Fall 2020
Hypoxia Task Force Public Meeting
October 1, 2020
Virtual Agenda

Thursday, October 1

9:50am Eastern
(8:50am Central) Attendees Join Webinar

10am Eastern
(9am Central) Facilitator Introduction to the Virtual Meeting (10 minutes)
• Jason Gershowitz, Senior Facilitator, Kearns & West

Welcome (10 minutes)
• David P. Ross, Task Force Federal Co-Chair, United States Environmental Protection Agency
• Mike Naig, Task Force State Co-Chair, Iowa Department of Agriculture and Land Stewardship

10:20am Eastern
(9:20am Central) Summary of HTF Workgroup Activities
• Objective: Report on actions of both the new HTF workgroups charged at the February 2020 meeting and those ongoing HTF workgroups.
• Anna Wildeman, Principal Deputy Assistant Administrator for Water, EPA

10:30am Eastern
(9:30am Central) State Progress
Objective: Share progress and key status updates.
• Minnesota: Five-year Nutrient Reduction Strategy Report
  o Katrina Kessler, Minnesota
• Illinois: Illinois Nutrient Research and Education Council Report
  o Trevor Sample, Illinois
  o Julie Armstrong, Illinois Nutrient Research and Education Council
• Louisiana: Nutrient Reduction and Management Strategy
  o Harry Vorhoff, Louisiana
• Iowa: Advancing Water Quality Wetland Implementation
  o Matt Lechtenberg, Iowa

11:50am Eastern
(10:50am Central) Partner Updates
Objective: Highlight opportunities for HTF and partners in advancing HTF goals.
• HTF Collaboration on Basin-Wide Water Quality Trends, Ted Kratschmer, National Great Rivers Research and Education Center
• Industry Partner Program: Payments to Farmers for Practices with Carbon and Water Quality Benefits, Dr. Jeff Seale, Bayer
12:10pm Eastern
(11:10am Central) Lunch Break

1:00pm Eastern
(12:00pm Central) Federal Agency Contributions (10 minutes each)
Objective: Highlight federal actions in support of the states.

- U.S. Department of Agriculture
- U.S. Environmental Protection Agency
- NOAA
- U.S. Department of the Interior
- U.S. Army Corps of Engineers

1:50pm Eastern
(12:50pm Central) Public Comment Session
Objective: Hear comments from interested members of the public.

2:20pm Eastern
(1:20pm Central) Closing Comments
Objective: Identify meeting achievements and explore any opportunities and challenges for implementation.

- David P. Ross, Task Force Federal Co-Chair, United States Environmental Protection Agency
- Mike Naig, Task Force State Co-Chair, Iowa Department of Agriculture and Land Stewardship

2:30pm Eastern
(1:30pm Central) Adjourn
Minnesota’s Nutrient Reduction Strategy

Tracking Progress in the Mississippi Headwaters State

Strategy implementation to reduce nutrients in water

Large-scale Program Advances

Local Watershed Approach

Changes in Rural & Urban Lands

Changes in Water
Nutrient Reduction Strategy 5-year Progress Report

Progress Part 1
Large-scale Program Advances

Progress Part 2
Local Watershed Approach

Progress Part 3
Changes in Rural & Urban Lands

Progress Part 4
Changes in Water

https://www.pca.state.mn.us/water/nutrient-reduction-strategy
Minnesota Clean Water Fund – boosted state BMP $$

Spending by year

More than 30 program advances since 2014

- Education, Outreach and Research
  - Nitrogen Smart training for farmers and farm advisors
  - Annual nutrient management and conservation tillage conferences
  - Forever Green Initiative
  - Discovery Farms
  - Minnesota Office of Soil Health
  - Guidance manuals for agricultural best management practices, drainage, urban stormwater management
  - Conservation professionals training and certification
  - Nutrient Management Initiative
  - Center for Changing Landscapes

- Voluntary Programs
  - Minnesota Agricultural Water Quality Certification
  - NR Certification led by private industry (cropland nutrient management)
  - Red River Basin Initiative and Red River Valley Drainage Water Management
  - Minnesota Conservation Reserve Program
  - Board of Water and Soil Resources Cover Crop Demonstration Program
  - Clean Water Fund – increases for BMP implementation
  - Point – nonpoint trading
  - Reinvent in Minnesota Multi-purpose drainage water management

- Regulatory Programs
  - Municipal and Industrial Wastewater Program
  - Groundwater Protection Rule (Nitrogen Fertilizer)
  - Household Septic Buffer Law
  - Feedlot and land application of manure rules and program
  - Urban Stormwater Runoff Program
  - Subsurface Sewage Treatment Program

- Water Quality Partnerships and Tools
  - Watershed Restoration and Protection Strategies (WRAPS) in over 50 HUC-8 watersheds
  - One Watershed, One Plan (1W1P) Program
  - Groundwater Restoration and Protection Strategies
  - Watershed Conservation Planning Initiative
  - Small focus watersheds – Federal Section 319 Program (20 watersheds)
  - Guidance on Lake Protection for WRAPS and SWLP
  - National Water Quality Initiative and Mississippi River Basin Healthy Watershed Initiative
  - Watershed-based Funding Implementation Program
  - Root River Field to Stream Partnership

All 30+ programs described in:

