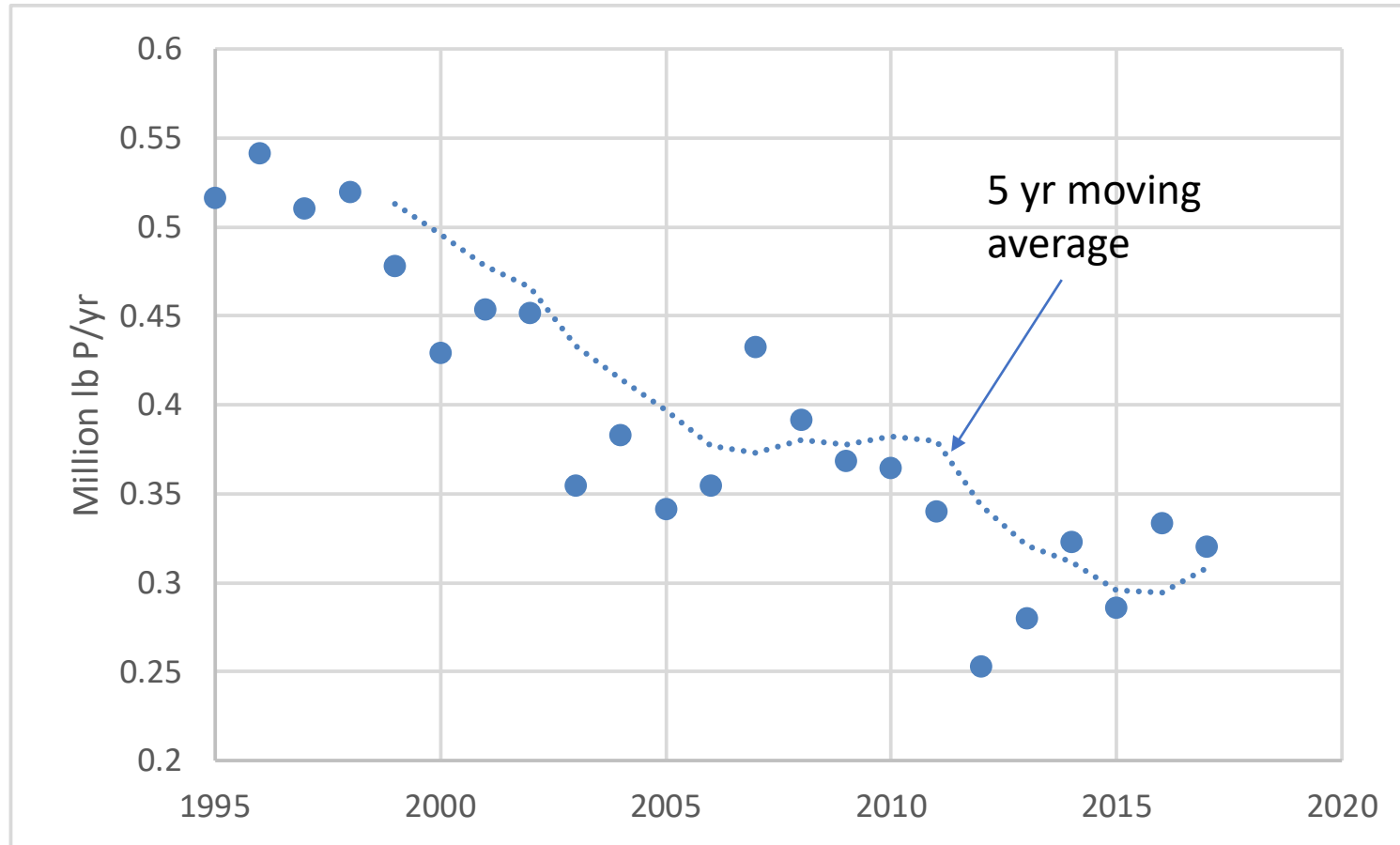


Statewide Results: Riverine Flow and Loads

New update

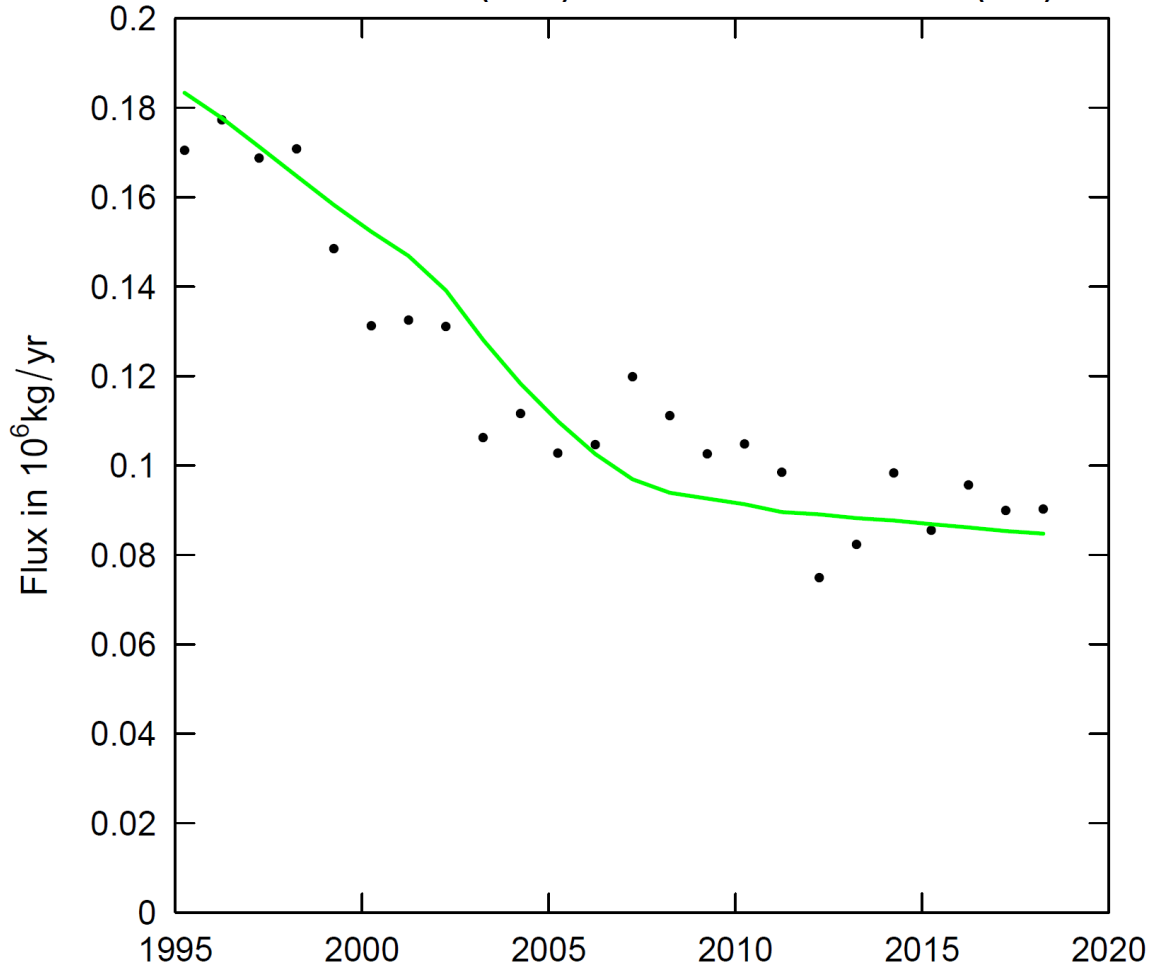
	<u>1980-96 baseline</u>	<u>2013-17</u>	<u>% change from 1980-96</u>	<u>2014-18</u>	<u>% change from 1980-96</u>
Water Yield (in/yr)	13.0	14.7	+13%	14.1	+9%
Nitrate-N Load (Million lb N/yr)	397	425	+7%	378	-5%
Total P Load (Million lb P/yr)	33.7	42.7	+27%	41.5	+23%

North Branch Chicago River plus Thorn Creek Annual TP loads



**THORN CREEK AT THORNTON, IL Phosphorus
Water Year**

Flux Estimates (dots) & Flow Normalized Flux (line)



