

# Navigating Clean Water Act Regulations

NUTRIENT REMOVAL SEMINAR

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David Dilks  
LimnoTech



# Overview

- History of water quality regulation for nutrients
  - Water quality standards, permits, and total maximum daily loads
- The present
  - Lawsuits
  - “Downstream” issues
  - Implementation examples
    - Chesapeake Bay, Missouri TMDLs
- Options for navigating in a sea of change



# History of Water Quality Protection

- 1899 Rivers and Harbors Act
- 1956 Federal Water Pollution Control Act
- 1965 Water Quality Act
  - Focus on Water Quality Standards
  - Established the Federal Water Pollution Control Administration



# Early Standards for Plant Nutrients

1. Careful control of organic wastes such as sewage, food processing, cannery, and industrial wastes
2. Limit increase of anaerobic decomposition zone of a lake or reservoir
3. Preserve naturally occurring ratios and amounts of nitrogen ( $\text{NO}_3$  and  $\text{NH}_4$ ) to total phosphorus  
100 ug/l TP for streams; 50 ug/l for lakes or reservoirs
4. Establish biological monitoring programs

*FWPCA (1968). Water Quality Criteria . Report of the National Technical Advisory Committee to the Secretary of Interior. (aka "The Green Book")*



## History of Water Quality Protection (2)

- 1970 EPA established through an executive order
- 1972 FWPCA Amendments (“Clean Water Act”)
  - Create NPDES and TMDL programs
  - Water quality standards
  - Establish zero discharge & “fishable / swimmable” goals



## History of Water Quality Protection (3)

- 1998: EPA issues national strategy for criteria development
- 2000: EPA publishes guidance giving options for defining nutrient criteria
  1. Reference condition approach
    - Set criterion equal to concentrations observed in unimpacted reference streams
  2. Linkage between nutrient concentration and environmental response



## History of Water Quality Protection (4)

- 2007: EPA conducts assessment of state programs
  - Very few states define water quality standards for nutrients
  - EPA memo citing need for accelerated progress
    - Shift to “requirement” for numeric criteria
    - Easier and faster TMDLs
    - Easier on permit writers
    - Easier to measure progress (“objective” baselines)
      - Nonpoint source programs
      - Overall improvement

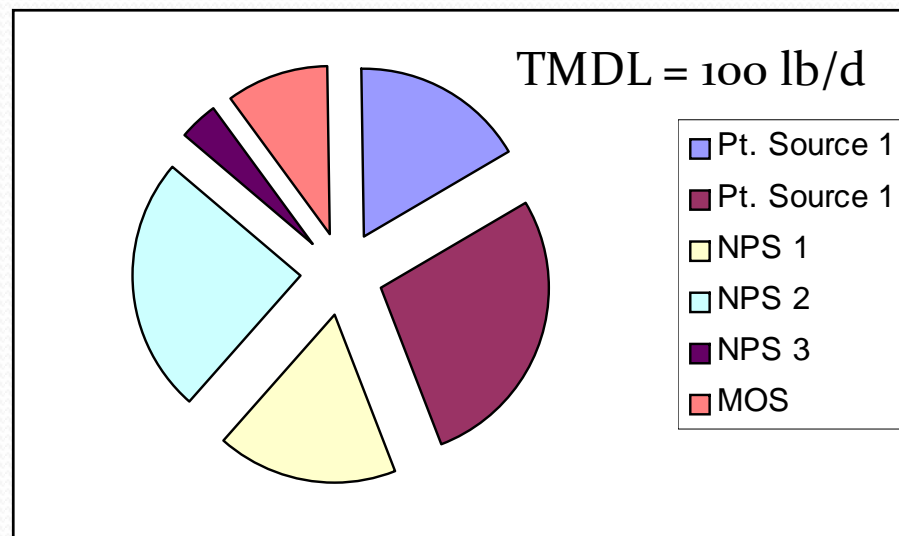


# Total Maximum Daily Load (TMDLs)

- Defined in Section 303(d) of the 1972 Clean Water Act
  - “Each State shall identify waters for which (basic) effluent limitations are not stringent enough to implement water quality standards”
    - 303(d) or “Impaired waters” list
  - “Each State shall establish ... the total maximum daily load ... at a level necessary to implement the applicable water quality standards”

