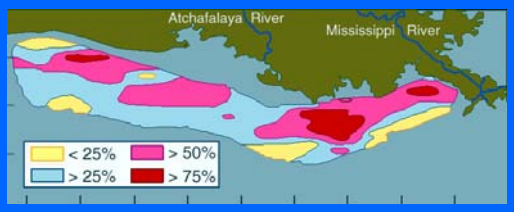
Hypoxia in the Gulf of Mexico

Reassessment of the Science & Revision of the Action Plan

Extent of Hypoxia in the Gulf

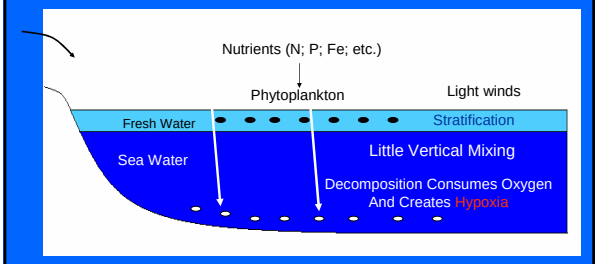


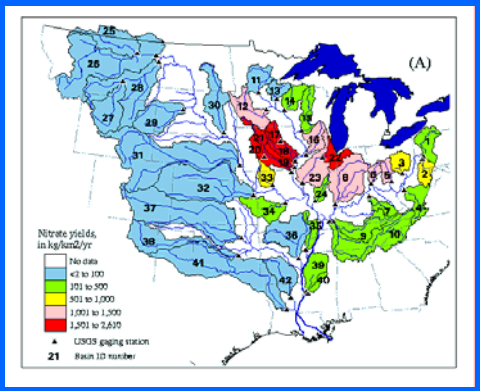
Frequency of Occurrence 1985 - 1999

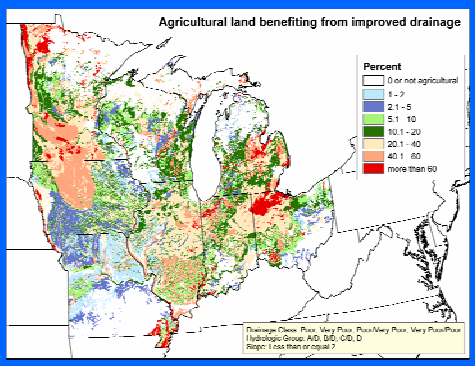
Rabalais, et al.

Summer Hypoxia

Dissolved Oxygen <2 mg/L







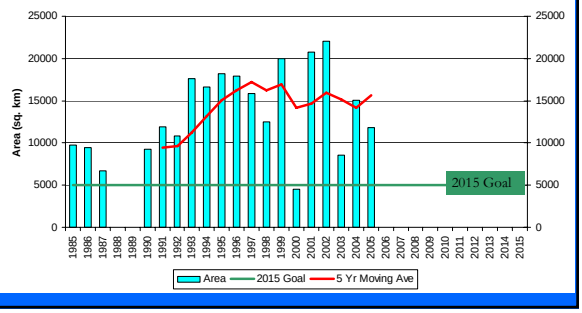
USDA/ARS National Soil Tilth Laboratory 2004

Goals of the *Action Plan*

January 2001

- **Coastal Goal:** Reduce zone to less than 5,000 sq. kilometers
- **Within Basin Goal:** Implement actions to restore & protect the waters of the Basin
- **Quality of Life Goal:** Improve communities & economic conditions in Basin.

Size of Gulf Hypoxic Zone (1985-2005)



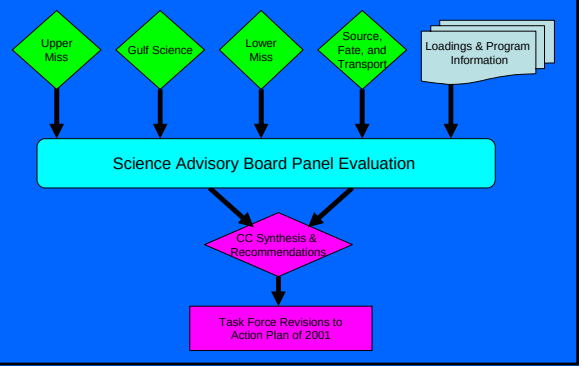
Reassessment

11

By December 2005, and every five years thereafter, the Task Force will assess the nutrient load reductions achieved and the response of the hypoxic zone, water quality throughout the Basin, and economic and social effects. Based on this assessment, the Task Force will determine appropriate actions to continue to implement this strategy or, if necessary, revise the strategy.