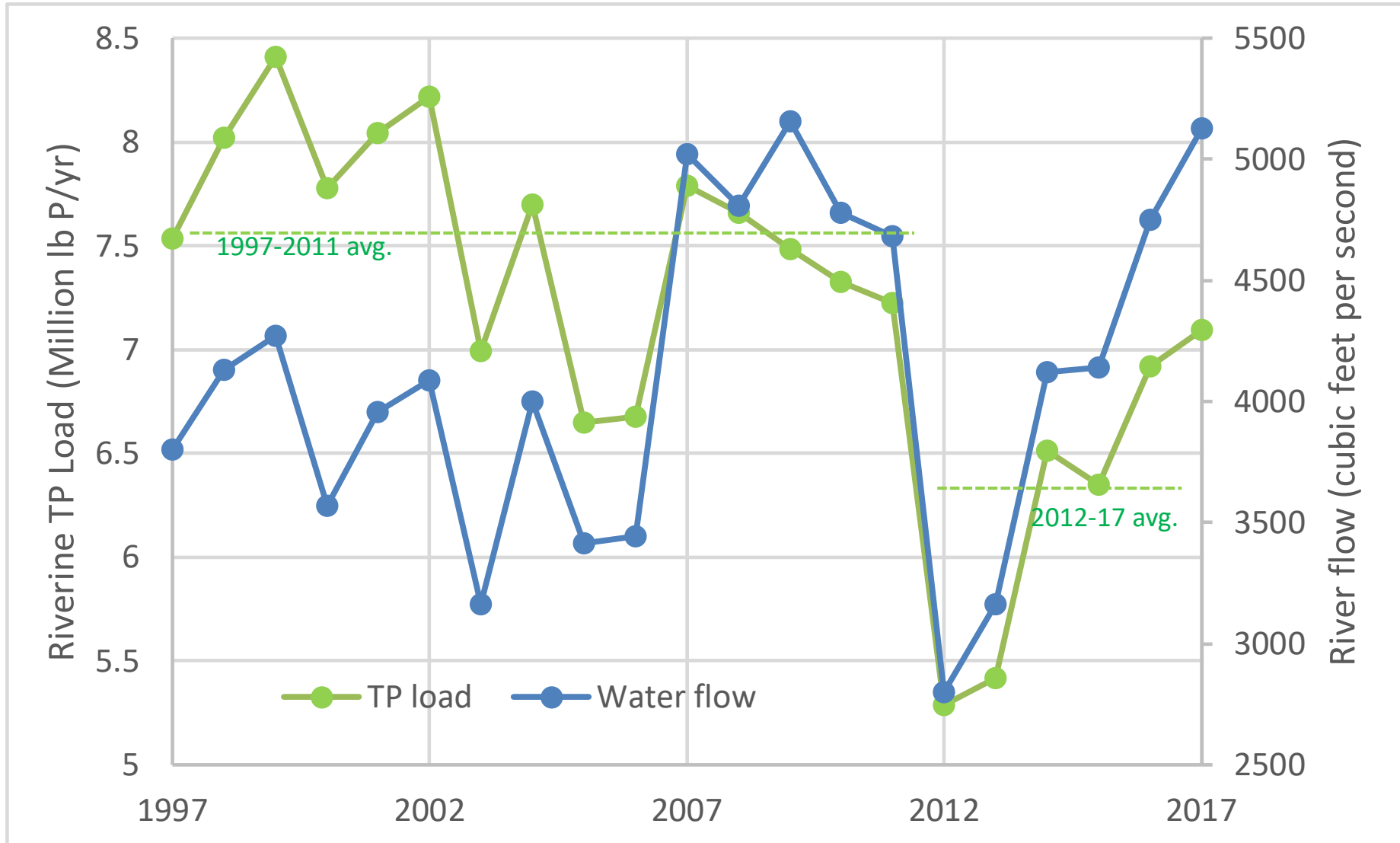
**NORTH BRANCH CHICAGO RIVER AT NILES, IL Phosphorus
Water Year**

Flux Estimates (dots) & Flow Normalized Flux (line)