# Total Maximum Daily Load (TMDLs)

- A TMDL is the amount of a pollutant that a water body can receive and still meet water quality standards
  - This load is then allocated to point source discharges, nonpoint source discharges, and a margin of safety





# Total Maximum Daily Loads Timeline

- 1972: CWA requires TMDLs
  - Essentially no TMDLs conducted for 20 years
    - Unfunded mandate requiring consideration of all sources
    - No mechanism for requiring control on nonpoint sources
- 1990s: Lawsuits regarding EPA failure to do TMDLs
  - Court orders with rigorous schedules
  - Many poorly done TMDLs
- 2000s: Program matures
  - Non-point sources still primarily face voluntary (or incentive-based) approaches



# Why You Should Care About TMDLs

- If you aren't located in a 303(d)-listed watershed, you may not need to
  - Pending Lake Erie/Gulf of Mexico issues discussed below
- If you are located in such a watershed, however, you could face:
  - Required load reductions on NPDES permits
  - Moratorium on new permits or increased loads until a TMDL is conducted



## Lawsuits & Petitions

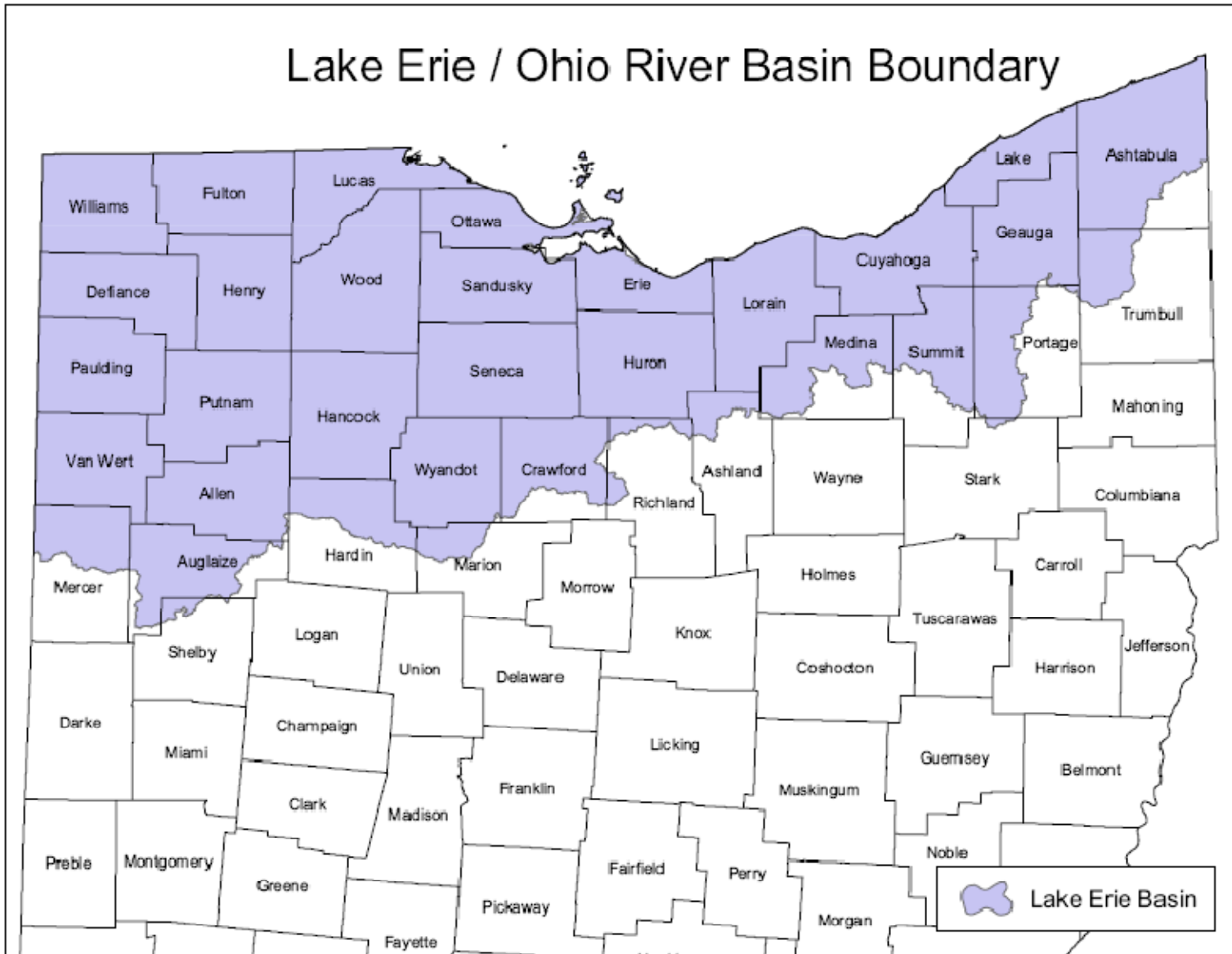
- 2003: Sierra Club - Mississippi and Missouri Rivers
- Nov. 2007: NRDC - redefine secondary treatment
- Jul. 2008: Earthjustice – Florida criteria
- Jul. 2008: Gulf Restoration Network et al – WQ standards & TMDLs for Mississippi River & Northern Gulf of Mexico
  - Mar. 2010: Sierra Club submits 42,000 signatures
- Nov. 2009: Midwest Env. Activists – Wisconsin criteria
- Jun. 2010: Friends of the Kaw (Waterkeeper Alliance) lawsuit for criteria for Kansas River



