Illinois Nutrient Science Advisory Committee
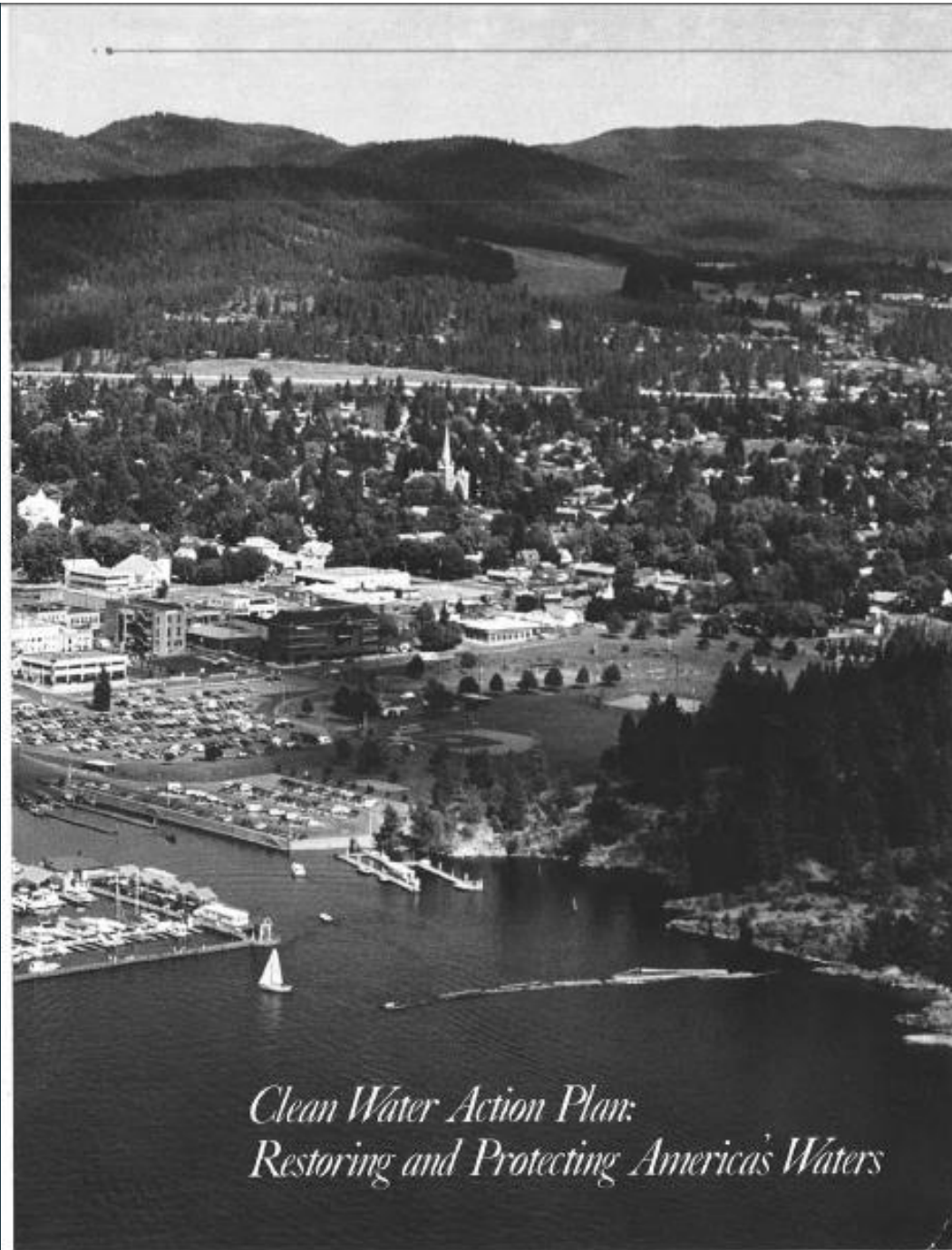
**Dr. Candice Bauer
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*Clean Water Action Plan:
Restoring and Protecting America's Waters*