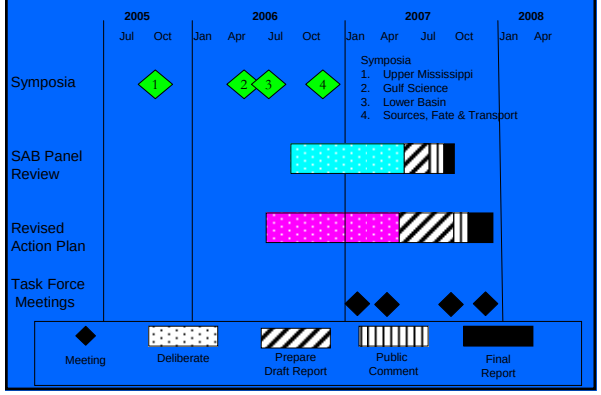
Mississippi River/Gulf of Mexico Watershed Nutrient Task Force Reassessment Process

Revised 9/5/06



Mississippi River/Gulf of Mexico Watershed Nutrient Task Force Timeline for Reassessment

Revised 9/5/06



Hypoxia Advisory Panel's Charge: Three Topics

1. Characterization of the Cause(s) of Hypoxia
2. Characterization of Nutrient Fate, Transport and Sources
3. Scientific Basis for Goals and Management Options.

Gulf Hypoxia and Local Water Quality Concerns

www.umrshnc.org

A workshop assessing tools to reduce agricultural nutrient losses to water resources in the Corn Belt.

September 26 – 28, 2005
Iowa State Center • Iowa State University
Ames, Iowa

A workshop with a "decidedly different" approach to encourage interaction and the exchange of information on tools to reduce nutrient losses to water resources in the Corn Belt. Sessions feature a short, introductory presentation followed by a panel discussion. Session topics include:

- Fate and transport of nutrients
- Water management
- Wetlands
- Buffer and vegetative filter strips
- Nitrogen rates
- Nitrogen application timing, forms, and additives
- Phosphorus fertilizers
- Animal manures
- Erosion control practices to reduce sediment and nutrients
- Alternative cropping and cover crops
- Field-scale tools
- Watershed-scale tools
- Evaluating nutrient loss reduction effects
- Soil organic matter content

Early registration for this program is $175 and includes meals, workshop materials and a copy of the workshop proceedings. Registration also includes admission to Iowa State University's Reiman Gardens for an evening reception and social.

Visit www.umrshnc.org to complete your registration today.

For more information:
Visit our Web site at www.umrshnc.org for additional information. If you have additional questions regarding the workshop please contact the Iowa State University Agriculture Education Program by calling (515) 400-7668 or e-mail us at aep@iastate.edu.

Sponsored by:
- Upper Mississippi River Sub-basin Hypoxia Nutrient Committee (UMRSHNC)
- Iowa State University College of Agriculture
- U. S. Environmental Protection Agency Regions 5 and 7, and the Office of Wetlands, Oceans and Watersheds
- USDA - Agricultural Research Service

IOWA STATE UNIVERSITY
University Extension

UPPER MISSISSIPPI RIVER SUB-BASIN HYPOXIA NUTRIENT COMMITTEE

UMRSHNC

FUTURE DIRECTION?

1. Nitrate load reduction target?

FUTURE DIRECTION?

1. Nitrate load reduction target?
2. Target reductions for both N & P?

FUTURE DIRECTION?

1. Nitrate load reduction target?
2. Target reductions for both N & P?
3. Next Farm Bill?

FUTURE DIRECTION?

1. Nitrate load reduction target?
2. Target reductions for both N & P?
3. Next Farm Bill?
4. Louisiana Coastal Restoration Plan?

Lower Basins

FUTURE DIRECTION?

1. Nitrate load reduction target?
2. Target reductions for both N & P?
3. Next Farm Bill?
4. Louisiana Coastal Restoration Plan?
5. Renewable fuels?

FUTURE DIRECTION?

1. Nitrate load reduction target?
2. Target reductions for both N & P?
3. Next Farm Bill?
4. Louisiana Coastal Restoration Plan?
5. Renewable fuels?
6. Climate change?