# Effects of Lawsuits on Nutrient Criteria

- Lawsuits have “jump started” previously slow-moving program
  - Similar to TMDL program, rapid acceleration in pace is leading to some rough patches

# Lake Erie vs. Gulf of Mexico issues



Source: Ohio EPA.

[http://www.epa.ohio.gov/portals/35/wqs/basin\\_boundary\\_20071015.pdf](http://www.epa.ohio.gov/portals/35/wqs/basin_boundary_20071015.pdf)

# Lake Erie Nutrient Issues

- Previous “success” story in jeopardy
  - Increased dead zone size
  - Tributaries with highest ever TP loads



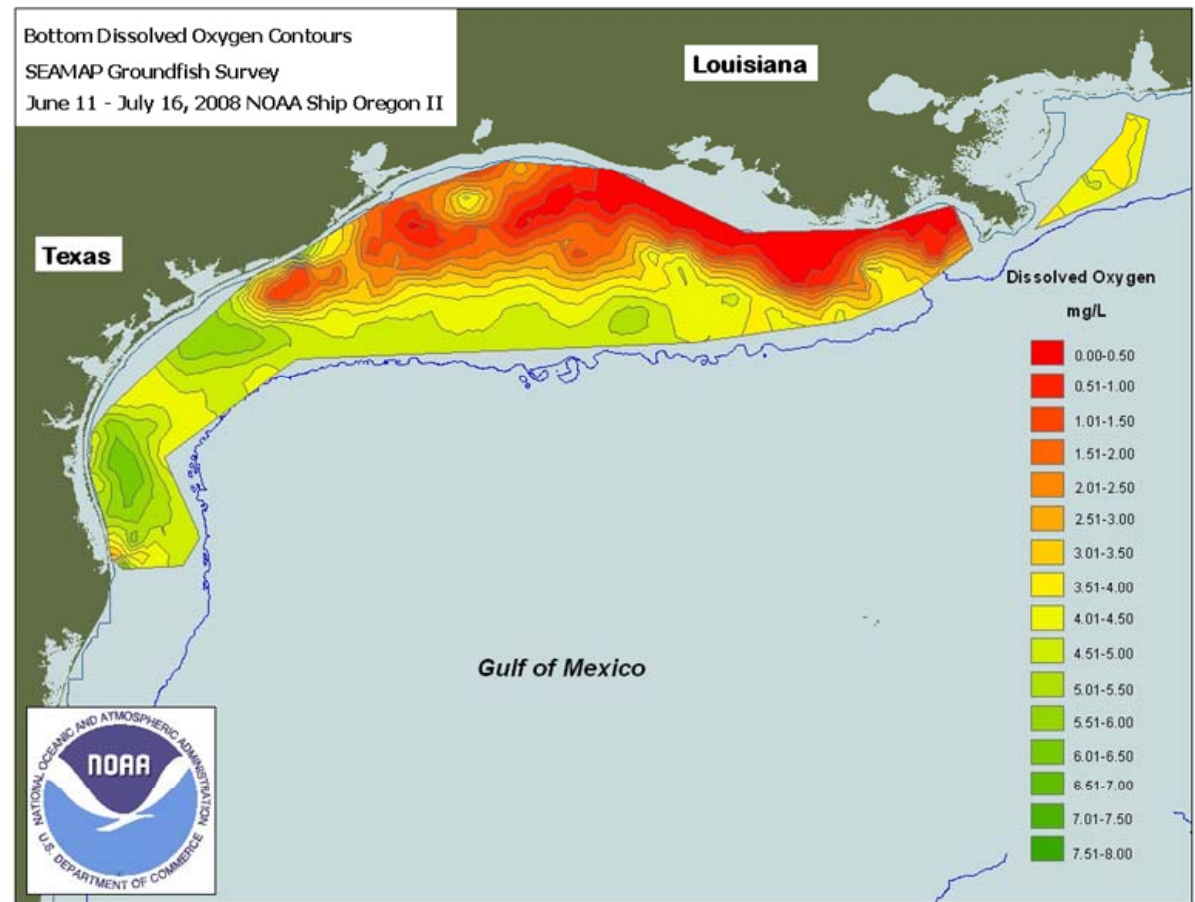
## ANNOUNCEMENTS

An algae bloom has made this area potentially unsafe for water contact. Avoid direct contact with visible surface scum.

**[Click here for current advisory levels for state owned bodies of water.](#)**

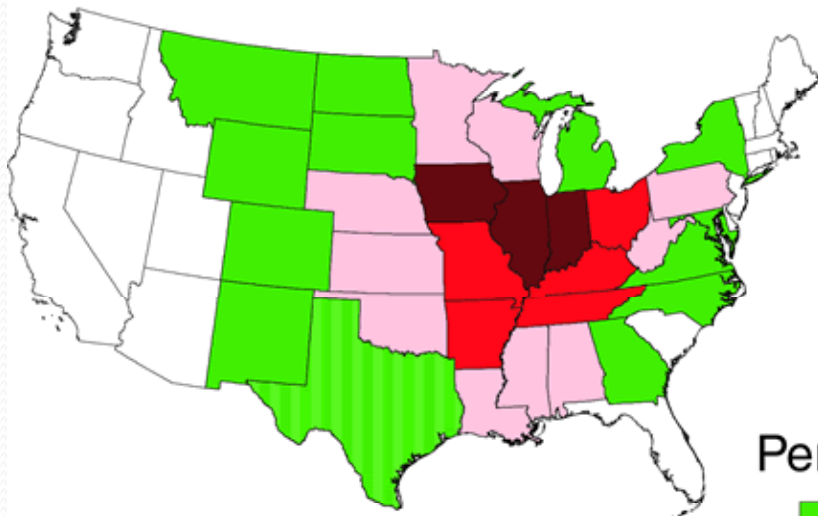
# Gulf of Mexico Hypoxia

- \$2.8 billion annual fishery resource
- Oxygen concentrations decreased due to nitrogen and phosphorus loads from the Mississippi R.