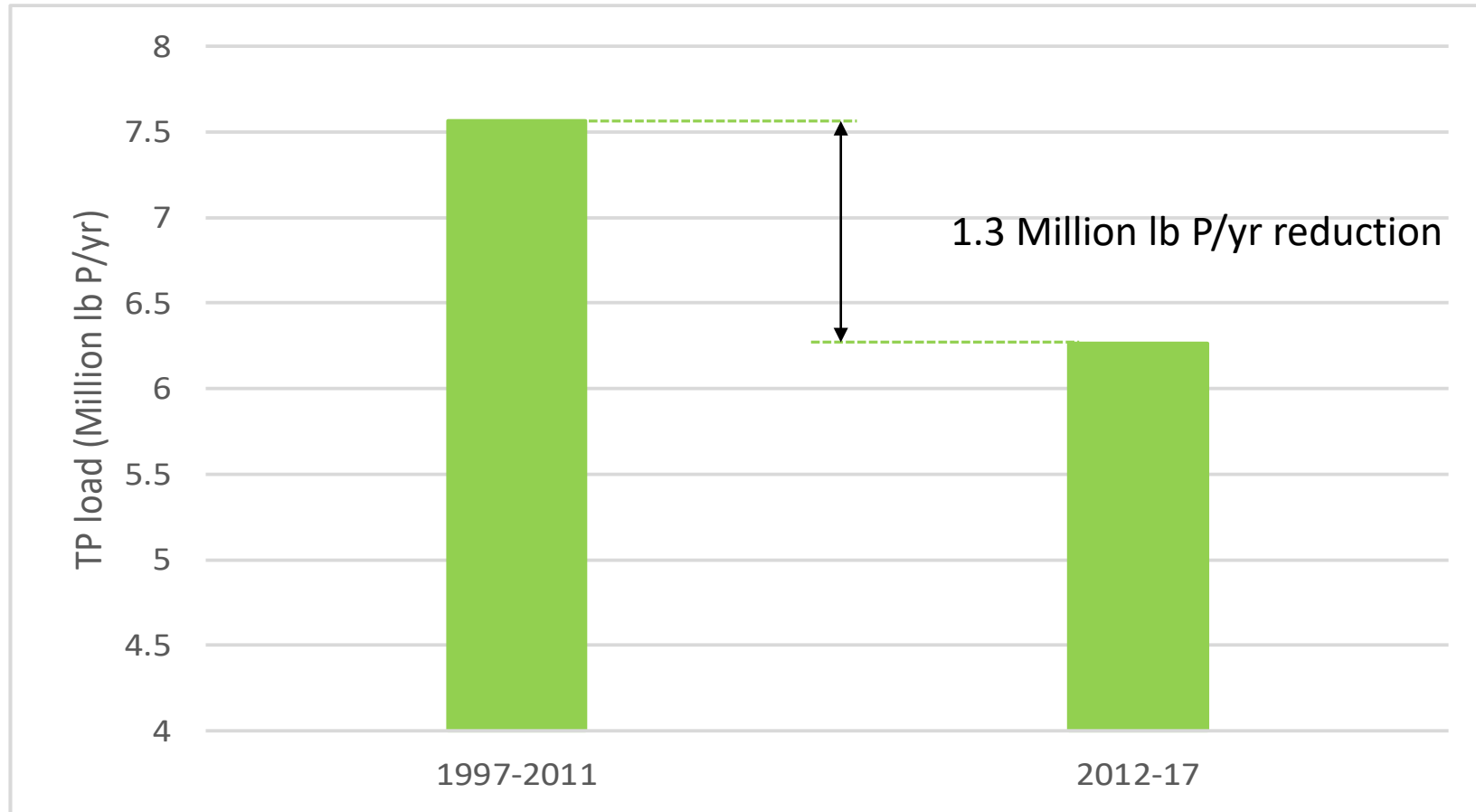


Output from WRTDS

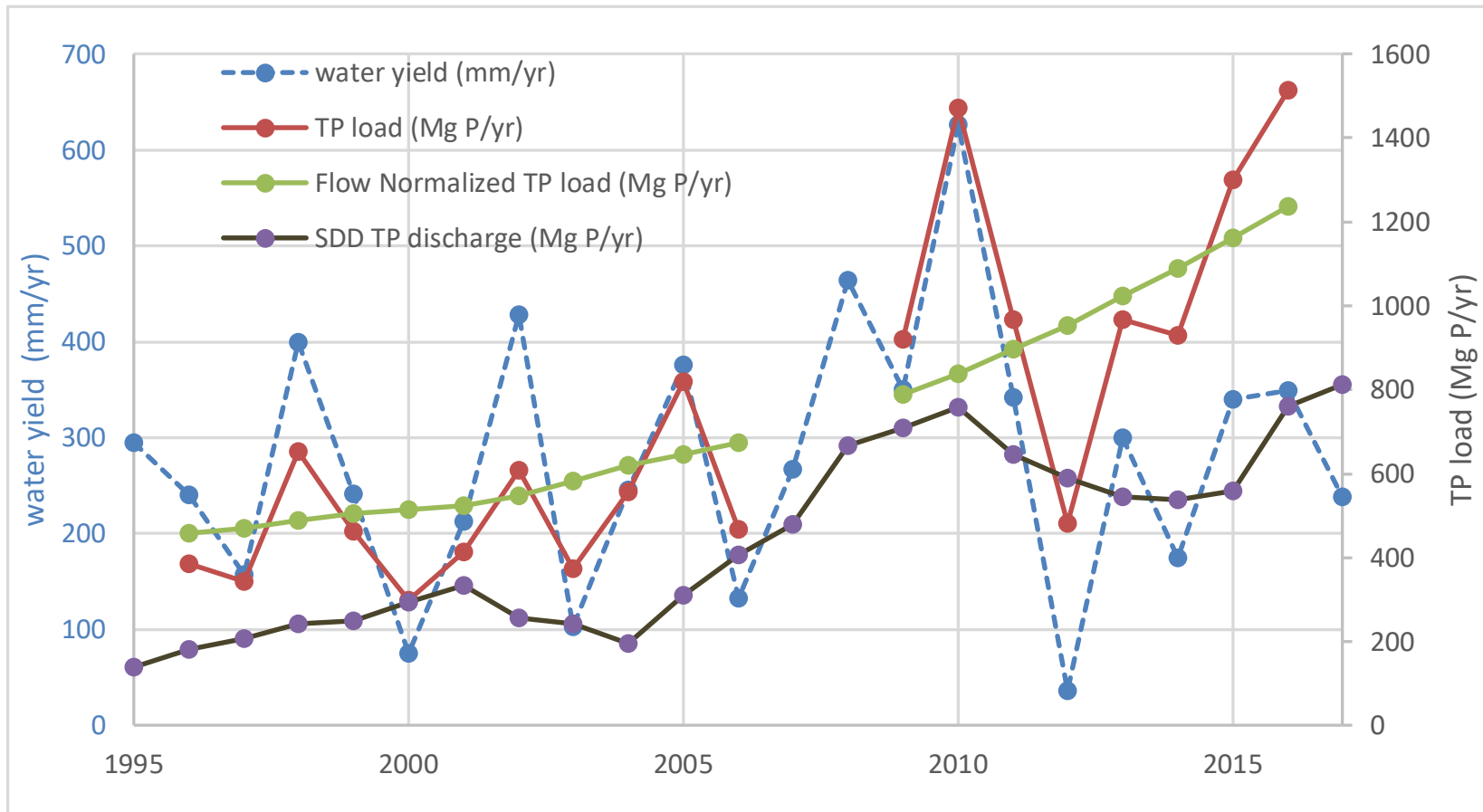
Riverine TP Load and Water Flow for the Des Plaines River at Joliet minus Des Plaines at Russell plus DuPage River at Shorewood (Approximately Des Plaines plus Chicago HUCs; Point source load reduction of ~2.3 million lb P/yr from 2011 to 2017)



Riverine TP Load for the Des Plaines River at Joliet minus Des Plaines at Russell plus DuPage River at Shorewood
(Approximately Des Plaines plus Chicago HUCs; Point source load reduction of ~2.3 million lb P/yr from 2011 to 2017)



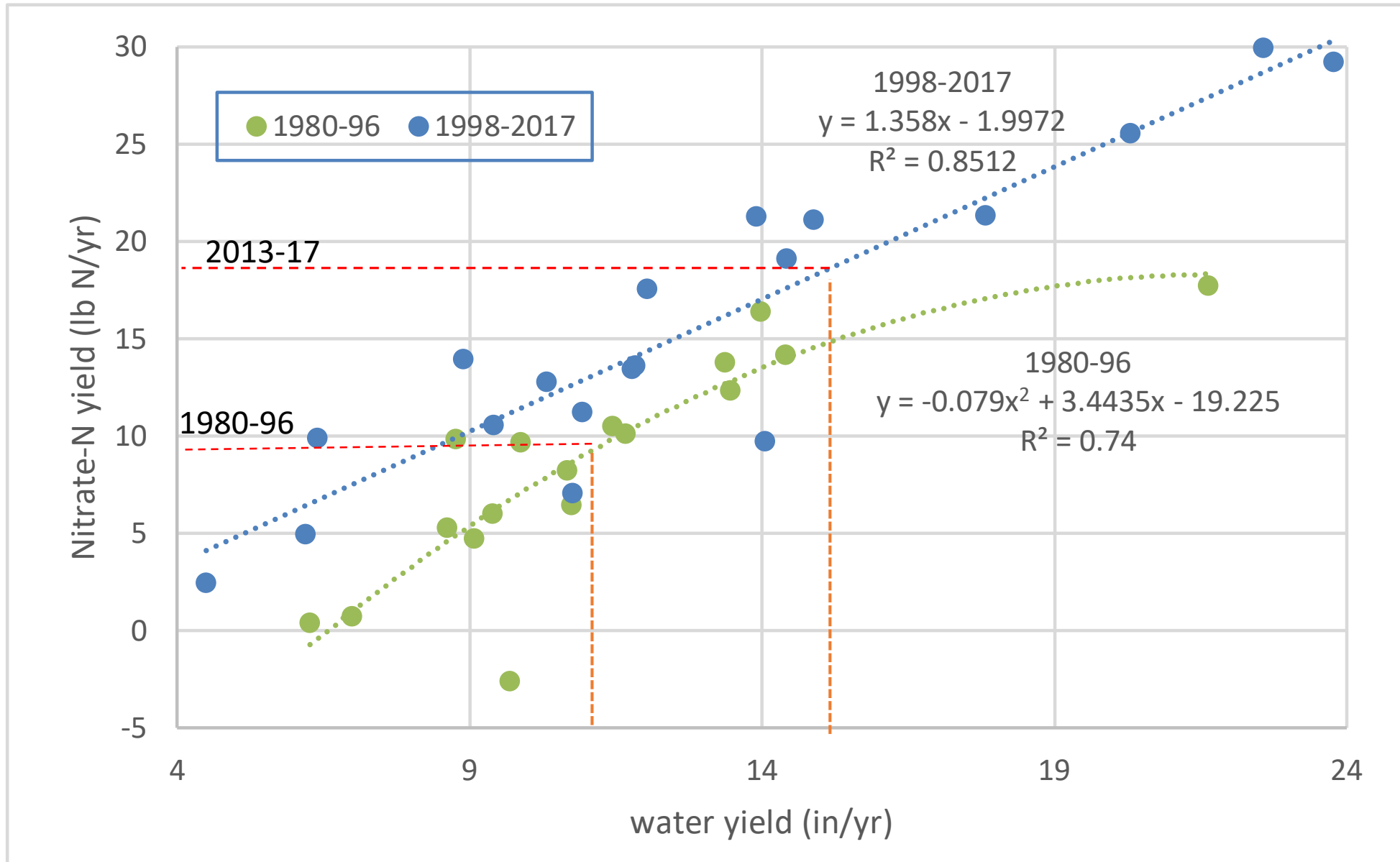
Water Yield and TP loads in the Sangamon River at Riverton minus TP load in the South Fork of the Sangamon at Rochester, and estimated TP discharge from the Sanitary District of Decatur (SDD)