Appendix A: State-level Nutrient Reduction Program Advancements
5 year Progress Report on Minnesota's Nutrient Reduction Strategy

https://www.pca.state.mn.us/water/nutrient-reduction-strategy
Minnesota Agricultural Water Quality Certification

Voluntary Partnership:
- Producers
- Government agencies
- Private sector

WQ certified farmers get:
- 10 yrs of regulatory certainty
- Priority $ for new practices
- Community recognition

Growth since 2015:
- 900+ farms
- 600,000+ acres
- 1800+ new practices
- 46,000+ lbs P reduced

Forever Green Program

- Developing new cropping systems for continuous living cover
  - plant breeding
  - agronomic systems
  - food science
  - economics
- Supply Chain Development
- Market Development
MN Groundwater Protection Rule
Nitrogen fertilizer restrictions adopted in 2019

Fall N fertilizer restrictions in vulnerable areas

BMPs can phase from voluntary to regulatory in drinking water supply management areas, depending on nitrate levels/trends & BMP adoption rates

2.6 million acres

<100,000 acres

https://www.mda.state.mn.us/nfr

Wastewater Permitting Program - Phosphorus

Over 70% reduction from:

- **2000** - 1 mg/L effluent performance standard for new/expanded plants
- **2008** - Lake Eutrophication Standards & wastewater rules
- **2014** - River Eutrophication Standards
- **2014** - Nutrient Reduction Strategy

![Graph showing phosphorus reduction over years](chart)
Wastewater Permitting Program – Nitrogen (N)

Wastewater N strategy - steps:
1. Monitor influent & effluent nitrogen
2. Evaluate N reduction optimization
3. Develop N management plan templates
4. Encourage voluntary N removal when upgrading facility
5. Establish N effluent limits – after nitrate water quality standards developed
6. Develop point/nonpoint trading options

Presentation Outline: Progress with our watershed approach
Minnesota’s watershed approach aims to meet local & downstream needs

Watershed load reduction targets – to collectively achieve downstream load reduction goals
Minnesota’s watershed approach works at multiple scales

Watershed science informing local planning across the entire state

Smaller-scale focus watersheds

Farm and field-scale implementation & monitoring

New private-public collaborative watershed partnerships developing

Cannon River Agricultural Collaborative

Headwaters Agricultural Sustainability Partnership (central Minnesota)

Cedar River Watershed Partnership

Central Farm Service

Hormel Foods

Land O’Lakes SUSTAIN

MN Dept. of Agric. MAWQCP

Mower County SWCD

Environmental Initiative
Presentation Outline: progress with BMP adoption

Progress Part 1
Large-scale Program Advances

Progress Part 2
Local Watershed Approach

Progress Part 3
Changes in Rural & Urban Lands

Progress Part 4
Changes in Water

New on-line BMP tracking System at multiple scales subwatersheds to statewide

BMPs adopted through Gov’t Programs

- NRCS - federal EQIP, CSP, RCPP
- BWSR - eLINK tracks state cost-shared BMPs
- BWSR - CREP and RIM tracking
- MDA – Ag BMP Loan Program, Ag Water Quality Certification
- MPCA – Clean Water Partnership & 319 program

https://www.pca.state.mn.us/water/nutrient-reduction-strategy
www.pca.state.mn.us/water/healthier-watersheds
Statewide tracking example:
New acres of living cover added each year through gov’t programs

Government Program BMP adoption 2014-18 compared to scale of adoption goals for 2025

Note: This does not include private adoption outside of government programs
How can we tell if practices are being adopted at needed scales?

A. Adoption through government support programs (previous 3 slides)

B. Indicators of broader overall adoption
   1. Census of Agriculture and surveys
   2. Satellite imagery
   3. Fertilizer sales
   4. Nutrient use efficiency trends

C. Permitting – reporting & inspections

In combination indicates MN is falling short of Nutrient Strategy BMP scenarios

Presentation Outline: trends in the water

Progress Part 1: Large-scale Program Advances
Progress Part 2: Local Watershed Approach
Progress Part 3: Changes in Rural & Urban Lands
Progress Part 4: Changes in Water
10-year nutrient concentration trends

Nitrate – increasing or no significant trend

Total Phosphorus – decreasing or no significant trend

Phosphorus – decreasing or no significant trend

20-year nutrient concentration trends

Phosphorus (~1999-2018)

- 21 – decreasing (15-56%)
- 6 - no trend detected
- 1 - increase

Nitrate (~1999-2018)

- 3 – decreasing
- 11 - no trend detected
- 14 - increasing
More precipitation leading to higher nutrient loads

**Annual Precipitation Departure, 2000 - 2019**

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Source:
DNR State Climatology Office and the DNR Watershed Health Assessment Framework

Nitrate and phosphorus loads
Mississippi River at Red Wing

Nitrate loads increasing since late 1990's

Phosphorus loads with no detected trend since late 1990's
In Conclusion

- **5-year progress report recently completed** - found at:
  [https://www.pca.state.mn.us/water/nutrient-reduction-strategy](https://www.pca.state.mn.us/water/nutrient-reduction-strategy)
  - Advanced 30+ large-scale programs affecting nutrients
  - Agricultural BMP adoption not keeping pace with scenarios outlined in nutrient strategy
  - Wastewater – over 70% reduction in phosphorus; nitrogen is now highly-monitored
  - River phosphorus concentrations decreased 20-50% (20 yrs) – but increasing river flow offsetting load reductions
  - River nitrogen concentrations and loads increasing by over 25% (20 yrs)

- **New in September 2020 – 10-year Minnesota State Water Plan**
  - Combining nutrient & climate change practices to reduce and mitigate effects of climate change

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Thank You!

