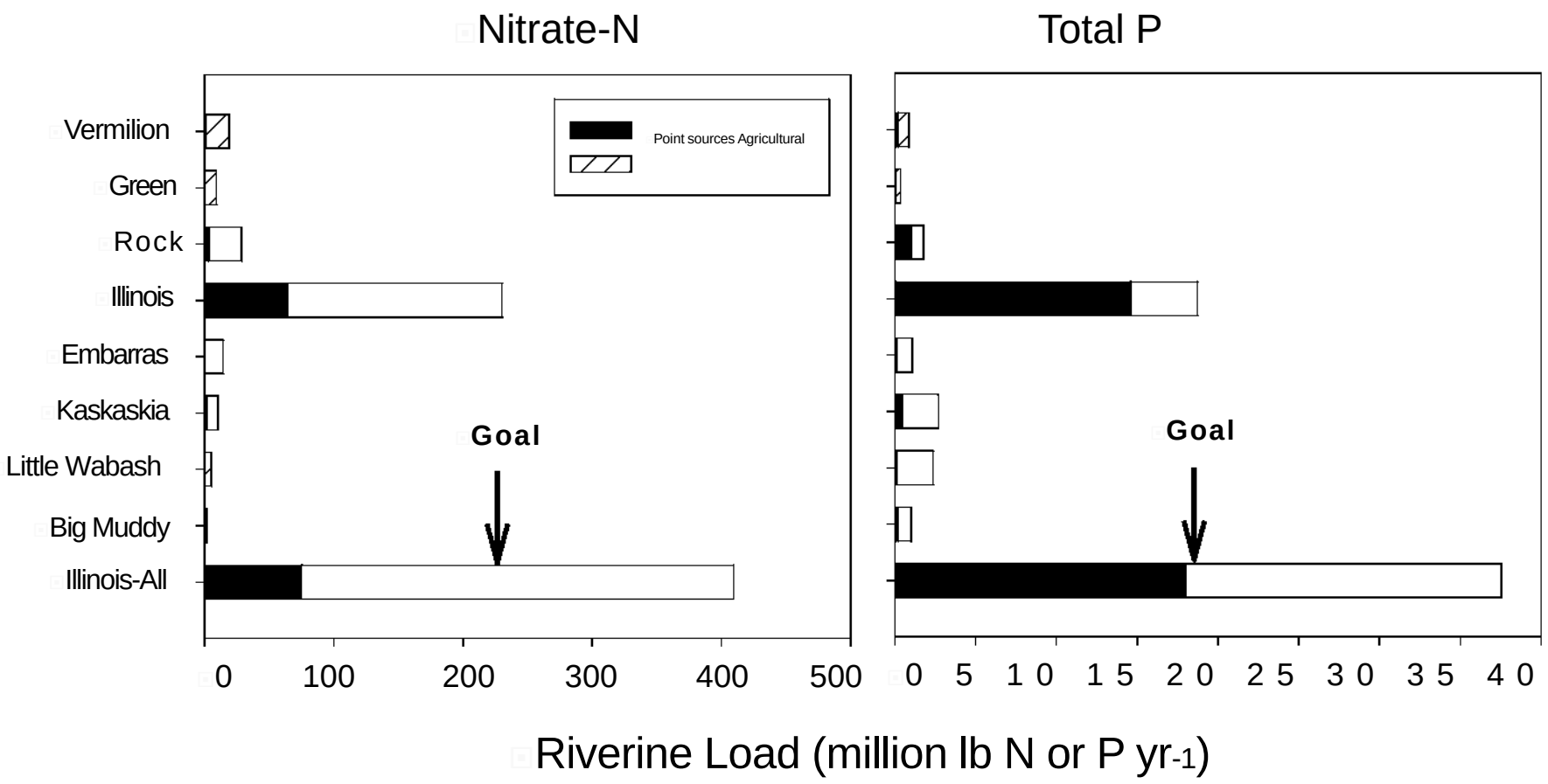
Local WQ Goals – Established by TMDL and/or watershed specific study