EPA

Ambient Water Quality Criteria Recommendations

Information Supporting the Development of State and Tribal Nutrient Criteria

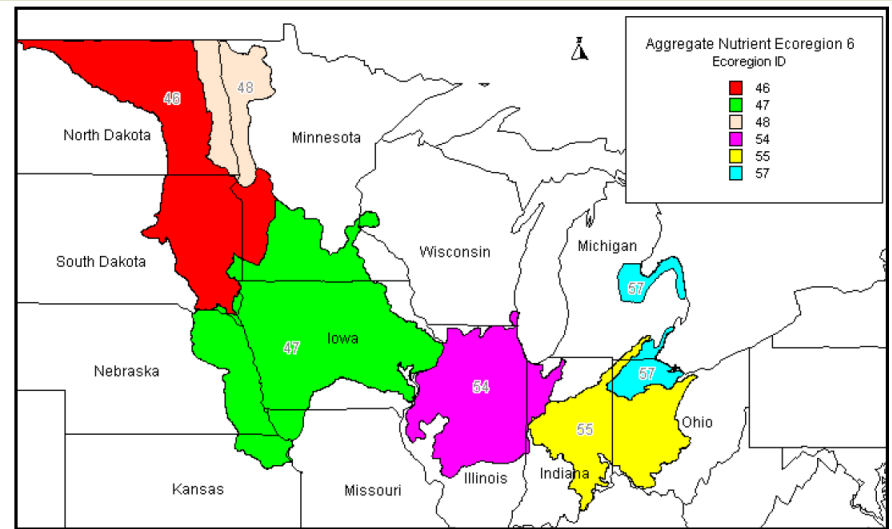## Rivers and Streams in Nutrient Ecoregion VI

54. *Central Corn Belt Plains*

Figure 2.   Ecoregion VI with level III ecoregions shown.

EPA

Ambient Water Quality Criteria Recommendations

Information Supporting the Development of State and Tribal Nutrient Criteria

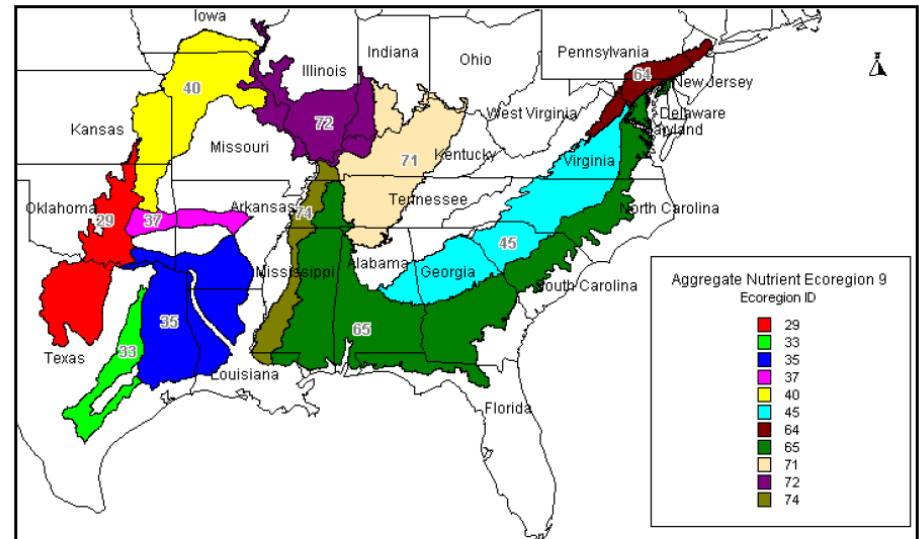## Rivers and Streams in Nutrient Ecoregion IX