[www.pca.state.mn.us/water/nutrient-reduction-strategy](http://www.pca.state.mn.us/water/nutrient-reduction-strategy)
Who is Illinois NREC?

- Created in 2012 through state statute
- Funded by $.75/ton assessment on fertilizer sold in Illinois
- Collaboration between ag, environmental groups, and state agencies
- Pursue nutrient research & educational programs
- Ensure adoption and implementation of practices that
  - Optimize nutrient use efficiency
  - Ensure soil fertility
  - Address Environmental concerns regarding fertilizer
Who is Illinois NREC?

- 13 Member Council (9 voting and 4 advisory)
  - Voting Members
    - 3 Farmers (ILFB, ICGA, ISA)
    - 3 Members from Fertilizer Industry
    - CCA
    - Specialty Fertilizer
    - Illinois Department of Ag
  - Advisory Members
    - 2 Environmental Organizations (Sierra Club & Environmental Law Policy Center)
    - State/Federal Ag Research Station Representative
    - Illinois EPA

Illinois NREC Research Funding

Solicit proposals that focus on
- Improved nutrient efficiency
- Enhanced crop production
- Protect water quality

Council, Research Committee, and Independent Peer Review Team review applications

Projects are ranked on merit and availability of funds
Funding and Progress to Date

- Since 2013
- Over $26M invested in research projects
- Four NREC publications: Turf Guide, Cover Crop Guide 1.0, Guide to MRTN, and Cover Crop 2.0
- Annual Reports, Investment Insights, Field Notes, and videos, Research Forum
- More than a dozen papers published in Professional Journals written by NREC-funded researchers
- Many opportunities for collaboration on research and outreach projects

NREC and Illinois’ Strategy

- Work in parallel (but independently) with the strategy
- Evaluate removal rates for BMP’s already in strategy
- Provide peer-reviewed research for BMP’s not already in strategy
- Serve on Policy Working Group, and Ag Water Quality Partnership with support to Science Advisory Team
- Fund bi-annual USDA-NASS Survey re: NLRS awareness and adoption
4R NUTRIENT MANAGEMENT

4R Nutrient Management

- Ongoing N-rate trials to support the MRTN
- Impact of timing on tile nitrate levels
- The role of mineralization and nitrate loss from 0 nitrogen trials
- 4R Nutrient research focus is both agronomic, economic and environmental
- Precision Ag for N-Management
- N placement
- Using stable isotopes to understand sources and cycling of nitrates
Cover Crop Research

- Long-term paired watershed research
- N application timing and cover crops impact on Fate and Availability of N Fertilizer
- Extended rotation with cover crops
- Insect management in cover crop systems
- Utilizing cover crops in Southern Illinois for P and N loss
- Modeling projects to evaluate the suitability and benefits of cover crops
- Integrating grazing into cover crop systems
Phosphorus Research

- Struvite made from recycled P from wastewater treatment facilities as an alternative P Source
- Edge of Field P Filters:
- Freeze/Thaw Cycle Impact on P Loss in Cover Crops
- Designer BioChar for P removal
- The role of legacy P and utilizing 150 years of soil samples
- Evaluation of WASCOB’s P Removal Potential
- Role of Gypsum in managing P losses
Edge of Field Practices

- Woodchip Bioreactors
- Constructed Wetlands
- Drainage Water Management
- Saturated Buffers
EMERGING ISSUES

Novel Research

- Dissimilatory Nitrate Reduction to Ammonium for Nitrate Retention in Agricultural Soils
- Tile Depth and Spacing
- White paper research related to P loading in Illinois River watershed
- Maize microbiome research
- Fragipan busting with annual ryegrass
Where can I get more info?

- **Website**: illinoisnrec.org
- **Twitter**: @IllinoisNREC
- **Facebook**: @IllinoisNREC
- **Email**: Julie.Armstrong@illinoisnrec.org
Hypoxia Task Force
Louisiana Update
Harry Vorhoff

UPDATES

I. Louisiana’s Nutrient Reduction and Management Strategy

II. Governor’s Second Term Coastal Priorities
**Approaches**

- Nutrient monitoring & science development
- Identifying high priority watersheds for BMP implementation
- Cooperative and innovative efforts for nonpoint source reduction
Hypoxia Task Force Grant

Louisiana received $100,000 in 2019 and additional $70,000 in 2020.

Funded Projects

1. Nonpoint Source Program Monitoring
   1. Establish current water quality conditions in watersheds, to identify geographic areas for targeting BMP locations, and track changes in water quality over time from BMP implementation in watersheds.
   2. Nutrient monitoring (N/P) and flow measurements.
   3. Monitoring in 4 southern LA watersheds at an additional 85 sites.