FUTURE DIRECTION?

1. Nitrate load reduction target?
2. Target reductions for both N & P?
3. Next Farm Bill?
4. Louisiana Coastal Restoration Plan?
5. Renewable fuels?
6. Climate change?
7. Need for research & tech development

"We have an opportunity/obligation to create a coordinated, integrated initiative that builds on research and addresses compelling needs"

Wendy Wintersteen, Dean, College of Agriculture, ISU
April 12, 2006

Upper Mississippi Environmental Research & Technology Initiative

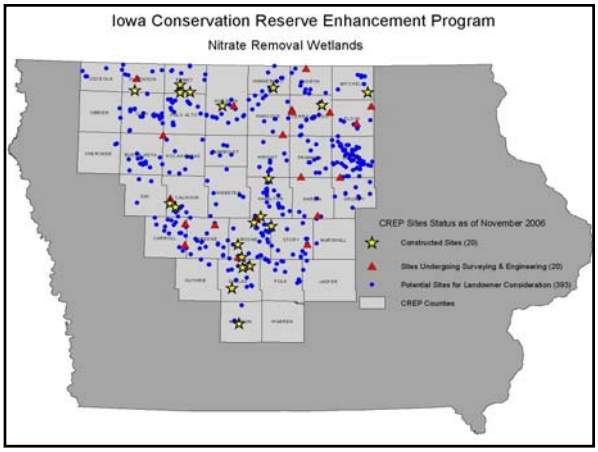
Innovative and integrated research needed to address:

- Land use changes and modifications
- Hydrology, drainage water management
- Nutrient management

For More Information

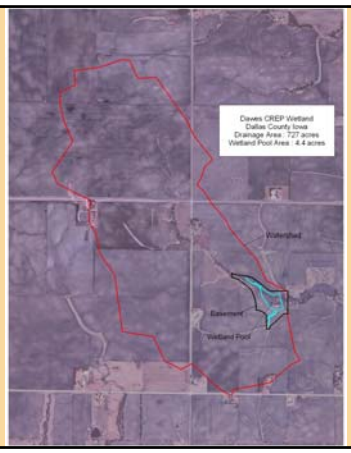
www.umrshnc.org

- Workshop Detailed Information
- Proceedings - Draft Papers
- Detailed Information
  - All UMRSHNC Activities & Meetings
  - Hypoxia Resource Info For Research Scientists
  - Links



Site Criteria

- **Drainage area > 200 hectares (500 acres)**
- **Wetland pool should be 0.5% to 2% of watershed drainage area**
- **To maintain wetland vegetation, no more than 25% of the wetland should be 3 feet in depth**
- **"Shall not damage the value of property in any public or private drainage system without the property owner's consent."**



Summary of 20 Constructed Sites

(totals for 20 sites)

- **Wetland pool** **198.3 ac**
- **Watershed area treated** **27,813 ac**
- **N removal (lifetime)** **14,872 tons**
- **Avg cost/watershed acre** **$239.48/ac**
- **Avg cost/yr/watershed acre $1.60/ac/yr**
- **Avg cost/lb N removed** **$0.21/lb**

Need for Regulatory Streamlining

"The Clean Water Act is creating a 'dead zone' in the corn belt for adoption of new technologies needed to address the hypoxia 'dead zone' in the Gulf of Mexico."

– Lemke, 2006

Iowa CREP Experience

- **Initial 6 wetlands constructed under Corps of Engineers Nationwide Permit #27**
- **Regulatory reversal requiring individual Clean Water Action Section 404 permits – June 2004**
- **Program stopped and negotiation to resolve permitting issues – 24 months**
- **Resolution is that CWA 404 assessments repeat & duplicate similar USDA assessments**

Individual CWA 404 Permits

- **Fish ladders – Topeka Shiner**

Individual CWA 404 Permits

- Fish ladders – Topeka Shiner
- **Reversion rights after 30 year easement**

Individual CWA 404 Permits

- Fish ladders – Topeka Shiner
- Reversion rights after 30 year easement
- **Require 50% rooted pool vegetation in 3 years or plant at landowner cost**

Individual CWA 404 Permits

- Fish ladders – Topeka Shiner
- Reversion rights after 30 year easement
- Require 50% rooted pool vegetation in 3 years or plant at landowner cost
- **Assess each site for bald eagle nests**

Individual CWA 404 Permits

- Fish ladders – Topeka Shiner
- Reversion rights after 30 year easement
- Require 50% rooted pool vegetation in 3 years or plant at landowner cost
- Assess each site for bald eagle nests
- **Assess each site for rare prairie plants**

Individual CWA 404 Permits

- Fish ladders – Topeka Shiner
- Reversion rights after 30 year easement
- Require 50% rooted pool vegetation in 3 years or plant at landowner cost
- Assess each site for bald eagle nests
- Assess each site for rare prairie plants
- **Core holes and soil screening for cultural resources, including undisturbed portions of sites**

“Navigable Waters” of U.S.