72. *Interior River Lowland*

Figure 1.   Aggregate Ecoregion IX

NUTRIENT ECOREGIONS IN ILLINOIS

Parameter	Ecoregion 54	Ecoregion 52	Ecoregion 53	Ecoregion 72	Ecoregion 73	
	Cent Corn Belt	Driftless Area	SEWI Till Plain	Intr Rv Lowland	Miss Aluvl Plain	
TP (ug/L)	72.5	70	80	83	125	
TKN (mg/L)	0.663	0.15	0.65	0.539	0.69	
NO2+NO3 (mg/L)	1.798	1.73	0.94	0.215	0.13	
TN (reported, mg/L)	2.95	1.51	1.3	1.669	0.71	
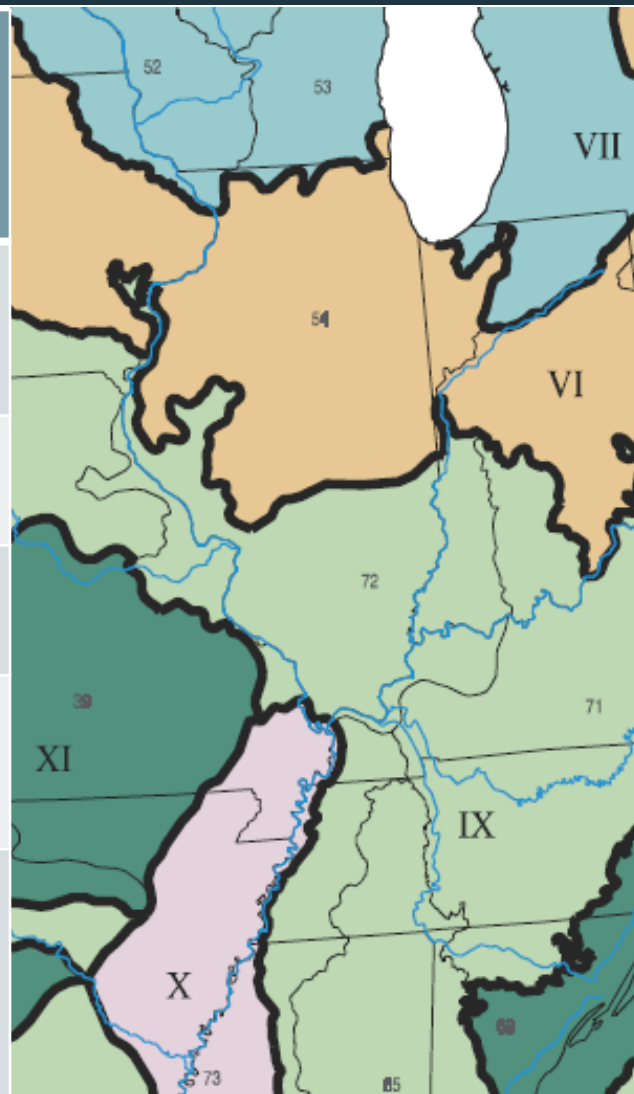
Table 5. Benthic macroinvertebrate total nitrogen and total phosphorus criteria determined by various statistical analyses.