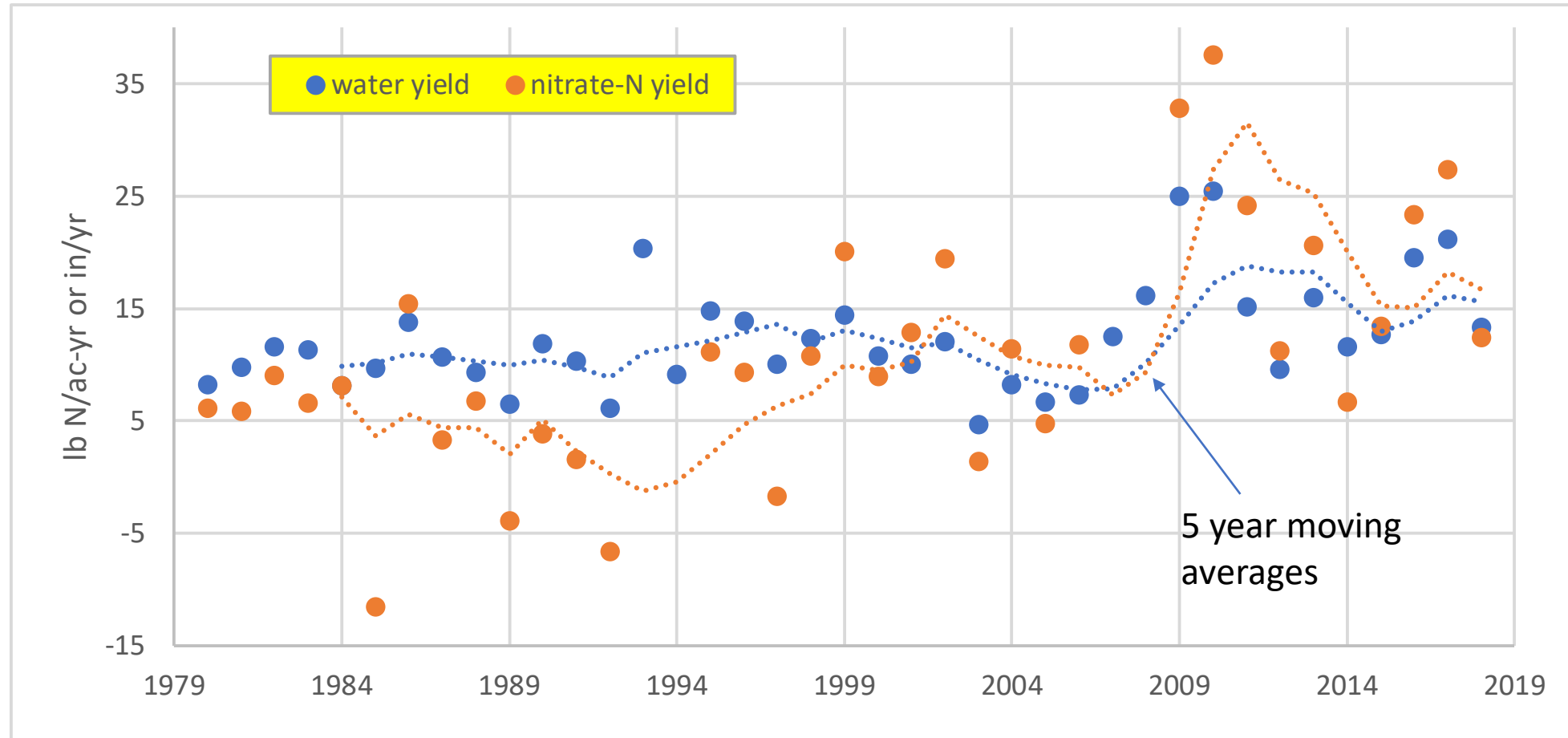
Data sources: River flow and River TP concentrations from USGS; SDD TP discharge estimated from concentration and discharge data provided by the Sanitary District of Decatur.

Rock River between Rockton and Joslin

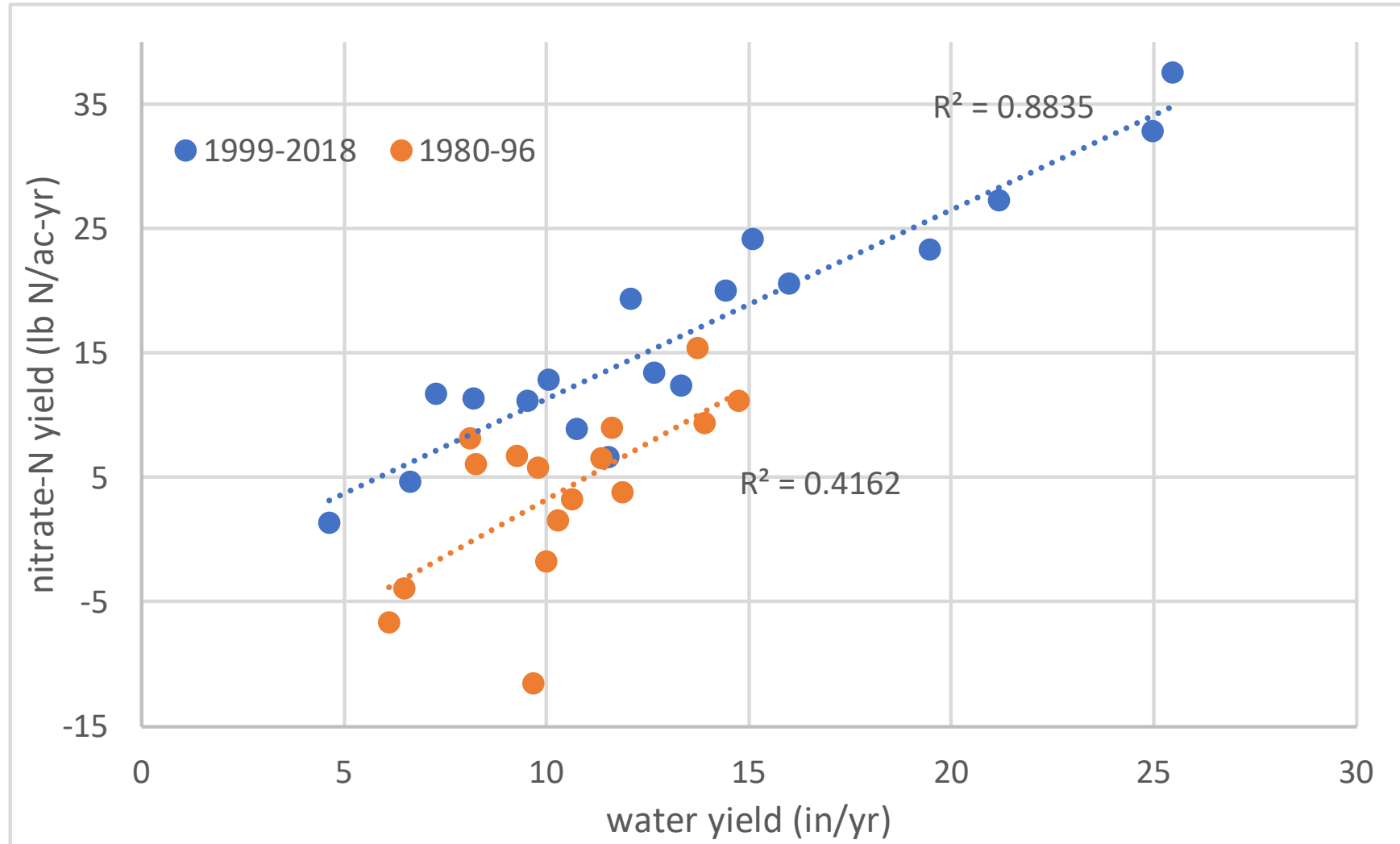
Annual Nitrate-N yield as a function of water yield for 1980-96 and 1998-2017



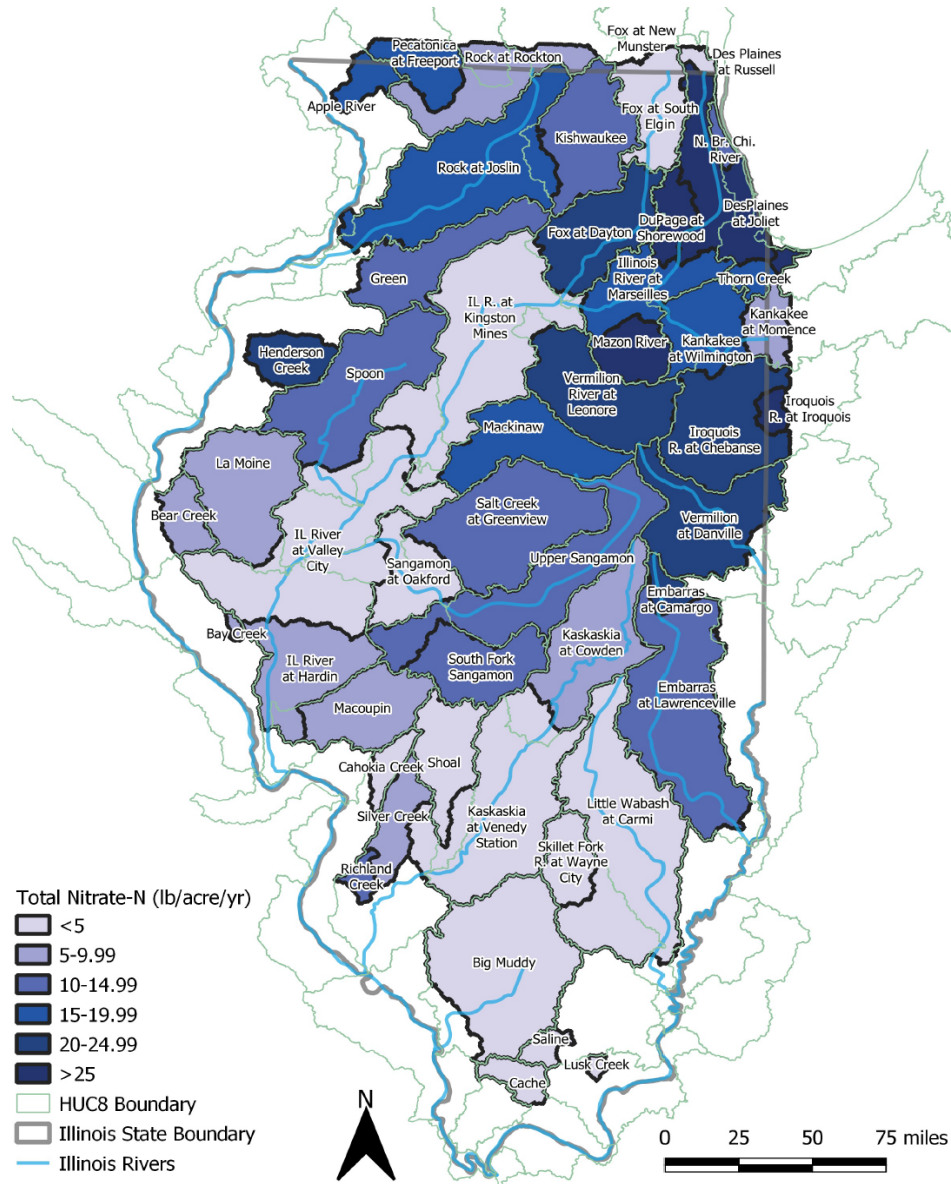
Rock River at Joslin minus Rockton and Kishwaukee annual water yields and nitrate-N yields



