



Virtual 2021 Hypoxia Task Force Meeting December 14, 2021

<p>Tuesday, December 14</p> <p>Hypoxia Task Force (HTF) Public Meeting</p> <p>Please reference your confirmation email for Zoom link.</p>	
<p>9:50 am ET 8:50 am CT</p>	<p>Webinar Open for Attendees to Join</p>
<p>10:00 am ET 9:00 am CT</p>	<p>Welcome to the Virtual 2021 Hypoxia Task Force Meeting</p> <p>Facilitator Welcome <i>Barry Tanning, Tetra Tech</i></p> <ul style="list-style-type: none"> • Provide agenda overview and meeting objectives. • Review ground rules and provide instructions on how to use the platform. • Remind participants about raise hand function and chat box, identify contact information for any technical difficulties. <p>Co-Chair Welcome and Remarks <i>Radhika Fox, HTF Federal Co-Chair, Assistant Administrator for the Office of Water, United States Environmental Protection Agency</i> <i>Mike Naig, HTF State Co-Chair, Secretary, Iowa Department of Agriculture and Land Stewardship</i></p>
<p>10:15 am ET 9:15 am CT</p>	<p>Overview of the Office of Water's Nutrient Reduction Strategy <i>Radhika Fox, HTF Federal Co-Chair, Assistant Administrator for the Office of Water, United States Environmental Protection Agency</i></p>
<p>10:35 am ET 9:35 am CT</p>	<p>Member State Progress Objective: Share information on state nutrient reduction strategies, including recent HTF grant activities and strategy implementation updates</p> <ul style="list-style-type: none"> • Arkansas – New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy: <i>Ryan Benefield, Deputy Director, Natural Resources Division-Arkansas Department of Agriculture</i> • Iowa – Leveraging State Investments with Federal Programs: <i>Matt Lechtenberg or Susan Kozak, Iowa Department of Agriculture and Land Stewardship</i> • Minnesota – Update on Minnesota's Agricultural Water Quality Certification Program: <i>Brad Jordahl Redlin, Minnesota Department of Agriculture</i> • Wisconsin – Wisconsin's Producer-led Watershed Protection Program: <i>Sara Walling, Administrator, Agricultural Resource Management Division-Wisconsin Department of Agriculture, Trade and Consumer Protection</i>

	<p>Member State Progress (continued)</p> <ul style="list-style-type: none"> HTF Sub-basin Committee Updates: <ul style="list-style-type: none"> <i>Doug Daigle, Coordinator, Lower Mississippi River Sub-basin Committee</i> <i>Kirsten Wallace, Executive Director, Upper Mississippi River Basin Association</i> <i>Greg Youngstrom, Environmental Scientist, Ohio River Valley Water Sanitation Commission</i>
12:05 pm ET 11:05 am CT	Break for Lunch
12:35 pm ET 11:35 am CT	<p>Federal Agency Contributions and Support for the Hypoxia Task Force</p> <p>Objective: Highlight federal actions in support of the states; discuss new programs, initiatives, etc. that may assist states with nutrient reduction efforts.</p> <ul style="list-style-type: none"> U.S. Department of Agriculture, Farm Production and Conservation: Gloria Montaño Greene U.S. Department of Agriculture, Research, Education, and Economics: Dr. Shefali Mehta U.S. Department of the Interior: Lori Sprague National Oceanic and Atmospheric Administration: Dr. Steven Thur
1:20 pm ET 12:20 pm CT	<p>Reporting on Trends in Basin Metrics</p> <p>Objective: Report on various efforts to track trends in basin metrics, with an eye on the 2025 interim target to reduce nutrient loads by 20 percent</p> <ul style="list-style-type: none"> HTF Trends Workgroup Update: <i>Lori Sprague, USGS and Whitney King, EPA</i> The HTF Trends Workgroup engages in ongoing efforts to evaluate new metrics to complement current metrics that are used to assess water quality trends in the basin. This presentation will feature an update on the status of their work, notably the methodology and considerations for site selection. How the Great Lakes to Gulf Virtual Observatory Helps Track Nutrient Trends and Conservation Practices in the MARB: <i>Dick Warner, Senior Scientist, National Great Rivers Research and Education Center (NGRREC)</i> The Great Lakes to Gulf (GLTG) Virtual Observatory facilitates ready access to water resource information from the Mississippi River and its tributaries, expediting data-to-knowledge-to-policy connections. It is a project of the NGRREC, a partnership of Lewis and Clark Community College and the University of Illinois. Nutrient Trends in the Upper Mississippi and Illinois River Ecosystems: <i>Lauren Salvato, UMRBA and KathiJo Jankowski, USGS</i> This presentation will feature the nutrient-related results of Upper Mississippi River Restoration program's long-term resource monitoring and identifying the relationship between nutrient levels and ecological health parameters. Third Point Source Progress Report Update: <i>Adam Schnieders, Iowa DNR and Max Potthoff, EPA ORISE</i> The HTF Point Source Progress Report documents the efforts of the states to reduce point source nutrient loads.

1:45 pm ET 12:45 pm CT	Mississippi River Cities & Towns Initiative Objective: Receive updates from MRCTI on a new partnership to reduce 7.6 million lbs of nitrogen through the conservation of 60,000 acres involving 30 cities through 8 states. <ul style="list-style-type: none"> • <i>Hon. Scott Maddasion, Mayor of Clinton, IA, MRCTI Iowa State Chair</i> • <i>Aditya Ranade, Principal, Two Degrees Adapt</i> • <i>Dr. Karen Waldrop, Chief Conservation Officer, Ducks Unlimited</i>
1:55 pm ET 12:55 pm CT	Agricultural Nutrient Policy Council Objective: Receive updates from the ANPC on their report “American Agriculture’s State, Regional and National Initiatives to Reduce Nutrient Losses in the Mississippi River Basin” <ul style="list-style-type: none"> • <i>Lauren Lurkins, Illinois Farm Bureau and ANPC President</i> • <i>Tom Hebert, Senior Advisor to the ANPC</i>
2:15 pm ET 1:15 pm CT	Public Comment Session Objective: Hear comments from interested members of the public.
3:00 pm ET 2:00 pm CT	Closing Comments Objective: Identify meeting achievements and explore any opportunities and challenges for implementation. Co-Chair Remarks <i>Radhika Fox, HTF Federal Co-Chair, Assistant Administrator for the Office of Water, United States Environmental Protection Agency</i> <i>Mike Naig, HTF State Co-Chair, Secretary, Iowa Department of Agriculture and Land Stewardship</i>
3:10 pm ET 2:10 pm CT	Adjournment of the HTF Public Session

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy



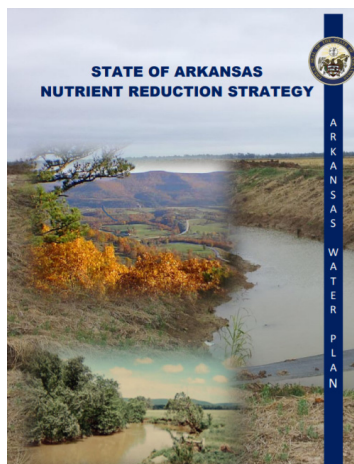
**NATURAL RESOURCES
DIVISION**

Tate Wentz
Water Quality Section Manager

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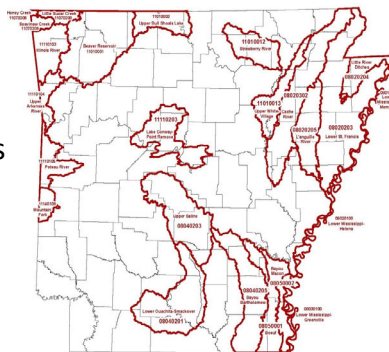
Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy



2014 ANRS priority areas focused on:

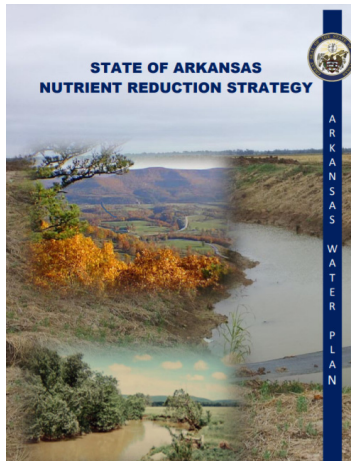
- Integrated Water Quality Assessment
- NRCS priorities
- Interstate water quality issues
- Watershed models
- Local Conservation District goals
- AR NPS Management Plan
- State Water Plan



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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy



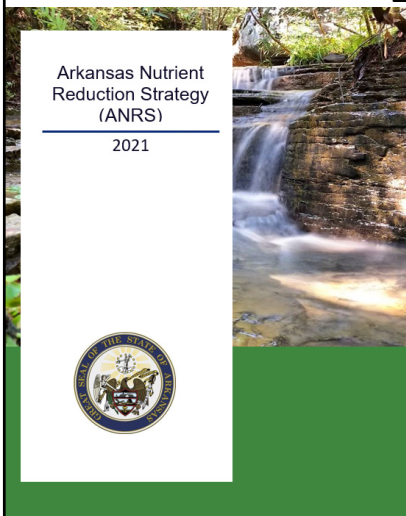
2014 ANRS:

- Cannot adequately show that the resources expended has resulted in a documentable positive effect on in-stream water quality statewide
- Detailed report of the work being done in the State related to nutrients but does not present a strategy for future work
- Lacks a clearly defined goal
- No method to evaluate progress or lack of progress
- Targeting strategy based on where we are doing work and not based on in-stream nutrient loads or concentration

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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy



2018-2021 ANRS Update:

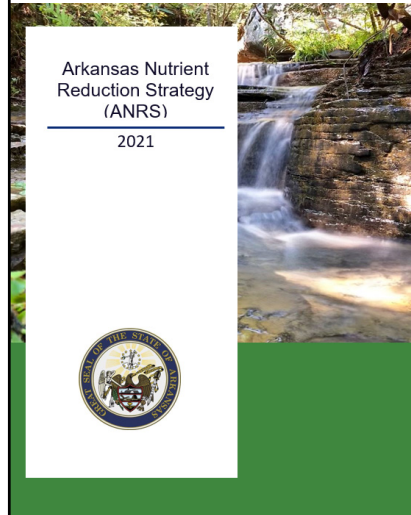
- Defined Nutrient Focus Watersheds
- Clear goals and strategies for focus watersheds
- Updated nonpoint source and point source implementation strategies

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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

2018-2021 ANRS Update:



Defined Nutrient Focus Watersheds

- Project funded through Arkansas Water Resource Center
- Statewide prioritization framework based on statistical analysis of measured in-stream nutrient concentrations

Goals

- Assess TN & TP concentration trends (1990-2019) at HUC-8 level
- Screen TN & TP concentrations to identify HUC-8's where nutrients are elevated relative to ecological thresholds
- Site-specific trend analysis for flagged HUC-8

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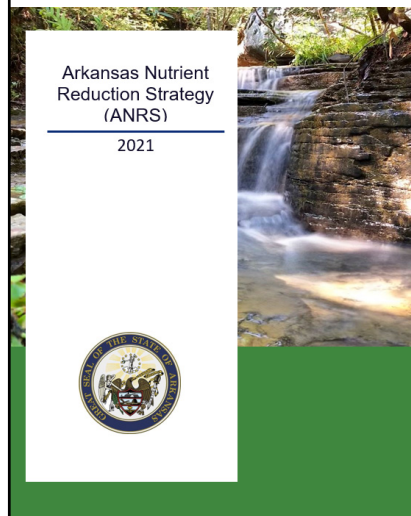
Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

HUC-8 Trend Analysis

➤ Methods

- Evaluated Arkansas DEQ WQX data 1990-2019
 - Required 10+ years & 50% of years in POR for HUC-8
- Calculated site median 75th percentile for TN & TP
- Linear regression and Mann-Kendall test
- Significance $p < 0.05$



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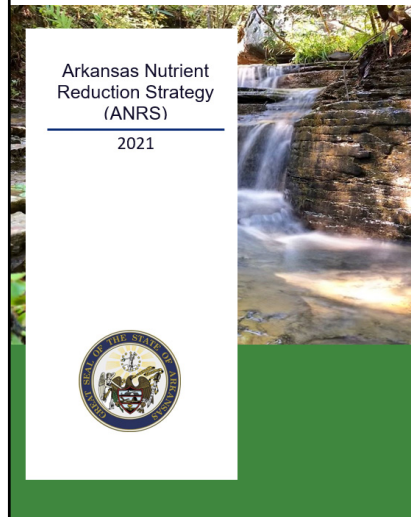
Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

Site-Specific Analysis

➤ Methods

- Evaluated Arkansas DEQ WQX data 2000-2019
 - Sites (n=50) identified through magnitude evaluation
- Calculated site median 75th percentile for TN & TP
- Linear regression, Mann-Kendall test, and seasonal Kendall test
- Significance $p < 0.05$

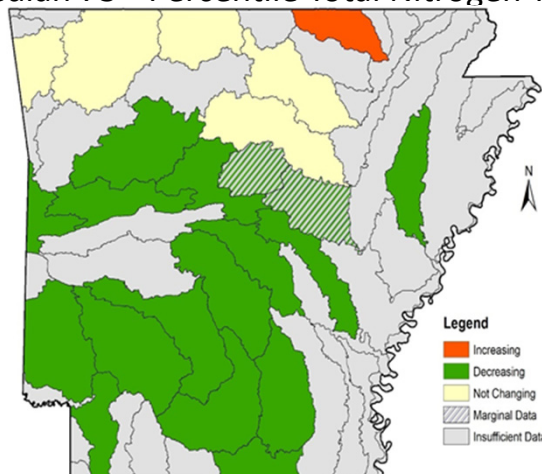


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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

1990-2019 Site Median 75th Percentile Total Nitrogen Trends

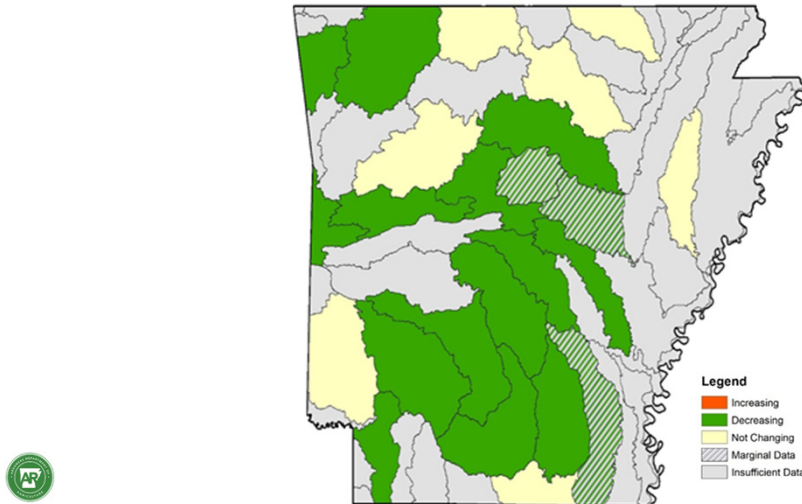


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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

1990-2019 Site Median 75th Percentile Total Phosphorus Trends

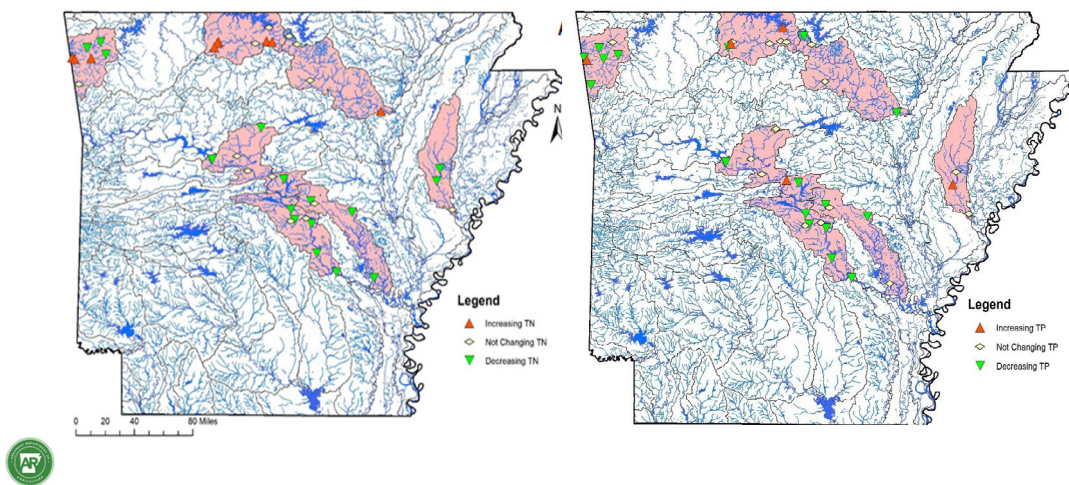


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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

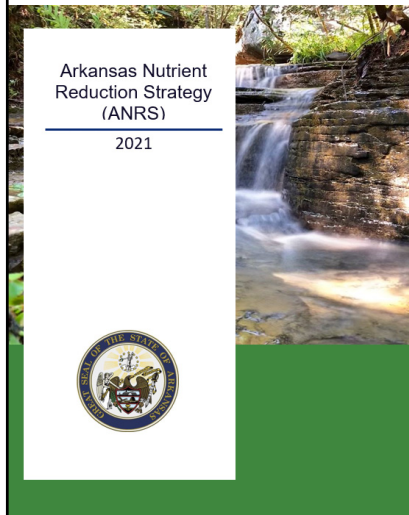
2000-2019 Site-Specific Trends



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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy



HUC-8 Categories

➤ Data analyses will inform final priority categorizations:

1. **Focus**, with robust data
2. **Possible focus**, but more data needed
3. **Not a Focus**, with robust data
4. **Likely Not a Focus**, but more data needed

➤ Categories 1 and 2 represent priority status for nutrient reduction activities and for data collection to support future assessment, respectively

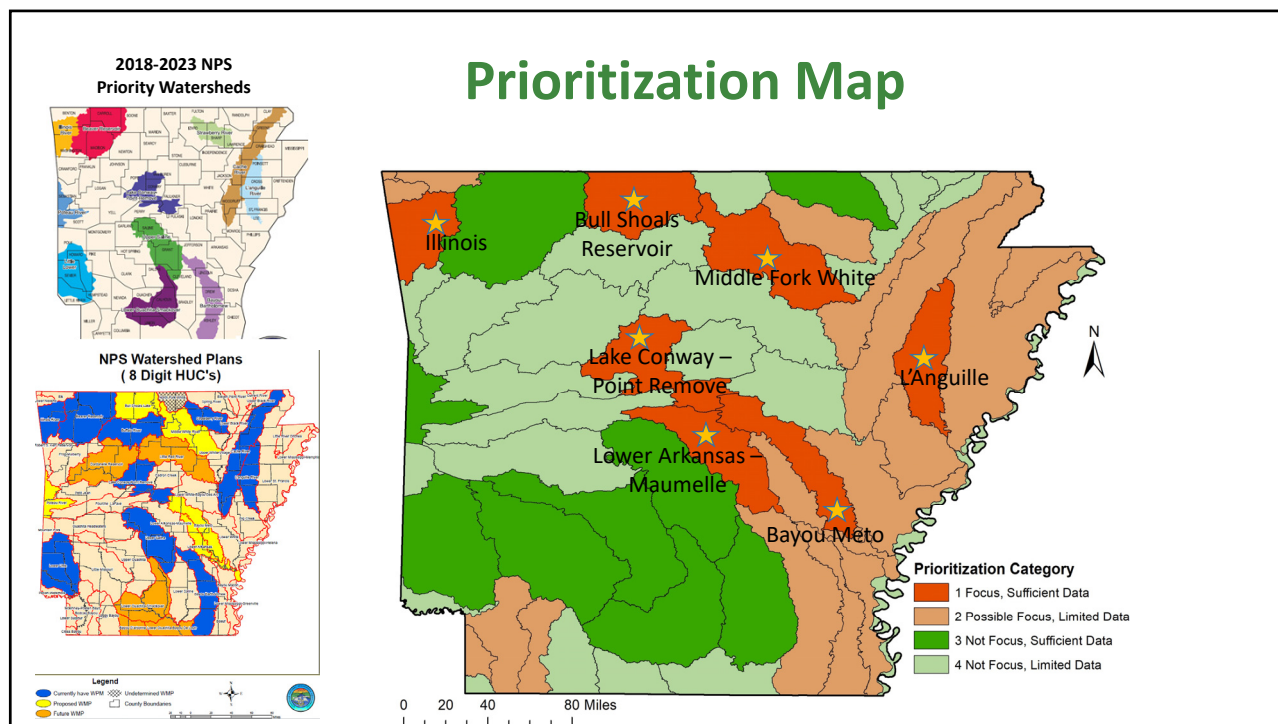
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Priority Categorization Synthesis