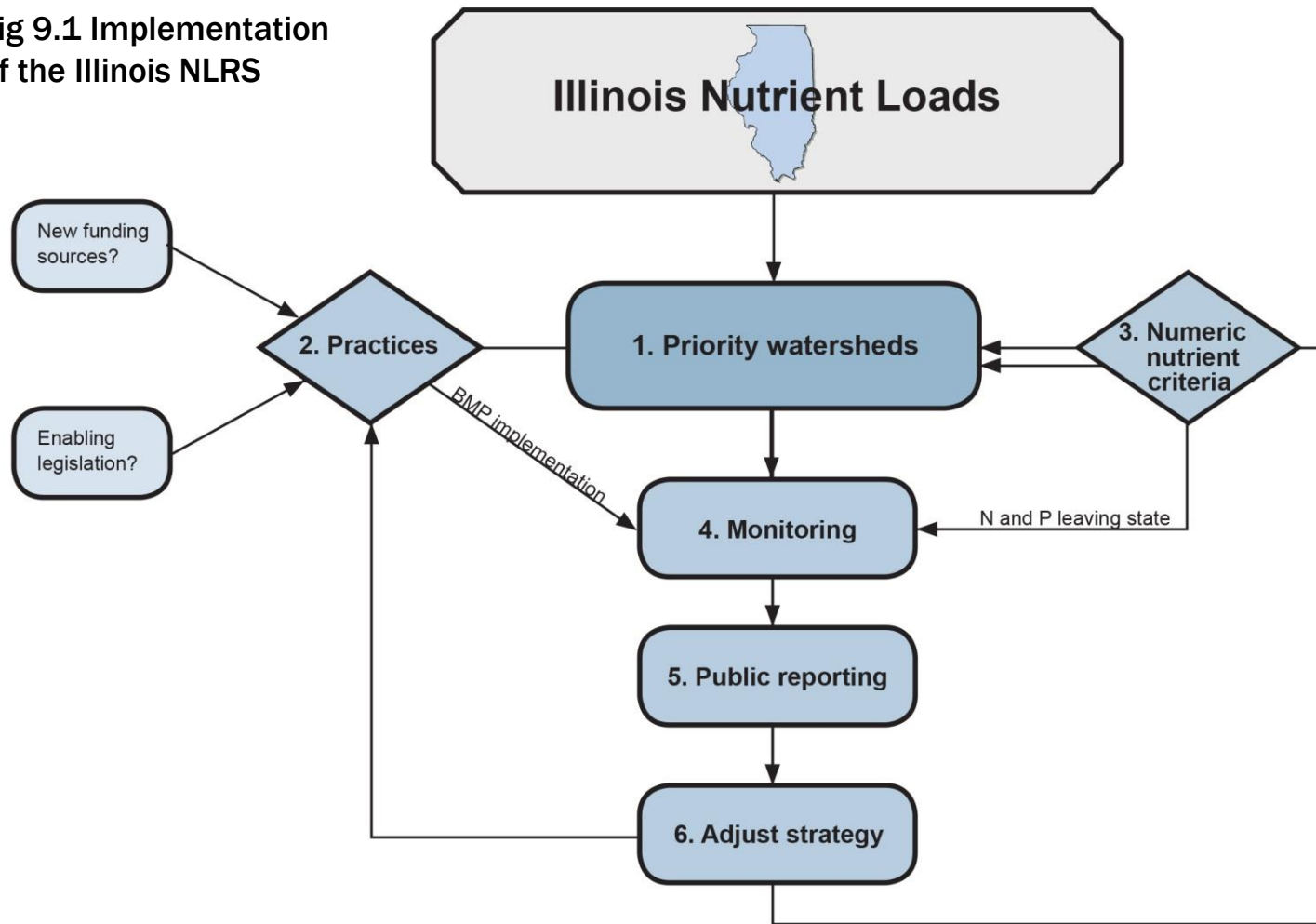| Dependent variable	Criteria estimation method†	TN‡ estimated criteria	TP§ estimated criteria	Citation
		mg L^{-1}		
Percentage of EPT individuals	regression tree	1.68	0.08	Wang et al., 2007
Percentage of EPT taxa	regression tree	1.3	0.09	Wang et al., 2007
Hilsenhoff Biotic Index	regression tree	1.14	0.09	Wang et al., 2007
Taxa richness	regression tree	0.87	0.04	Wang et al., 2007
Percentage of EPT¶ individuals	2DKS	0.98	0.09	Wang et al., 2007
Percentage of EPT taxa	2DKS	1.11	0.09	Wang et al., 2007
Hilsenhoff Biotic Index	2DKS	0.61	0.09	Wang et al., 2007
Taxa richness	2DKS	0.85	0.04	Wang et al., 2007
Taxa richness	regression tree	1.92	0.15	Weigel and Robertson, 2007
Mean pollution tolerance value	regression tree	0.63	0.06	Weigel and Robertson, 2007
Taxa richness	nCPA	1.04	0.05	Evans-White et al., 2009
Primary consumer richness	nCPA	1.14	0.05	Evans-White et al., 2009
Gathering consumer richness	nCPA	0.93	0.06	Evans-White et al., 2009
Scraping consumer richness	nCPA	NS	0.05	Evans-White et al., 2009
Shredding consumer richness	nCPA	NS	0.05	Evans-White et al., 2009

† 2DKS, two-dimensional Kolmogrov Smirnov test; nCPA, nonparametric changepoint analysis.

‡ Total nitrogen.

§ Total phosphorus.

¶ Ephemeroptera, Trichoptera, and Plecoptera.