2. Coastal Transect Monitoring
   1. Cooperative effort between DEQ and CPRA – continues previously established monitoring effort for water quality data collection from inshore to offshore waters of Barataria Bay. Fills critical gap on nutrients in coastal area.
CRMS & SWAMP Water Quality Monitoring

Period of record 1978-2014, monthly monitoring at 21 long-term sites

- Majority of trends decreasing (73%)
  - All 21 sites had decreasing trend for TKN
  - 12 sites showed decreasing trend for NOx
  - 13 sites showed decreasing trend for TP
  - Only 1 site showed increasing trend for NOx

Basins with Ag showed nutrient water quality improvement (either decreasing or no observable trends in nutrients)
RESTORE Act Center of Excellence
Research Grants Program

“Multiple Tools for Determining the Fate of Nitrate in Coastal Deltaic Floodplains”

Lead Investigator (Institution): Robert Twilley (Louisiana State University)

Goal: Study how nitrogen moves through the water column and is transformed by wetlands, plants, and microbes in the deltaic floodplain.

“Determining the Influence of Surface Water Diversions on Physical and Nutrient Characteristics of Wetland Soils”

Lead Investigator (Institution): John White (Louisiana State University)

Goal: Determine impact of Davis Pond Diversion on soil properties, including nutrient content.

PRIORITY WATERSHEDS
Priority Watersheds

NONPOINT SOURCE INNOVATION & COLLABORATION
Watershed Nutrient Management Plans

I. Project Description: LSU AgCenter will develop producer-specific masters programs and watershed nutrient management plans.

II. Intent: Reduce excessive nutrient pollution from farm practices through enhancing existing NRCS practices.

III. Funding: Mosaic Beneficial Environmental Project (BEP) Consent Decree through LDEQ.

IV. Project Period: July 2019 to June 2022.

Water Quality Trading Program

I. Project Description: Trading as market-based, cost effective means to achieve water quality goals for point and nonpoint source pollution.

II. Project Timeline

I. 2017: Louisiana State Legislature authorized creation of program, which allowed for both point and nonpoint sources to participate.

II. October 2019: Water Quality Trading regulations finalized and published.

III. Current Progress: Working with stakeholders interested in participation.
GOVERNOR’S SECOND TERM
COASTAL PRIORITIES

Largest Hypoxic Zone in the U.S.

Area of the Northern Gulf of Mexico Mid-summer Bottom Water Hypoxia from 1985 to 2019
(Source: Nancy N. Rabalais, LUMCON, and R. Eugene Turner, LSU)
Local Impacts: Seafood & Fishing Industries

Burdens:

- Competition among vessels
- Higher fuel costs
- Increased bycatch

(Jordan 2018; Marohn 2018)

Over 53,000 jobs in the state are related to the seafood and recreational fishing industries (USDC et al. 2018).

The Louisiana Shrimp Association and Louisiana Oyster Task Force have passed resolutions to support Hypoxia Task Force goals.

Louisiana’s Role in a Watershed-Scale Problem

In its unique position at the mouth of the Mississippi-Atchafalaya River Basin, Louisiana faces the aggregate effects of nutrients introduced to the system in each up-river state.
Governor Edwards’s Priorities for Second Term:

• Integrate the goals of flood protection, ecosystem restoration, navigation, water quality, and fisheries habitat.
  • Renewed commitment to reducing nutrient pollution in the Mississippi River
• Manage the Mississippi and Atchafalaya Rivers more holistically
• Establish a task force on the future management of the Atchafalaya Basin
• Promote and maintain a thriving oyster resource and industry in Louisiana
• Establish Climate Initiative Task Force and Resilience Initiative
• Innovation and Collaboration Hub at The Water Institute of the Gulf
2020 WRDA – Work in Progress

House Bill, Section 128. Harmful Algal Bloom Demonstration Program.
Secretary shall carry out a demonstration program to determine the causes of, and implement measures to effectively detect, prevent, treat, and eliminate, harmful algal blooms associated with water resources development projects.

Specifies the coastal and tidal waters of the State of Louisiana as a focus area.

House Bill, Section 210. Lower Mississippi River Comprehensive Study.
Secretary shall conduct a comprehensive study of the Lower Mississippi River Basin, from Cape Girardeau, Missouri, to the Gulf of Mexico, to identify actions to be undertaken by the Corps for comprehensive management of the basin for the purposes of flood risk management, navigation, ecosystem restoration, water supply, hydropower, and recreation.

Specifies consideration of Union and Am diversion, Manchac Landbridge Diversion, increase Atchafalaya flow to Terrebonne, and natural features and nature-based features including levee setbacks and instream and floodplain restoration.

2020 WRDA – Work in Progress (cont.)

Section 308. Upper Mississippi River System Environmental Management Program.
Would increase funding authorization long-term resource monitoring, including research on water quality issues affecting the Mississippi River (including elevated nutrient levels) and the development of remediation strategies.
Oyster Management & Rehabilitation Strategy

Lead agency: Louisiana Department of Wildlife and Fisheries
Issue: Oyster resources at all-time lows on public oyster areas
Action: $132 million strategy (still in draft form)

$25.6M of NRDA approved in August 2020 for oyster-related projects
- 2 brood reefs (10-acres each) in St. Bernard Parish
- 2 new public oyster reefs (200 acres each) in Mississippi Sound and Terrebonne Parish
- Production of at least 500 million oyster larvae to be distributed across Louisiana’s public oyster areas

Hypoxia Commitments

- Recommit to supporting and following the science
- Raise as a priority in Louisiana
- Increase coordination and collaboration
- Foster innovative policies
- Identify needs and secure resources
Thank You

Questions?