Illinois Nutrient Sources

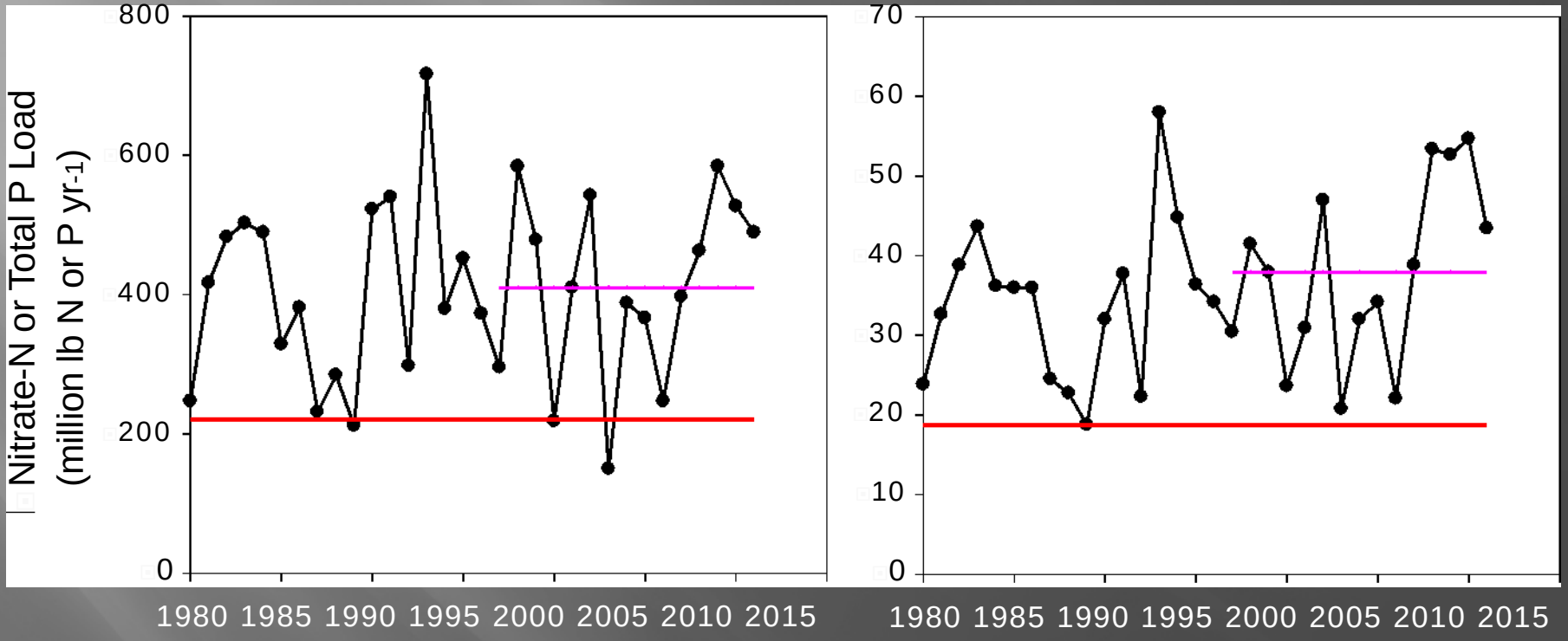


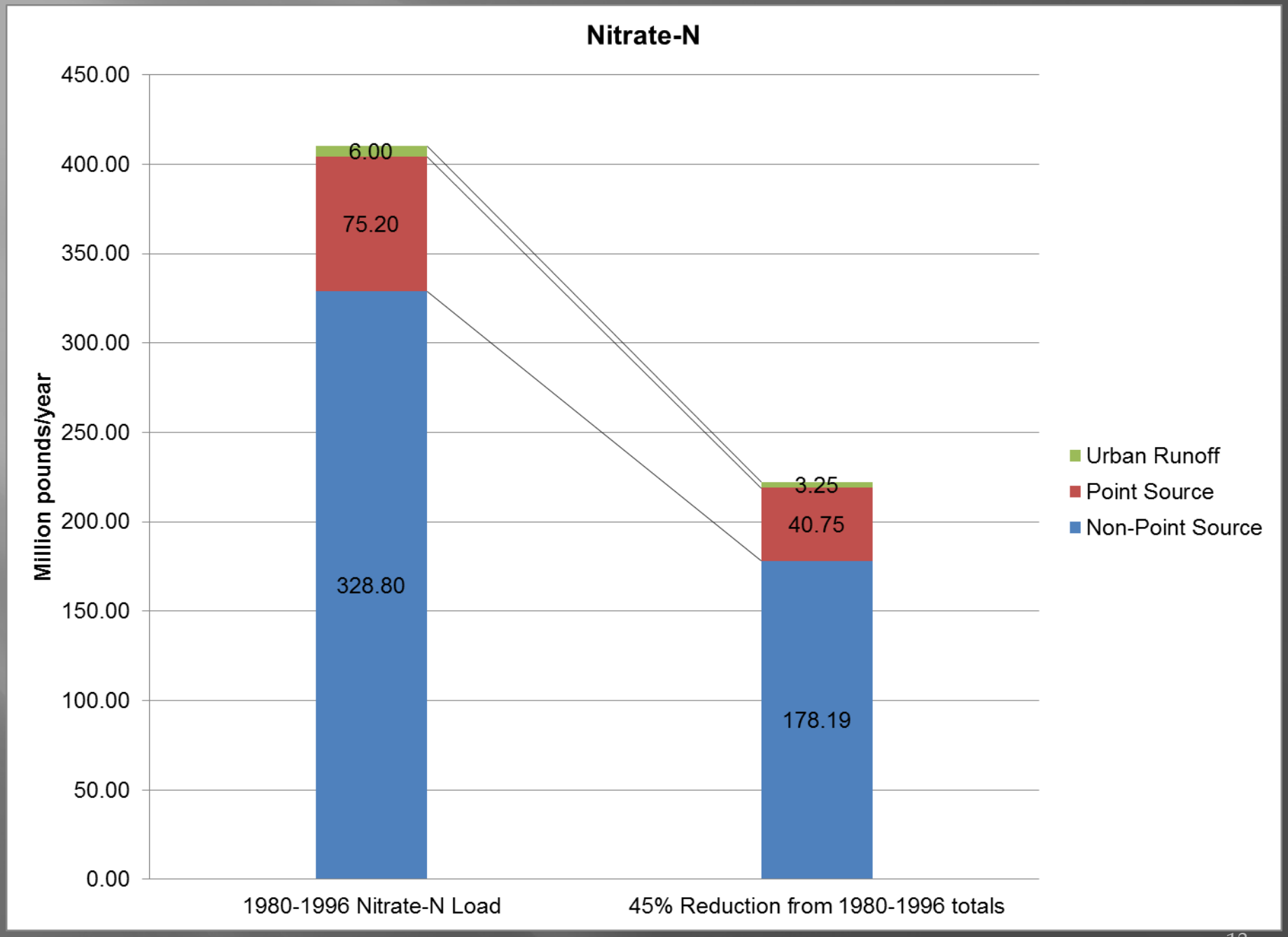