Rock at Joslin minus Rockton and Kishwaukee annual nitrate-N yield as a function of annual water yield



Nitrate-N yield (2012-17) at monitoring locations



(Aaron Hoyle-Katz, NCSA)

HUC-8 Challenges

Drainage areas of the monitoring locations do not match HUC boundaries.

Extrapolating from monitored area to HUC area introduces uncertainty and probability of inaccurate estimates

For 16 HUCs, monitored drainage area is between 85% and 115% of HUC area.

For another 9 HUCs, monitored drainage area is between 65% and 135% of HUC area.

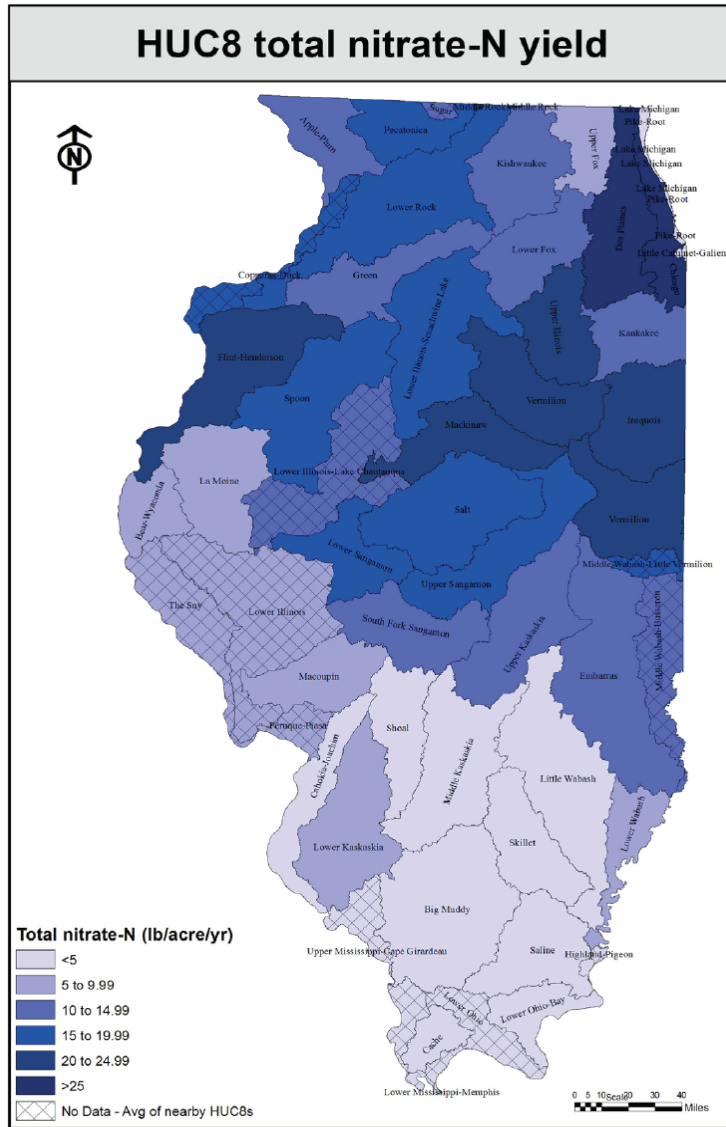
For 15 HUCs, monitored drainage area differs from HUC area by more than 35%.

For 9 HUCs there is no monitoring data

2 HUCs draining to Lake Michigan are ignored

Estimated Average Annual Nitrate-N Yields by HUC (lb N/ac-yr)