Category	Prioritization criteria	Data sufficiency criteria
1 – Focus, Sufficient Data	<ul style="list-style-type: none"> Analysis shows nutrient reduction need in both TN and TP 	<ul style="list-style-type: none"> Min 4 sites for $\geq 50\%$ of years Qualified for both analyses
2 – Possible Focus, Limited Data	<ul style="list-style-type: none"> Analysis shows nutrient reduction need in TN and/or TP (one must be flagged by Scenario 1) MRBI priority or Nutrient Surplus Area (if no data) 	<ul style="list-style-type: none"> < 4 sites for $\geq 50\%$ of years Did not qualify for one or both analyses
3 – Not a Focus, Sufficient Data	<ul style="list-style-type: none"> Nutrient reduction need not indicated, or indicated for only one nutrient 	<ul style="list-style-type: none"> Min 4 sites for $\geq 50\%$ of years Qualified for both analyses
4 – Likely Not a Focus, Limited Data	<ul style="list-style-type: none"> Nutrient reduction need not indicated, or indicated for TN and/or TP by Scenario 2 only NOT an MRBI priority or Nutrient Surplus Area (if no data) 	<ul style="list-style-type: none"> < 4 sites for $\geq 50\%$ of years Did not qualify for one or both analyses



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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

ANRS Update Goals and Strategies

The three main goals of ANRS are:

1. Increase or maintain downward nutrient trends in Tier I watersheds
2. Enhance water quality monitoring stations and increase or maintain downward nutrient trends in Tier 2 watersheds
3. Continue efforts to reduce nutrients in all watersheds



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Arkansas

New Targeting Strategy for Advancing of the Arkansas Nutrient Reduction Strategy

ANRS Update: Next Steps

- Finalize goal and strategy revisions
- Review from focus group
- Release for comment to extensive stakeholder group
- Public notice
- Programmatic implementation and incorporation to NPS Program



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Questions

Tate Wentz

Water Quality Section Manager

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IOWA NUTRIENT REDUCTION STRATEGY

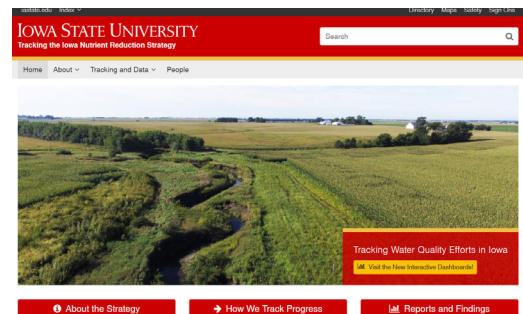
**Matt Lechtenberg – Water Quality Initiative
Coordinator**



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WQI Update & Background

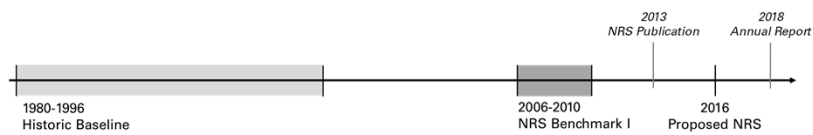
- Strategy Released in 2013
 - Collaborative, science-based assessment
- Iowa Legislature established Water Quality Initiative
 - Leveraging resources (RCPP, MRBI, private \$, other federal funding, and landowners)
 - Engage partners, build capacity and overcome barriers to scale-up
 - Accountability and tracking – Logic Model (<https://nrstracking.cals.iastate.edu/>)
 - 2018 Legislative Session passes longer-term sustainable funding.
 - \$15M annually for NPS to advance Iowa NRS.
 - 2021 extends sustainable funding to 2039



2

Updated Baseline Assessment

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



		1980-96 Baseline Load (tons)	2006-10 Benchmark Load (tons)	Change, 1980-96 to 2006-10		Major cause of change
Nitrogen	NPS	278,852*	293,395	5.2%	Increase	Land use change
	PS	13,170	14,054	6.7%	Increase	Flow increase
	Total	292,022	307,449	5.3%	Increase	
Phosphorus	NPS	21,436	16,800	21.6%	Decrease	Reduced tillage and soil test P
	PS	2,386	2,623	9.9%	Increase	Flow increase
	Total	23,822	19,423	18.5%	Decrease	

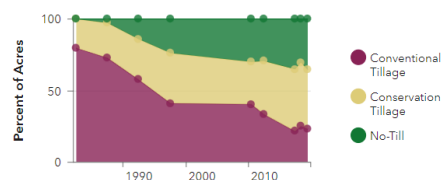
*The method used to derive the total nitrogen estimate of 292,022 tons indirectly reflected the point source contributions.

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BMP Mapping - Land

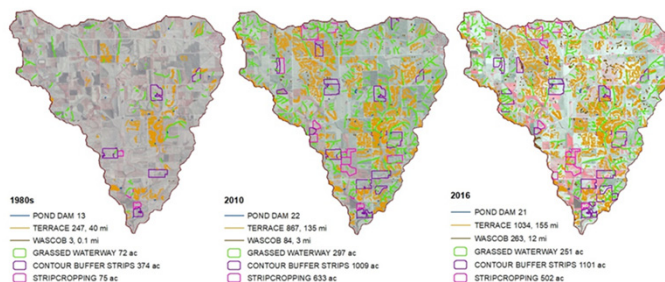
- Select BMPs identifiable w/ available data
- 2007-2010 Benchmark
- Documentation
- Historical
- WS Modeling

Iowa Tillage Practices - Percent of Total Row Crop Acres



Statewide Practice Summary			
Pond Dams (number)	Grassed waterways (ac)	Terraces (ft)	WASCOBs (number)
114,423	327,904	469,257,556	246,139

Estimated >\$6B in investment based on today's costs.



Learn more at

<https://www.gis.iastate.edu/gisf/projects/conservation-practices>

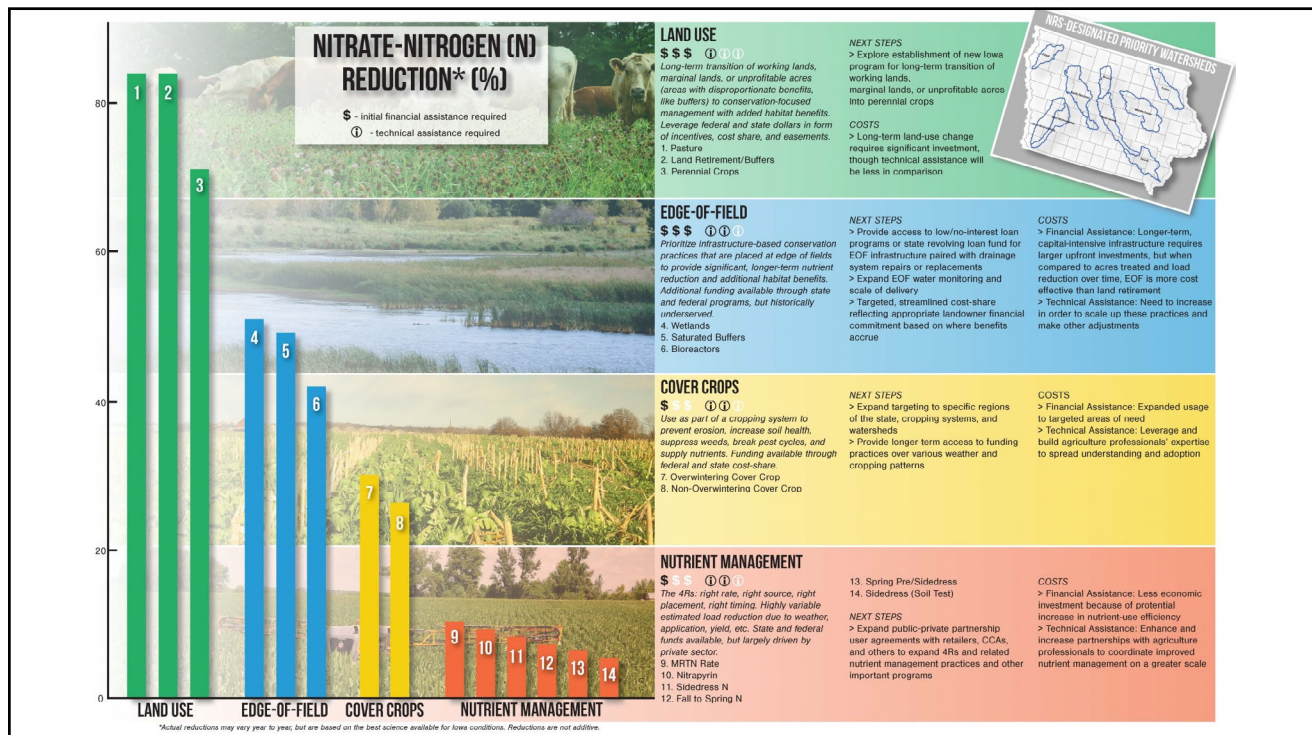
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Water Quality Initiative

highlights

- **Increasing the scale to address the goals of the NRS**
 - Traditionally soil conservation, livestock and in-field nutrient management based
 - Advance understanding and critical practices and delivery of practices focusing on addressing nutrient reduction
 - **Leverage and expand state and farmer resources**
- **Tracking and documenting progress**
 - Collective effort of management and practice installation
 - ISU established measurement coordinator in 2015
 - **Utilize information to inform progress, but also inform/prioritize resources**

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Leveraging Federal Funding Sources Iowa Nutrient Reduction Strategy

- Regional Conservation Partnership Program (RCPP) projects:
 - Expand technical capacity: Conservation planning services to leverage state and federal funding
 - Increase available funding: State+Private investments provides more leverage for RCPP
 - Direct/prioritize geographies, practices, etc.



- 16 individual RCPPs
- 7 led by IDALS
- 14 "Classic" RCPPs
- 2 "Alternative Funding Arrangements"
- Over \$84M awarded.

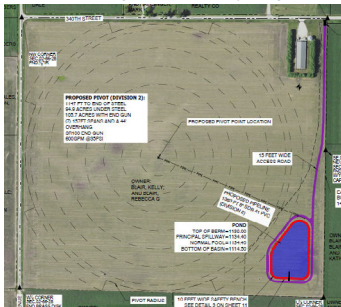


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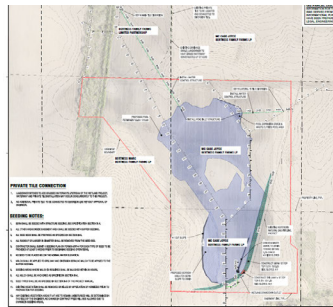
Leveraging Federal Funding Sources Iowa Nutrient Reduction Strategy

- EPA-Gulf of Mexico (GOM) – Farmer to Farmer projects:
 - Demonstrate and deploy new(er) practice concepts/methods.
 - Expand opportunities and learn from processes to adapt to future efforts.
 - 3 Current Projects over \$3M awarded by EPA-GOM

Drainage Water Recycling



Tile-zone Wetland



Batch and Build Model



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Leveraging Federal Funding Sources

Iowa Nutrient Reduction Strategy

- America's Rescue Plan (ARP) projects:
 - Just announced – Iowa Governor Reynolds announced \$100M investment in WQ - \$25M to IDALS for practice implementation in support of the INRS.
 - Focus will be on priority practices and watersheds
 - Leverage and expand state resources for infrastructure-based practice installation



Minnesota Agricultural Water Quality Certification Program

Certifying that Minnesota's farms and waters can prosper together



Hypoxia Task Force Public Meeting
State Member Progress Report - Minnesota
December 14, 2021



www.mda.state.mn.us
www.mylandmylegacy.com



1



Program Overview

- Historic partnership of local, state, federal government, and private industry
- Whole-farm planning for water quality; risk assessment of every parcel, every crop; boots-on-the-ground conservation
- Pairs producers with professionals to develop site-specific solutions for risks to water quality



2



Program Overview

- **Site Specific Risk Assessment:** every field/parcel, every crop; acres and practices mapped; random reviews.
- MAWQCP offers producers:
 - Regulatory certainty for 10 years
 - Financial and technical assistance
 - Check-up/Validation for growers
 - Recognition
 - Branding and marketing opportunity
 - Specialty endorsements
- Available to either/both renter or landlord
- Free and voluntary



3



Financial Assistance

Regional Conservation Partnership Program (RCPP)

- ~\$1.5 million available annually for MAWQCP producers

MAWQCP Financial Assistance Grant

- \$5,000 max, 75% cost share

Farm Business Management Scholarship

- Up to 75% off tuition for MAWQCP producers
- Available at seven Minnesota State Colleges

Absolutely any and all available programs and sources

- Technical assistance provided by certifying agent to access

Cost share can be used for practices needed to get certified or improvements when certified



4



Implementation

Access Control
 Alternative Drain Tile Intakes (rock, pattern, Agri
 Drain H2O Quality Intakes/no perforated risers)
 Channel Bed Stabilization
 Conservation Cover
 Constructed Wetland
 Contour Buffer Strips
 Cover Crop
 Critical Area Planting
 Denitrifying Bioreactor
 Diversion
 Drainage Water Management
 Feedlot/Wastewater Filter Strip
 Fence
 Field Border
 Filter Strip
 Forage and Biomass Planting
 Grade Stabilization Structure
 Grassed Waterway
 Heavy Use Area Protection
 Integrated Pest Management
 Irrigation System, Sprinkler
 Irrigation Water Management
 Karst Sinkhole Treatment
 Lined Waterway or Outlet
 Mulching
 Nutrient Management (plan development)
 Obstruction Removal
 Open Channel
 Pipeline

Pond
 Prescribed Grazing
 Pumping Plant
 Residue and Tillage Management - No-Till/ Strip Till/
 Direct Seed
 Residue and Tillage Management - Ridge Till
 Riparian Forest Buffer
 Roof Runoff Control (feedlot)
 Sediment Basin
 Spring Development
 Stream Crossing
 Streambank and Shoreline Protection
 Strip cropping
 Structure for Water Control
 Subsurface Drain
 Terrace
 Trails and Walkways
 Tree & Shrub Site Preparation
 Underground Outlet
 Vegetated Subsurface Drain Outlet (Saturated
 Buffer)
 Vegetative Barriers
 Waste Storage Facility
 Water & Sediment Control Basin
 Water Well
 Water Well Decommissioning
 Watering Facility
 Wetland Restoration



Top practices include:

- Cover crop
- Grassed waterway
- Water and sediment control basin
- Fence
- Prescribed grazing



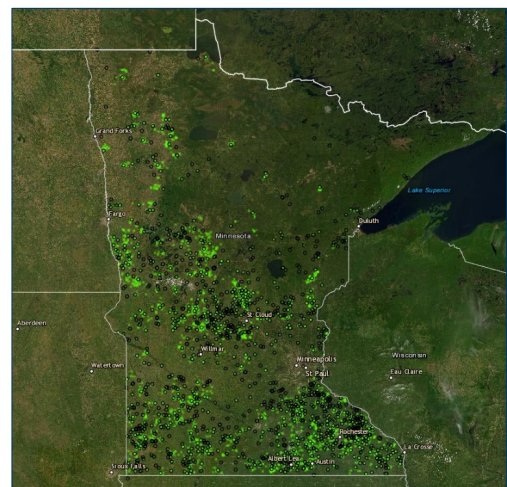
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Program Outcomes

Outcomes as of December 6, 2021

- **1,152** certified producers
- **805,073** certified acres
 - 2,330 new practices
 - 116,027 tons of soil saved per year
 - 39,818 tons of sediment reduced per year
 - 50,896 pounds of P prevented per year
 - As much as 49% reduction in nitrogen loss
 - 43,347 CO2-equivalent tons reduced per year
- **160** Endorsements:
 - 52 Soil Health
 - 46 Integrated Pest Management
 - 33 Wildlife
 - 29 Climate Smart

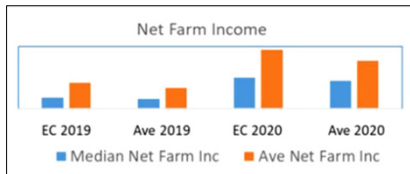
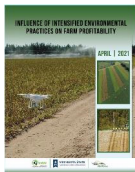


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Program Outcomes

- Farm Business Management program water quality sort results for 2019 and 2020 (FINBIN)
 - MAWQCP-certified farms averaging 20% higher net income than non-certified farms
 - Better debt-to-asset and operating expense ratios
 - 2020 profits averaged \$40,000 or 18% higher
 - 2019 profits averaged \$19,000 or 20% higher



Income Statement	2019		2020	
	Environmental Sort (EC)	Benchmark Average (Ave)	Environmental Sort (EC)	Benchmark Average (Ave)
Gross Cash Farm Income	\$801,282	\$744,078	\$997,573	\$834,622
Total Cash Farm Expense	\$658,545	\$645,752	\$751,565	\$697,094
Net Cash Income	\$142,737	\$98,326	\$246,008	\$137,529
Inv Chg/Deprec/Cap Sales	-\$49,916	-\$24,683	-\$33,116	\$35,158
Average Net Farm Income	\$92,821	\$73,643	\$212,892	\$172,687
Median Net Farm Income	\$40,008	\$33,377	\$111,406	\$100,684

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Program Outcomes

Appropriation	FY14-15	FY16-17	FY18-19	FY20-21	Total
Clean Water Funds	\$3.0M	\$5.0M	\$5.0M	\$6.0M	\$19.0M
Dollars Passed Through	\$1.6M	\$2.7M	\$3.1M	\$4.2M	\$11.6M
Total\$/acre	FY14 \$1.5M \$541.52	FY16 \$5.5M \$50.15	FY18 \$10.5M \$28.04	FY20 \$16M \$25.33	
	FY15 \$3M \$113.63	FY17 \$8M \$31.95	FY19 \$13M \$25.37	FY21 \$19M \$24.25	

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Program Outcomes

Random Reviews Conducted

- 305 reviews complete 2018-2020
- 94% remain in active certification status
 - 99.4% when remove sales & deaths
- Several examples of continuous improvements
 - Approx. 25% further decrease in tillage since time of certification
 - Many examples of new cover crops and perennial planting



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Partnerships

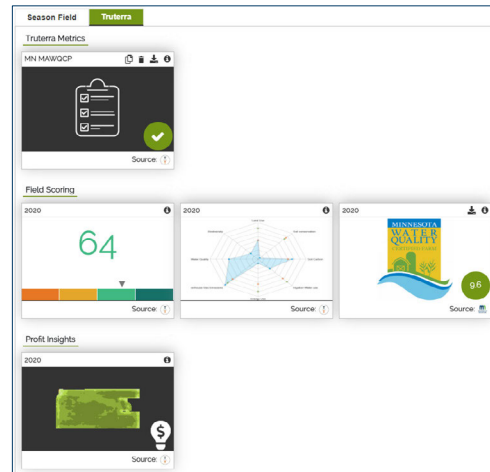


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Partnerships

- Interface with precision ag software platforms and providers.





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...Up Next


- Farmers Climate Market Guide
- MAWQCP Climate Smart Farms bridge-payments
- Water Quality Trading pilot project
- Agroinformatics data discovery and analysis platform project (G.E.M.S™)
- Parties seeking new endorsements: Irrigation and Drainage Water Management
- More....

Appendix C. Agricultural eligibility criteria for credit generation

For eligibility to generate water quality trading credits agricultural sites must demonstrate adherence to good farming practices by:

- 1) Current and maintained Water Quality Certified Farm status



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Contacts

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Thank You



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brad.jordahlredlin@state.mn.us



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Producer-Led Watershed Protection Program

Sara Walling – Administrator, Division of Agricultural Resource Management

WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

December 2021

1



GRANT PROGRAM OVERVIEW

Program Goal: To improve Wisconsin's soil and water quality by supporting and advancing Producer-Led conservation solutions by increasing on the ground practices and farmer participation in these efforts.