Harry.Vorhoff@la.gov (GOCA)
Angelina.Freeman@la.gov (CPRA)
Amanda.Vincent@la.gov (DEQ)
joey_b@ldaf.state.la.us (DAF)
Charles.Reulet@la.gov (DNR)
**Wetlands**

Wetlands are strategically located and designed to remove nitrate from tile-drainage water from cropland areas.

The larger the wetland, the greater the percentage of N removal; nitrate concentration reduction averages 52%. Wetlands also provide improved habitat for Iowa wildlife.

Source: CleanWaterIowa.org

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**BMP Mapping**

- Select BMPs identifiable w/ available data
- 2007-2010 Benchmark
- Documentation
- Historical
- WS Modeling

Statewide Practice Summary

<table>
<thead>
<tr>
<th>Pond Dams (number)</th>
<th>Grassed waterways (ac)</th>
<th>Terraces (ft)</th>
<th>WASCOBs (number)</th>
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<tbody>
<tr>
<td>114,423</td>
<td>327,904</td>
<td>469,257,556</td>
<td>246,139</td>
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Estimated >$6B in investment based on today’s costs.

Learn more at [https://www.gis.iastate.edu/gisf/projects/conservation-practices](https://www.gis.iastate.edu/gisf/projects/conservation-practices)
Updated Baseline Assessment

- **NPS**
- **Historical progress on P loss from cropland**
- **Nitrogen needs more emphasis**

### Nitrate-Nitrogen (N) Reduction (%)

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<tr>
<th>Method</th>
<th>Initial</th>
<th>Technical</th>
<th>Financial Assistance Required</th>
<th>Land Source Contributions</th>
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<tr>
<td><strong>NPS</strong></td>
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<td><strong>Total</strong></td>
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### Nitrogen

- 1980-96 Baseline Load (tons): 278,652
- 2006-10 Benchmark Load (tons): 293,395
- Change, 1980-96 to 2006-10: 5.2%
- Major cause of change: Land use change

### Phosphorus

- 1980-96 Baseline Load (tons): 21,436
- 2006-10 Benchmark Load (tons): 16,800
- Change, 1980-96 to 2006-10: 21.6%
- Major cause of change: Reduced tillage and soil test P

The method used to derive the total nitrogen estimate of 292,022 tons indirectly reflected the point source contributions.
Program options

- Iowa CREP – limited to 37 counties
- NRCS-EQIP – RCPP/MRBI
- WQI (IDALS)
- CRP – CP-39
- EPA – Gulf of Mexico Program Funding
- Private funding – DU, IPPA, TNC, etc.
- Others

*Often combine these sources to support projects and provide full funding package to landowners.

Typical timeframe is 18-24 months from interest to construction completion (experience w/ CREP).
Wetland Opportunities and Challenges

- **Breakpoint (traditional)**
- **Created/Excavated or “Tile Zone”**
- **Floodplain**

- Build off of current understanding from monitoring existing sites translated to new site concepts

- Pros and cons to navigate through all of these types of sites:
  - Advantages: costs (easements, construction, etc.), improved performance, habitat value
  - Challenges: permitting, costs, private landowners, time

- Focus on expanding opportunity, not one vs. the other
Wetland Opportunities and Challenges

options

• Expands the number of sites feasible in the basin:
  • Conceptual watershed
  • 13 breakpoint sites
  • + 5 potential TZ sites
  • + 3 potential floodplain sites
WQ Wetlands
Expanding Opportunities – “Tile Zone”
WQ Wetlands
Expanding Opportunities – “Floodplain” and “Created”

Expanded Capacity in Iowa to Advance Wetlands

• **Expanded Delivery Partnerships**
  • Ducks Unlimited
  • Iowa Nutrient Research and Education Council (INREC)

• **Expanded Funding Opportunities:**
  • Regional Conservation Partnership Program (RCPP) – Iowa Systems Approach to Conservation Drainage, Midwest Agriculture Water Quality Partnership Project, etc.
  • Mississippi River Basin Healthy Watersheds Initiative (MRBI)
  • Private sector (DU, TNC, IPPA, others)
Great Lakes to Gulf: Supporting the HTF on measuring progress through analyzing trends in watersheds across the MARB

Ted Kratschmer, Dick Warner, Ellen Gilinsky, Jong Sung Lee
National Great Rivers Research and Education Center
National Center for Supercomputing Applications
October 1, 2020

What is the Great Lakes to Gulf Virtual Observatory?

- The GLTG Virtual Observatory is a web-based geospatial application that integrates water quality data and analytical tools from multiple sources allowing a user to visualize and understand nutrient pollution and water quality conditions in the Mississippi River watershed.

- The online interactive application provides users with tools to explore, analyze and compare water quality data from the Mississippi River and its tributaries.
Data to Decision Support

- Support states and other stakeholders “where they are” through narratives, visual tools, and analyses

Nutrient Reduction Progress Tracking Journey

Data → Data to Knowledge → Knowledge to policy action

- Monitoring, land use, cover crops, etc. etc.
- Choosing models, trend analysis etc.