Fig 9.1 Implementation of the Illinois NLRS

Illinois Nutrient Loads

New funding sources?

Enabling legislation?

2. Practices

1. Priority watersheds

3. Numeric nutrient criteria

BMP implementation

N and P leaving state

4. Monitoring

5. Public reporting

6. Adjust strategy

Responsible party:

1. Policy Working Group and Illinois EPA
2. Agriculture Water Quality Partnership Forum, Urban Stormwater Working Group, and point source permits—Illinois EPA
3. Nutrient Science Advisory Committee
4. Nutrient Monitoring Council

5. Public reporting—Illinois EPA and IDOA
   • Biennial meeting
   • Biennial report
6. Adjust strategy/adaptive management—based on annual reports, determined by Policy Working Group

Nutrient Science Advisory Committee Committee Charge

➢ **Determine the numeric criteria for nutrients most appropriate for Illinois waterbodies based on the best science available.**

➢ **Consider whether standard should be statewide or watershed specific.**

Zoe Zaloudek, Water Is Photo Contest

NUTRIENT SCIENCE ADVISORY COMMITTEE (NSAC)

Policy Working Group update February 2017

NSAC

- Convened November 2015

- Monthly teleconferences; ~ 10 to date
- Quarterly face-to-face meetings; – 4 to date (next week)

- Dr. Walter Hill resigned from the committee
- New member: Dr. Chris Peterson (Aquatic Ecologist)
  ### Loyola University Chicago

- 18-24 month timeframe; expected to conclude work early 2018.

- Summary of activities and meetings available on the NLRS website.

NSAC - WORKPLAN

Based upon Environmental Risk Assessment principles

1. **Planning / Problem Formulation**
   - ✓ Develop conceptual model(s) of biological response to potential stressors – initial model developed, refinement in process

2. **Analysis**
   - ✓ Effort to identify and evaluate potential data sets to use in updated stressor-response analysis. (solicited suggestions and hosted webinar)

   - ✓ Determined Illinois EPA and US EPA / USGS NRSA data sets (2006-15) were most appropriate for the initial analyses, but several watershed- or regionally-based data sets can be valuable for watershed or site-specific standards.