2

GRANT PROGRAM OVERVIEW



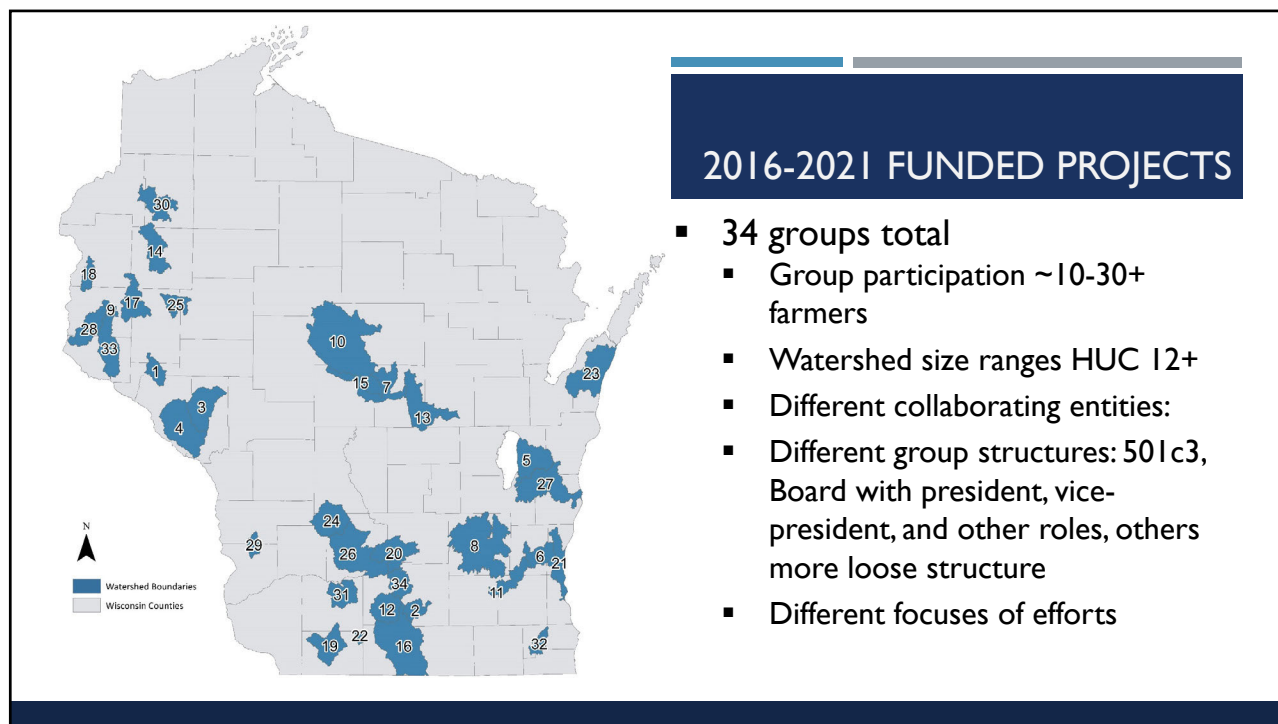
- Activities must address water quality improvement and must be driven by farmers
- At least 5 farmers within watershed boundary to apply
- Collaborating entity
- \$40,000 max per group
- Newly passed state budget increases annual funding to \$1,000,000 for Producer-Led projects

3

FUNDING OVER TIME

FY	Total Requests	Total Awarded	# of requests	# of groups awarded
2016	\$262,550	\$242,550	15	14
2017	\$197,065	\$197,065	11	11
2018	\$619,721	\$558,246	21	17
2019	\$869,815	\$750,000	27	24
2020	\$1,051,871	\$750,000	27	24
2021	\$1,043,910	\$750,000	33	30
2022	\$1,194,543	\$1,000,000	36	36

4



5

WHAT DO GROUPS DO WITH GRANT FUNDS?

- **Outreach and Education Events**
 - Field days, conferences, workshops, trainings
- **On-farm Research and Demonstration Projects**
 - Cover crop test plots, nitrogen use efficiency, manure application methods, planting green systems, managed grazing, No-till/reduced-till equipment demonstrations




WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

6

WHAT DO GROUPS DO WITH FUNDS?

Incentive Programs

- Cover crops (various types of application)
- Interseeding
- Planting green
- Harvestable and non-harvestable buffers
- Reduced tillage (no-till, strip till)
- 60" corn
- Precision conservation management assessments
- Low disturbance manure injection applications
- Testing: soil fertility, soil health, forage, plant tissue



7

PARTNERSHIPS

- Local Farm Bureau chapters
- Ag associations (WI Farmer's Union, Dairy Business Association, etc.)
- NRCS
- Lake Associations
- University of Wisconsin- professors, extension agents, Discovery Farms, etc.
- Ag businesses and other local businesses
- The Nature Conservancy, Pheasants Forever and other conservation focused NGOs
- Crop consultants, agronomists
- Land Conservancies
- Adaptive management programs



8

EXAMPLES OF GROUP GOALS AND VISIONS

OUR GOALS

LASA recognizes that we have three main responsibilities in Lafayette County – protecting the natural resources, helping the public understand general farming practices and empowering members to improve farming techniques. These goals can be achieved through open communication and a willingness to share knowledge and research while being open-minded to new practices on our farms.

Vision statement

The Lake Wisconsin Farmer Watershed Council is working together to help farmers adopt improved practices that protect and improve surface and groundwater quality. They wish to work with and encourage farmers in the Lake Wisconsin area to learn and adopt new methods of reducing soil erosion and increasing water infiltration on the land they manage and accomplish this by maintaining or improving farm profitability. People who live, work, and play in the Lake Wisconsin area will all benefit from having high quality surface and groundwater.

Sauk Soil & Water Improvement Group (SSWIG)

The Sauk Soil & Water Improvement Group (SSWIG) is focused on improving the soil health and water quality of the area by minimizing runoff, increasing infiltration, and increasing the number of acres that incorporate comprehensive practices that will help to mitigate flooding events. They are currently working primarily in the Otter Creek, Honey Creek, and Narrows Creek - Baraboo River Watersheds.



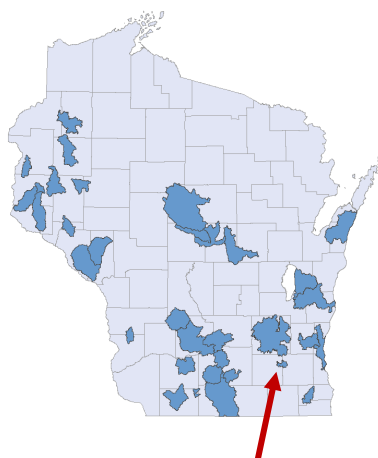
Project Examples: Farmers for Lake Country Aerial Seeding Program

PROGRAMS

Farmer Education Events – These free sessions help farmers to get a better understanding of the excellent funding available through NRCS for aerial seeding of cover crops and many other Best Management Practices. Other topics include strategies being implemented by local farmers that are protecting land and water resources.

Aerial Cover Crop Seeding Program – In 2020, the group completed its fourth aerial cover crop planting program. Oats, barley, wheat and other custom blends were flown into standing corn and soy beans. Please contact Darrell Smith for more information:

Cell: 414-313-4323 * E-mail: dsmith.earthcare@gmail.com



Project Examples: Lafayette Ag Stewardship Alliance Supply Chain Sustainability

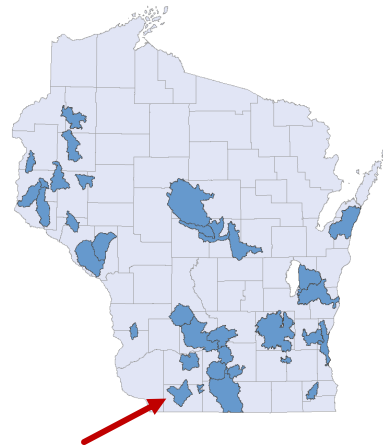
FREE TRIAL AUDIO & VIDEO PODCASTS STUDENT STORIES TRADE POLICY PRESS RELEASES EVENTS

Home > PRESS RELEASES > LASA, Farmers for Sustainable Food, Grande Cheese Company: Framework, pilot project earn national dairy sustainability award for collaboration

LASA, Farmers for Sustainable Food, Grande Cheese Company: Framework, pilot project earn national dairy sustainability award for collaboration

GREEN BAY, Wis. — A group of Wisconsin farmers and partners in the dairy food supply chain are earning national praise for creating a framework for conservation projects that protect soil and water quality, keep farms financially viable and demonstrate a commitment to sustainability to communities, customers and regulators.

The first-of-its-kind framework and its use in a pilot project in southwestern Wisconsin were recognized today by the Innovation Center for U.S. Dairy with an "Outstanding Supply Chain Collaboration" award. The recipients — Farmers for Sustainable Food, Grande Cheese Company and Lafayette Ag Stewardship Alliance (LASA) — drove development of the project.



WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

11

FARMER TO FARMER LEARNING | BUILDING COMMUNITY | "AG-VOCATES"

You're Invited!
HEALTHY SOILS, HEALTHY CROPS!
Ozaukee Demo Farms Network and
Clean Farm Family Field Day

Wednesday, June 30th
10:30 am - 12:30 pm
Clean Farm Families Hwy. 57 Demonstration Plot
Across from 1671 Beech Lane Fredonia, WI
LUNCH PROVIDED

Topics Include:

- Farmer Panel discussion on experiences
- Infiltration comparisons
- Physical Structure observations
- Cover crop options and management
- Nutrient Management

Healthy Soils, Healthy Crops
Ozaukee County Demo Farms Network and
Clean Farm Family Field Day
Registration at 10:30 am
Location: Clean Farm Families Hwy 57 Demonstration Plot
Across from 1671 Beech Lane Fredonia, WI
LUNCH PROVIDED

Please Join Pecatonica Pride Watershed Association
for a FREE Field Day, Tour, and Lunch

You're Invited!
POP UP FIELD DAY
ON THE PECATONICA:
MIKE BERG FARM
JULY 2 10AM
Riverbank Restoration Tour

Berg Farm
HWY 78 at Lee Bridge, 1.5m south of Blanchardville
Friday, July 2, 10am to 1pm
- River Bank Restoration
- Cost Share and Phosphorus Trading
- Citizen Science WAV Stream Monitoring
- Conservation Professionals

FIELD DAY
7-9 P.M. JULY 15
Hosted by Friendsuh Family Farms
Meet at 465 75th St, Clear Lake, WI
Topic: Impact of Spring and Fall manure
applications on no-till fields planted in
rye, including examination of the
sub-soils

WESTERN WISCONSIN
CONSERVATION COUNCIL



WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

12

STATEWIDE NETWORK

- Annual workshop
- Regional meetings/trainings/support
- Networking with other farmers throughout the state
- Farmer-Led Webinar series



13

WHAT CAN MAKE GROUPS SUCCESSFUL?

- Strong farmer leadership
- Diverse partnerships
- Diverse funding
- Outreach component
- Tracking of progress to report on success
- Plans for growth - expanding membership and continuing to innovate



14

PRODUCER-LED TRACKING PROJECT

- Tracking conservation outcomes of the producer-led program
 - Conservation Systems Analysis
 - Individual Practice Analysis (No-till and cover crops)
 - Other reports

DATCP Home > Producer-Led Tracking Project

Producer-Led Tracking Project

Tracking Conservation Outcomes of the Producer-Led Watershed Protection Grants Program

Since the inception of the Producer-Led Watershed Protection Grants Program in 2016, producer-led groups have played an important role in advancing conservation practices and promoting soil health farming systems across the agricultural landscape. This work helps improve water and soil quality throughout the state.

Moving forward, it is imperative to track and quantify the outcomes of the program as we continue to build and advance the efforts of producer-led groups. In 2019, DATCP initiated this tracking project to help provide a more detailed picture of the program's impacts to waters of the state.

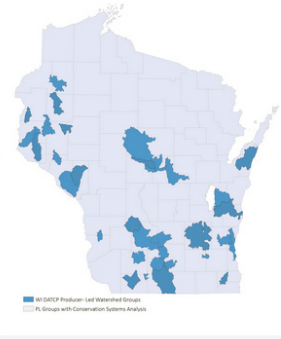
To date, group projects cover more than 600,000 acres of cropland. Farmers involved represent a wide variety of operation types, crop rotations, and management techniques. Due to the diversity of farming operations and practices represented within the program, DATCP is using models to quantify water quality outcomes, mainly SnapPlus, Wisconsin's nutrient management planning software. It is important to note that these outcomes are projected water quality impacts and not measured water quality improvements through water quality sampling or edge of field monitoring.

Conservation Systems Analysis

A conservation systems analysis was conducted on 13 of the 93 Producer-Led groups (click the Wisconsin map to enlarge). This analysis compares different conservation systems that are common to these particular watersheds. These analyses provide a snapshot of the variation of conservation outcomes that may be realized depending on the unique landscapes and conservation farming practices being implemented throughout the state.

More information on each analysis can be found within each group's individual report:

- Buffalo-Trempealeau Farmer Network
- Dodge County Farmers for Healthy Soil Healthy Water
- Horse Creek Area Farmer-led Watershed Council
- Producers of Lake Redstone
- Watershed Protection Committee of Racine County
- Farmers of the Sugar River



Soil Quality Benefits Report

15

ESTIMATING SOIL & WATER QUALITY BENEFITS | Model Inputs

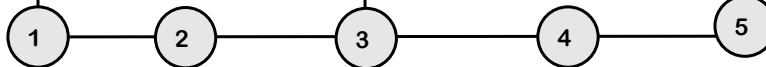
Dominant soil types of watershed + corresponding organic matter percentages (NRCS Web Soil Survey)



County average yields



Average plant and harvest dates of crops for Wisconsin (NASS)



The lower quartile, median and upper quartile soil test P levels for the appropriate county as provided by DATCP soil laboratory results summaries.

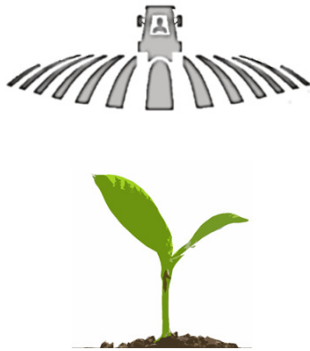
Farm operation type representative of watershed and conservation crop rotation scenarios

16

NO-TILL AND COVER CROP ANALYSIS

Model Assumptions

- Dominant soil types for each watershed
- County average soil test P-levels (dominant county within watershed project boundary)
- No-till and cover crop acres reported by each group
- Baseline, cover crop, and no-till rotation scenarios



Analysis of Practice Changes

No Till Practice Change

- Baseline: Corn- soybean rotation, chisel + disk, no cover crop
- Practice change: No-till soybean crop

Cover Crop Practice Change

- Baseline: Corn- soybean rotation, chisel + disk, no cover crop
- Practice change: Rye cover crop after soybeans

17

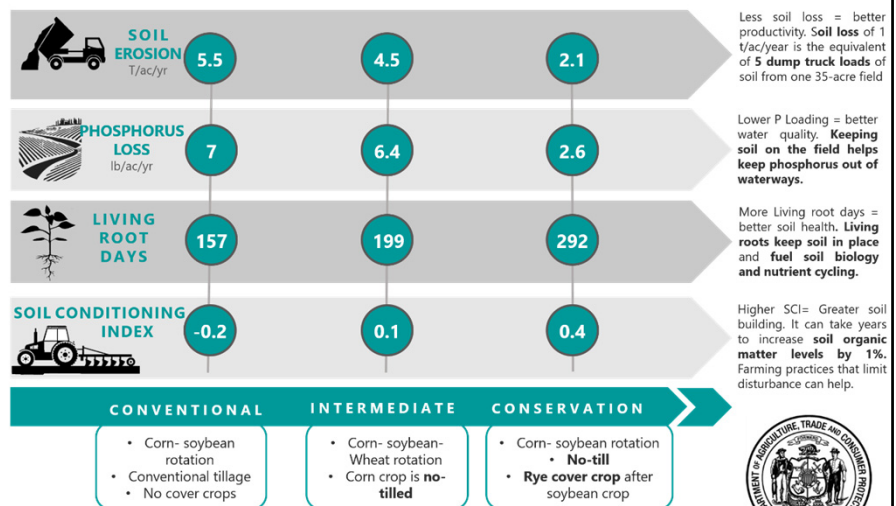
Conservation Systems Analysis Example:

Farmers of the Sugar River



SOIL & WATER CONSERVATION IMPACT

Farmers of the Sugar River | Grain Operations



18

NO TILL AND COVER CROP ANALYSIS



NO-TILL ACRES

62,587 acres (+19% from 2019) across **211 farms**

Estimated reduction:

84,860 tons of soil erosion and **54,072 pounds of phosphorus**

COVER CROP ACRES

83,843 acres (+19% from 2019) across **423 farms**

Estimated reduction:

75,364 tons of soil erosion and **41,492 pounds of phosphorus**

19

FOR MORE INFORMATION:

- Webpage: www.datcp.wi.gov/
Search: Producer-led

Rachel Rushmann, Program Manager
(608) 590-7357

Rachel.Rushmann@wisconsin.gov

Dana Christel, Conservation Specialist
(608) 640-7270

Dana.Christel@wisconsin.gov



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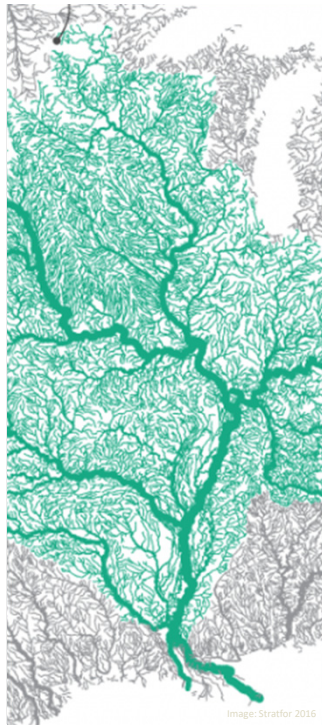
Thank you!



Sara Walling
Agricultural Resource Management Division Administrator

608-400-5151 sara.walling@wisconsin.gov

WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION (DATCP)



Sub-basin Committees in the Gulf Hypoxia Action Plan

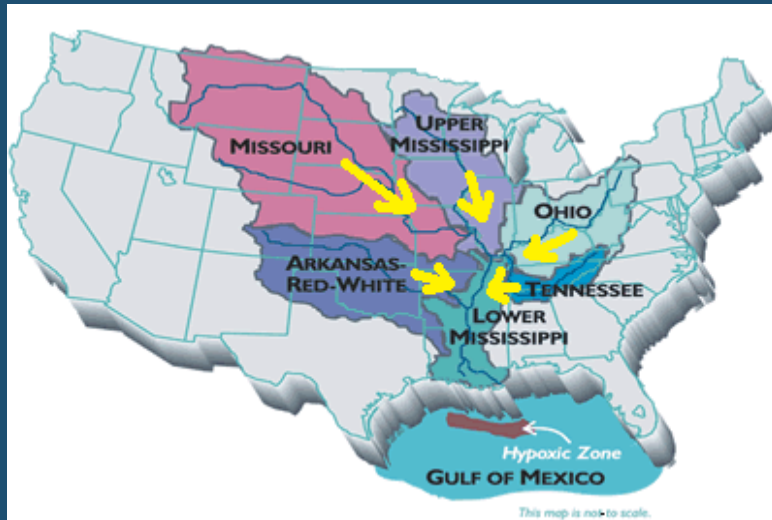
2021 Gulf Hypoxia Task Force
Meeting
December 14, 2021

1

2001 Gulf Hypoxia Action Plan

States and Tribes in the Basin, in consultation with the Task Force, will establish sub-basin committees to coordinate implementation of the Action Plan by major sub-basins, including coordination among smaller watersheds, Tribes, and States in each of those sub-basins...