How Great Lakes to Gulf Supports Nutrient Reduction Efforts by Federal Government, States and NGOs

Work with collaborators to:

- Add value to existing data, projects and efforts
- Provide context for efforts
- Provide a tool for non-scientists
- Provide a tool to support decision making
- Provide a framework for collaboration
Summaries, Model Outputs and Analyses

Provide users with information on “what the data mean” through:

- Narrative storyboards
  - Gives background and explanation
  - Tells a “story” based on the data
- Annual Statistics
- Trends
- Model outputs
- Piecing data and projects together into coherent story

HTF Trends Workgroup Collaboration

- Progress tracking through analysis/visualization/interpretation of water quality trends
- Met with members of work group on “site criteria” to choose trend sites:
  - Within MARB
  - Nitrate, Total Nitrogen, Total Phosphorus, Orthophosphate
  - ~15 year trends going backward from 2017
  - Weighted Regression on Time Discharge and Season (WRTDS)
- Narrative Storyboards
HTF Trends Workgroup Collaboration

• Progress and timeline
  • Set criteria that site data must meet - complete
  • “Data harmonization” – in progress (thankful for help from EPA via TetraTech)
  • Demonstrate trend analysis on two sites – October 2020

• Live mockup of the trend dashboard – complete & ongoing
  • Full trend site list to workgroup for review – End of 2020
  • Analysis complete and dashboard fully live – April 2021
  • Narrative Storyboards – ongoing, 2021

Collaboration with IL – NLRS as an example

• Collaborating with IEPA in support of Illinois Nutrient Loss Reduction Strategy
• Geospatial data support for analyses on N/P changes over time
• Capability to develop and house short presentations that explain what is seen in trends
Thanks to all our collaborators and funders
Hypoxia Task Force Meeting

Under Secretary Bill Northey
USDA Farm Production and Conservation

Mississippi River Basin Initiative

- **2010 to 2019:**
  - $307M obligated for voluntary conservation contracts
- Provided treatment on over 1.46 million acres
- Resulted in several delistings
Announcing New Focus Areas and Watersheds in FY21

All MRBI eligible states will have at least one project in the planning or implementation phase for FY21.

Focus areas align with state nutrient reduction strategy priorities.

NWQI FY21 New Watersheds, Source Water Protection Areas
USDA Agriculture Innovation Agenda (AIA)

- Increase U.S. production by 40% while cutting environmental footprint in half by 2050
  1) Identify Ready-To-Go technologies
  2) Develop internal capacity to expedite adoption of technologies
  3) Deliver innovation to farmers

- August: USDA and EPA announce Next Gen Fertilizer Challenges
  - Environmental and Agronomic Challenge

MRBI’s Nexus with the Ag Innovation Agenda

- One AIA goal - reduce nutrient loss by 30%
- Consistent with interim metrics for the HTF action plan.
- MRBI will be an AIA focus, highlighting projects that use:
  - Novel prioritization
  - Targeting
  - Partner engagement
  - Innovative technologies
Conservation Effects Assessment Project (CEAP) Watersheds

- Quantifying effects of conservation practices
- Journal of Soil and Water Conservation Special Issue on CEAP watersheds:
  - 15 years of results in 34 watersheds
  - Majority have quantifiable water quality benefits from conservation

With new...
- precision conservation assessment and planning tools
- innovative practices
- accelerated conservation delivery
...we can now do even more!

CEAP Watersheds – Applying Insights

- NRCS program design
  - Priority watershed approach
  - Small watershed scale
- Program delivery approaches
  - Precision conservation approaches
  - Watershed assessment basis
- Program guidance
  - Critical source areas
  - Planning ACT practice systems
  - Screening and ranking criteria
- Locally-driven watershed conservation strategies
  - One-on-one technical assistance
  - Leveraging Farmer-to-farmer networks
- Outcome estimation procedures and reporting
It Takes Partnerships

- Nonpoint Source Progress Workgroup
  - NRCS provides annual applied practice data
  - Assisting with development of progress tracking framework

- Collaboration with EPA on NWQI

- Partnering with USGS on legacy nutrients

- NOAA Runoff Risk Index
  - Delivering with USDA AgOpt Tool

USDA Is Here for You
EPA Support to HTF Member States

October 1, 2020
Fall 2020 Virtual HTF Public Meeting

HTF Success Stories Story Map

- EPA has supported the HTF state members by publishing a new interactive Story Map of success stories.
  - Updates previous webpage of success stories from within the Mississippi/Atchafalaya River Basin (MARB).
- The Story Map highlights efforts of state efforts to reduce nutrient loss throughout the MARB and hypoxia in the Gulf.
- It is organized into four themes and can be updated regularly.
  - Technology and Practices to Reduce Nutrient Pollution
  - Strategies for Success
  - Monitoring and Assessment
  - Funding and Financing Projects

https://www.epa.gov/ms-htf/success-stories-hypoxia-task-force-htf
EPA Memo to State & Tribal Env. Agencies:
EPA Financing Available to Support Market-Based Water Quality Improvement Programs

- EPA has strongly encouraged states and authorized tribes to adopt market-based approaches for water quality improvement, including water quality trading, to supplement traditional regulatory programs and financing opportunities.
- The February 2019 memo, “Updating the EPA’s Water Quality Trading Policy to Promote Market-Based Mechanisms for Improving Water Quality,” ID’d six broad market-based principles.
- One principle is identifying financing opportunities that can assist in increasing adoption of nonpoint conservation practices and systems.
- A Sept 30, 2020 memorandum describes EPA financing available to support state and tribal adoption of market-based water quality improvement programs.
- Information may be found at the HTF webpage: https://www.epa.gov/ms-htf.