404 Regional Permit for Iowa Conservation Programs

- **320 acres drainage area**

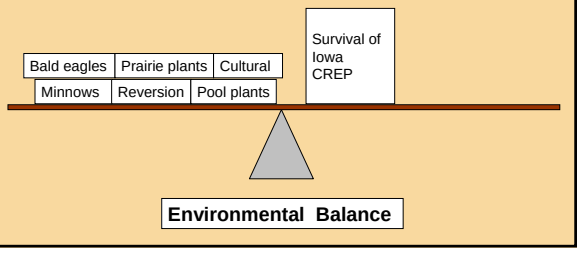
“Navigable Waters” of U.S.

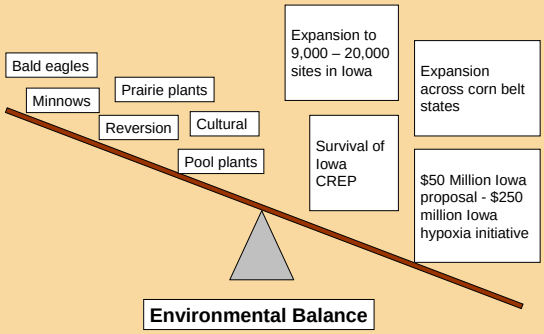
404 Regional Permit for Iowa Conservation Programs

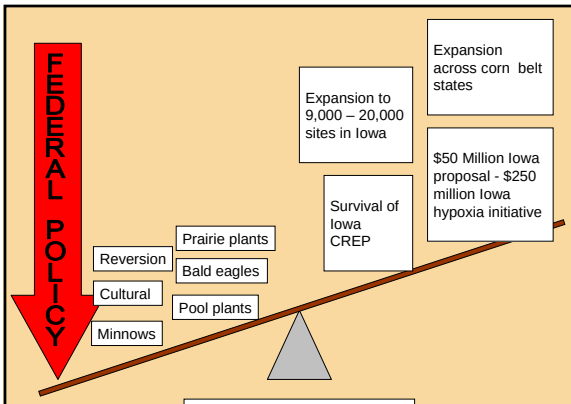
- **320 acre drainage area**
- **640 acre drainage area**

Needed "Scaling" of Practice Adoption

- **Current Iowa CREP – 25 sites/year**
- **$50 million Iowa WQ proposal – potential $250 million Iowa hypoxia reduction initiative**
- **Adoption level to achieve reduction by 40-55% of statewide NO_3 transport to water resources**
  9,000 – 20,000 sites
- **Expansion of off-field N sink technology to other corn belt states to meet Gulf hypoxia NO_3 reduction goal**







Options – Regulatory Streamlining

Improved coordination & collaboration between federal regulatory agencies

Accept USDA NEPA procedures which currently duplicate CWA 404 protections

- **Nationwide CWA 404 permit dedicated to wetland N sinks**
- **Authorize through CWA 404 Nationwide Permit #27 (currently proposed – comments due 11/27/06)**
- **"Regional Permits" are not a solution**

Development of N Wetland Sinks Through Existing Drainage Districts

- 3000 drainage districts in Iowa manage common-outlet drains for 6 million acres
- Governing boards of trustees (typically county board of supervisors)
- Taxing powers
- Power of eminent domain
- Construct and maintain drains

Federal Policy Opportunities

- Integrate N sink wetland restoration during near-future replacement of DD main tiles & outlets at end of service life
- "Pilot implementation" through CREP cost-share funds to drainage districts for wetland restoration
- Drainage organizations are supportive – Iowa legislation proposed in 2005 to authorize wetland expenditures
- Revision of federal wetland regulation policy from "avoidance" to "mitigation" – potential for N sink wetland restorations to be market-driven at private expense without public funding