Point and agricultural sources

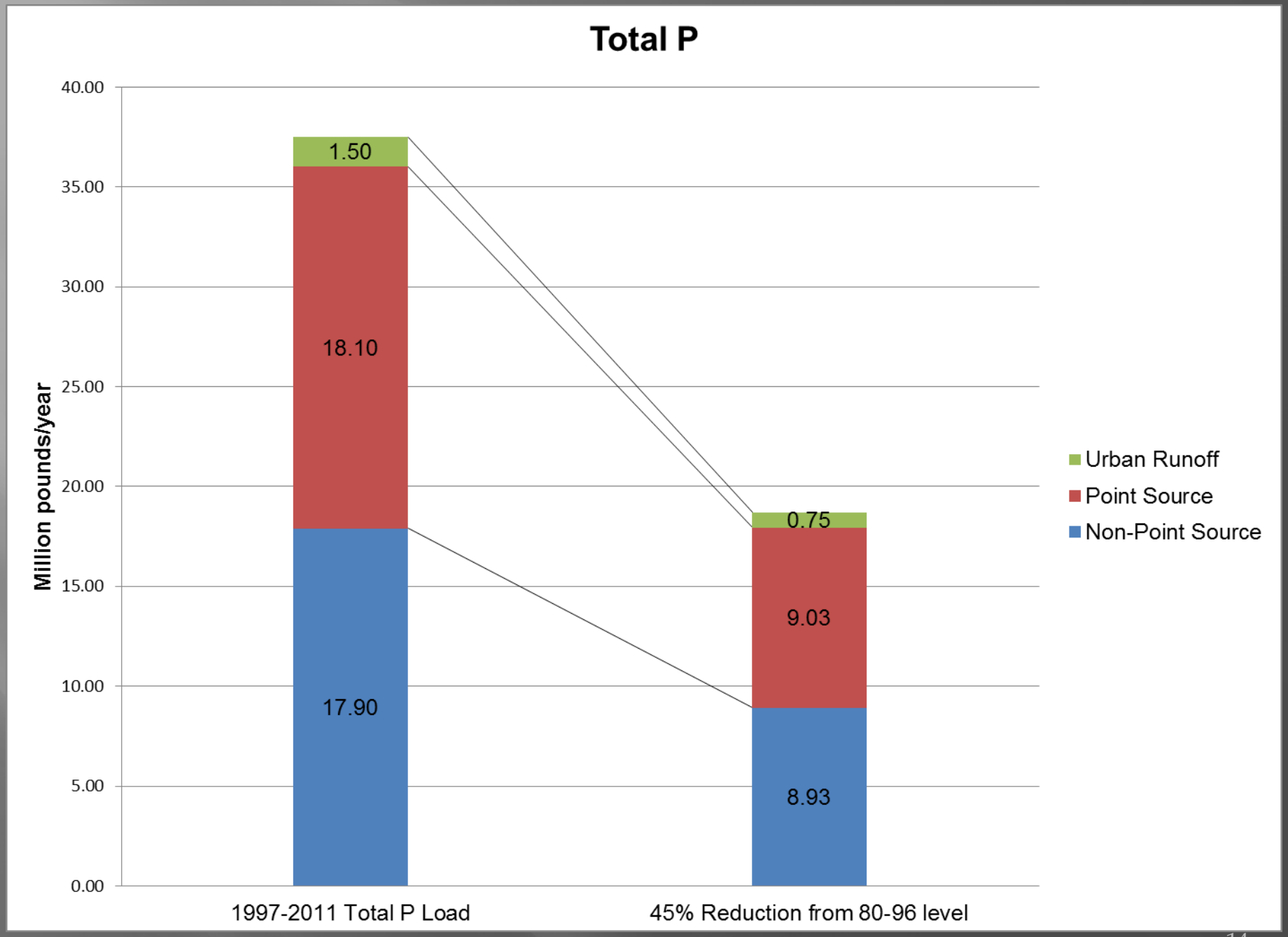
(1997-2011)