1997-2011, NLRS



2012-17 update

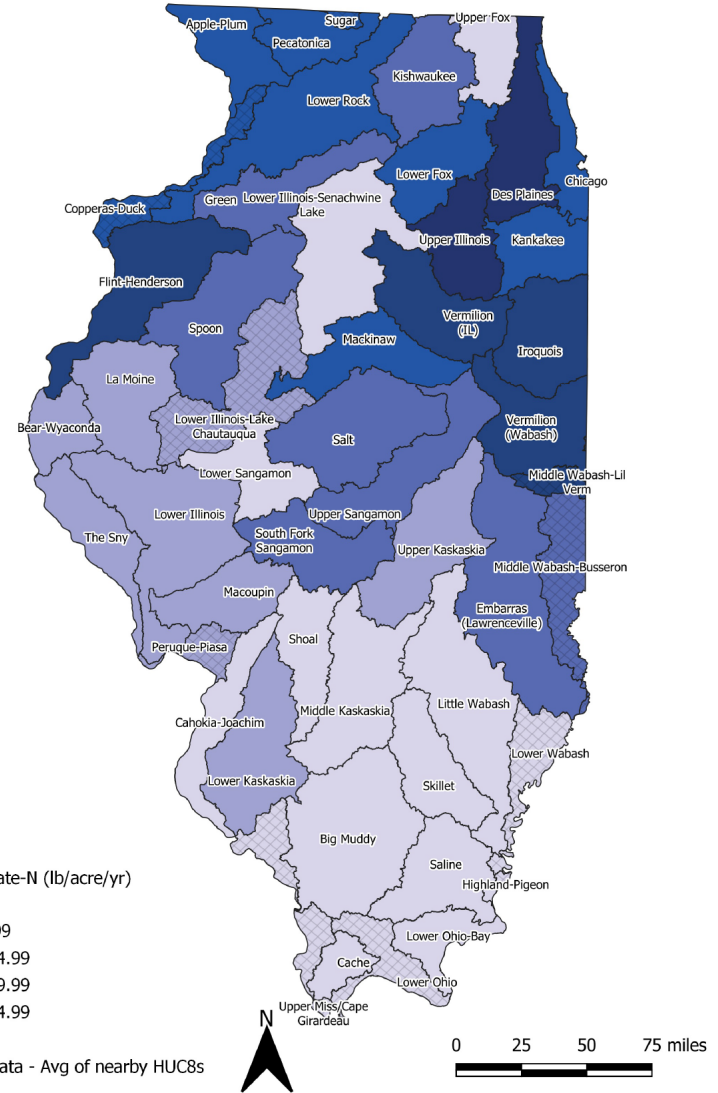


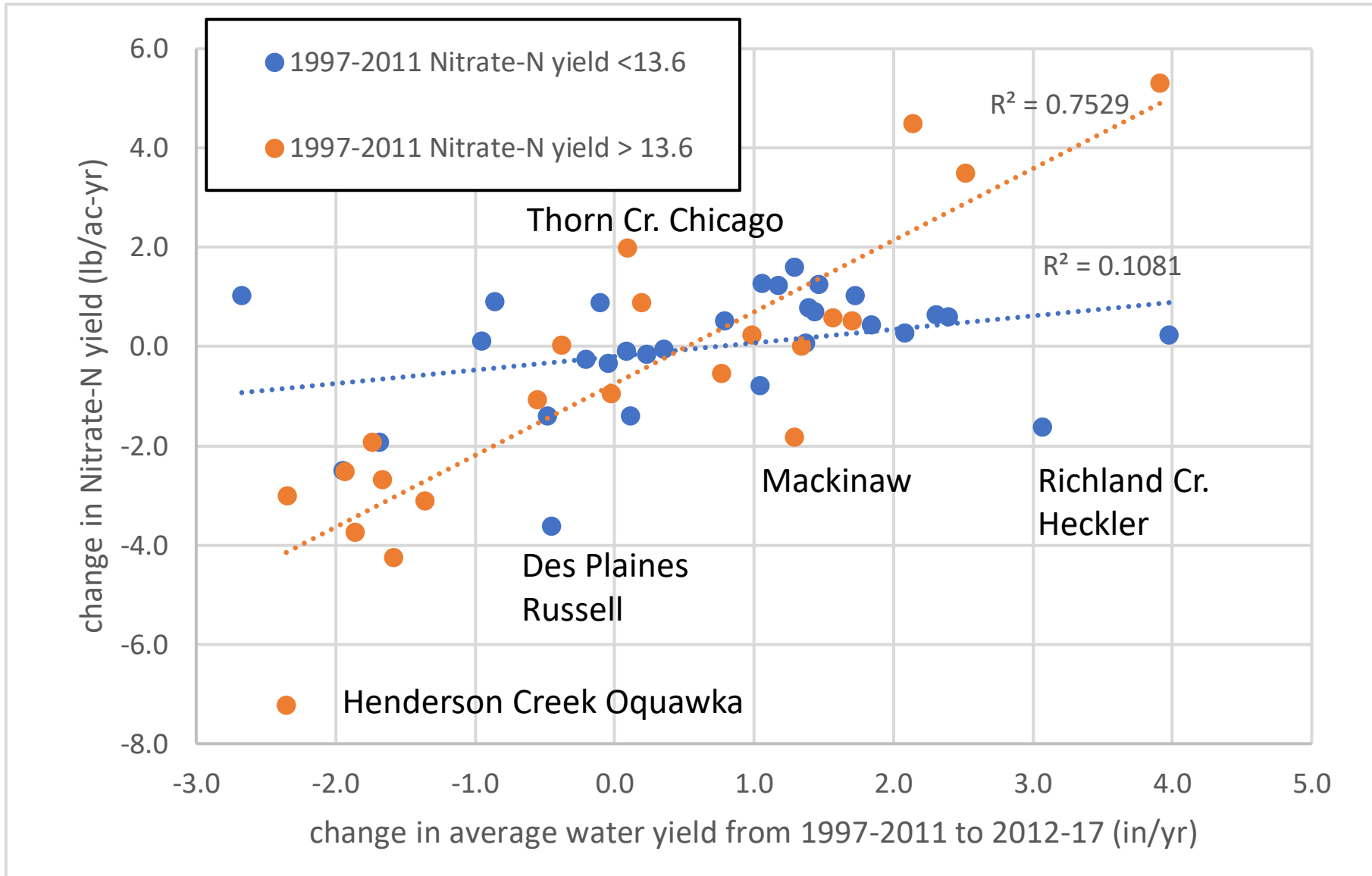
Figure 3.12. Total nitrate-nitrogen yields by HUC8 in Illinois.

Aaron Hoyle-Katz, NCSA

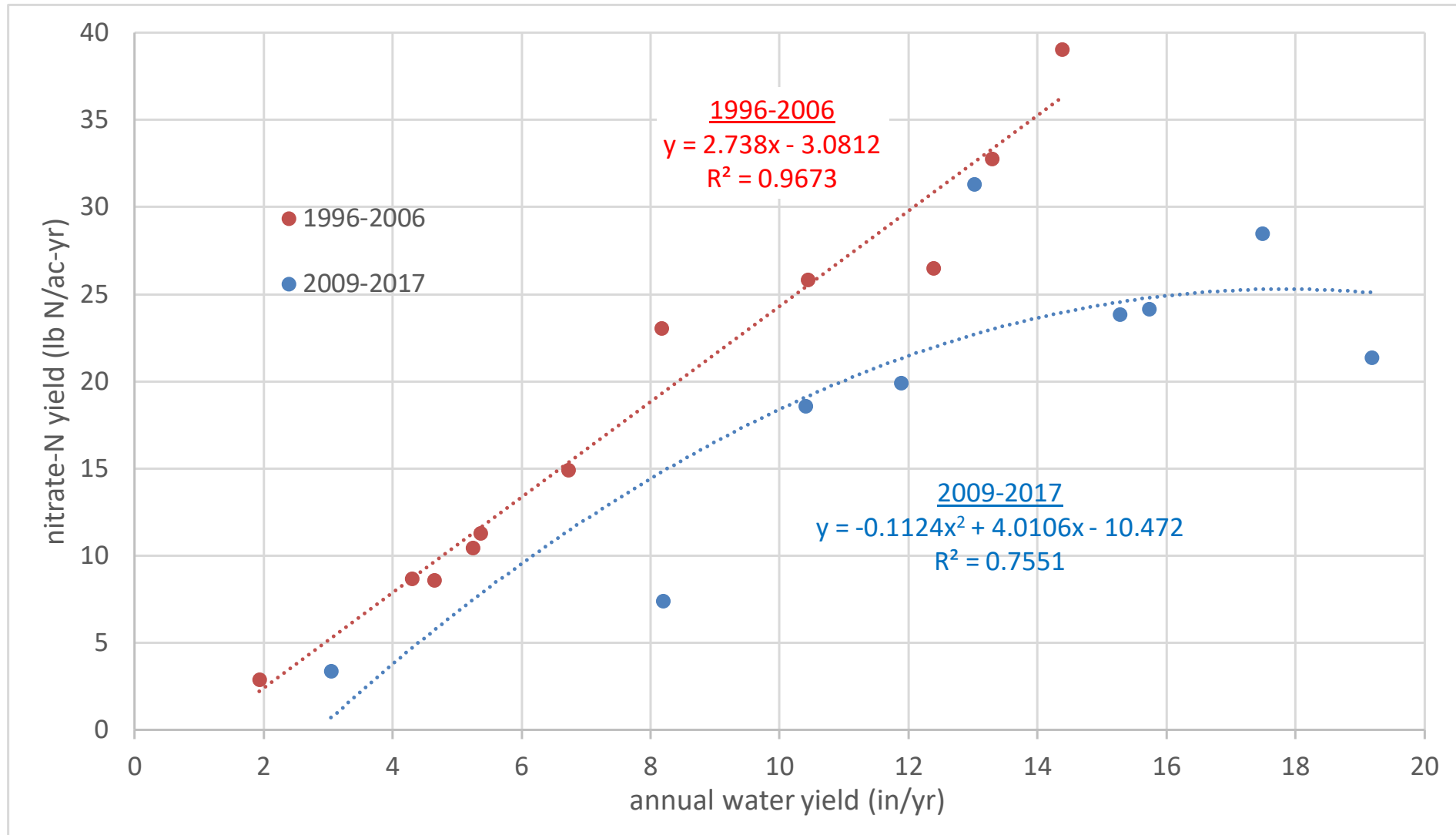
Changes in HUC 8 estimation methods for the Lower Sangamon and Lower Illinois-Senachewine Lake

- For NLRs (2015), small tributaries were used as proxies
 - Lower Sangamon: Spring Creek (12% of HUC area)
 - LI-SL: Big Bureau Creek (10% of HUC area)
- For 2012-17 Update
 - Upstream loads were subtracted from downstream load
 - Negative load estimates occurred in some years possibly due to denitrification
 - Comparison of upstream and downstream concentrations is consistent with denitrification losses

Changes in average annual Nitrate-N Yield vs Change in Water Yield from 1997-2011 to 2012-17