2



3

Hypoxia Action Plan Sub-basin Committees 2021

Upper Mississippi River Basin Association
(UMRBA)

Lower Mississippi River Sub-basin Committee
(LMRSBC)

Ohio River Sanitation Commission (ORSANCO)

4

Basin/Sub-basin Scale Activities – Collaboration, Partnerships

- USDA Landscape Initiatives: MRBI, RCPP
- SERA-46 Land Grant University Consortium
- Upper Mississippi River Conservation Committee
- Upper Mississippi River Restoration Program
- Lower Mississippi River Conservation Committee
- Lower Mississippi River Restoration Study
- Ohio River Basin Restoration Study
- America's Watershed Initiative
- Mississippi River Cities and Towns Initiative
- Private efforts: Ducks Unlimited, Nature Conservancy, Conservation Fund, Restore the Earth Foundation, etc.

5

Gulf Hypoxia Action Plan Collateral Benefits on the Sub-basin Level

SBC's are Advocates for the Action Plan: Collaboration, Education, Outreach at the Sub-basin, Basin, National levels.

Action Plan Collateral Benefits, Related Aims:

- Agricultural Productivity, Resilience
- Climate Resilience, GHG Reduction
- Drinking Water Protection
- Ecosystem Protection & Restoration
- Flood Risk Reduction – Natural Infrastructure
- Harmful Algal Bloom (HAB) Prevention

6

Thank you

Doug Daigle

Coordinator

Lower Mississippi River

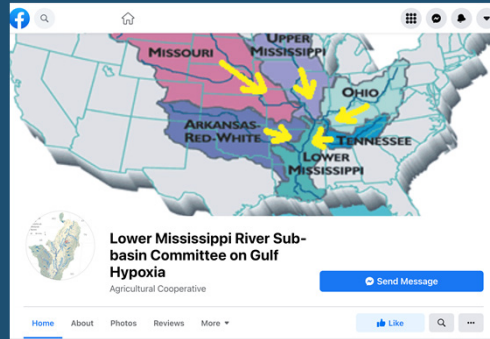
Sub-basin Committee

Room 1197, Energy, Coast, Environment

Louisiana State University

Baton Rouge, LA 70803

lmrsbc@gmail.com



"Like" us on Facebook

7

2020 Gulf Hypoxic Zone Measurement Mapping Cruise July 25-August 1, 2020

2,117 square miles/5,048 square km

*Size smaller than forecast due to lower Mississippi River level,
Tropical Storm/Hurricane Hanna*

8

OHIO RIVER BASIN ACTIONS

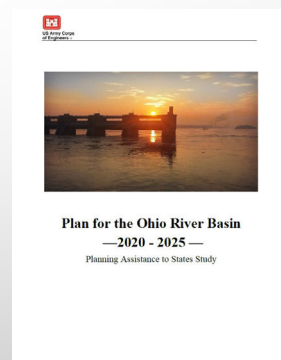
GREG YOUNGSTROM



1

OHIO RIVER BASIN PLAN

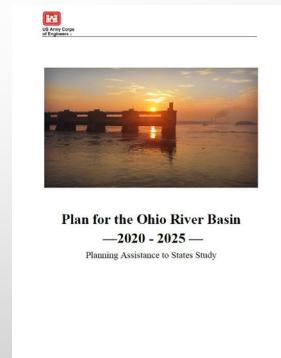
- **CORPS OF ENGINEERS IN COLLABORATION WITH THE OHIO RIVER BASIN ALLIANCE AND ORSANCO DEVELOPED THE PLAN**
- **CREATE A BASIN WIDE STRATEGY SIMILAR TO OTHER EFFORTS SUCH AS THE GREAT LAKES RESTORATION INITIATIVE**



2

OHIO RIVER BASIN PLAN GOALS

- ABUNDANT CLEAN WATER
- HEALTHY AND PRODUCTIVE ECOSYSTEMS
- KNOWLEDGE AND EDUCATION TO INFORM DECISIONS
- NATIONS MOST VALUABLE RIVER TRANSPORTATION AND COMMERCE CORRIDOR
- RELIABLE FLOOD RISK MANAGEMENT
- WORLD CLASS NATURE BASED RECREATION OPPORTUNITIES



3

NUTRIENT TRADING

- PROJECT PARTNERS INCLUDE EPRI, AMERICAN FARMLAND TRUST, ORSANCO
- OH, KY, IN SIGNED TRADING PLAN IN 2012 TO ALLOW INTERSTATE TRADES
- GENERATED 200,000 TN/TP CREDITS



4


United States Department of Agriculture



Natural
Resources
Conservation
Service



USDA Support for State Nutrient Reduction Strategies

Natural
Resources
Conservation
Service
nrcs.usda.gov/

USDA is an equal opportunity provider, employer, and lender.

1


United States Department of Agriculture

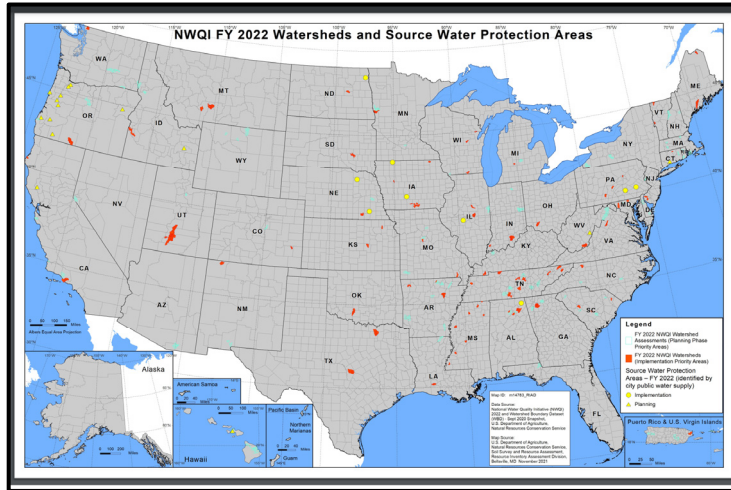
Mississippi River Basin Healthy
Watersheds Initiative (MRBI)



Natural
Resources
Conservation
Service
nrcs.usda.gov/

2

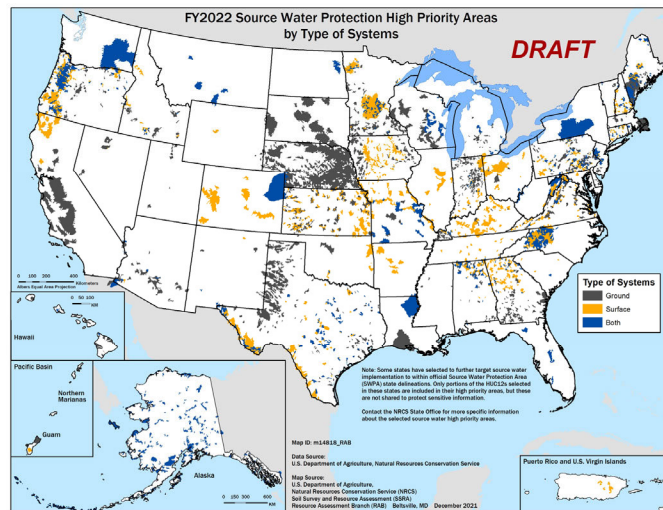
National Water Quality Initiative (NWQI)



Natural
Resources
Conservation
Service
nrcs.usda.gov/


3

Prioritization of Source Water



Natural
Resources
Conservation
Service
nrcs.usda.gov/

4


United States Department of Agriculture


RCPP Projects

NRCS Regional Conservation Partnership Program Projects

Pinpoints for the 2021 RCPP Classic projects have been placed in the center of the state. Actual project locations vary.

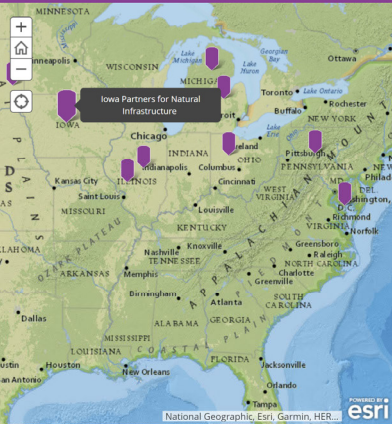
RCPP Alternative Funding Arrangements Projects 2021
RCPP Classic Projects 2021

Iowa Partners for Natural Infrastructure




Lead Partner: Iowa Department of Agriculture and Land Stewardship
Lead State: IA
Partner States:
Funding Amount: \$8,000,000

The Iowa Department of Agriculture and Land Stewardship (IDALS)



Natural Resources Conservation Service
nrcs.usda.gov/

5


United States Department of Agriculture


RCPP Projects

NRCS Regional Conservation Partnership Program Projects

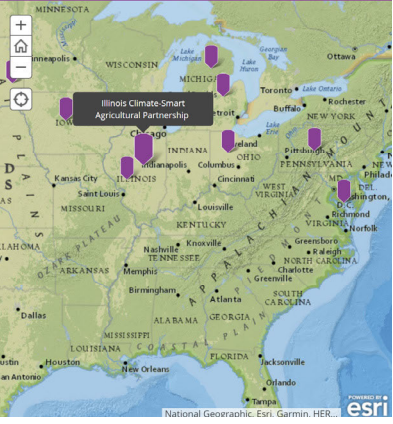
Pinpoints for the 2021 RCPP Classic projects have been placed in the center of the state. Actual project locations vary.

RCPP Alternative Funding Arrangements Projects 2021
RCPP Classic Projects 2021

Illinois Climate-Smart Agricultural Partnership



Lead Partner: Illinois Department of Agriculture-Bureau of Land and Water Resources
Lead State: IL
Partner States:
Funding Amount: \$1,396,590



Natural Resources Conservation Service
nrcs.usda.gov/

6



United States Department of Agriculture

RCPP Projects



NRCS Regional Conservation Partnership Program Projects

Piripoints for the 2021 RCPP Classic projects have been placed in the center of the state. Actual project locations vary.

Natural Resources Conservation Service



RCPP Alternative Funding Arrangements Projects 2021

RCPP Classic Projects 2021

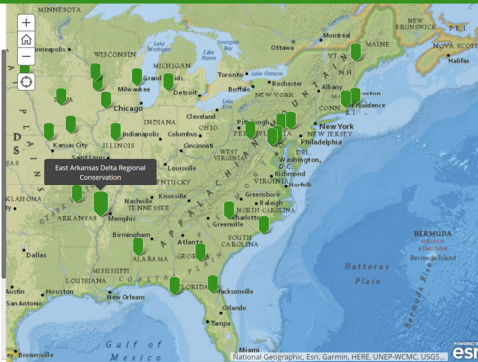
RCPP Classic Projects 2020



East Arkansas Delta Regional Conservation



Lead Partner: East Arkansas Enterprise Community, Inc.
Lead State: AR
Partner States:
Funding Amount: \$ 8,000,000
Partner Contributions: \$ 3,916,250



Natural Resources Conservation Service

nrcs.usda.gov/





1

2

AGENDA

1

Research, Economics & Education (REE) organization

2

Current Agency Priorities

3

Research, Economics & Education Efforts on Nutrient Reduction

USDA Science
"Cultivating Scientific Innovation"

USDA

2

Research, Education, and Economics (REE) Mission Area

REE is dedicated to creating a safe, sustainable, competitive and equitable U.S. food and fiber system. We support American farmers, ranchers, and foresters and help build stronger communities, families, and youth through sound integrated research, analysis, and education.

Agricultural Research
Service

Chavonda Jacobs
Young, Administrator

Economic Research
Service

Spiro Stefanou,
Administrator

National Agricultural
Statistics Service

Hubert Hamer,
Administrator

National Institute of
Food and Agriculture

Carrie Castille, Director

Office of the Chief
Scientist

Dionne Toombs,
Director

USDA Science
"Cultivating Scientific Innovation"

RESEARCH,
EDUCATION,
AND ECONOMICS 

3

USDA IS BUILDING U.S. AGRICULTURE BACK BETTER



Containing COVID-19
pandemic &
safeguarding USDA
workforce



Ensuring racial
justice and equity



Rebuilding the
rural economy



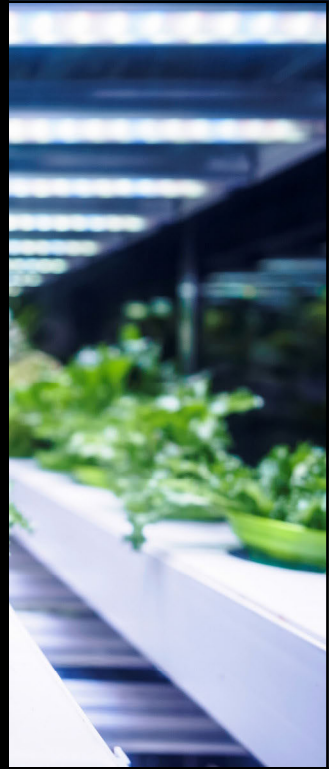
Addressing
mounting hunger
and nutrition
insecurity crisis



Tackling the impacts
of climate change

4

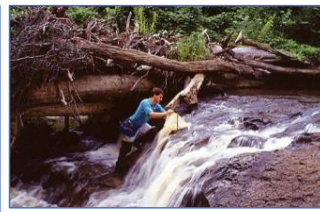
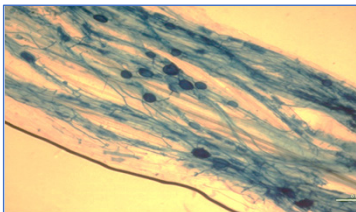
Agricultural Research Service



5

Overview of the Agricultural Research Service & NP211 Water Availability and Watershed Management 2021-2025 Action Plan

- ARS is the in-house research arm of USDA
- Finding solutions to agricultural problems from Field-to-table
- 15 National programs
- ~690 research projects
- Partnerships with universities and industry
- 2,000 scientists and post docs
- 6,000 other employees
- 90+ research locations, including overseas laboratories
- ~\$1.4 billion fiscal year budget

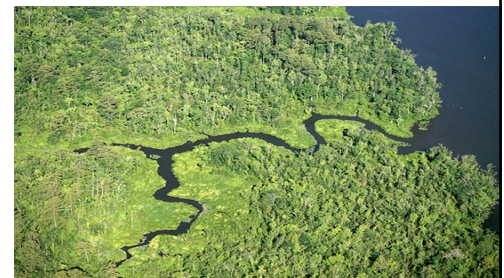


6

NP211:Water Availability & Watershed Management

Current Program Status

- 2016-2020 Action Plan
- 36 ARS-led projects; 299 Cooperative research projects
- \$62 million;
- 126 Full-time SY's; and
- 27 locations



7

AGRICULTURAL RESEARCH SERVICE

■ Research on Discharge & Nutrient Concentration Data from Maumee & Sandusky Rivers

To identify the dominant processes influencing past phosphorus loading patterns and inform predictions of future watershed response, ARS examined discharge and nutrient concentration data from two Lake Erie tributaries that have experienced substantial shifts in phosphorus concentration and loading over the past 40 years.

■ MAPHEX System

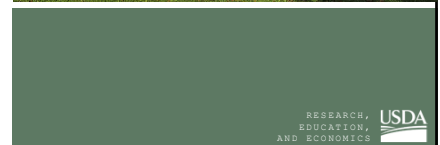
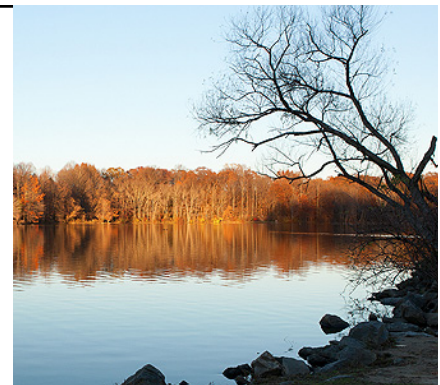
A truck-mounted mobile system capable of removing up to 95 percent of the phosphorus from raw dairy manure while leaving greater than 90 percent of the nitrogen behind in the fluid to be used for fertilization.

■ Nitration Separation in Contaminated Water

System can separate nitrate from contaminated water and concentrate it for reuse as fertilizer. Capable of removing ~42% of nitrate from water passing through it, concentrating it into a tank for subsequent use elsewhere as fertilizer.

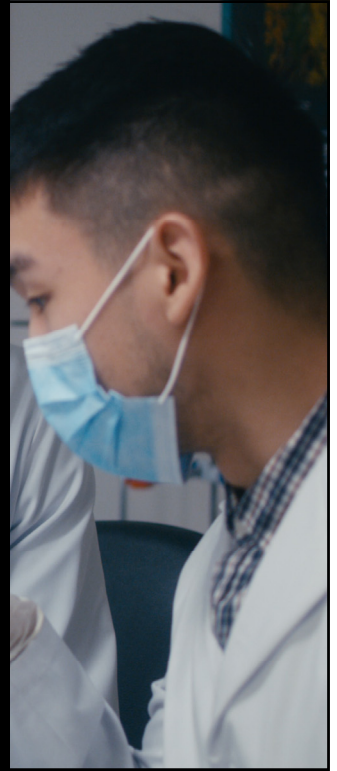
■ Long-Term Agro-Ecosystem Research Network & Conservation Effects Assessment Projects

Ongoing research on nutrient management and best management practices including manure management from animal feeding operations and water use and conservation on irrigated croplands.



8

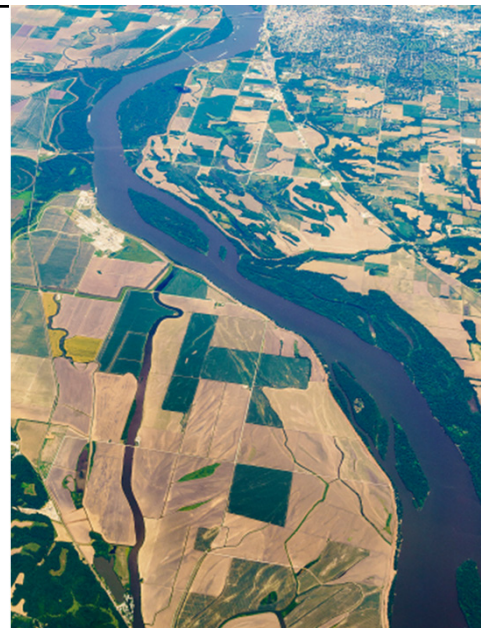
National Institute of Food and Agriculture



9

NATIONAL INSTITUTE OF FOOD & AGRICULTURE

- **NIFA-Funded Land-Grant University Committees**
 - **Southern Extension & Research Activities (SERA) Committee 46** – works to identify shared priorities for collaboration to strengthen networks, conservation systems research and outreach, and monitoring and tracking progress to achieve the goal of reducing the hypoxic zone.
 - **Additional Working Groups:** SERA-17, SERA-43, NC 1195, NC 1190, & NCERA 217
- **Multi-State Science Projects**
 - **Iowa State** field studies to evaluate the performance of nitrogen application timing and use of winter rye cereal crops on drainage water quality and crop production.
 - **University of Minnesota** research on targeted practices for poorly drained agricultural soils.
 - **Universities of Illinois & Arkansas's** recently completed projects on nutrient loss.
- **NIFA's Competitive Grants & Capacity Grants**



10

Economic Research Service



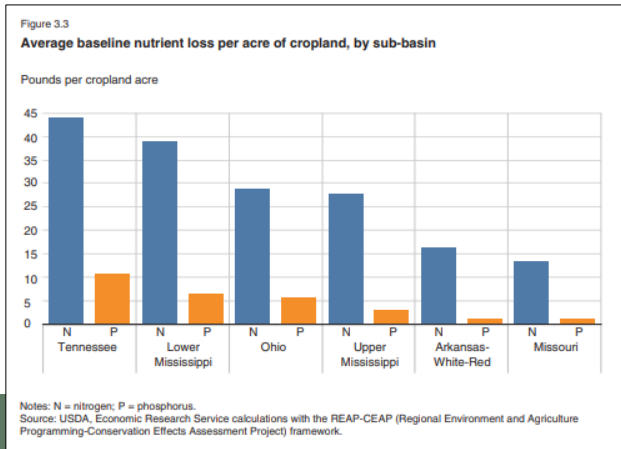
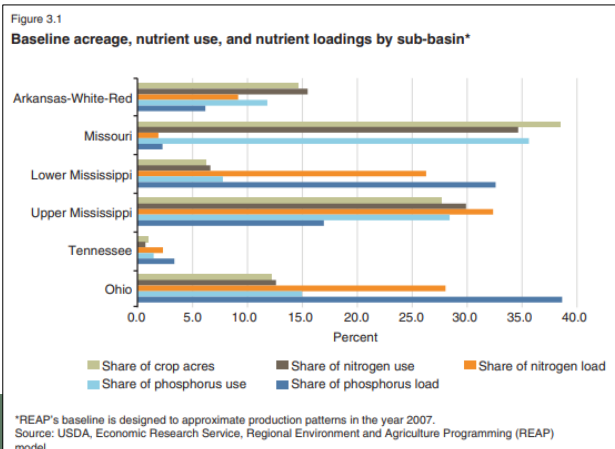
11

11

ECONOMIC RESEARCH SERVICE

Reducing Nutrient Losses From Cropland in the Mississippi/Atchafalaya River Basin: Cost Efficiency & Regional Distribution

Provides insights into how policies for addressing Gulf hypoxia & nutrient related water quality issues in the Mississippi/Atchafalaya River Basin could be more cost-effective.