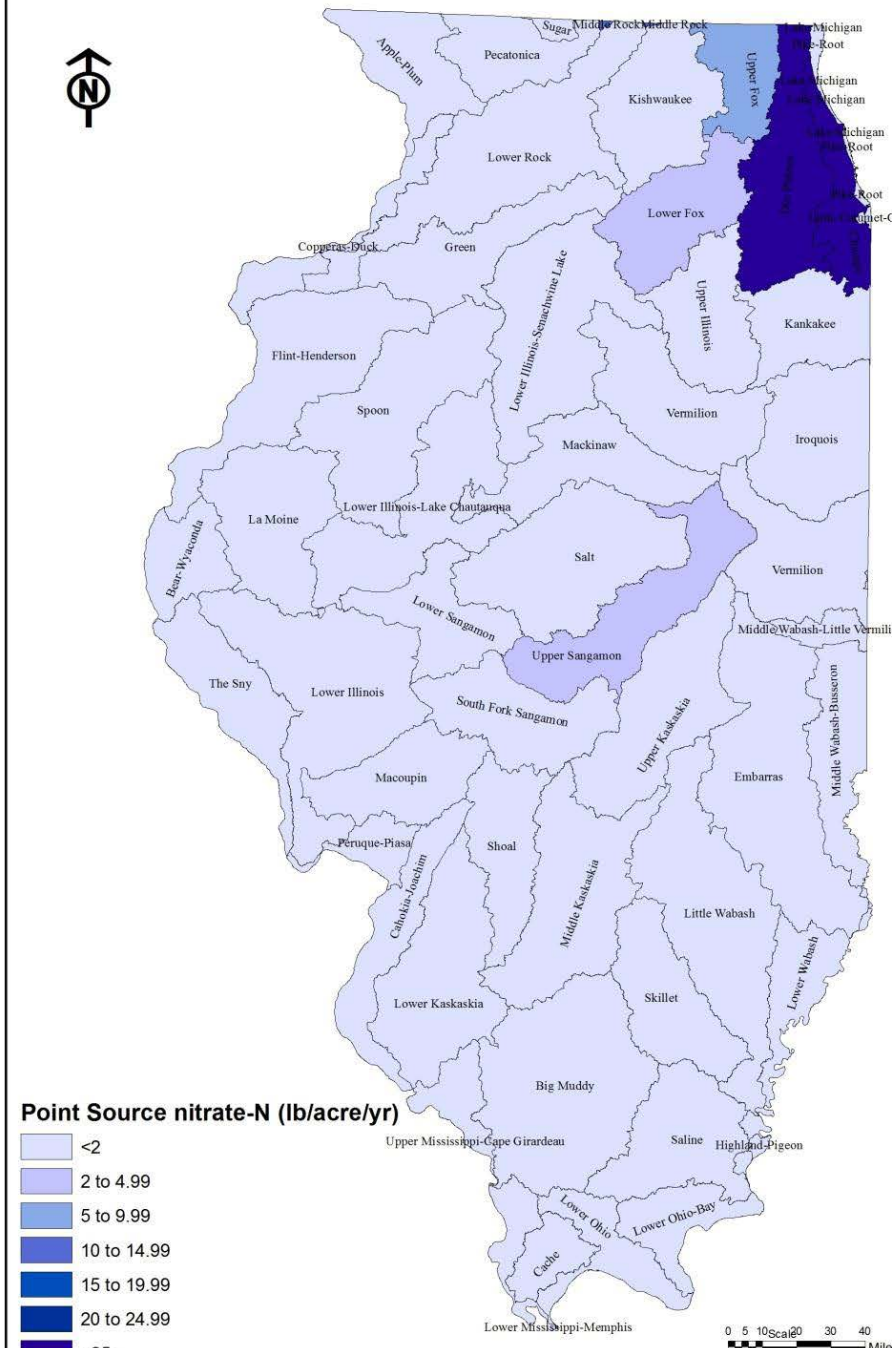
Nitrate-N & Total P Targets



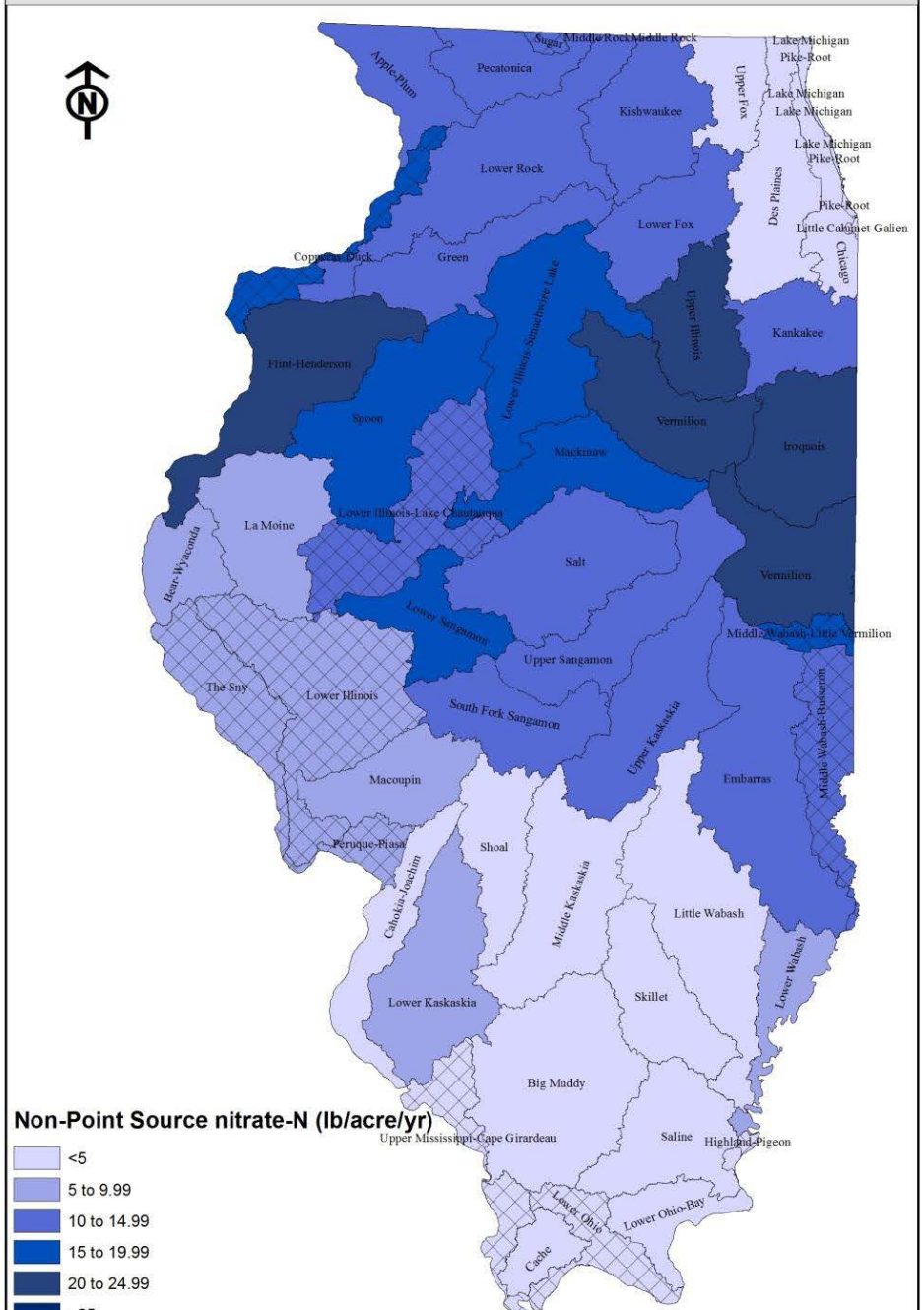

Nitrate-N
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Million pounds/year
6.00
75.20
328.80
3.25
40.75
178.19
1980-1996 Nitrate-N Load
45% Reduction from 1980-1996 totals
Urban Runoff
Point Source
Non-Point Source


Total P
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Million pounds/year
1.50
18.10
17.90
0.75
9.03
8.93
1997-2011 Total P Load
45% Reduction from 80-96 level
Urban Runoff
Point Source
Non-Point Source