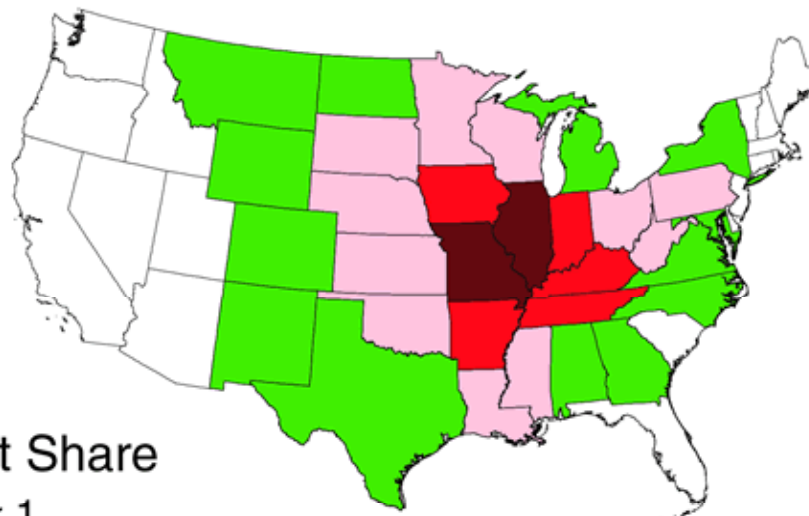


# Relative Nutrient Contribution to Northern Gulf of Mexico

## Nitrogen



## Phosphorus



Percent Share



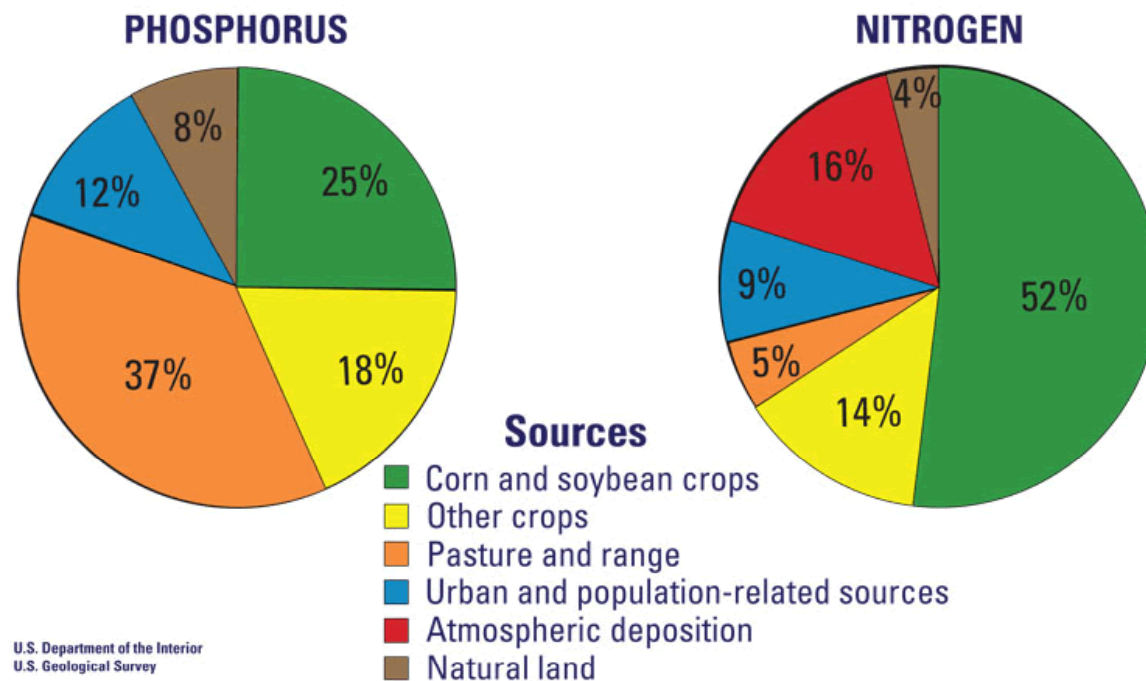
Source: USGS (2008).

[http://water.usgs.gov/nawqa/sparrow/gulf\\_findings/by\\_state.html](http://water.usgs.gov/nawqa/sparrow/gulf_findings/by_state.html)

# Relative Sources of P & N



## Sources of nutrients delivered to the Gulf of Mexico



Source: USGS (2008).

