ILLINOIS NUTRIENT REDUCTION STRATEGY

Updated 12/1/2014

OVERVIEW

- Numeric Water Quality Standards development in Illinois
- Gulf Hypoxia Task Force Study, SPARROW model, Illinois TMDLs
- Nancy Stoner Memo
- Illinois Nutrient Reduction Strategy development

The Problem with Excess Nutrients….

- **Total Nitrogen**
- **Total Phosphorus**
  - Causes Eutrophication of streams and lakes
  - Promotes excessive growth of algae. As the algae die decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish
  - Some algae produce toxins that harm livestock, pets, and humans
  - Excess algae causes taste/odor issue for drinking water, requiring extra treatment
  - Interferes with enjoying recreational activities (swimming and boating)

Nitrate

- High nitrate levels in drinking water pose a health risk to infants because they may cause methemologlobinemia, a condition known as “blue baby syndrome.”

DEVELOPING NUMERIC WATER QUALITY STANDARDS—

STREAMS

-Total Phosphorus

-Total Nitrogen

- USEPA regulations require water quality standards for N, P, chlorophyll and turbidity.
- CFAR research teams conducted extensive projects to determine relationships between nutrient concentration and adverse biological impact.
- General finding: Nutrients alone do not cause impacts in most Illinois streams because physical factors such as depth, shading, turbidity, substrate and gradient are usually more limiting to algae growth.
- No strong cause-effect threshold values for P or chlorophyll were determined—needed for scientifically defensible standards.

DEVELOPING NUMERIC WATER QUALITY STANDARDS—
TOTAL PHOSPHORUS AND TOTAL NITROGEN IN STREAMS

- On two occasions, USEPA has conducted Stressor Response Correlation Studies on Illinois stream data
  - No strong correlation obtained.

- IL WQS typically established to protect IL streams, not downstream waters.

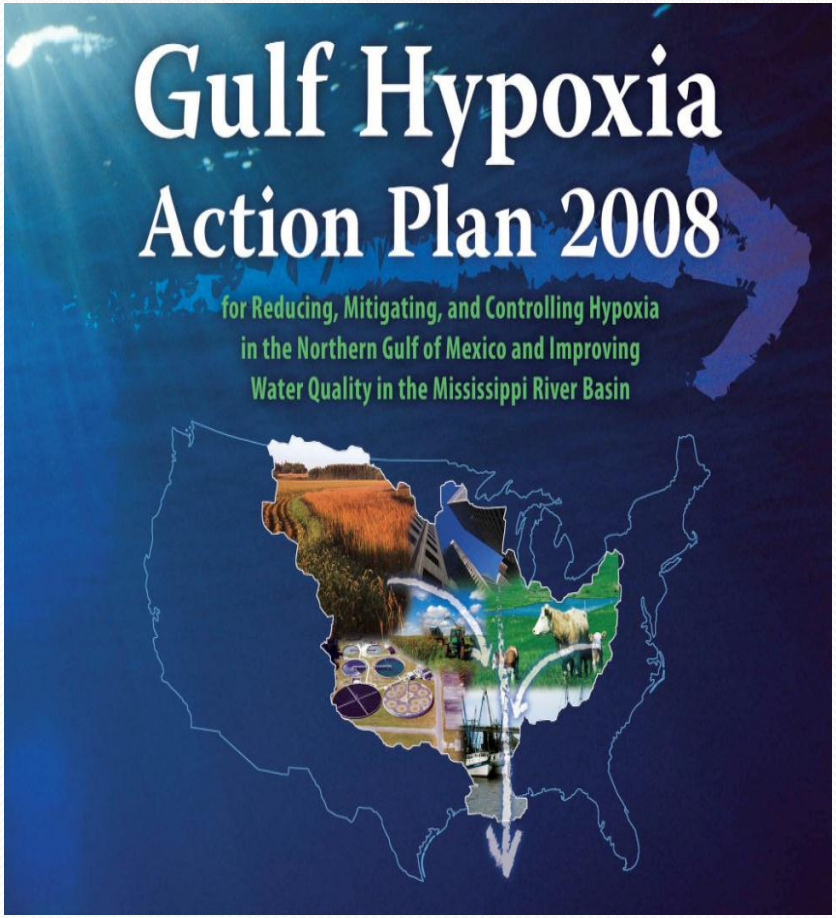
Current Approaches to Nutrient Standards Development

1. Update the narrative water quality standard to define and prohibit excess algae and aquatic plant growth and link this to phosphorus
2. Expand coverage of the state effluent standard for P to include discharges upstream of stream segments not meeting the narrative standard
3. Protect streams that are already low in P