12

National Agricultural Statistics Service



13

NATIONAL AGRICULTURAL STATISTICS SERVICE

- **Agricultural Chemical Use Program** – USDA's official source of statistics about on-farm chemical use and pest management practices.
- **Preparing for the 2022 Census of Agriculture** – Taken once every five years, the Census of Agriculture looks at land use and ownership, operator characteristics, production practices, income and expenditures.



RESEARCH,
EDUCATION,
AND ECONOMICS



14



Thank you!

Dr. Shefali Mehta


*REE Deputy Under Secretary
& Acting Chief Scientist*

Shefali.mehta@usda.gov

Follow us on Twitter:





@USDAScience



Updates from the U.S. Department of the Interior

Mississippi River Gulf of Mexico Watershed Nutrient Task Force Meeting
December 14, 2021

TANYA TRUJILLO
ASSISTANT SECRETARY FOR WATER AND SCIENCE
U.S. DEPARTMENT OF THE INTERIOR

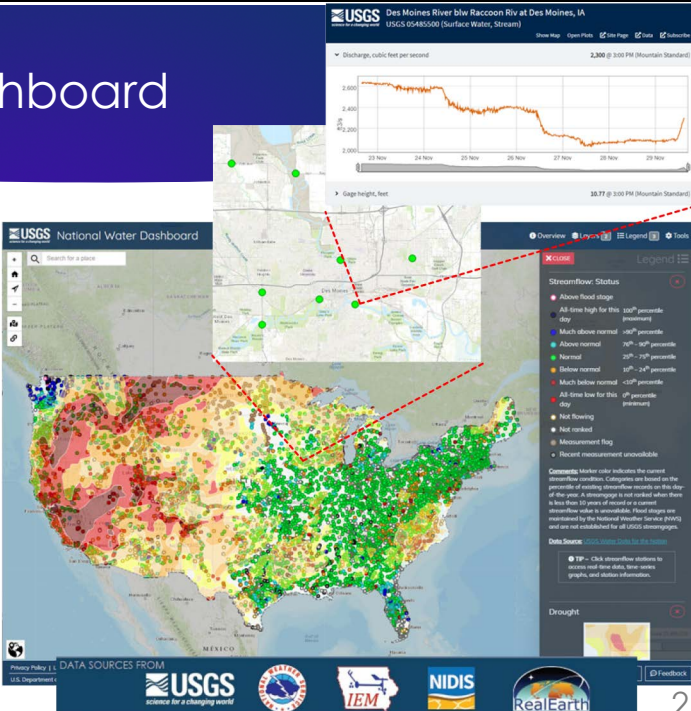




1

National Water Dashboard

- ▶ Provides a “one-stop” perspective of real-time hydrologic conditions
- ▶ Presented in context with current weather and hazard data from partner agencies
- ▶ Mobile-friendly
- ▶ Data refreshed every minute

<https://dashboard.waterdata.usgs.gov/>

2

Integrated Water Science Basins

- ▶ Ten regional focus areas for intensive observation, research, modeling, and assessment
 - ▶ Past, current, and future human and ecosystem water needs, as affected by the amount and quality of surface water and groundwater
- ▶ Extensive stakeholder engagement



3

3

Integrated Water Science Basins

A primary focus will be on a subset of national target issues that are important in the region

- ▶ Delaware River Basin: salinity, temperature, streamflow
- ▶ Upper Colorado River Basin: snowmelt, water supply
- ▶ Illinois River Basin: nutrients, sediment, HABs formation and toxicity



4

4

Integrated Water Science Basins

The USGS Next Generation Water Observing System (NGWOS) will provide high-resolution, real-time data to support research, modeling, and assessment in the Illinois River Basin

- ▶ Increase spatial and temporal coverage of critical data
- ▶ Use state-of-the-art data collection methods
- ▶ Provide modernized and timely data storage and delivery



NOAA Updates and Announcements

Steven Thur, Ph.D.
National Oceanic and Atmospheric Administration
National Ocean Service

Hypoxia Task Force
Meeting
December 2021

SCIENCE SERVING COASTAL COMMUNITIES

1

1

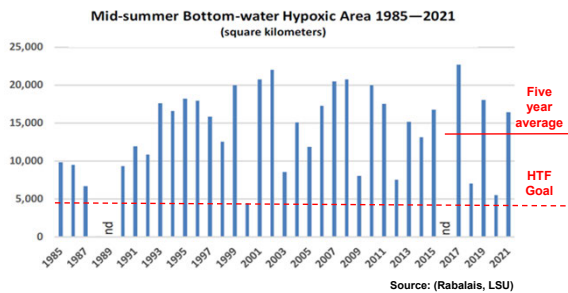
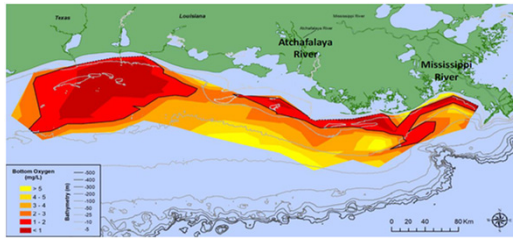
Outline

- 2021 Hypoxia monitoring cruise and retrospective analysis
- Emerging capabilities for hypoxia monitoring and modeling
- Additional Updates

2

2

Hypoxic Zone Monitoring Results and Outreach



Predicted Size = 12,640 km²
Measured Size = 16,400 km²
5-Year Average = 13,930 km²

Forecast models within margin of error
but zone larger than expected

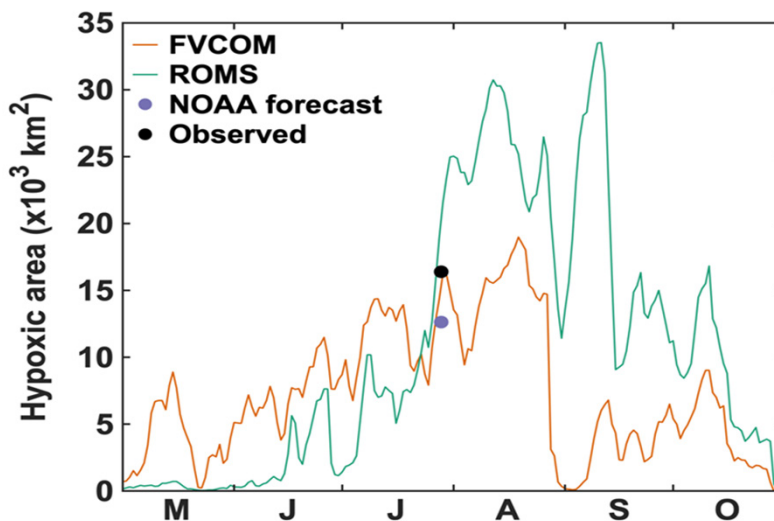
Mid-summer extent of hypoxic zone –
metric to assess progress toward HTF
Coastal Goal

Outreach Efforts

Two Press Releases
Media teleconference held with the
HTF Co-Chairs
~337 news articles written as a result

3

Retrospective Analysis



Source: (Fennel, Dalhousie; Justic, LSU)

Model agreement with cruise
data

Simulated hypoxic area
increased during the cruise

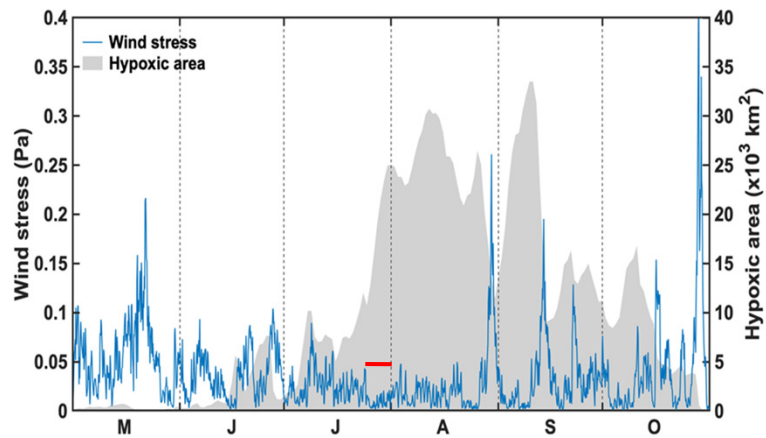
Large August peak predicted
by one of the models

Model agreement was not as
good as in previous years

4

Retrospective Analysis

- Western part of zone was very expansive this year leading to a larger than anticipated area given the nutrient loading
- Likely causes include the extremely calm conditions around the time of the cruise and a lack of major wind events
- This is reflected in the wind fields and strength of stratification



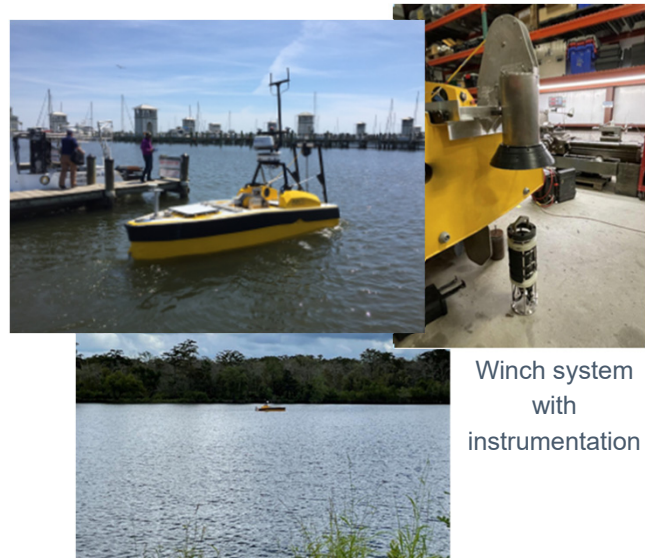
5

Emerging Technologies for Hypoxia Monitoring

C-Worker 5 ASV

- Diesel powered
- Winch system to sample at bottom
- Measure in waters from 5m to 50m
- Data management system from vessel to server has been developed for data transmitted in real time
- This system has been tested on a Lake
- Offshore testing in Summer 2022

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



Winch system with instrumentation

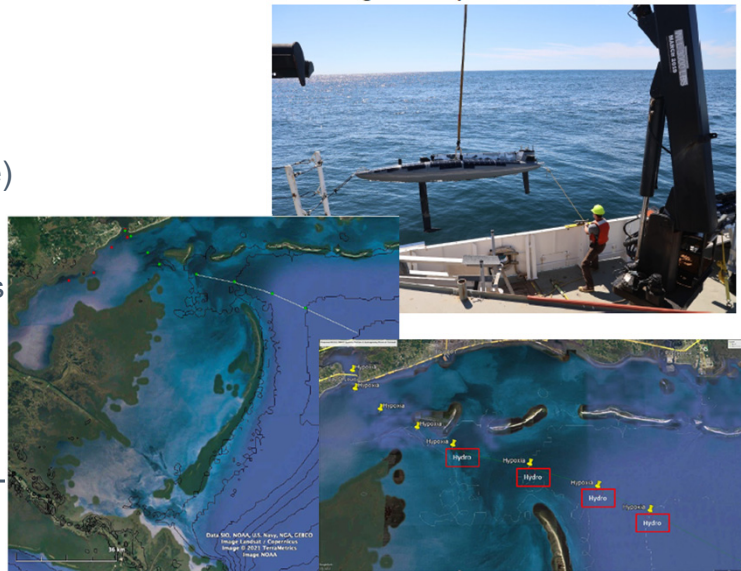
Picture Credits: L3Harris LSV

6

Emerging Technologies for Hypoxia Monitoring

Triton

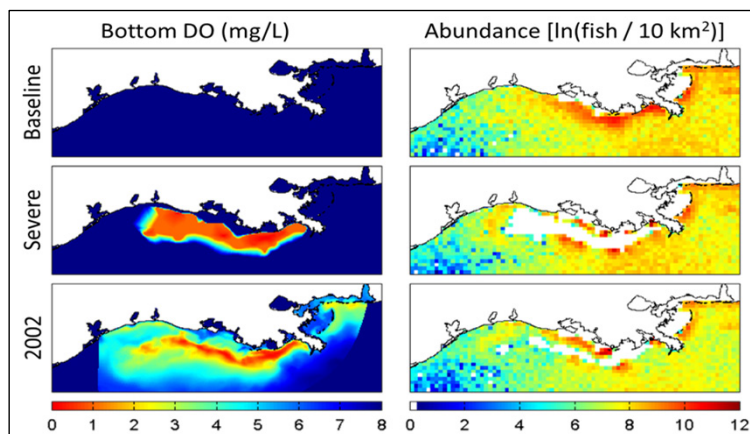
- Environmentally powered (solar)
- Surface (~3+ month endurance) and subsurface (~8+ day endurance) capabilities
- Keel with customizable sensors
- Proof of concept testing spring 2022
- Testing along transect off of Mississippi
- Comparing data with C Worker-5 to evaluate data quality



7

Living Marine Resources Models

- NOAA has invested \$2.7M over the past 5 years to investigate the impacts of the Gulf hypoxic zone on living marine resources
- Over 20 peer-reviewed publications have been produced so far
- Next year, findings will be synthesized in an upcoming dedicated journal publication
- New capabilities have been developed such as a data visualization tool and coupled watershed coastal models



Visualization Tool: <https://demutsertlab.wordpress.com/visualizations/>

Source: (Rose, UMCES)

8

Watershed Game

- Hands on, facilitated activity, for participants to learn how land use affects water quality and natural resources
- Players use limited financial resources to reduce excess nonpoint source pollution
- Game includes 4 linked modules (headwater stream, lake, large river and coast)
- Audience: anyone involved in outreach or education related to water quality
- Hundreds of educators across 20 states have been trained so far (university extension, local gov't, schools, NGOs)

watershedgame.umn.edu



9

Thank you



10

Recent Hypoxia Research Efforts and Publications

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

Wang, H., Lehrter, J., Maiti, K., Fennel, K., Laurent, A., Rabalais, N., Hussain, N., Li, Q., Chen, B., Scaboo, K.M., Cai, W-J. (2020) Benthic Respiration in Hypoxic Waters Enhances Bottom Water Acidification in the Northern Gulf of Mexico. JGR Oceans 125.

- *Severe hypoxic conditions, which correspond with less water movement, favor the accumulation of benthic respiration leading to the acidification of the bottom waters in the Gulf of Mexico hypoxic zone.*

LaBone, E., Rose, K., Justic, D., Huang, H., Wang, L. (2021) Effects of spatial variability on the exposure of fish to hypoxia: a modeling analysis for the Gulf of Mexico. Biogeosciences 18, 487-507.

- *Accurate estimation of exposure depends on both the degree of clumpiness of sublethal dissolved oxygen concentrations and the total area of sublethal dissolved oxygen. Exposure to sublethal concentrations occurred under all conditions examined regardless of the fish's ability to avoid hypoxia, including good and poor competency of fish for avoidance and allowing for vertical avoidance movement.*

Bian, Z., Tian, H., Yang, Q., Xu, R., Pan, S., Zhang, B. (2021) Production and application of manure nitrogen and phosphorus in the United States since 1860. Earth System Science Data 13, 515-527.

- *The enrichment of manure nutrients in the South Atlantic–Gulf, Mid-Atlantic, and Mississippi River basins increased the risk of excessive nutrient loading into the Gulf of Mexico and the Atlantic Ocean under extreme weather conditions.*

Water Quality Trends Workgroup

Lori Sprague, U.S. Geological Survey (co chair)
 Whitney King, U.S. Environmental Protection Agency (co chair)
 Katie Mann, Arkansas Department of Agriculture
 Julie Harrold, Indiana State Department of Agriculture
 Adam Schnieders, Iowa Department of Natural Resources
 Angelina Freeman, Louisiana Coastal Protection and Restoration Authority
 Dave Wall, Minnesota Pollution Control Agency
 Lee Ganske, Minnesota Pollution Control Agency
 Natalie Segrest, Mississippi Department of Environmental Quality
 Kurt Boeckmann, Missouri Department of Natural Resources
 Sally Zemmer, Missouri Department of Natural Resources
 Tania Datta (Tennessee Tech)

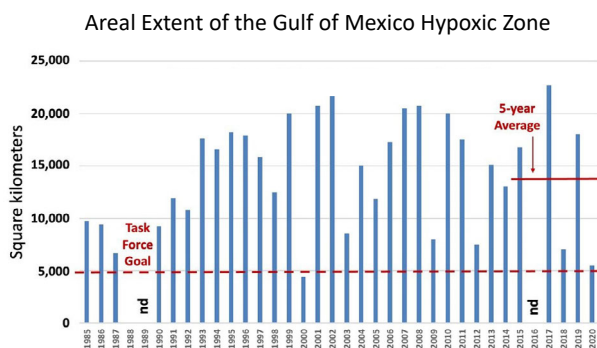
John Mathews, Ohio Environmental Protection Agency
 Adrian Stocks, Wisconsin Department of Natural Resources
 Marcia Wilhite, Wisconsin Department of Natural Resources
 Michael Shupryt, Wisconsin Department of Natural Resources
 Shawn Giblin, Wisconsin Department of Natural Resources
 Lauren Salvato, Upper Mississippi River Basin Association
 Doug Daigle, Lower Mississippi River Sub basin Committee
 Richard Mitchell, U.S. Environmental Protection Agency
 Katie Flahive, U.S. Environmental Protection Agency
 Tom Wall, U.S. Environmental Protection Agency

Lori Sprague, U.S. Geological Survey
 Mississippi River/Gulf of Mexico Hypoxia Task Force Meeting
 December 2021

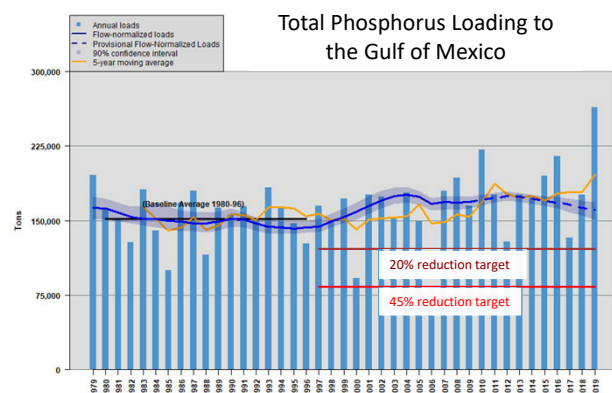


1

Current Metrics Used by the Hypoxia Task Force (HTF)



Bottom area of dissolved oxygen ≤ 2 mg/L. Source: Dr. Nancy Rabalais (Louisiana Universities Marine Consortium) and Dr. Eugene Turner (Louisiana State University). <https://gulphypoxia.net/research/shelfwide-cruises/>



Source: U.S. Geological Survey. <http://nrtwq.usgs.gov/nwqn/#?GULF>



2

2

New HTF metrics

To increase awareness of nutrient reduction efforts upstream in the Mississippi River Basin, the HTF is considering new metrics to complement current metrics