[http://water.usgs.gov/nawqa/sparrow/gulf\\_findings/by\\_state.html](http://water.usgs.gov/nawqa/sparrow/gulf_findings/by_state.html)



# Mississippi River/Gulf of Mexico Watershed Nutrient Task Force

- Work focused on loosely coordinating actions of 12 state agencies and 5 federal agencies
  - Kentucky and Indiana join in 2010
  - Also, Mississippi is 1<sup>st</sup> state to co-lead the Task Force
- Focus on actions to
  - Reduce N & P loading in the Mississippi/Atchafalya River Basin
  - Ultimately reduce size & severity of the Gulf of Mexico hypoxic zone



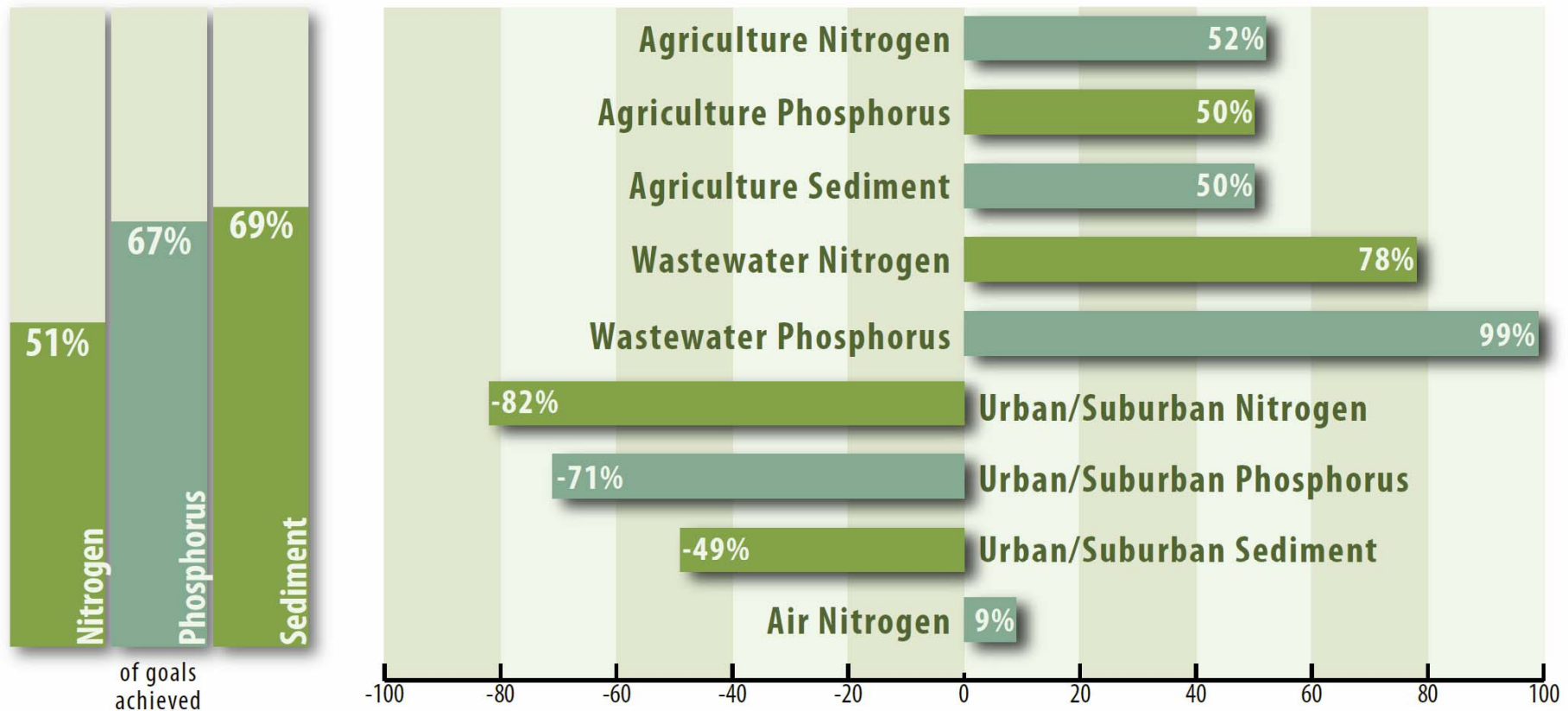
# Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (2)