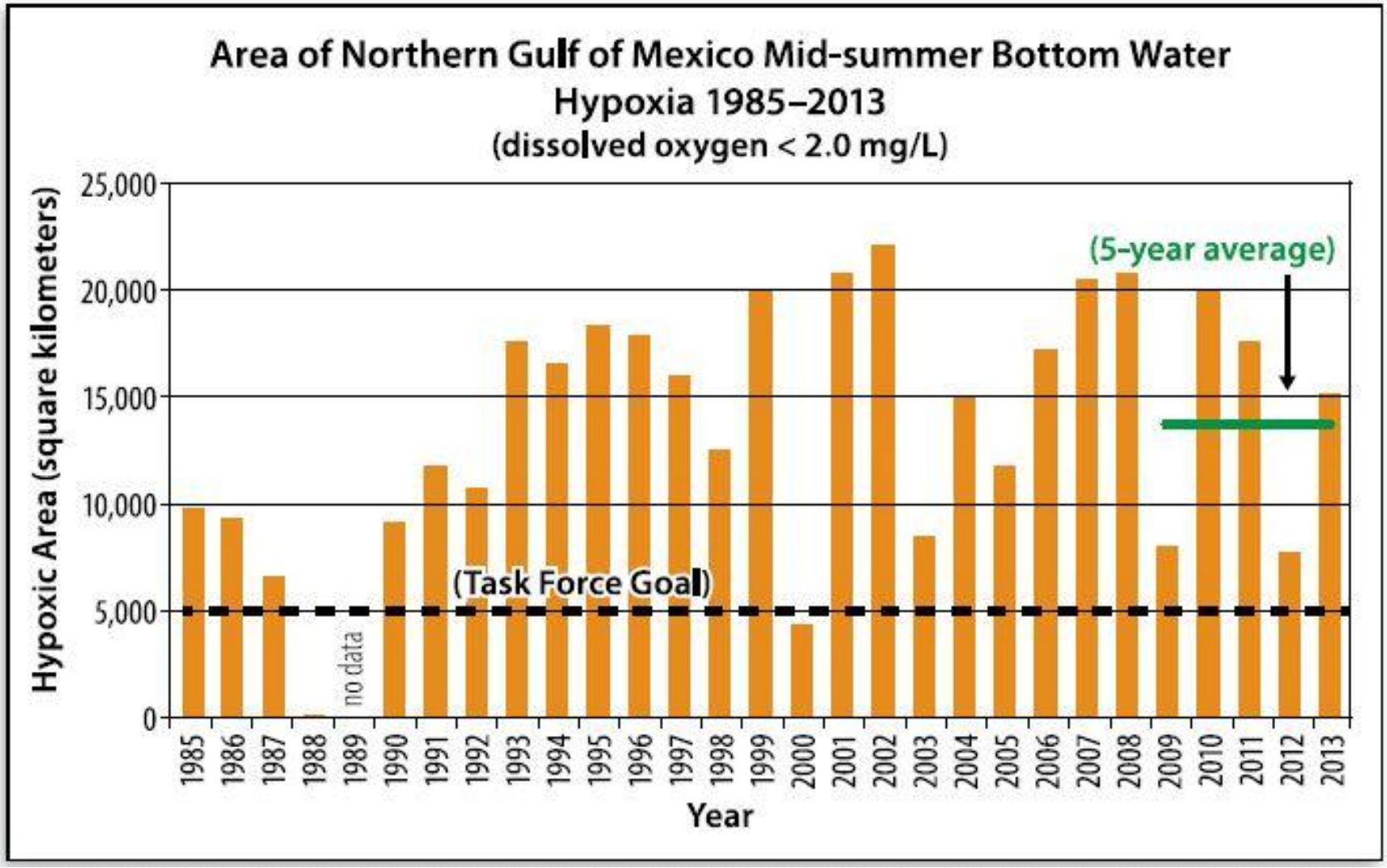
CURRENT ILLINOIS NUTRIENT WATER QUALITY STANDARDS

- Total Phosphorus: **0.05 mg/L**. Lakes only to protect Aquatic Life Use and Aesthetic Quality Use.
- Nitrate: **10 mg/L**. Stream segments and Lakes designated as Public Water Supplies.
- A narrative WQS prohibiting excess algae or plant growth exists for all waters.