1. Point source reduction efforts
2. Nonpoint source reduction efforts
3. Water quality trends within the basin



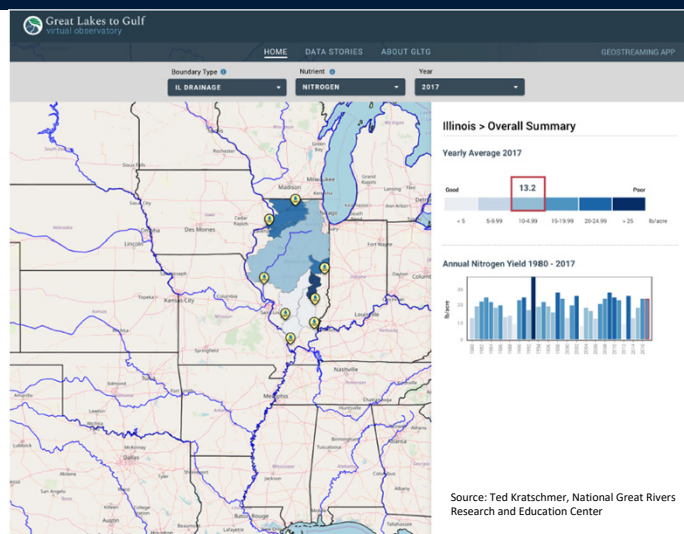
Partnership with the National Great Rivers Research and Education Center

Status

- Monitoring sites with required data have been identified
- Key subset of sites are being identified for review with States

Follow up with Hypoxia Task Force for further consideration

- Visuals, storyline, and dashboard for displaying trend results
- Evaluation of any differences with trend analyses performed by States and other member organizations



How the Great Lakes to Gulf Virtual Observatory Helps Track Nutrient Trends and Conservation Practices in the MARB

Hypoxia Task Force Public Meeting
14 December 2021

The National Great Rivers
Research & Education Center

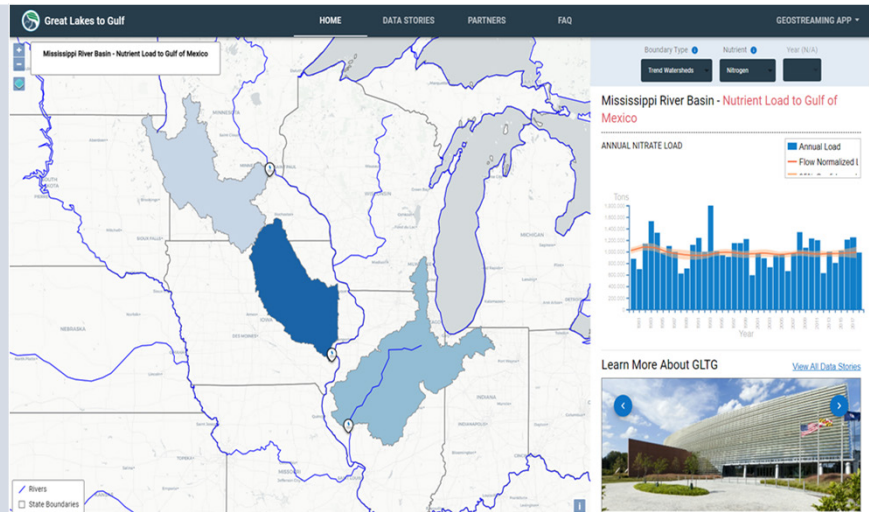
ILLINOIS
NCSA | National Center for
Supercomputing Applications



1

CHALLENGE: There is a need to be able to more fully visualize and understand historic and current water quality conditions in the Mississippi River watershed.

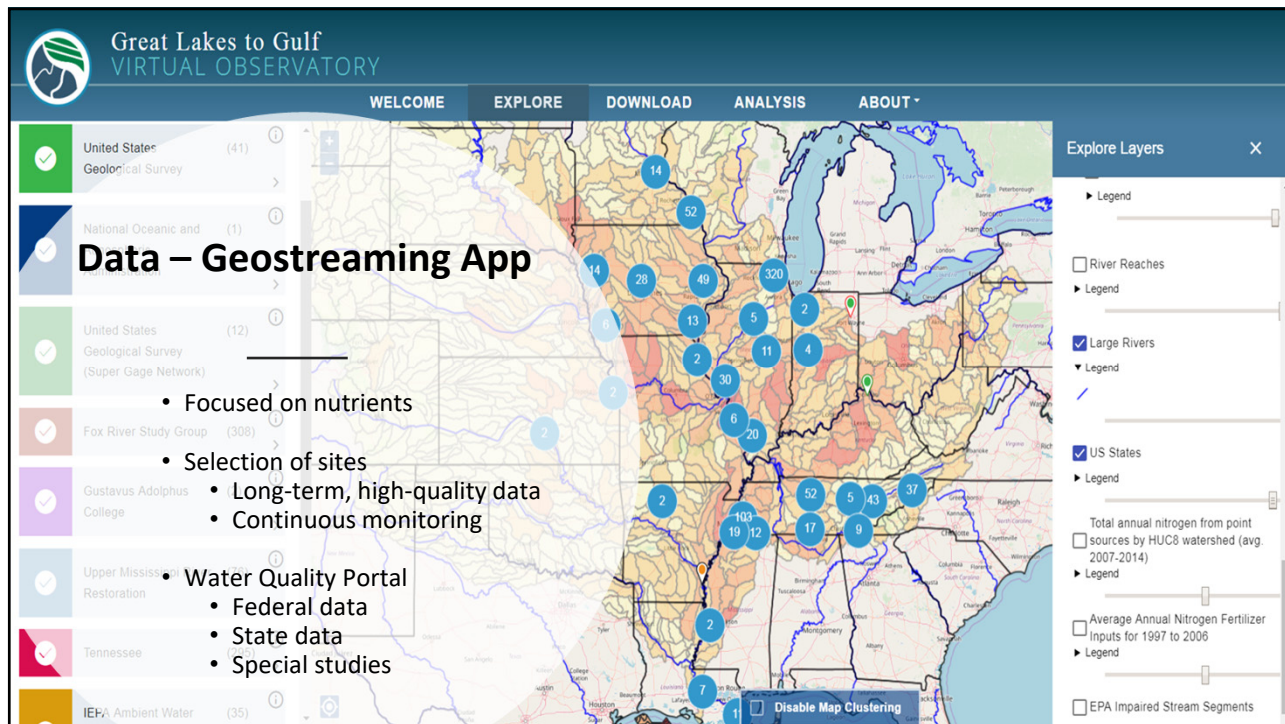
SOLUTION: A single platform that combines multiple data sources from the HTF states into a user-friendly tool that can be used by managers and stakeholders to model actions that will improve water quality in the Mississippi River watershed and in the Gulf of Mexico.



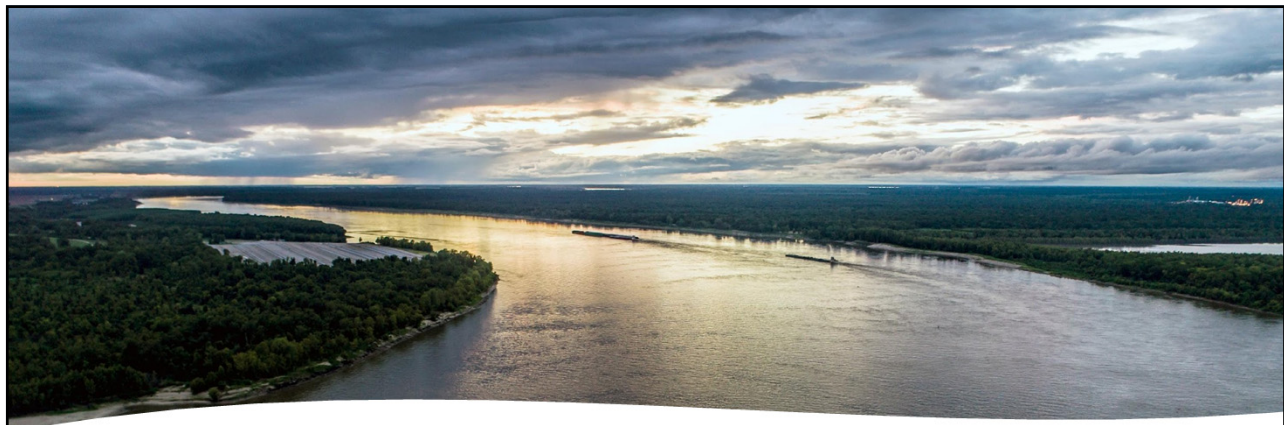
RESOURCE: The GLTG Virtual Observatory is a web-based, interactive geospatial application that integrates water quality data and analytics from multiple sources.

<https://gltg.ncsa.illinois.edu/>

2



3



With GLTG as the platform for analyzing and visualizing nutrient data –

Where to Next?

4

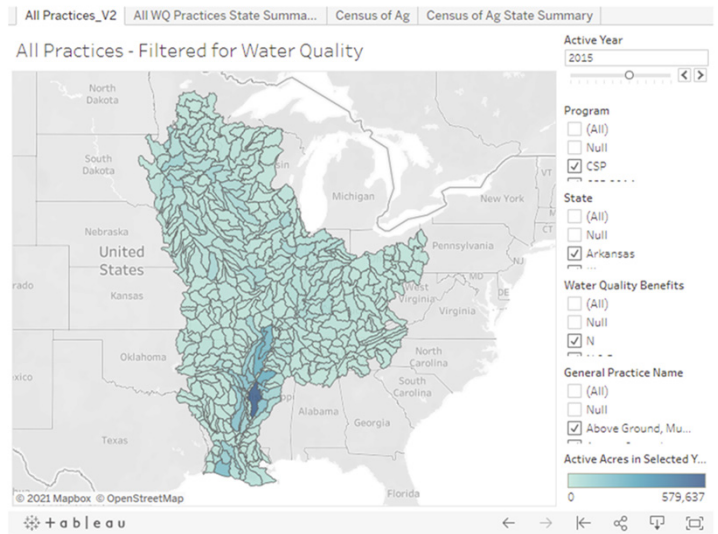
Conservation Practices

DATA TO BE ADDED in 2022-23

Nutrient Trends: GLTG will provide visualizations of flow-normalized nutrient trends (trends watershed, trend graph and statement of trend output) for at least 5 sites per HTF state on the dashboard.

Agricultural BMPs (location and densities): Working with Dr. Reid Christianson, University of Illinois, to Track Nonpoint Source Agricultural Conservation Practices:

- Inventory of ag best management practices for each of the 12 MRB mainstem states in the Mississippi River Basin
- EQUIP, CSP, EPA 319
- Pilot states (AR, IN, MN, IL, KY)
- Conservation "Heat" Maps



To cite these data, please use:
Christianson, R. 2021. Common Data for Hypoxia Task Force Member States through 2020 [spatial data – unpublished]. Retrieved from https://public.tableau.com/app/profile/reid.christianson/viz/HTF_NRCS_Conservation/AllPractices_V2?publish=yes.

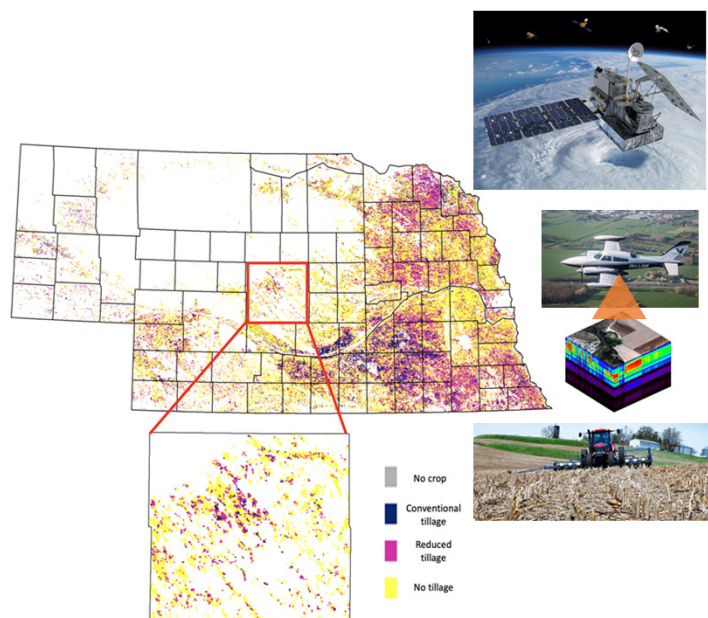
5

Conservation Practices

Remote Sensing of Cover Crops and Tillage Practices and the Relationship to Water Quality (location and densities):

Working with Dr. Kaiyu Guan, University of Illinois, on the Impact of Corn Fractions and Tile Drainage on Nitrogen Concentrations

- Long-term high resolution remotely sensed data for cover crops and tillage practices
- Agriculture at the field scale in real time
 - Tillage
 - Planting/Harvesting
 - Cover crop
 - Tracking Cover Crop Adoption for Each Field
- Includes "What If" scenarios
- Hindcasting



6

Conservation Practices

Hydrology: Working with Dr. Jason Knouft, Saint Louis University and NGRREC, on incorporating data from high-resolution streamflow and water temperature models to provide estimates of past, current, and future water conditions.

- HydroClim: Collaborative effort between Saint Louis University, Tulane University, and Indiana University
- Streamflow and water temperature estimates across the U.S. and Canada to enhance management of freshwater systems in a changing climate
- Monthly discharge and water temperature data from 1950 to 2099, with future estimates based on an array of climate change projections.
- SWAT hydrologic model
- Based on 39 Global Climate Model projections

https://www.hydroclim.org/index.html

7



Next Steps – Making Data Accessible

- Increasing awareness of nutrient conditions in the Mississippi River and its tributaries
- Visualizing BMP effectiveness as part of each state's nutrient reduction plans
- Guiding adaptive management of nutrient management practices in the field

8



CONTACT US

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Rivers Research and Education Center
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Dr. Jong Lee
University of Illinois, National Center for
Supercomputing Applications
jonglee1@illinois.edu

Nutrient Trends in the Upper Mississippi and Illinois River Ecosystems



This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information.

1

UMRBA Background

- Governor-level interstate organization for multi-purpose management
- Governor-designated interstate WQ entity
- Facilitate dialogue, cooperative action, and coordination
 - Interstate forum
 - Cooperative planning, coordinated management
 - Information exchange
 - Regional positions, advocacy on states' behalf



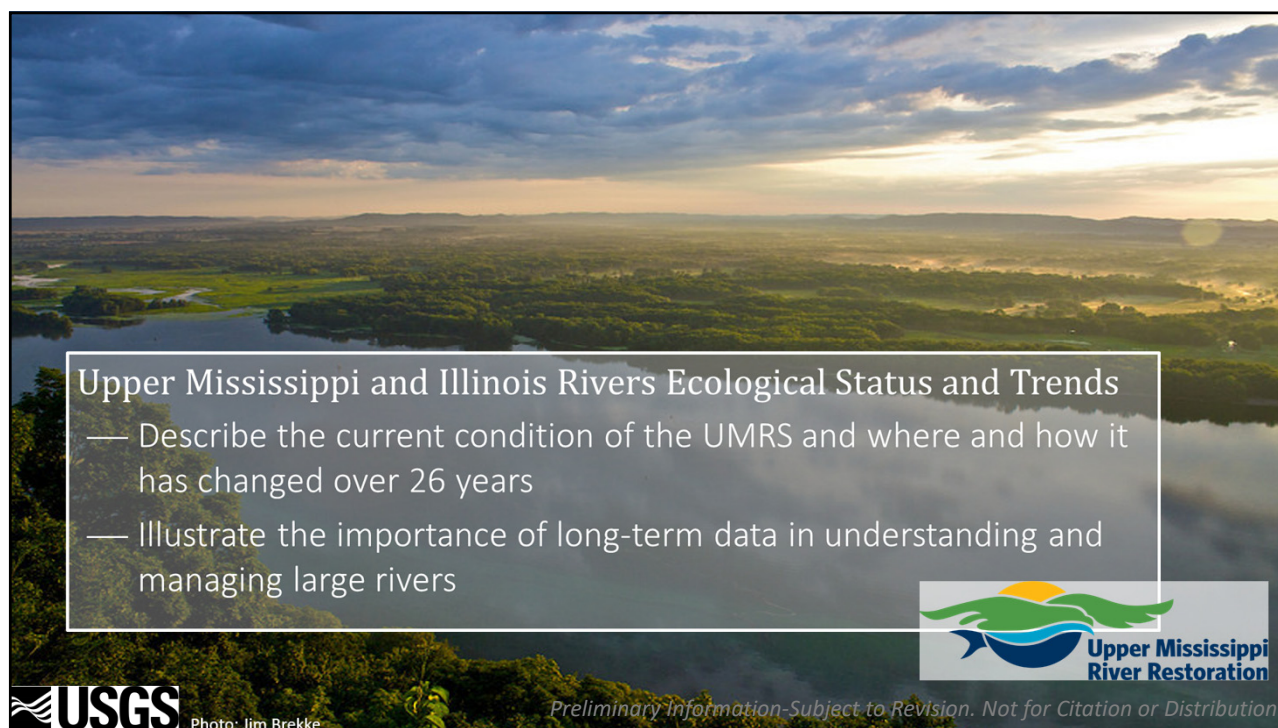
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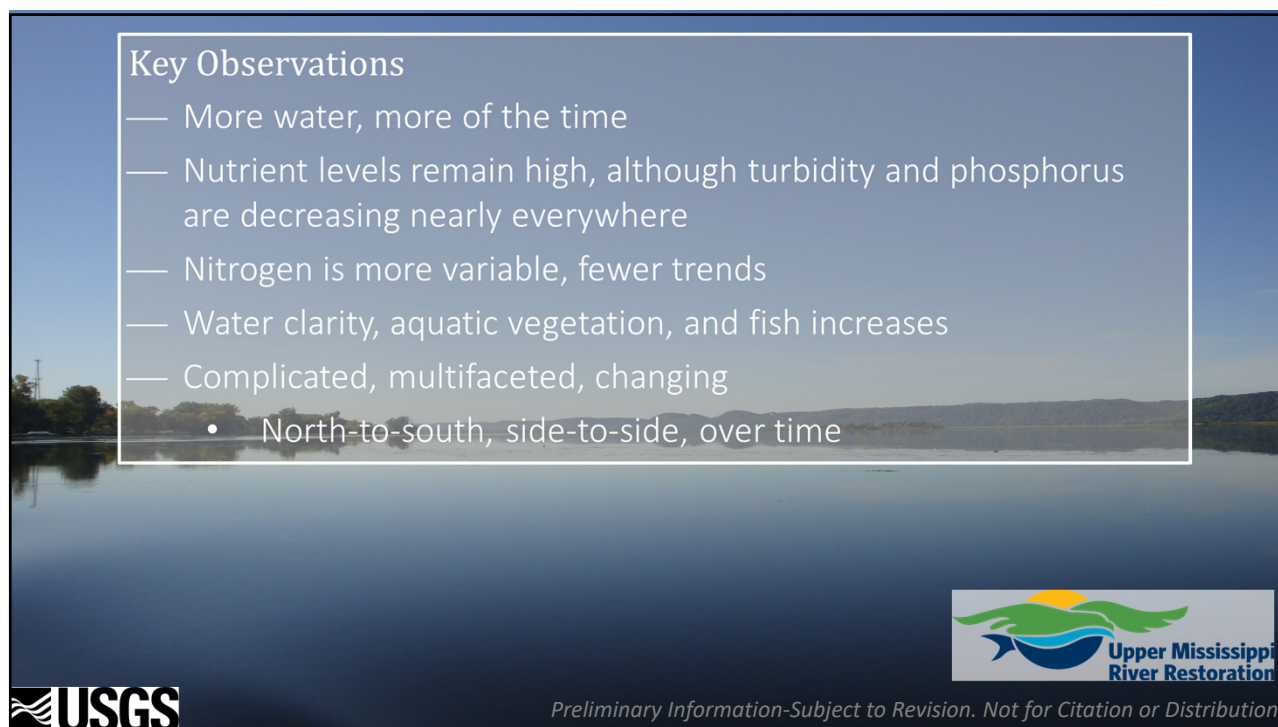
Upper Mississippi and Illinois Rivers Ecological Status and Trends

- Describe the current condition of the UMRS and where and how it has changed over 26 years
- Illustrate the importance of long-term data in understanding and managing large rivers