- Primary focus
  - Monitoring & modeling
  - Coordinating agricultural programs
- New focus for EPA?
  - Numeric nutrient criteria for major watersheds
  - EPA-led basin-wide nutrient control strategy
- Also, Targeted Watershed Grants
  - ORSANCO / EPRI trading study
  - WRI / SD<sub>1</sub> / MWRDGC trading feasibility assessment

# Chesapeake Bay TMDL



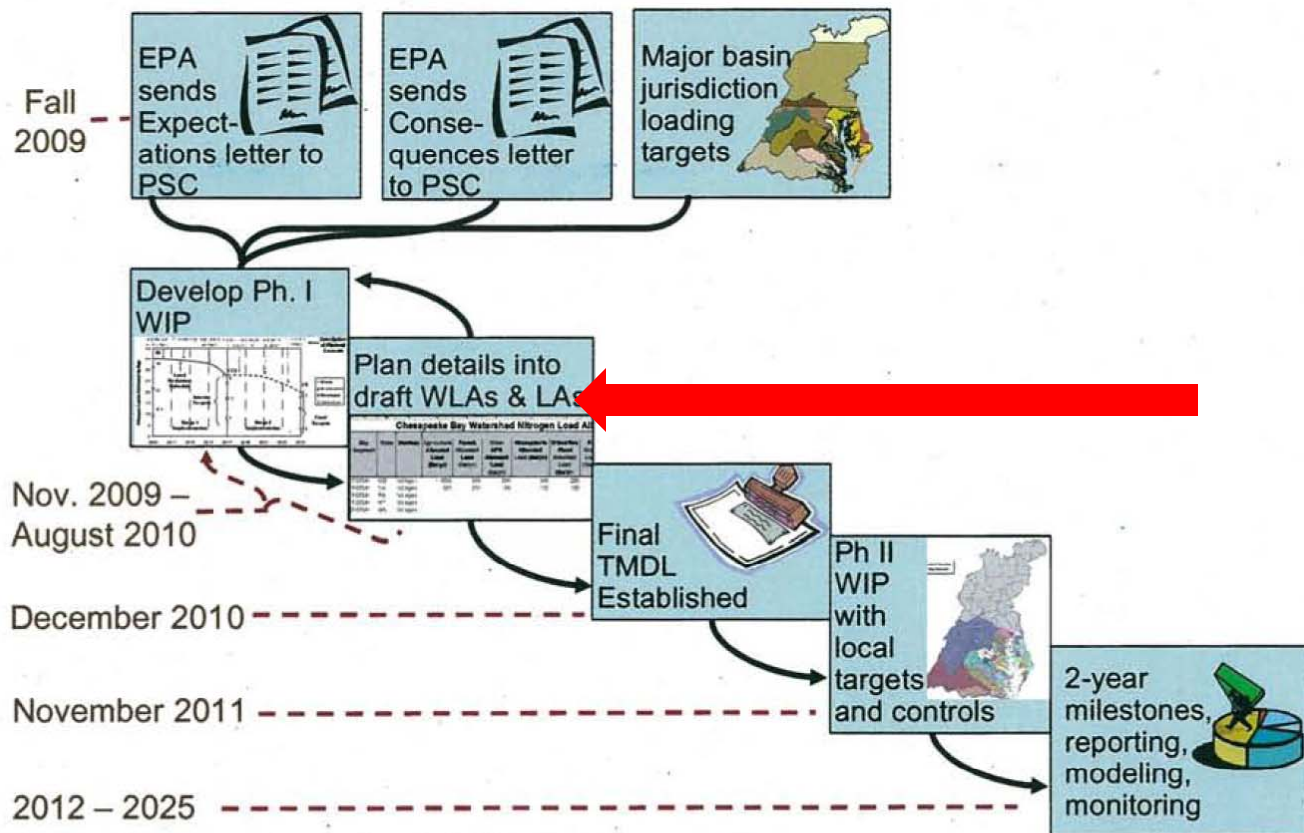
# Reported Progress in Reducing Nutrient Loads to Chesapeake Bay (2009)



Chesapeake Bay Program (2010). [www.chesapeakebay.net/news\\_baybarometer09.aspx?menuitem=50520](http://www.chesapeakebay.net/news_baybarometer09.aspx?menuitem=50520)

# Nov. 2009: EPA “Expectations” for State Watershed Implementation Plans

Figure 1. Overview of Watershed Implementation Plan and TMDL Development Process



Schedule based on completion of the Bay TMDL by December 31, 2010.