Gulf Hypoxia Task Force Study

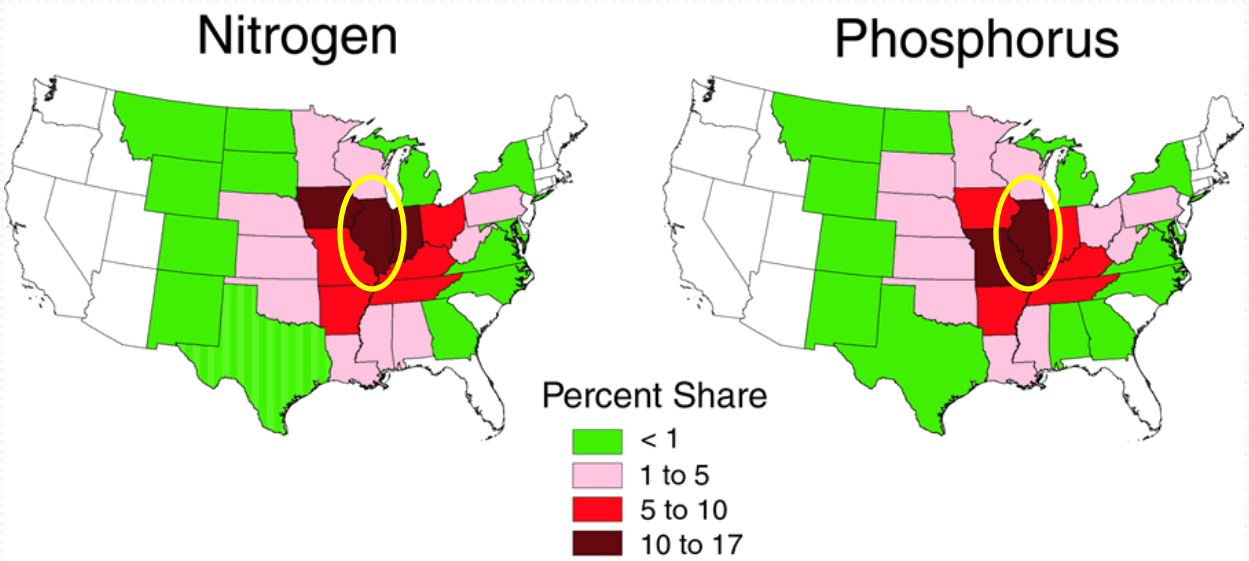


- **GOAL:**
  - **Reduce Hypoxic Zone to 5,000 Km^2 (1,930 sq miles)**
  - **Reduce Nutrient Loading to Gulf of Mexico**
- **TP and TN <u>45%</u>**


Area of Northern Gulf of Mexico Mid-summer Bottom Water Hypoxia 1985–2013
(dissolved oxygen < 2.0 mg/L)
Hypoxic Area (square kilometers)
25,000
20,000
15,000
10,000
5,000
0
(5-year average)
(Task Force Goal)
no data
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

USGS SPARROW MODEL

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



Local Water Quality Impairments

2014 Illinois Integrated Water Quality Report and 303(d) List

- STREAM MILES
  - Total Phosphorus: 2,031
  - Nitrate: 76

- LAKE ACRES
  - Total Phosphorus: 107,648

Approved Nutrient TMDLs

Illinois EPA

TMDL | Total Maximum Daily Loads

- LAKES
  - Total Phosphorus: 92
  - Nitrate: 5
- STREAMS
  - Nitrate: 4
  - *At this time, Illinois EPA does not develop TMDLs for total phosphorus in streams due to no numeric water quality standard.

September 2010 Agency held Nutrient Summit

- Over 200 attendees representing industry, academia, government, and non-governmental organizations.
- Presentations on scientific research and stakeholder viewpoints on reducing nutrient losses in Illinois.

Nancy Stoner Memo

USEPA, Acting Assistant Administrator
March 2011

- *"Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions"*
- Purpose: Encourage states to develop nutrient reduction strategies while continuing to develop numeric nutrient standards.
- Lays out framework for developing nutrient reduction strategies.
- Comprised of 8 Elements.

Memo Framework

- ELEMENT #1
  - **Prioritize watersheds on a statewide basis for nitrogen and phosphorus loading reductions**
- ELEMENT #2
  - **Set watershed load reduction goals based upon best available information.**
- ELEMENT #3
  - **Ensure effectiveness of point source permits in targeted/priority sub-watersheds.**
    - *Municipal/Industrial, CAFO, Urban Stormwater*

Memo Framework

- ELEMENT #4
  - **Agricultural Areas**
    - *"In partnership with Federal and State Agricultural partners, NGOs, private sector partners, landowners, and other stakeholders, develop watershed-scale plans that target the most effective practices where they are needed most. Look for opportunities to include innovative approaches, such as targeted stewardship incentives, certainty agreements, and N & P markets, to accelerate adoption of agricultural conservation practices. Also, incorporate lessons learned from other successful agricultural initiatives in other parts of the country."*

Memo Framework

- **Agricultural Areas (cont.)**

"USDA and State Departments of Agriculture are vital partners in this effort. If we are to make real progress, it is imperative that EPA and USDA continue to work together but also strengthen and broaden partnerships at both the national and state level."