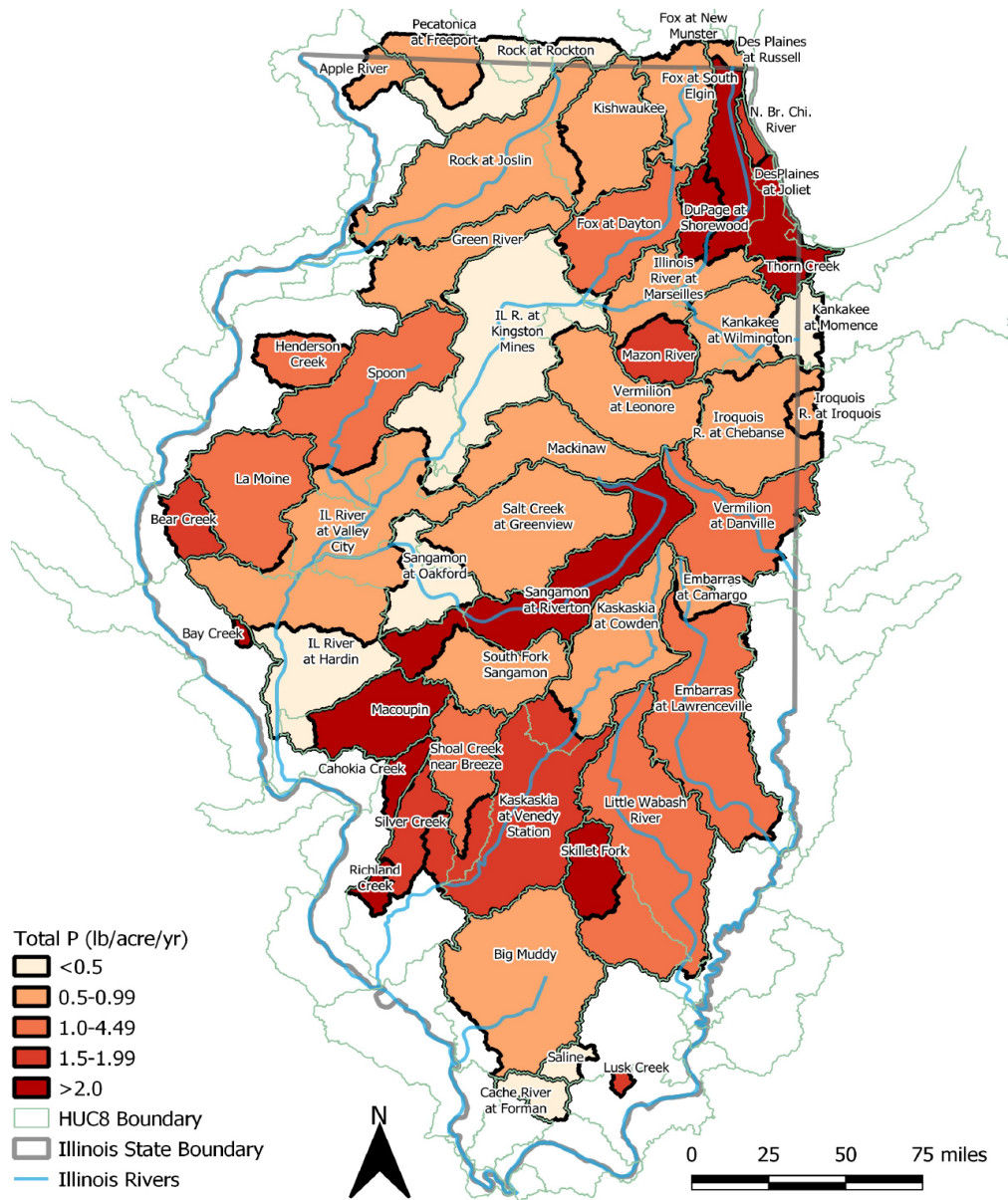


Mackinaw River at Green Valley (05568000) and South Pekin (DK-12)
Annual nitrate yield vs annual water yield 1996-2006 vs 2009-2017 water years

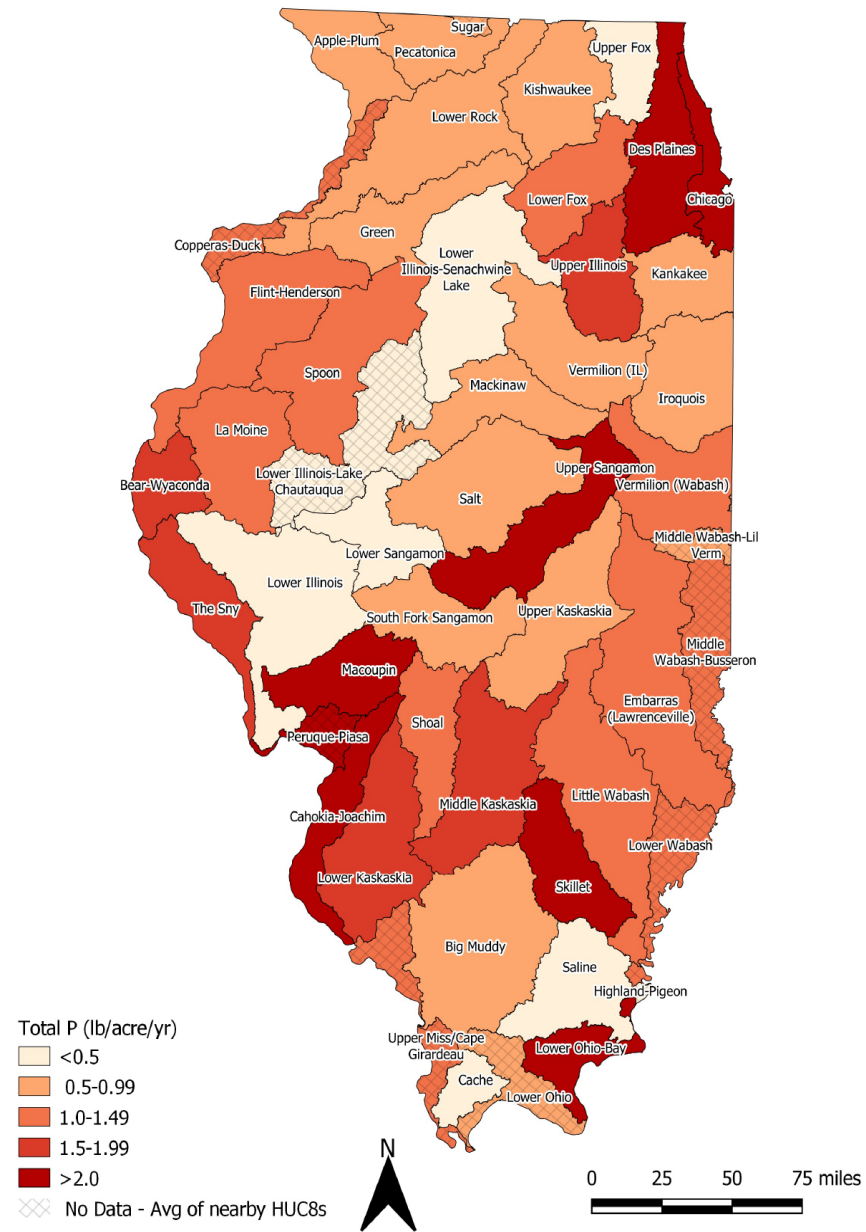


Similar patterns occurred for the Spoon River and Henderson Creek

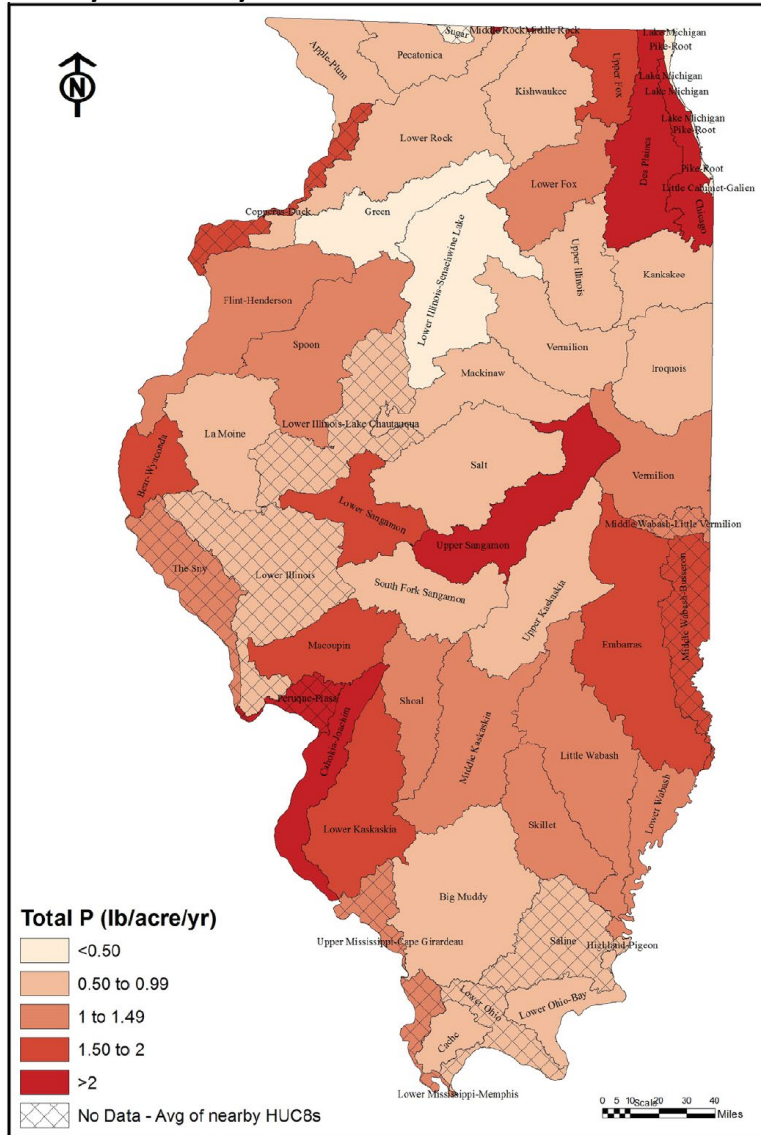
Total P yield by monitored drainage area 2012-17