USGS Photo: Jim Brekke *Preliminary Information-Subject to Revision. Not for Citation or Distribution.*




5



Key Observations

- More water, more of the time
- Nutrient levels remain high, although turbidity and phosphorus are decreasing nearly everywhere
- Nitrogen is more variable, fewer trends
- Water clarity, aquatic vegetation, and fish increases
- Complicated, multifaceted, changing
 - North-to-south, side-to-side, over time

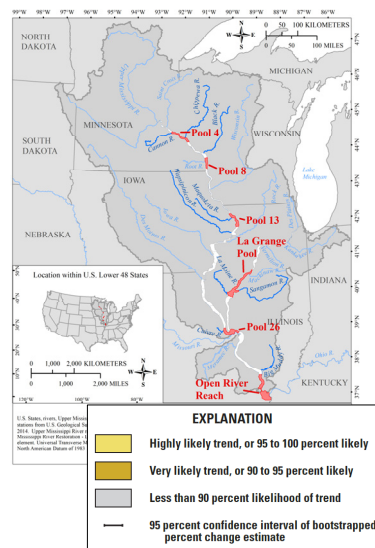
USGS *Preliminary Information-Subject to Revision. Not for Citation or Distribution.*



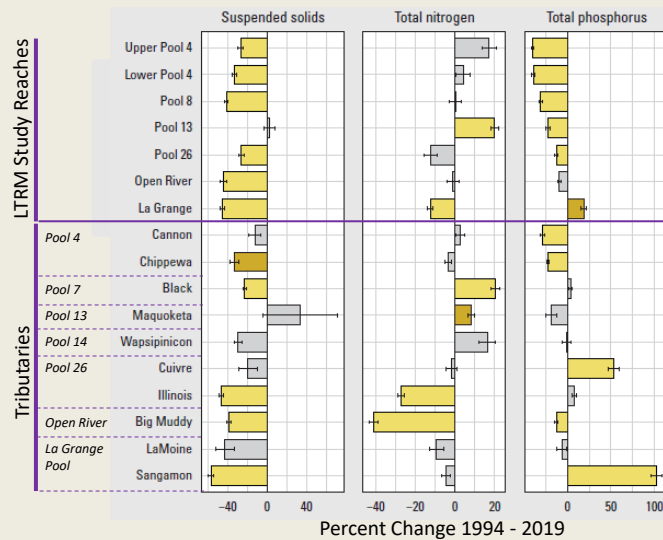
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Nutrient Trends

(fixed sites in main channel and tributaries)



Percent change in Flow-normalized concentration¹ (Main channel and tributary fixed sites)



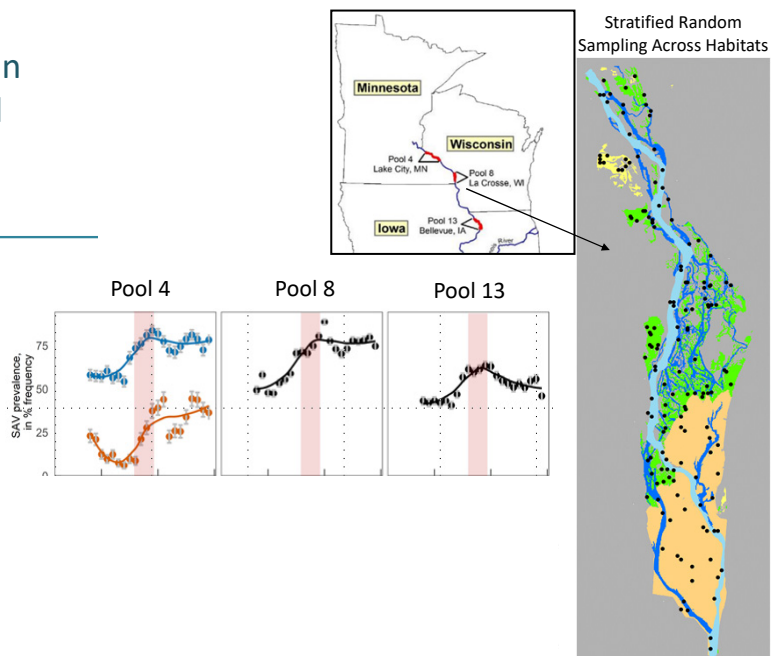
¹Calculated using Weighted Regressions on Time Discharge and Season (Hirsch et al. 2010; Hirsch et al. 2015)

7

Preliminary Information-Subject to Revision. Not for Citation or Distribution.

Long-term ecological changes in water clarity, vegetation, and fish in the Upper Impounded Reach of the UMRS

- Increase in submersed vegetation
- Period of low discharge (2006,7, 9)
- Small decline in suspended solids (SS) inputs
- Substantial increase in water clarity (decrease in turbidity)
- Decline in Common Carp
- Changes in fish community composition



8



Dr. KathiJo Jankowski, Research Ecologist
kjankowski@usgs.gov | 608-781-6242

Lauren Salvato, Policy and Programs Director
lsalvato@umrba.org | 952-208-1166

Point Source Workgroup Update Presentation to the Hypoxia Task Force

Adam Schnieders, Iowa Dept. of Natural
Resources

December 13th and 14th, 2021



Indianola Wastewater Treatment Facility – source: [desmoinesregister.com](https://www.desmoinesregister.com)

1

Recap: Task Force Decisions/Actions on Tracking Point Source Progress

- 2014-2015: HTF agrees on and releases a “Revised Goal Framework” with a 2025 interim target to reduce N and P loads by 20 percent
 - HTF commits to track progress and charters Point Source and Nonpoint Source Workgroups
- March 2016: HTF releases the Point Source Workgroup’s first progress report with 2014 data on the number of major sewage treatment plant permits with
 - monitoring requirements for nitrogen and phosphorus
 - permits with limits for nitrogen and phosphorus
 - State-specific supplements with info on permitting approaches and additional measures of progress
- October 2019: second Point Source Progress Report released using 2017 data
 - In addition to updated data on monitoring, limits and state supplements, this report also estimated discharge loads from major sewage treatment plants

2

Comparing Reports: Facilities with Monitoring Requirements

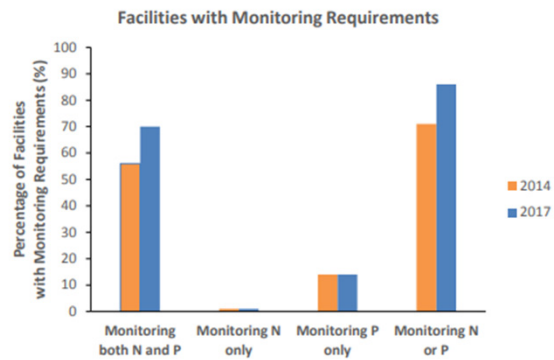


Figure 1. The percentage of major sewage treatment plants with nitrogen (N) and/or phosphorus (P) monitoring requirements, by reporting year.

3

Comparing Reports: Facilities with Discharge Limits

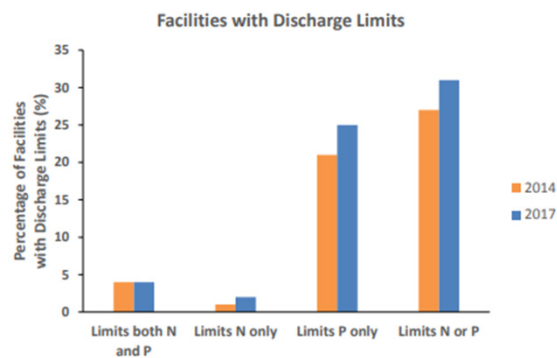


Figure 2. The percentage of major sewage treatment plants with nitrogen (N) and/or phosphorus (P) discharge limits, by reporting year.

4

2017 Estimated Discharge Loads

2017 N Loads (lb/yr) from major
sewage treatment plants: 287,708,571

2017 P loads (lb/yr) from major sewage
treatment plants: 44,972,256

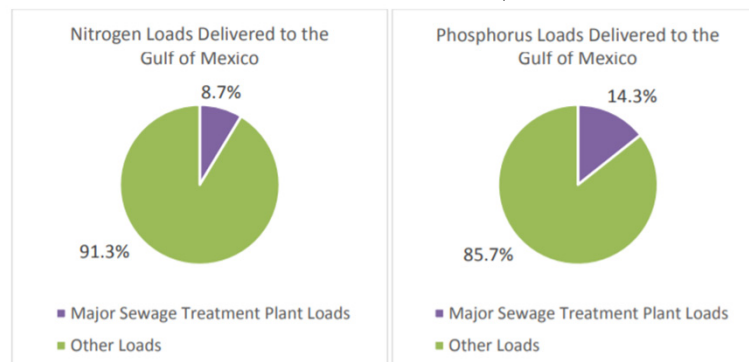


Figure 3. Calculated or estimated 2017 nutrient loads from major sewage treatment plants (purple) discharging to the MARB vs. all other nutrient loads based on USGS-calculated total MARB nutrient loads in 2017 (green).

5

Next Steps



- Currently producing our third report using 2020 data on monitoring, limits and estimated discharges
 - *Again including state specific supplements*
- Adding a focus on innovative approaches, e.g., market-based approaches, POTW optimization of secondary treatment
- As third report develops, we will begin to look to quantify trends

6

Thank you
Point
Source
Workgroup
Members!

- IL EPA
- IA DNR
- MN PCA
- MO DNR
- MS DEQ
- WI DNR
- US EPA
- USGS



Mississippi River

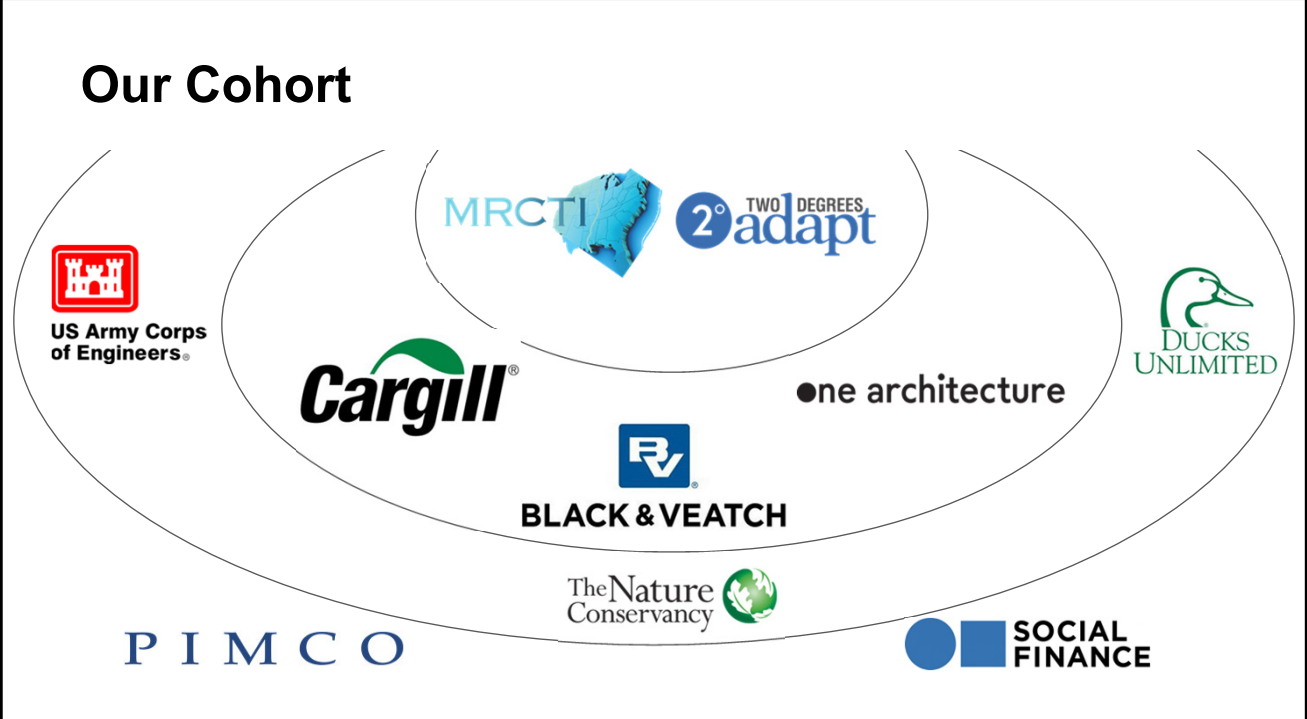
Flooding Economic Impact & Nature-Based Adaptation Solutions


EPA Hypoxia Task Force, December 14, 2021





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Our Cohort






US Army Corps of Engineers







Cargill




one architecture




DUCKS UNLIMITED




BLACK & VEATCH



The Nature Conservancy

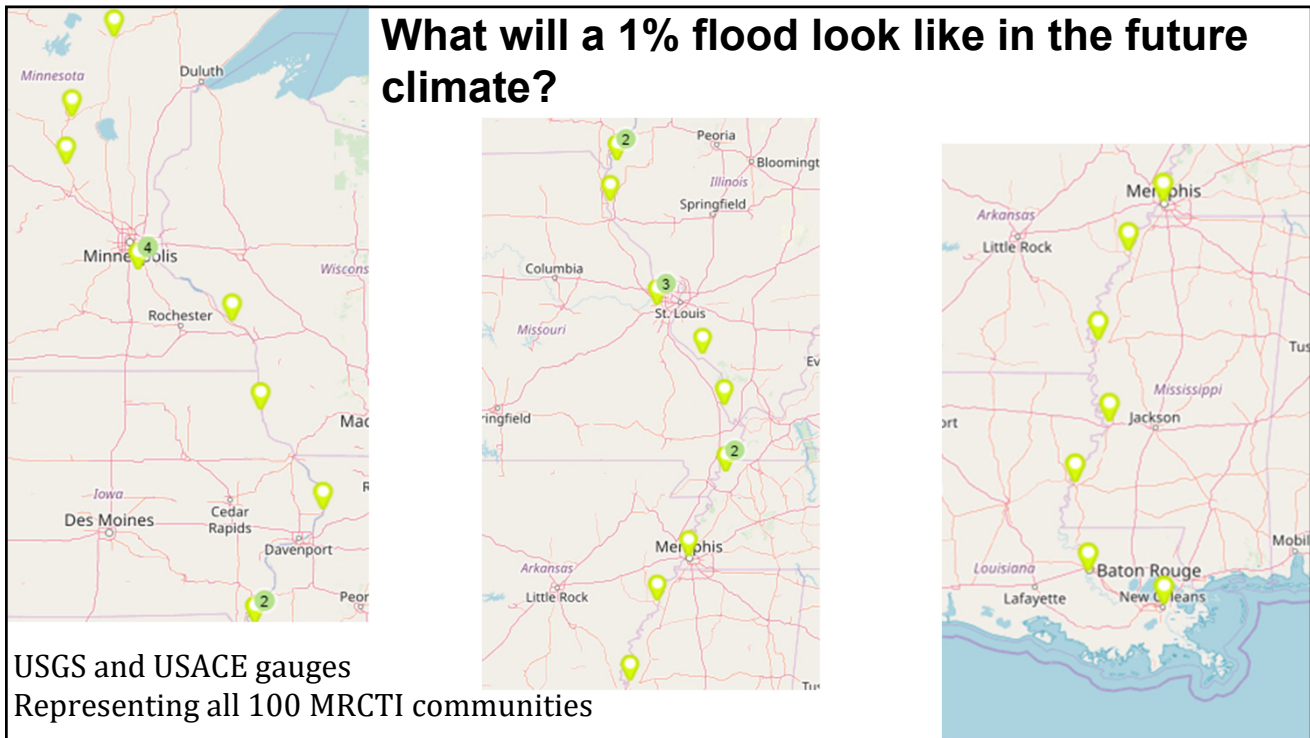


PIMCO

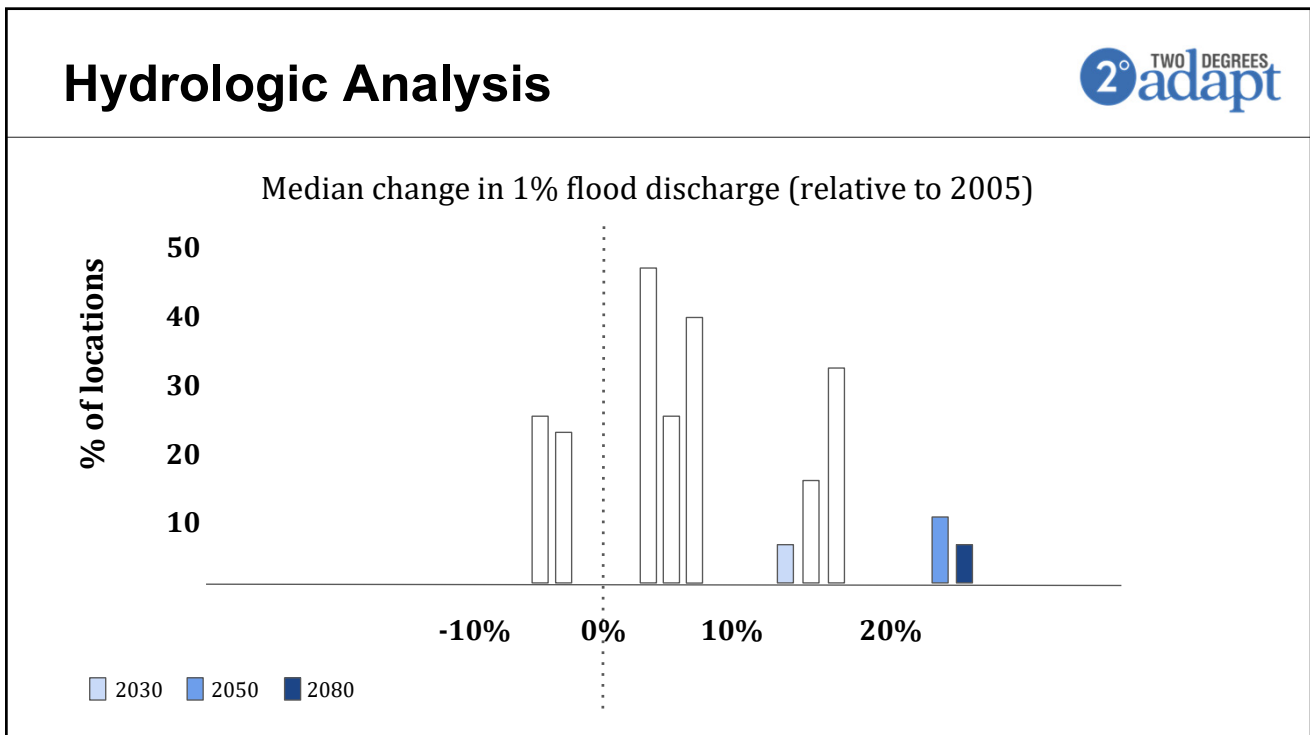


SOCIAL FINANCE

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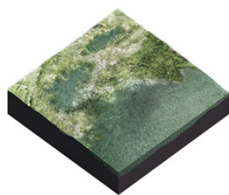
Several levees are at risk of overtopping



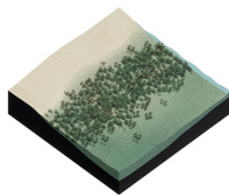
Location	Levee	Probability of Overtopping for 2030 1% Flood
Mississippi River at Grafton, IL	Consolidated North County Levee System	1.074
Mississippi River at Winona, MN	Winona City & Prairie Island	1.043
Mississippi River at Helena, AR	Mississippi and White Rivers Below Helena System	1.026
Mississippi River at Chester, IL	Bois Brule Levee & Drainage District System	1.010
Mississippi River at Greenville, MS	Greenville Harbor - West Bank	0.988
Mississippi River at Baton Rouge, LA	Mississippi River West Bank - Below Morganza	0.987
Mississippi River at Baton Rouge, LA	Mississippi River East Bank	0.983
Mississippi River at Greenville, MS	Greenville Harbor - East Bank	0.959
Mississippi River at Chester, IL	Saint Genevieve Levee System No. 2	0.938