Financial Support to States and State Partners

- In 2019 and 2020, EPA has funded $2.4M in grants to the 12 HTF states to support their nutrient reduction strategies.
  - These resources supplement support for states via “base” program investments in nonpoint source management (CWA Section 319 grants), state Revolving Loan Fund programs, and state water quality management programs (CWA Section 106 grants)
- EPA has awarded more than $9.5 million in grants to fund farmer-led projects that improve water quality, habitat and environmental education in the Gulf of Mexico watershed.
  - Next RFA closes on October 16, 2020, to fund up to $10 million in new projects. See Farmer to Farmer grant Story Map.
NOAA Updates and Announcements

Dr. Steven Thur
NOAA
National Ocean Service

Outline

- 2020 Hypoxia monitoring cruise and retrospective analysis
- Newly funded project on emerging technologies for hypoxia monitoring
- Runoff Risk update and new collaborative effort with USDA Agricultural Research Service (ARS)
Hypoxic Zone Monitoring Results and Outreach

Predicted Size = 17,353 km²
Measured Size = 5,480 km²
5-Year Average = 14,004 km²

3rd Smallest Measured
(impacts from Hurricane Hanna)

Outreach Efforts
Two Press Releases
Media teleconference held with the Hypoxia Task Force Co-Chairs
Over 185 news articles written as a result

Retrospective Analysis

Rapid intensification of hypoxic zone after Hurricane Hanna
Model agreement with cruise data
Large August peak
Storms continue to pose challenges with monitoring

Source: (Rabalais, LSU)

Mid-summer extent of hypoxic zone – metric to assess progress toward HTF Coastal Goal

Source: (Fennel, Dalhousie; Justic, LSU)
New project to support hypoxia monitoring

- **Purpose:**
  - Develop cost-efficient technology to sample hypoxic zone using autonomous surface vehicles

- **Capabilities:**
  - Utilize a winch driven system to sample within 1m of bottom
  - Can measure in waters from 5m to 50m
  - Data transmitted in real time and made publically available

- **Funding:**
  - Support provided by the NOAA IOOS OTT Program with 3-yr award to the University of Southern Mississippi ($1,161,017)
  - Intended partners include L3Harris, Integral Consulting Inc, Texas A&M Univ, GCOOS, EPA and NOAA

https://ioos.noaa.gov/project/ott-asv-hypoxia/

NOAA Runoff Risk Decision Support Tools

State partners host the tools and provide free-to-use actionable guidance to farmers and producers

Real-time NWS forecast model output sent to the states

Nutrient applications scheduled to avoid unfavorable conditions
Runoff Risk - Current Status

- Runoff Risk (version 2) tools active in MI, MN, OH, and WI
  - Tailored to fit the needs of states
  - States maintain and distribute forecasts
- Very early stages in IN and NY
- Current version will be upgraded in winter 2020-21
- Future implementation nationally on the NWS National Water Model (~2023, based on version 3)

Graphic showing runoff risk potential for Ohio (May 2018), Quick Link to tools (Courtesy of WI): runoffrisk.info

Runoff Risk - Comparison of v2 and v3

- Runoff Risk v3 will leverage the spatial and temporal scale and processing power of the NWM
- Resolution will be reduced from 2 km down to 1 km
- Use of the NWM platform offers the opportunity to expand outside the Great Lakes footprint
### Emerging NOAA and USDA Collaboration

- Workshop was held in Jan of 2020 to explore avenues and options for collaboration between the two groups with several follow on meetings.

- Areas of mutual interest
  - Comparison of the two approaches to learn their strengths and weaknesses
  - Incorporation of key data streams, parameters, and processing to ensure consistency across platforms and efficiency of tool provision
  - Pursue opportunities for leveraging of critical elements toward an interchangeable and integrated platform

- Quarterly meetings and an annual workshop planned for 2021

- **Ultimate Goal:** Enhanced ability to predict nutrient export events across the Mississippi River watershed
Recent Hypoxia Research Efforts and Publications

Several publications have come out with implications for hypoxic zone monitoring, forecasting, economic impacts and management targets.


Rahman, Md. K., Richard, Vázquez, O., Khan, I., Thomas, P. (2020) Molecular characterization and expression of arginine vasotocin V1a2 receptor in Atlantic croaker brain: Potential mechanisms of its downregulation by PCB77 Journal of Biochemical and Molecular Toxicology v34


Kim, Jongsun & Chapman, Piers & Rowe, Gilbert & Dimarco, Steven & Thornton, Daniel. (2020). Implications of different nitrogen input sources for potential production and carbon flux estimates in the coastal Gulf of Mexico (GOM) and Korean Peninsula coastal waters. Ocean Science. 16. 45-63. 0.
Recent Hypoxia Research Efforts and Publications

Several publications have come out with implications for hypoxic zone monitoring, forecasting, economic impacts and management targets.

Grüss, Arnaud & Rose, Kenneth & Justić, Dubravko & Wang, Lixia. (2020). Making the most of available monitoring data: A grid-summarization method to allow for the combined use of monitoring data collected at random and fixed sampling stations. Fisheries Research. 229. 105623. 3.


Recent Hypoxia Research Efforts and Publications

Several publications have come out with implications for hypoxic zone monitoring, forecasting, economic impacts and management targets.