Total P yield by HUC 8 2012-17

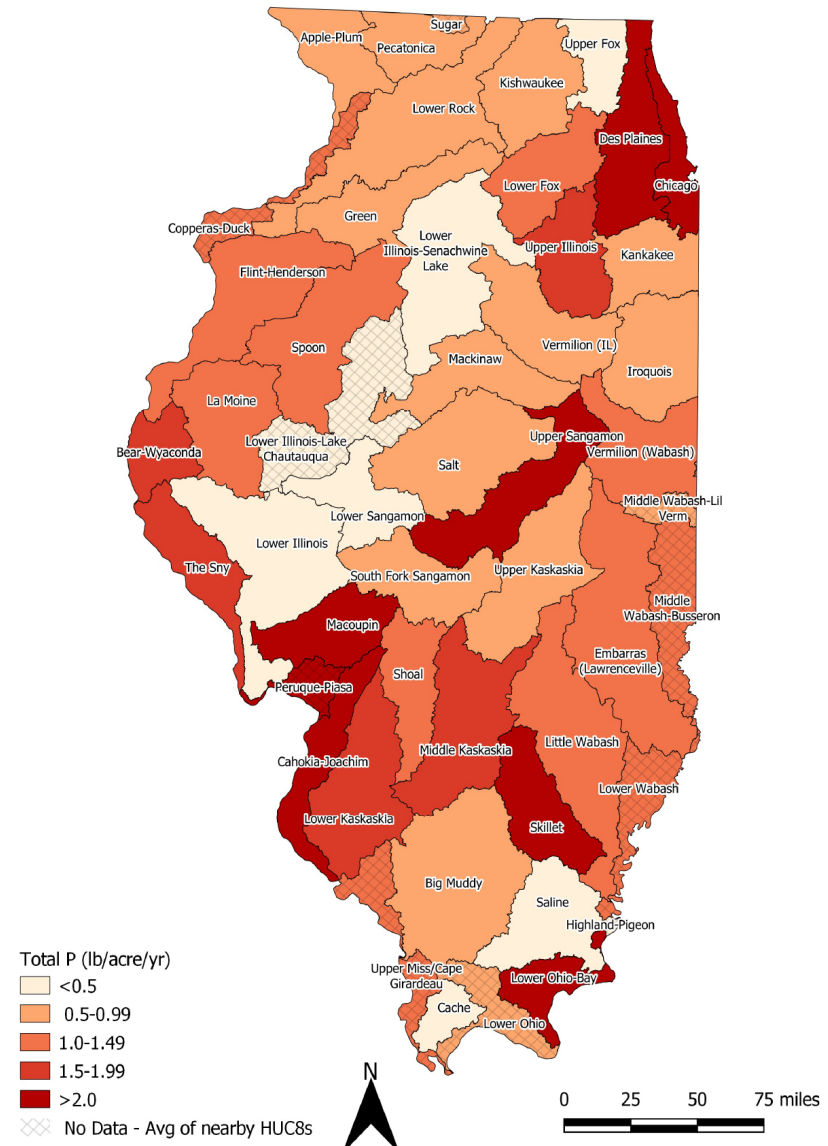


TP yields by HUC 8 1997-2011



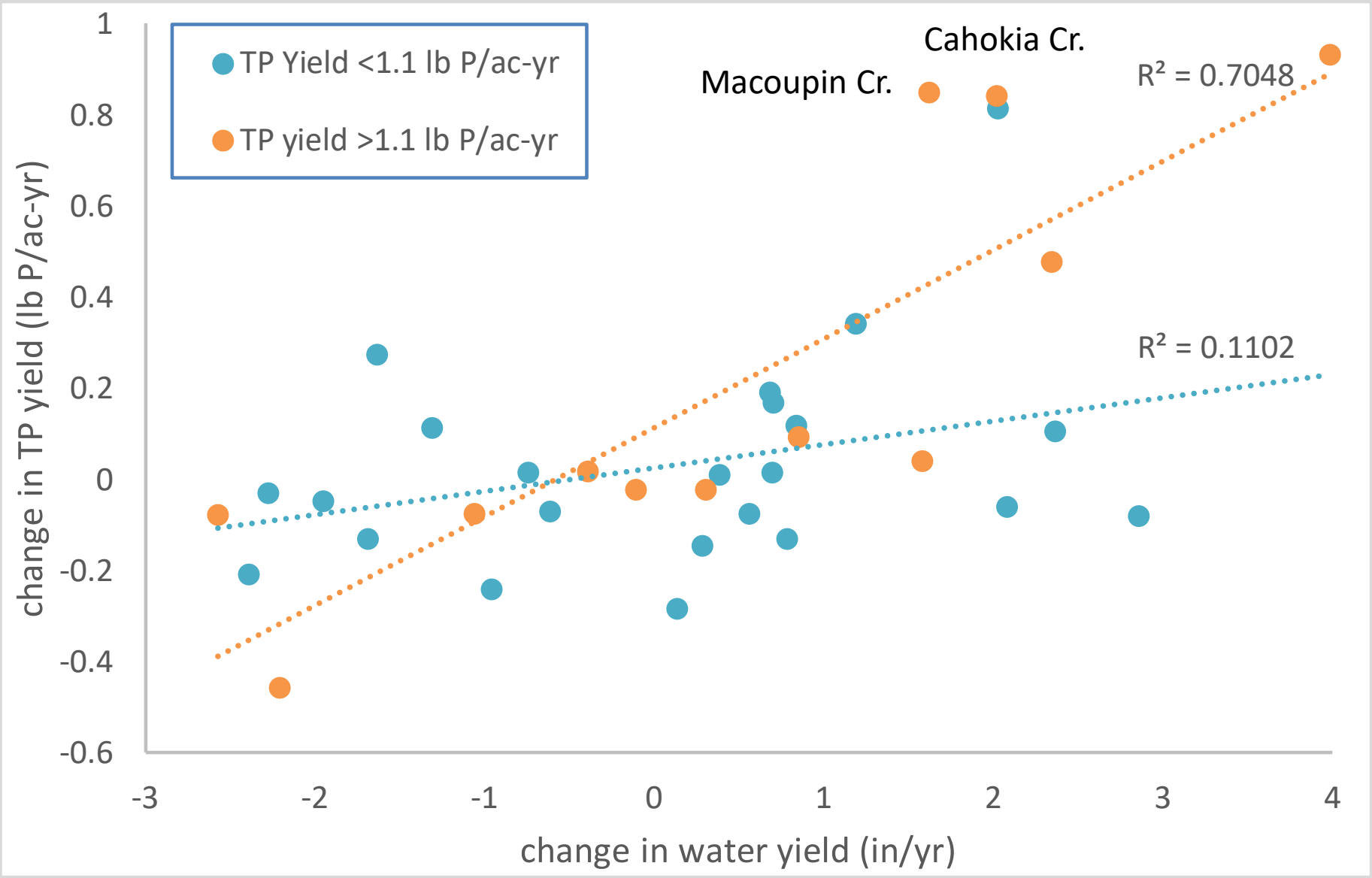
IL NLRs (2015)

TP yields by HUC 8 2012-17



Aaron Hoyle-Katz NCSA

Changes in TP yield from 1997-2011 to 2012-17 plotted against change in water yield from 1997-2011 to 2012-17. Chicago, Des Plaines, Sangamon Basins are excluded due to high point source inputs. The Sny is excluded due to high uncertainty in yield estimate.



Work in progress