## Do WIPs meet the allocations?

| Jurisdiction | Nitrogen | Phosphorus | Sediment |
|--------------|----------|------------|----------|
| DC           | ✓        | ✓          |          |
| DE           |          |            | ✓        |
| MD           | ✓        | ✓          | ✓        |
| NY           |          |            | ✓        |
| PA           | ✓        |            |          |
| VA           |          |            | ✓        |
| WV           |          | ✓          |          |

From District of Columbia public meeting on Sep. 29, 2010



# Federal Backstops

- Backstop allocation adjustments
  - Minor
    - Adjust load allocations to equal targets
  - Moderate
    - Stronger feedlot and stormwater requirements
    - Significant WWTPs: N @ 4 mg/l, P @ 0.3 mg/l
  - High
    - Even stronger feedlot and stormwater requirements
    - Significant WWTPs: N @ 3 mg/l, P @ 0.1 mg/l



# The Chesapeake Bay TMDL is Still on the Fast Track

- EPA limited the public comment period to 45 days
  - 1,066 comments received
- EPA still intends to issue the final TMDL by Dec. 31, 2010
- Lawsuits likely



# Implementation of Numeric Nutrient Criteria

## The Missouri Example

- Part of the rationale for requiring numeric nutrient criteria was “Easier and faster TMDLs”
- USEPA has developed several nutrient TMDLs in Missouri that may foreshadow
- TMDL development process
  - Instream criteria based on published reference concentrations
  - Allocation strategy requires all sources (point and non-point) to meet criteria
  - Point sources must meet nutrient criteria “end-of-pipe”

# Implementation of Numeric Nutrient Criteria

## The Missouri Example

- Results of three “Easier and faster” TMDLs

| Site                  | TP WLA<br>(mg/l) | TN WLA<br>(mg/l) |
|-----------------------|------------------|------------------|
| West Fork Black River | 0.007            | 0.289            |
| Cave Springs Branch   | 0.007            | 0.289            |
| Bear Creek            | 0.092            | 0.855            |

# New Ammonia Criteria

| Temp.<br>(deg C) | pH  | Chronic Criteria, mg/L as N    |  |                                 |
|------------------|-----|--------------------------------|--|---------------------------------|
|                  |     | Existing<br>Ohio<br>Criteria** | US EPA 2009 Draft<br>Recommended Criteria* |                                 |
|                  |     |                                | Freshwater<br>Mussels<br>Present           | Freshwater<br>Mussels<br>Absent |
| 15               | 7.5 | 2.2                            | <b>0.88</b>                                | 6.3                             |
| 20               | 7.5 | 2.1                            | <b>0.63</b>                                | 4.6                             |

\*

[http://water.epa.gov/scitech/swguidance/waterquality/standards/criteria/aqlife/pollutants/ammonia/upload/2009\\_12\\_23\\_criteria\\_ammonia\\_2009update.pdf](http://water.epa.gov/scitech/swguidance/waterquality/standards/criteria/aqlife/pollutants/ammonia/upload/2009_12_23_criteria_ammonia_2009update.pdf)

\*\* OAC 3745-1-07.

# Recommendations for Navigating the Nutrient Seas of Change





# Recommendations

- Establish a regulatory compliance team
  - Estimate capital & O&M costs to meet future requirements
  - Understand your asset requirements & financial capability
- Consider doing your own data collection to put your sources in context with others
  - Flows & in-stream concentrations
  - Fish, bugs, and habitat
  - Source data



## Recommendations (2)

- Make sure you consider downstream issues!
  - Prepare comments
- Engage elected officials at all levels
  - Local, including the public!
  - State
  - Federal

# Questions?

David Dilks, Ph.D.

Vice President

LimnoTech

Ann Arbor, MI

(734) 332-1200

[ddilks@limno.com](mailto:ddilks@limno.com)

[www.limno.com](http://www.limno.com)