   - ✓ Many questions / clarifications / implications of data set characteristics have been and continue to be evaluated.
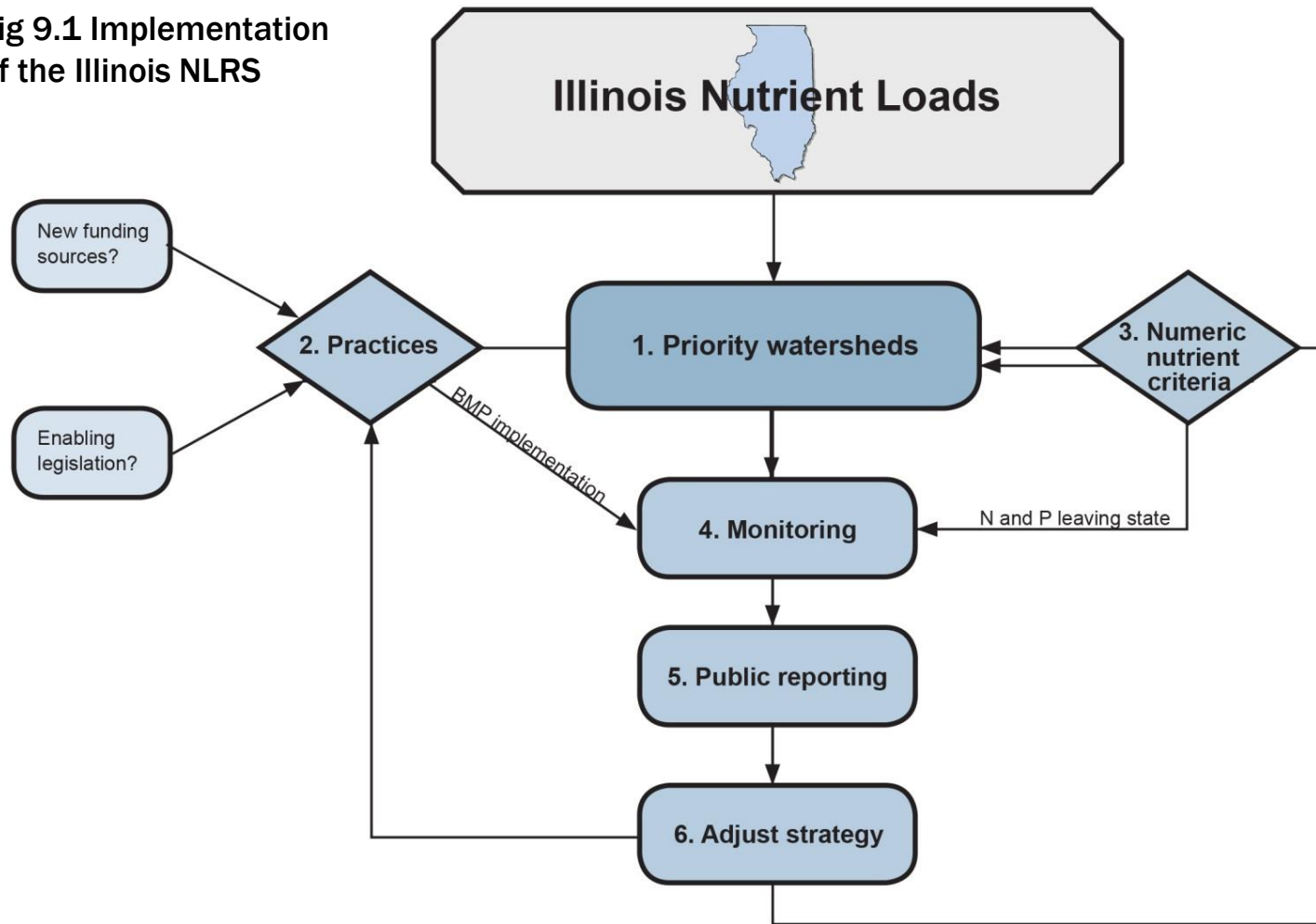
NSAC - WORKPLAN

2. **Analysis (continued)**
   - ✓ US EPA has provided funding and a contract with Tetra Tech, Inc. to provide an updated analysis of Illinois EPA data. This is a considerable iterative and ongoing discussion and analysis effort.

3. **Synthesis / Characterization**
   - ✓ Refine and evaluate candidate criteria

   - ✓ Evaluate uncertainties

   - ✓ Consider combined criterion approaches (seasonal, response variables, multiple stressors)

   - ✓ Ensure all uses are considered and consistent with the CWA and State regulations

4. **Report** – Candidate standards and supporting data, methodology, and analyses.

Fig 9.1 Implementation of the Illinois NLRS

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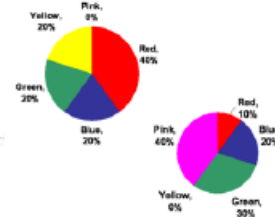N and P leaving state

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Responsible party:
1. Policy Working Group and Illinois EPA
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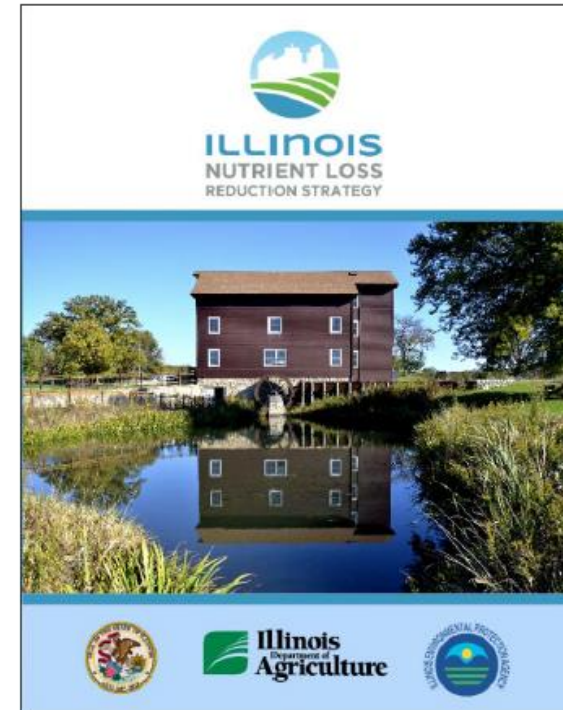3. Nutrient Science Advisory Committee
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NMC Charges (Revised 10/26/15)

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.