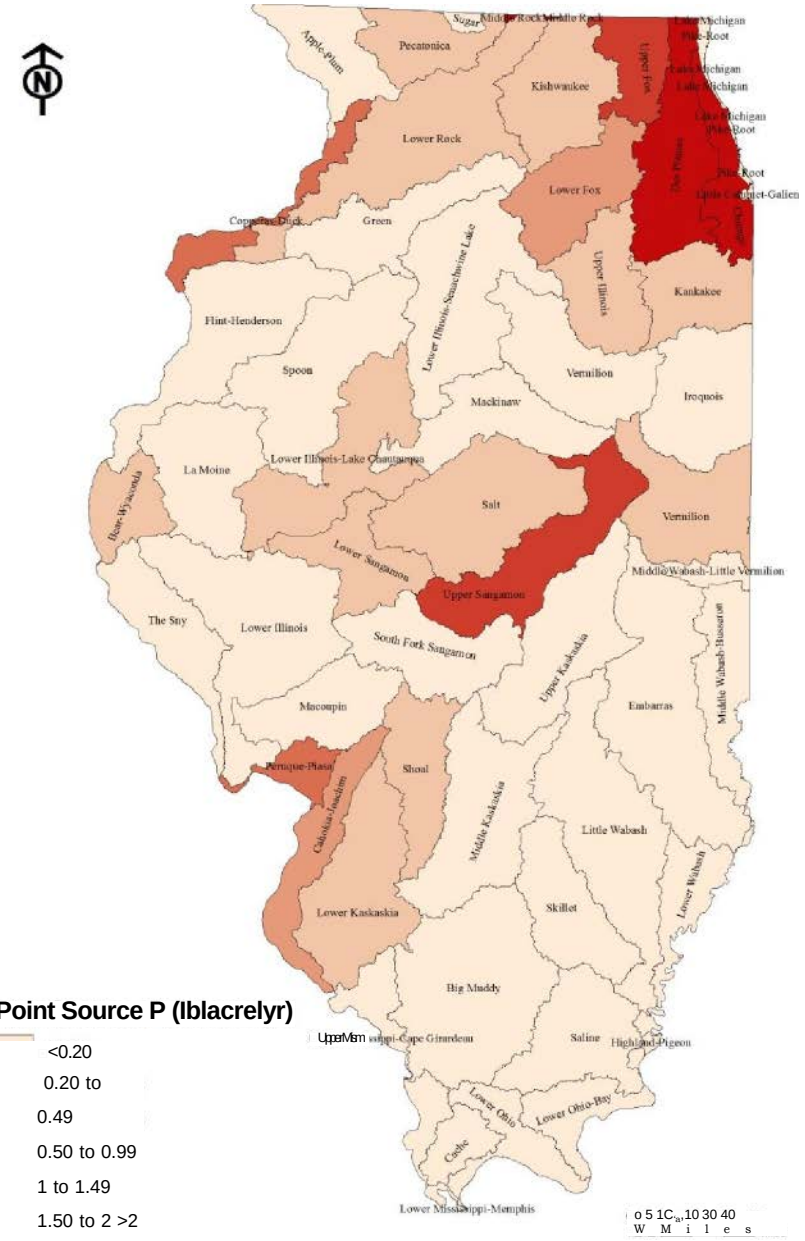
HUC8 Point Source nitrate-N Yields



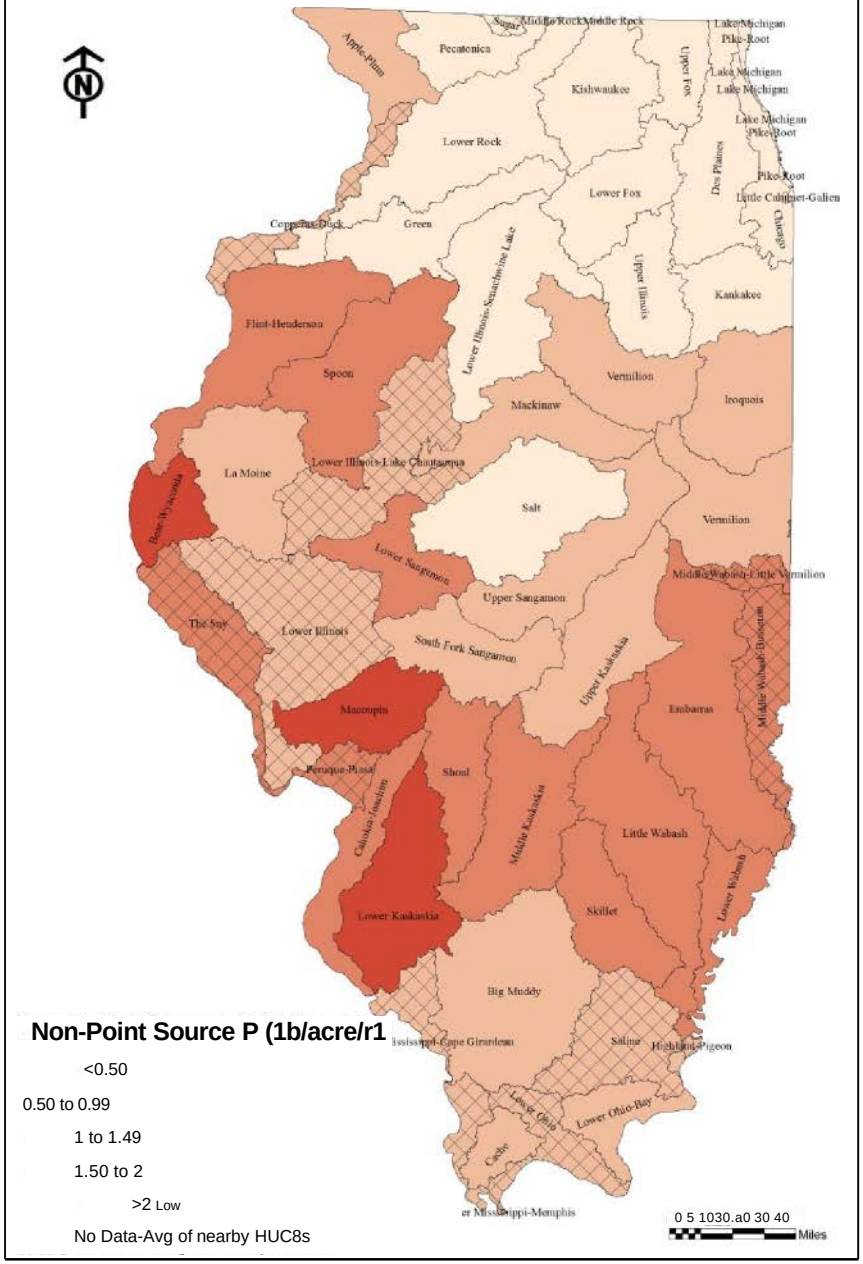
HUC8 Non-Point Source nitrate-N Yields



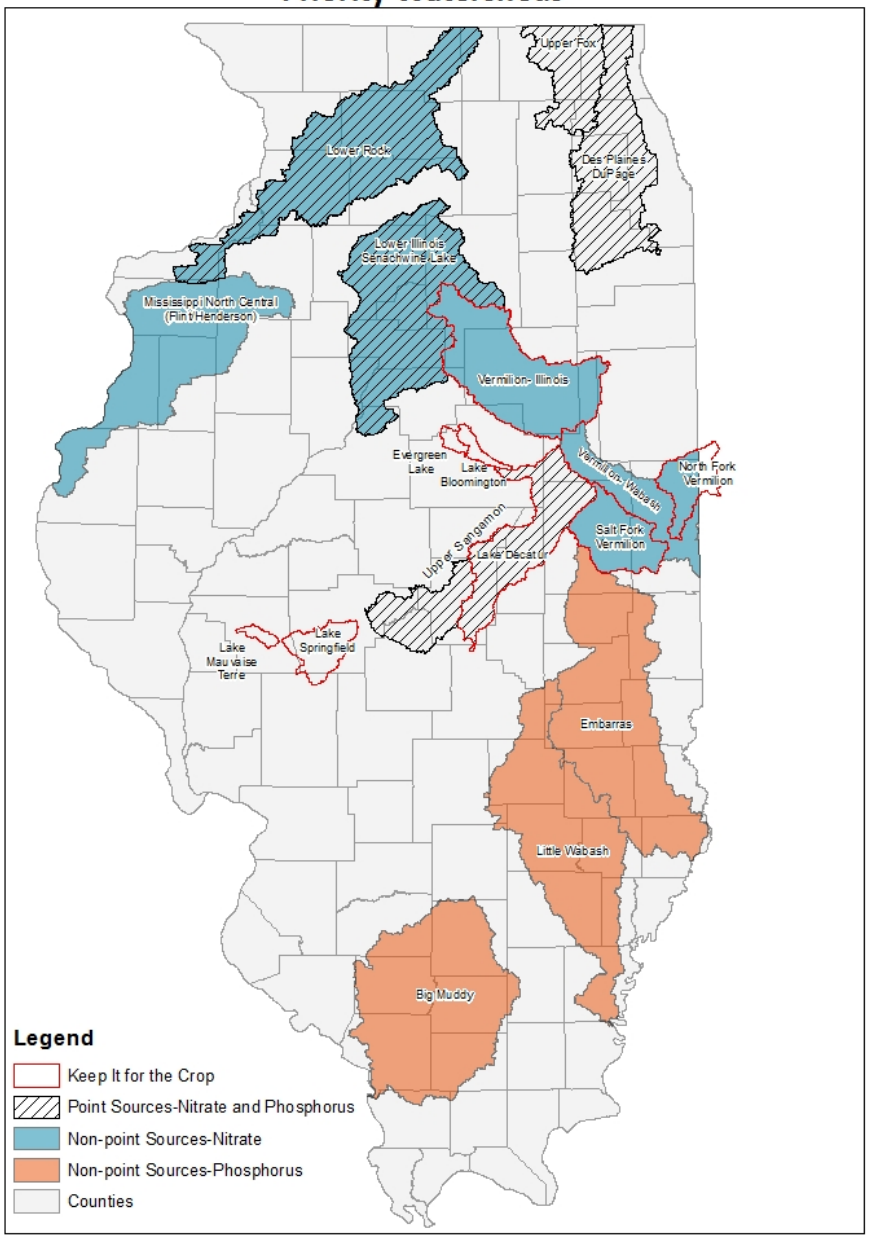
HUC8 Point Source P Yields



HUC8 Non-Point Source P Yields



Illinois Nutrient Loss Reduction Strategy
Priority Watersheds



Example Statewide Results for N

	Practice/Scenario	Nitrate-N reduction per acre (%)	Nitrate-N reduced (million lb N)	Nitrate-N Reduction % (from baseline)	Cost ($/lb N removed)
	Baseline			410	
In-field	Reducing N rate from background to the MRTN (10% of acres)	10	2.3	0.6	-4.25
	Nitrification inhibitor with all fall applied fertilizer on tile-drained corn acres	10	4.3	1.0	2.33
	Split (50%) fall and spring (50%) on tile-drained corn acres	7.5 to 10	13	3.1	6.22
	Fall to spring on tile-drained corn acres	15 to 20	26	6.4	3.17
	Cover crops on all corn/soybean tile-drained acres	30	84	20.5	3.21
	Cover crops on all corn/soybean non-tiled acres	30	33	7.9	11.02
Edge-of-field	Bioreactors on 50% of tile-drained land	40	56	13.6	1.38
	Wetlands on 25% of tile-drained land	40	28	6.8	5.06
	Buffers on all applicable crop land (reduction only for water that interacts with active area)	90	36	8.7	1.63
Land use change	Perennial/energy crops equal to pasture/hay acreage from 1987	90	10	2.6	9.34