5

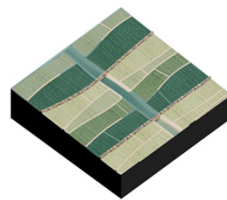
Solutions Analyzed



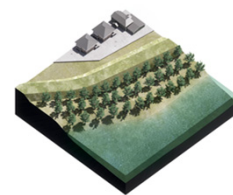
Wetland Restoration



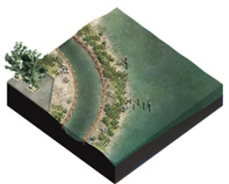
Submerged Vegetation



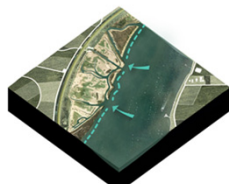
Regenerative Agriculture



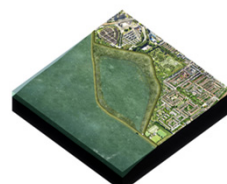
Reforestation



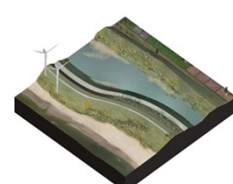
Secondary Channels*



Spillway Creation*



Controlled Overtopping*



Levee Armoring

* Collectively termed Floodplain Expansion strategies

6

Example of Shovel Ready Project: St Genevieve Restoration along Levee #3



7

Example of a Mega Project: Vicksburg- Eagle Lake Restoration



8

Return on Investment: 200 Acre Hypothetical Wetland Reforestation



- Key Assumption: City owns the land
- **If robust carbon and nutrient removal markets exist, even small NbS projects can yield attractive returns**

	Price Starting in 2021
Carbon	\$20/MT CO ₂ e
Nitrate Removal	\$9.5/lb
Phosphate Removal	\$4.2/lb

20-year NPV	\$380,000
IRR	9%
Payback Period	13 years

9

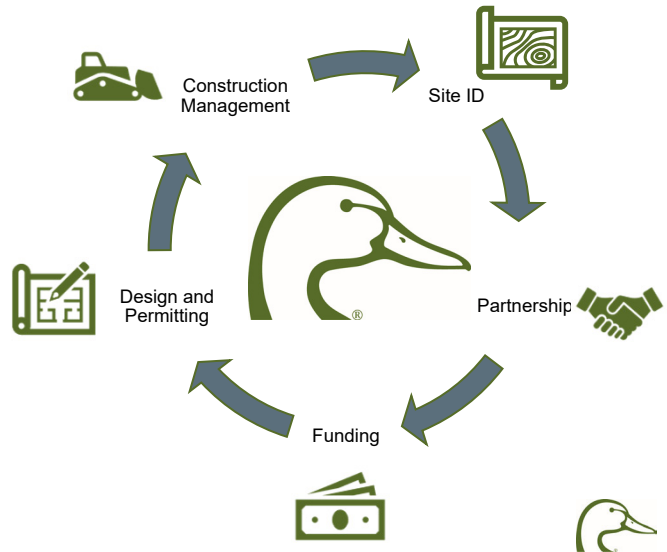
Flood Damage Reduction Quantification



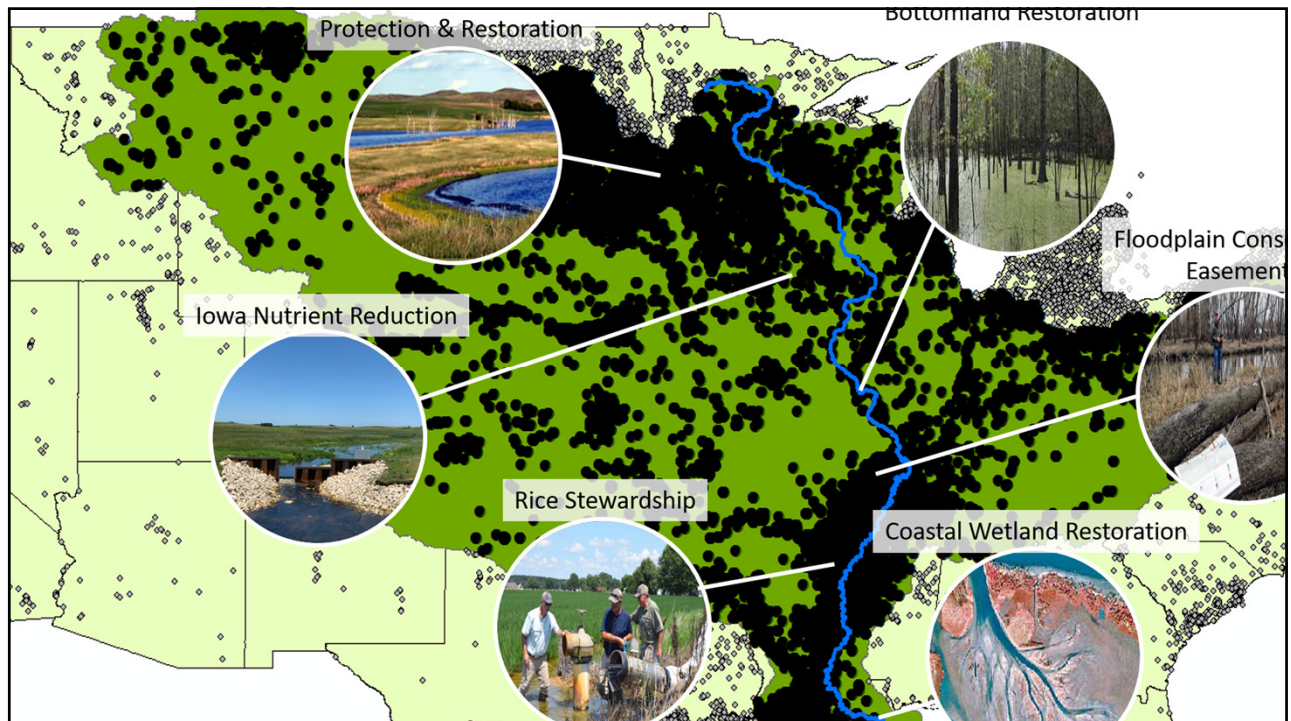
- To reduce the probability of overtopping by 10% for Levee #2 in St Genevieve in a 1% riverine flood in 2030
 - Nature-based solutions must offset 95,000 cfs of peak discharge
 - A set of wetlands with **60,000 acre-ft** of flood storage can do this for a duration of ~ **8 hours of peak discharge**
 - A reservoir with ~ **180,000 acre-ft** can store this peak discharge for **24 hours**
- “cutting the peak off a major flood is a local problem” flood expert at NOAA
- Smaller projects can still contribute significantly to
 - Lessen the impact of smaller riverine floods
 - Mitigate other types of floods e.g. flash floods
 - Co-benefits e.g. carbon sequestration, nutrient removal, recreational tourism

10

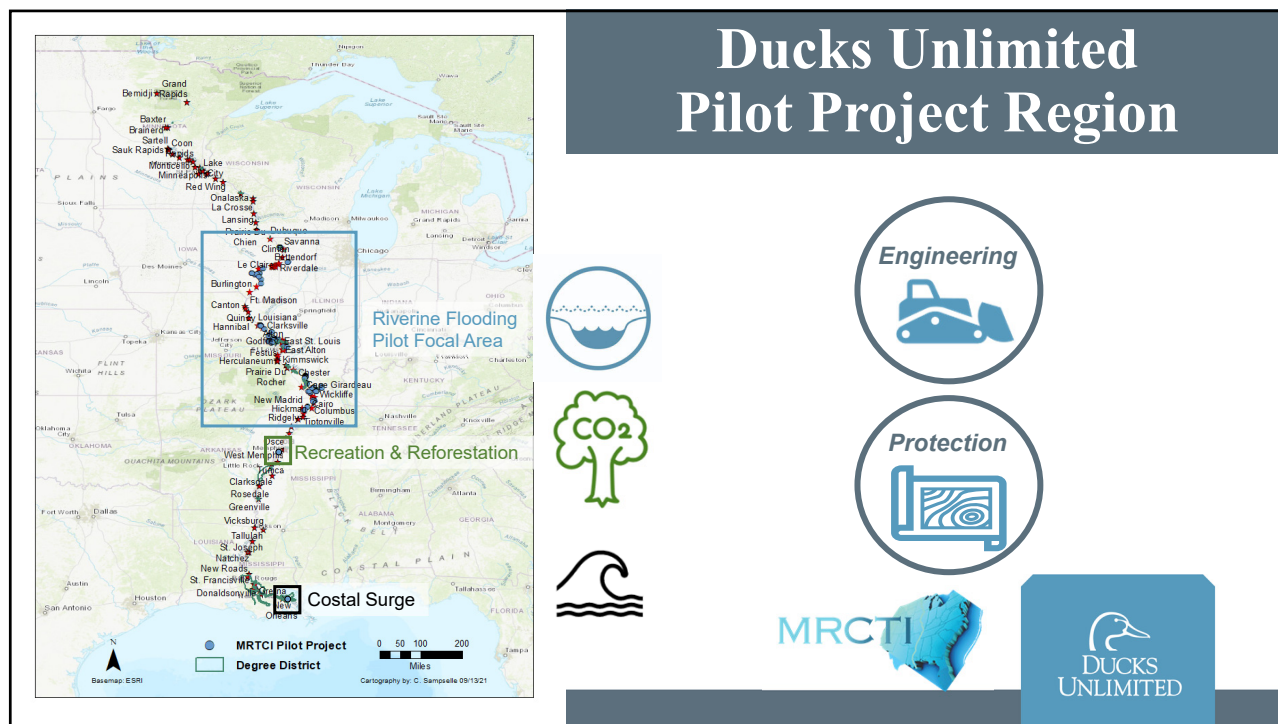
Ducks Unlimited: How We Work



1



2



3



4

Riverine Flood Reduction Capacity



Minimum of 10,000 acres to achieve 1% reduction in riverine flood by 2030

St. Genevieve 10% overtopping reduction 60,000 acre-feet

Region	Area (acres)	Flood storage (min acre-feet)	Flood storage (max acre-feet)
Quad Cities	19,539	15,308	41,751
St. Louis	19,347	12,281	58,041
Tri-State	19,987	21,985	59,961

- Average cost per acre-foot of storage (one flood): \$2,524
 - 1 flood/year over 30-year design life: \$84/acre foot



5

Co-Benefits for Project Portfolio



54,618 to 268,078 mtCO₂e/year



529,009 to 944,647 kg N/year



\$16-\$1,400/acre annually
in recreation and other
benefits



6

American Agriculture's State, Regional, and National Initiatives to Reduce Nutrient Losses in the Mississippi River Basin

Prepared by the Agricultural Nutrient Policy Council
December 2021

Agriculture's Nutrient Loss Reduction Efforts in the MRB

**A Presentation to the Gulf Hypoxia Task Force
Agricultural Nutrient Policy Council**

Ms. Lauren Lurkins, President

Mr. Tom Hebert, Senior Advisor

December 14, 2021

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 16 2011

OFFICE OF WATER

MEMORANDUM

SUBJECT: Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions

FROM: Nancy K. Stoner
Acting Assistant Administrator

TO: Regional Administrators, Regions 1-10

Recommended Elements of a State Framework for Managing Nitrogen and Phosphorus Pollution

1. Prioritize watersheds on a statewide basis for nitrogen and phosphorus loading reductions
2. Set watershed load reduction goals based upon best available information
3. Ensure effectiveness of point source permits in targeted/priority sub-watersheds
4. In partnership with state agricultural partners target the most effective practices where they are needed most.
5. Identify how the State will use its tools assure nutrient reductions from unpermitted communities and systems
6. Identify where and how each of the tools identified above will be used within targeted/priority sub-watersheds
7. Conduct annual public reporting of implementation activities and biannual reporting of load reductions and environmental impacts
8. Develop work plan and schedule for numeric criteria development

“We hope that the framework will encourage development and implementation of effective state strategies for managing nitrogen and phosphorus pollution. ”

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Mississippi River/Gulf of Mexico Hypoxia Task Force Newsletter

October 2021 | Issue 9

HTF HIGHLIGHTS

STATE ACTIVITIES

FEDERAL ACTIVITIES

RESOURCES

Hypoxia Task Force Highlights

The Hypoxia Task Force is planning a virtual public meeting in December 2021. More information will be shared [here](#) as it becomes available.

Tracking Conservation Tools

July 2021

Remote sensing technologies, including satellite imagery and aerial photography, are increasingly being used to characterize and track crop areas, cover crops, riparian vegetation, and pasture-based practices for overall conservation system assessment and tracking. There are several available technologies (free and publicly available, commercial, and state specific) that are used in the United States. The remote sensing data and reports included in this document are a compilation of all the different technologies used by the Hypoxia Task Force (HTF) is aware of states using. If technology used in the future, let us know. This is a living document, and additional information will be added as it becomes available.

SECOND REPORT ON POINT SOURCE PROGRESS IN HYPOXIA TASK FORCE STATES

OCTOBER 2019

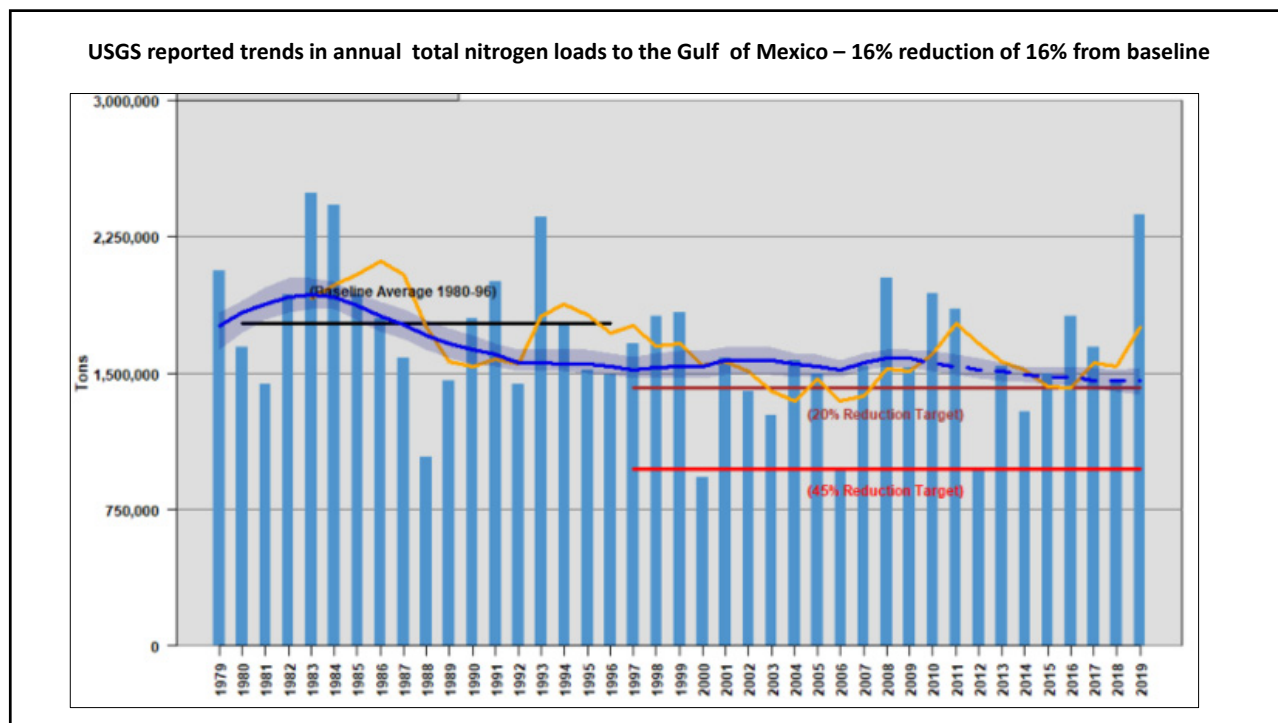
Progress Report on Coordination for Nonpoint Source Measures in Hypoxia Task Force States

May 2018

Hypoxia Task Force Research Needs Workgroup

Research Needs – Top Priorities

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Farmer-Led Partner Alliances



Nutrient Stewardship Grant Program



Arkansas Soil Health Alliance
@Arsoilhealth



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Farmer-led or supported research, education & practice implementation programs



Farmers Investing in their Future



Nutrient Stewardship Grant Program



Minnesota
Agricultural Fertilizer Research and
Education Council (AFREC)

Indiana Science Assessment

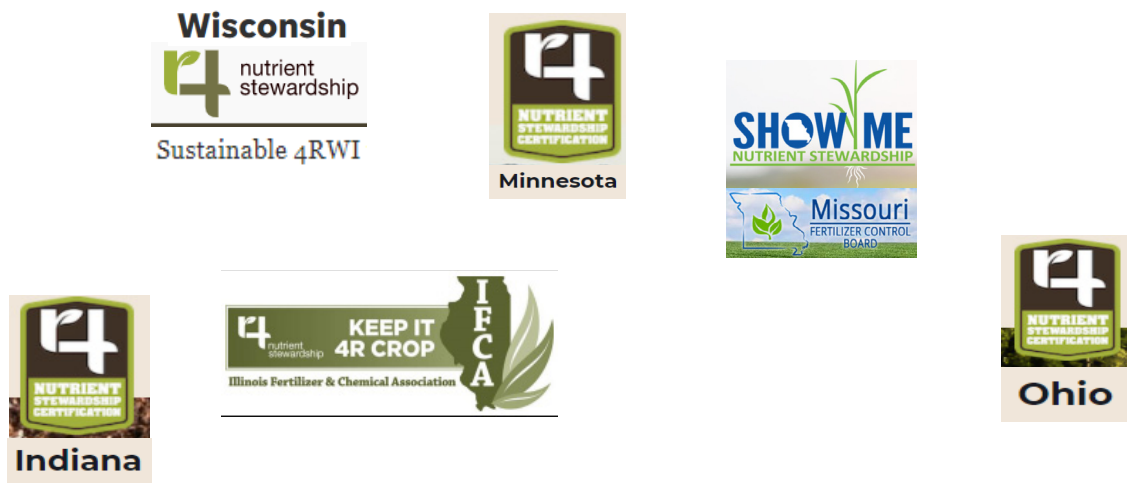


Agricultural Water Quality Monitoring Program



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4R Certification or Promotion Programs



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Active Farmer Participation in Federal, State and NGO Practice-Adoption Programs



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Farmers' Own Private Efforts

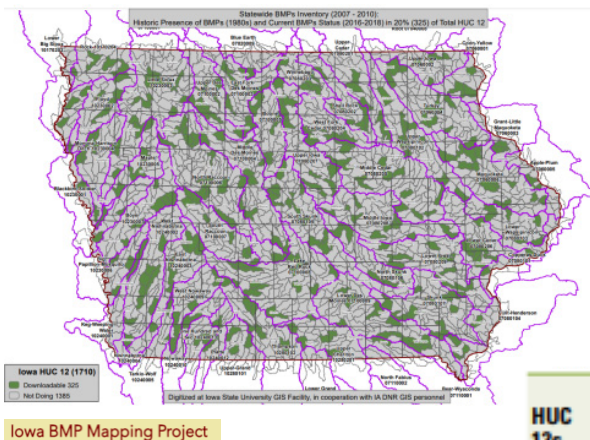


Table 4. Statewide Counts of BMPs in the 319 HUC12 Watersheds Included in this Study

BMP Type	1980s	2016-2018
Pond Dams	14,884	20,429
Terraces	63,815	102,867
WASCOBs	16,213	53,835
Contour Buffer Strips	618	2,264
Grassed Waterways	40,888	134,007
Strip Cropping	258	527
Total	136,676	313,929

HUC 12s mapped	Pond dams (number)	Grassed waterways (acres)	Terraces (miles)	WASCOBs (miles)	Contour buffer strips (acres)	Strip cropping (acres)
1,710	111,721	281,088	89,081	11,144	386,258	108,681

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Our Requests

- Give strong, ongoing and clear support for the core principles of the Obama 2011 Framework Memo, and carry these policies forward – maintain focus on state-led strategies
- Federal partners engage directly and meaningfully with state stakeholders responsible for the success of the state strategies
- Fund the practices called for in the strategies, and do so in a way that is practical for farmers
- Help us develop a farmer-led practice data collection effort
- Foster strong collaborative efforts between agriculture and our municipal neighbors and partners

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Thanks!