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY | Improving our water resources with collaboration and innovation

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

But what about:

- generating loading estimates and loading trends for some or all 18 priority watersheds?

- trying to show local water quality improvements (outcomes)?

Illinois Nutrient Loss Reduction Strategy
Priority Watersheds

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY | Improving our water resources with collaboration and innovation
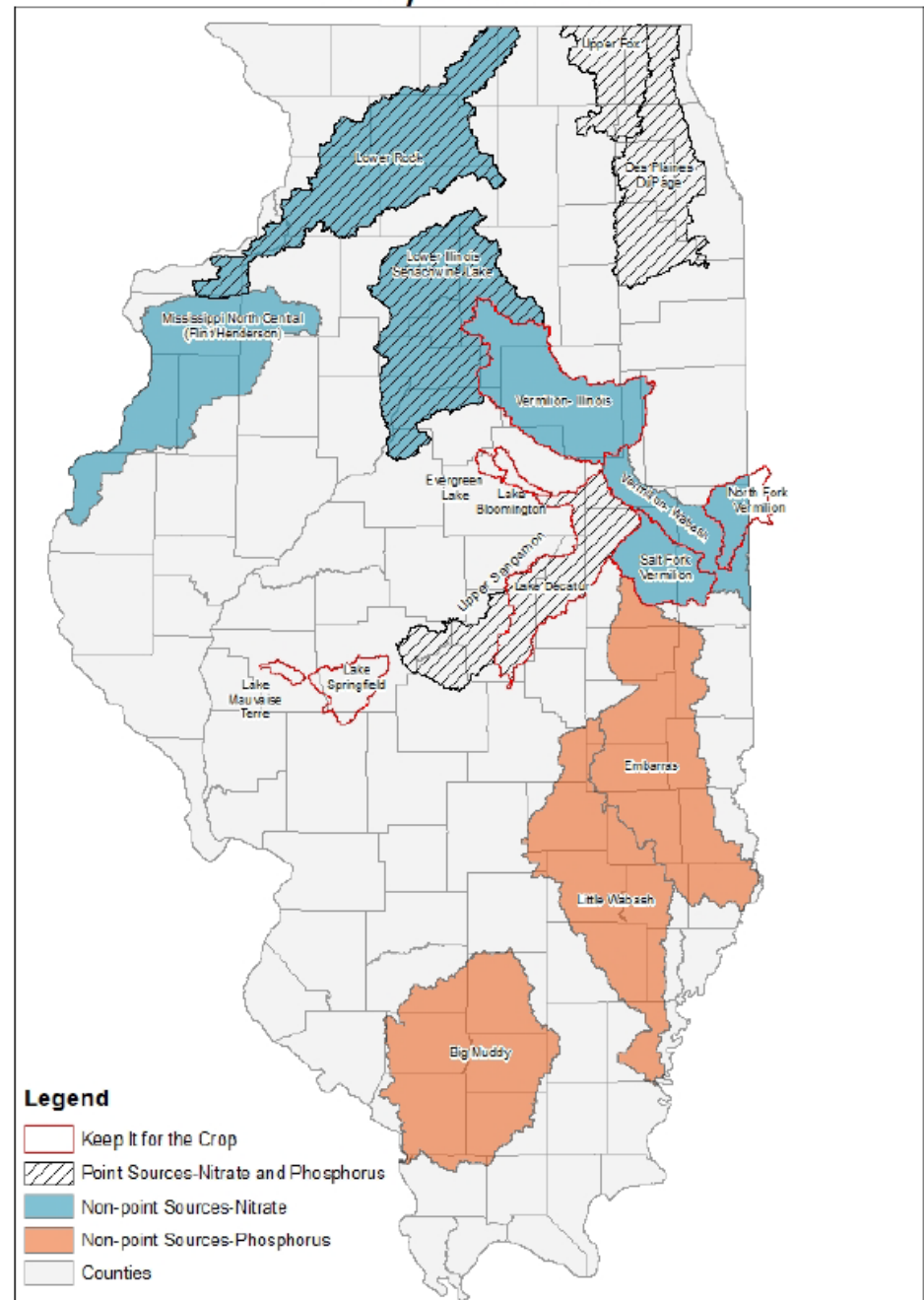
Total P and Nitrate Export from Illinois Rivers:
1980-2015 Update