Memo Framework

- ELEMENT #5
  - **Storm Water (non-MS4) and Septic Systems**
- ELEMENT #6
  - **Accountability and verification measures**
- ELEMENT #7
  - **Annual public reporting of implementation activities and biannual reporting of load reductions and environmental impacts associated with each management activity in targeted watersheds**

Memo Framework

- ELEMENT #8
  - **Develop work plan and schedule for numeric nutrient criteria development**

ILLINOIS NUTRIENT REDUCTION STRATEGY

- **February 2013** Partnered with University of Illinois to develop Science Assessment for Nutrient Reduction.
  - Mark David, Greg McIsaac, George Czapar, Gary Schnitkey, Corey Mitchell

ILLINOIS NUTRIENT REDUCTION STRATEGY
Science Assessment

- Develop a science based technical assessment of:
  - current conditions in Illinois of nutrient sources and export by rivers in the state from point and non-point sources
  - methods that could be used to reduce these losses and estimates of their effectiveness throughout Illinois
  - estimates of the costs of statewide and watershed level application of these methods to reduce nutrient losses to meet TMDL and Gulf of Mexico goals

ILLINOIS NUTRIENT REDUCTION STRATEGY
Meetings

- **Kickoff**: March 11, 2013—Illinois EPA, Springfield
- **Meeting 1**:August 8, 2013—Illinois EPA, Springfield
  - Charge to group
  - Science Assessment update
- Illinois EPA contracted with Illinois-Indiana Sea Grant staff to conduct meeting facilitation.
- **Meeting 2**: September 18, 2013—IFCA, Bloomington
  - Science Assessment update
  - Memo Elements 1 & 2

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **Meeting 3**: October 18, 2013—Illinois EPA, Springfield
  - Reviewed Iowa and Ohio Nutrient Strategy Documents
  - Discussed Illinois' Nutrient Strategy Report Outline
  - Formed Subcommittees to address topics for Report
    - Agriculture/nonpoint sources
    - Point Sources
    - Urban Runoff

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **Meeting 4**: November 13, 2013—NRCS, Champaign
- University of Illinois Science Team Presentation
  - Discussion of data limitations and appropriate usage
- Overview of Iowa, Minnesota, and Ohio strategies to establish watershed load reduction
- Facilitated Discussion: How will Illinois articulate load reduction goals?
  - Intermediate goals or final goals
  - Source type versus nutrient type
  - How to articulate goals Existing Credit – Phosphorus, Nitrogen

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **SUBCOMMITTEE MEETINGS**
  - Point Source—11/13/2013, Champaign
  - Urban Runoff—12/13/2013, Normal
  - Ag Nonpoint Source—12/16/2013, Bloomington

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **Meeting 5**: January 15, 2014—IFCA, Bloomington
  - Updates from Subcommittee Chairs
  - Science Team Presentation
    - BMP Scenarios Analysis
  - Target/Priority Watershed Discussion

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **Meeting 6**: February 19, 2014—Illini Center, Chicago
  - Nutrient Trading
  - Watershed Targeting
  - Environmental Utility Fund

- **Subcommittees**
  - Point Source: February 19, 2014
  - Urban Runoff: February 24, 2014

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **Meeting 7**: March 19, 2014—Illinois Dept. of Agriculture, Springfield
  - Subcommittee Reports
  - Priority Watersheds
  - Memo item #6: Accountability and Verification
  - Numeric Nutrient Criteria pre-planning

- **Subcommittees**
  - Agriculture: March 10, 2014

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- **Meeting 8**: April 16, 2014—Urbana-Champaign Sanitary District, Urbana
  - Monitoring Programs in Illinois
  - Memo item #7: Public Report of Implementation Activities and Load Reductions

- **Subcommittees**
  - Agriculture: April 16, 2014

ILLINOIS NUTRIENT REDUCTION STRATEGY Meetings

- May 14, 2014
  - **Draft Strategy Report sent to Committee members for comment**
- **Final Meeting:** May 19, 2014—Illinois EPA, Springfield
  - Review each section of draft Strategy Report.
  - Committee member comments due May 30, 2014

ILLINOIS NUTRIENT REDUCTION STRATEGY

- **Public Draft Nutrient Loss Nutrient Reduction Strategy**
  - Public Notice released November 24, 2014
  - Public Comment period runs until January 24, 2015
  - Draft Strategy, Fact Sheet, and Public Notice can be found at: http://www.epa.state.il.us/water/nutrient/nlrs.html
  - Information regarding Strategy development and other nutrient issues can be found at:
  - http://www.epa.state.il.us/water/nutrient/index.html

Questions?

Marcia Willhite
Chief
Bureau of Water
Illinois EPA
Marcia.Willhite@Illinois.gov
217-782-1654