	Perennial/energy crops on 10% of tile-drained land	90	25	6.1	3.18
Point source	Point source reduction to 10 mg nitrate-N/L		14	3.4	3.30
	Point source reduction in N due to biological nutrient removal for P		8	1.8	

Example Statewide Results for P

	Practice/Scenario	Total P reduction per acre (%)	Total P reduced (million lb P)	Total P Reduction % (from baseline)	Cost ($/lb P removed)
	Baseline		37.5		
In-Field	Convert 1.8 million acres of conventional till eroding >T to reduced, mulch or no-till	50	1.8	5.0	-16.60
	P rate reduction on fields with soil test P Above the recommended maintenance level	7	1.9	5.0	-48.75
	Cover crops on all corn/soybean acres	30	4.8	12.8	130.40
	Cover crops on 1.6 million acres eroding >T currently in reduced, mulch or no-till	50	1.9	5.0	24.50
Edge-of-field	Wetlands on 25% of tile-drained land	0	0	0.0	
	Buffers on all applicable crop land	25-50	4.8	12.9	11.97
Land use change	Perennial/energy crops equal to pasture/hay acreage from 1987	90	0.9	2.5	102.30
	Perennial/energy crops on 1.6 million acres>T currently in reduced, mulch or no-till	90	3.5	9.0	40.40
	Perennial/energy crops on 10% of tile-drained land	50	0.3	0.8	250.07
Point source	Point source reduction to 1.0 mg total P/L (majors only)		8.3	22.1	13.71