Major River Systems in Illinois

Mark B. David, Gregory F. McIsaac
and Corey A. Mitchell
University of Illinois
Prepared for the Illinois Nutrient Monitoring
Council, Gregg Good, IL EPA Chair
August 30, 2016

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY | Improving our water resources with collaboration and innovation
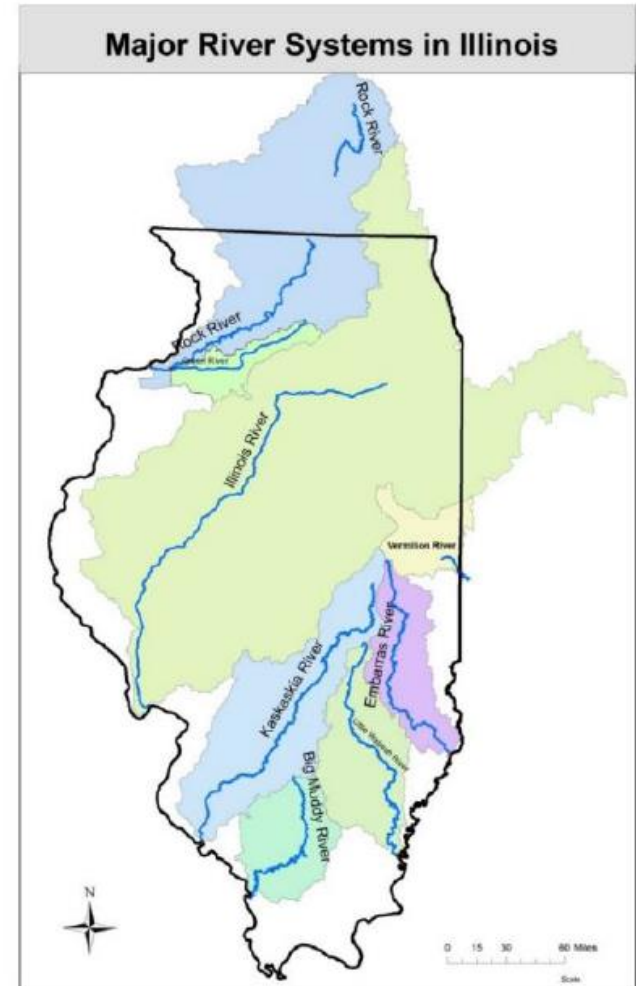
Background

> eight major rivers used to estimate Illinois export of nitrate and total P

>> Rock, Green, Illinois, Kaskaskia, Big Muddy, Little Wabash, Embarras, Vermilion

> previously estimated through 2011

>> added 2012 to 2015 water years

>> same methodology (interpolation for nitrate, WRTDS* for total P)

> examined trends in water, nitrate, and total P

>> compared to 1980-1996 baseline period

*Note: For total P calculated with WRDTS, the greatest uncertainty about loads and concentrations is at the end of the record, so that future estimates for the 2011-2015 period could change when additional data become available.

ILLINOIS NUTRIENT LOSS REDUCTION STRATEGY | Improving our water resources with collaboration and innovation

Summary

- **total P losses have increased**
  - not clear why, although changes in flow and point source P discharges appear to be important factors
- **nitrate losses are decreasing**
  - likely due to improved agricultural N balances
- **5-year averages seem appropriate for evaluating how we are doing**
- **continue annual load and trend analysis**

UPDATES ON ILNRS

- Illinois Nutrient Loss Reduction Strategy Website
- http://www.epa.illinois.gov/topics/water-quality/watershed-management/excess-nutrients/nutrient-loss-reduction-strategy/index