- Diversions of Mississippi River into adjacent estuarine waters should be considered in relation to expected and, possibly, unexpected changes in phytoplankton communities to the receiving waters and coastal ecosystems (Ren et al., 2020)

- Salinity/nutrient relationships in the Gulf of Mexico varied systematically with distance from the two rivers in winter but not in summer. This is because boundaries of the different regions vary with river flow, overall nutrient flux, and grids of stations at the regional spatial scale (Kim et al., 2020).

- Model scenario results suggest that overall oxygen demand in the Gulf of Mexico will increase approximately 21% if we fail to reduce riverine N input, likely increasing considerably the area affected by hypoxia (Kim et al., 2020).

- The model results indicate that total nitrogen export during 2000–2014 was twofold larger than that in the first decade of twentieth century: Dissolved inorganic nitrogen export increased by 140% dominated by nitrate; total organic nitrogen export increased by 53% (Tian et al., 2020)
Federal Actions in Support of the States

Randy Holder
U.S. Army Corps of Engineers
MR&T Environmental Program Manager
Lower Mississippi River Environmental Program Manager
Mississippi Valley Division

Agenda

• USACE Mission
• USACE Civil Works Mission
  – Navigation
  – Flood Risk Management
  – Ecosystem Restoration
• Lower Mississippi River Conservation Committee (LMRCC)
• Planning Assistance to the States Program
The U.S. Army Corps of Engineers Mission:

Deliver vital public and military engineering services; partnering in peace and war to strengthen our nation's security, energize the economy and reduce risks from disasters

Federal Actions in Support of the States

- USACE Civil Works Mission Includes:
  - Dredging for Waterway Navigation
  - Design and Construction of Flood Protection Systems
  - Ecosystem Restoration and Environmental Regulation
Federal Actions in Support of the States

- Levees
- Channel Stabilization
- Tributary Basin Improvements
- Floodways
Federal Actions in Support of the States

• Navigation
  – Dredge 255,000,000 cubic yards annually
  – Operates and maintains 12,000 miles of commercial inland navigation channels
  – Supports nation’s inner cities
  – Commercial harbors

Federal Actions in Support of the States

• Flood Risk Management
  – Mississippi Rivers and Tributaries Project
    • Protects population (4.5 million)
    • Protects infrastructure
    • Protects food source
LMRCC’s Mission

• Promote the restoration and wise use of the natural resources of the Lower Mississippi River through cooperative efforts involving planning, management, information sharing, public education, advocacy and research.

LMRCC Member Agencies

Arkansas Department of Environmental Quality
Arkansas Game and Fish Commission
Kentucky Department for Environmental Protection
Kentucky Department of Fish and Wildlife Resources
Louisiana Department of Environmental Quality
Louisiana Department of Wildlife and Fisheries
Mississippi Department of Environmental Quality
Mississippi Department of Wildlife, Fisheries and Parks
Missouri Department of Conservation
Missouri Department of Natural Resources
Tennessee Department of Environment and Conservation
Tennessee Wildlife Resources Agency
LMRCC Cooperating Federal Agencies & Partners

- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- U.S.D.A. Natural Resources Conservation
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Mississippi River Trust
- The Nature Conservancy

LMRCC Programs

- Restoring America’s Greatest River Initiative
- **Lower Miss River Batture Reforestation Project**
- Lower Miss River Basin Asian Carp Management & Control
- Fishing the Lower Miss River
- Lower Miss River Resource Assessment
- Lower Miss River Economic Profile
Monitoring / Assessment
Project Implementation “Moving Dirt (Rock)
Site Identification
Contract(s)
Permits
Engineering / Design
Funding (Grants)
Monitoring / Assessment

LMRCC Restoration Projects

<table>
<thead>
<tr>
<th>Project Category</th>
<th># of Projects per Category</th>
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<tbody>
<tr>
<td>Restore Secondary Channels</td>
<td>73</td>
</tr>
<tr>
<td>Restore Lakes/Backwaters</td>
<td>69</td>
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<tr>
<td>Notch Dikes – Main Channel</td>
<td>39</td>
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<tr>
<td>Improve Boat Ramp Access</td>
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<tr>
<td>Conserve/Restore Gravel Bars</td>
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<tr>
<td>Procure Batture Land</td>
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<tr>
<td>Restore Borrow Pits</td>
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<tr>
<td>Construct Chevrons</td>
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<td>Construct Hardpoints</td>
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<tr>
<td>Restore Tributary Mouth</td>
<td>2</td>
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<tr>
<td>Construct/Restore Islands</td>
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<tr>
<td>TOTAL PROJECTS</td>
<td>239</td>
</tr>
</tbody>
</table>
Federal Actions in Support of the States

Planning Assistance to States Program

- Section 22 of the Water Resources Development Act of 1974 (Public Law 93-251), as amended by Section 205 of the 1992 WRDA, provides authority for the U.S. Army Corps of Engineers to assist states, eligible Native American Indian tribes, local governments or other non-federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources.
Planning Assistance to States Program

- Water Supply and Demand Studies
- Water Quality Studies
- Environmental Conservation/Restoration Studies
- Wetlands Evaluation Studies
- Dam Safety/Failure Studies
- Flood Damage Reduction Studies
- Flood Plain Management Studies
- Coastal Zone Management/Protection Studies
- Harbor/Port Studies

Federal Actions in Support of the States

Randy Holder
U.S. Army Corps of Engineers
Mississippi Valley Division