Example Statewide N & P Scenarios

Name	Combined Practices and/or Scenarios	Nitrate-N (% reduction)	Total P (% reduction)	Cost of Reduction ($/lb)	Annualized Costs (million $/year)
NP1	MRTN, fall to spring, bioreactors 50%, wetlands 25%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, buffers on all applicable lands, point source to 1.0 mg TP/L and 10 mg nitrate-N/L	35	45	**	383
NP2	MRTN, fall to spring, bioreactors 50%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on all CS, point source to 1.0 mg TP/L and 10 mg nitrate-N/L	45	45	**	810
NP3	MRTN, fall to spring, bioreactors 15%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on 87.5% of CS, buffers on all applicable lands, perennial crops on 1.6 million ac >T, and 0.9 million additional ac.	45	45	**	791
NP4	MRTN, fall to spring N, bioreactors 35%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, buffers on 80% of all applicable land	20	20	**	48
NP5	MRTN, fall to spring N, bioreactors 30%, wetlands 15%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, point source to 1.0 mg TP/L and 10 mg nitrate-N/L on 45% of discharge	20	20	**	66
NP6	MRTN, fall to spring N, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on 1.6 million ac eroding >T and 40% of all other CS	24	20	**	244

Current Activities – Agricultural Sources

Illinois Agriculture is leading efforts to fund research, outreach and on-farm demonstration of effective practices.

- Nutrient Research and Education Council
- Keep It for the Crop
  - N-Watch
  - Nitrogen management systems
  - On-Farm nitrogen rate trials
  - N-Calc (MRTN calculator)
- Cover Crop Training Initiative

Current Activities – Agricultural Sources

Many programs available to promote and fund conservation practices that prevent nutrient loss

- Section 319
- CREP
- Partners for Conservation Cost Share
- Streambank Stabilization and Restoration
- EQIP
- CSP
- Easements
- MRBI
- RCPP
- Driftless Landscape Conservation Initiative
- Illinois Buffer Partnership
- Clean Water Initiative
- National Water Quality Initiative

Current Activities – Point Sources

- Effluent limits in NPDES permits
  - Total P limit of 1 mg/L for new/expanding wastewater treatment plants
  - Total P limit of 1 mg/L for discharges into or upstream of a lake
  - Total P limits and/or total N goals – anti-degradation
  - Voluntary acceptance of permit limits
  - Contribution to violation of narrative standards

Current Activities – Point Sources

- As a result, 42% of major municipal dischargers have P limits – 75% of regulated discharge from major municipals
- Permit limits for Metropolitan Water Reclamation District of Greater Chicago will achieve 33% of the point source load reduction goal for phosphorus – Gulf of Mexico hypoxia

Current Activities – Point Sources

- Watershed planning efforts help with local impairments as well as reduce loads leaving the State.
- Fox River
  - "placeholder" phosphorus limit
  - Phosphorus removal feasibility report – 1 mg/L and 0.5 mg/L
  - Fox River Implementation Plan
  - Allocation of phosphorus loads will drive future permit limits

Current Activities – Point Sources

- Watershed Planning
  - Upper Des Plaines
    - 1 mg/L P permit limit to start
    - Optimization of current equipment
    - Develop watershed implementation plan
  - DuPage River/Salt Creek
    - Focusing on habitat restoration to improve biology
    - Nutrient-related permit condition with compliance schedule

Future Directions – Point Sources

- Nutrient Loss Reduction Feasibility Plan
  - Focus on majors in priority watersheds
  - Favor biological nutrient removal
- Review data and identify additional strategies
  - Nitrate-nitrogen
  - Industrial discharges
- Expand reduction planning efforts to additional watersheds to address local water quality problems

Future Directions – Agricultural NPS

In order to make progress on nutrient loss reduction, widespread implementation of effective practices needed.

- Farmers select and apply the most appropriate and beneficial practices from options:
  - Fertilizer application
  - Cover crops
  - Edge-of-field (bioreactors, wetlands, water/sediment control basins, buffers, grassed waterways)

Future Directions – Agricultural NPS

- Expanded outreach and education on nutrient loss & available tools by public, private sector, academic and non-profits – watershed scale, crop advisors, farm managers
- Ag Water Quality Partnership Forum
  - Strengthen connections between industry initiatives, continuing education for CCAs, etc. to help producers evaluate/select BMPs
  - Steer education initiatives/assign responsibility
  - Coordinate/align funding
  - Identify future implementation steps

Showing Progress

- Track environmental outcomes and implementation activities
- Monitoring programs – local water quality/nutrient loads
  - Statewide Nutrient Export Loadings Network
- Implementation
  - NPDES
  - 319
  - Soil Conservation Transect Surveys
  - Natural Resources Inventory
  - NRCS Annual Report
  - Ag Industry Voluntary Reporting

Next Steps

- Draft NLRS released for public review/comment on November 24, 2014 – January 24, 2015
- www.epa.state.il.us/water/nutrient/nlrs.html
- Comments are posted on website
- Illinois EPA & IDOA review/incorporate comments
- Hope to finalize by early July 2015

Guiding Ongoing Implementation

- Policy Working Group
- Nutrient Monitoring council
- Ag Water Quality Partnership Forum
- Urban Stormwater
- Nutrient Science Advisory Committee

Challenges

- Implementation baseline for Ag
- Measuring Ag BMP implementation
- Resources
- Parity of effort