**SERA-46 Accomplishments/Annual Report – August 2023**

Project Number and Title: SERA46: Framework for Nutrient Reduction Strategy Collaboration: The Role for Land Grant Universities (/projects/18666)

Period Covered: March 2022 to June 2023

Date of this Report: August 18, 2023

Annual Meeting Date: March 6, 2023

Participants:

Dan Downing (MO)(Chair), Ken Genskow (WI)(co-chair/secretary), John Lawrence (Administrative Advisor), Nathan Slaton (Administrative Advisor), Shelly Nickols-Richardson (IL, Administrative Advisor),

Eric Norland (USDA NIFA Representative), Naveen Adusumilli (LA), Noel Aloysius (MO), Beth Baker (MS), Timothy Baye (WI), Joe Bonnell (WI), Mike Daniels (AR), Jane Frankenberger (IN), Amanda Gumbert (KY), Matt Helmers (IA), Jenny Seifert (WI), Forbes Walker (TN)

Guests: Katie Flahive (USEPA), Whitney King (USEPA), Jake Greif (USEPA), Elisabeth Lang (USEPA)

Brief Summary of Minutes of Annual Meeting: (to be attached/uploaded)

**Overall Accomplishments**

Accomplishments are organized around the project’s three main objectives.

**Objective 1**: *Establish and strengthen relationships that can serve the missions of multiple organizations addressing nutrient management and environmental quality.*

* Support regular communication and collaboration among LGUs, HTF members, and other partners to strengthen multi-state approaches regarding agricultural and environmental research and outreach.
* Encourage intrastate interactions among state agencies, universities, and others to meet state-level nutrient reduction goals.
* Leverage the synergy of the HTF-LGU relationship to seek/secure funding to support multi-state initiatives that address HTF goals

The above objectives are achieved through the activities listed below -

* Farmer-Led Watershed Leadership Summits
* Farmer-led Watershed leadership video development
* Newsletters and staff reports (e.g., The Confluence)
* Online exchange platform (OneGoodIdea: <https://goodideafarm.org> )
* Collaborative Impact – University engagement with state agencies on topics related to state nutrient reduction strategies and broader activities that support HTF Action Plan goals (e.g., action plan strategies to identify the role of nutrient management on working lands, and consequently nutrient loss to bodies of water.)
* Individual representatives of SERA 46 networking with, and providing input into their state's nutrient management plans and networking and planning with NRCS and FSA on nutrient management strategies.
* In response to USEPA announcement of a new Gulf Hypoxia Program (GHP), funded through the 2021 Bipartisan Infrastructure Law (BIL, P>L> 117-58, aka the Infrastructure Investment and Jobs Act of 2021 (IIJA)), SERA-46 submitted a draft scope of work to USEPA GHP staff to inform a future cooperative agreement around LGU engagement in priorities of the Hypoxia Task Force. Several SERA-46 university staff/faculty assisted state agencies in forming responses to new GHP funding opportunities.

Activities to date meet and surpass the proposed SERA-46 milestones for Objective 1 listed below:

* By Spring 2020 SERA-46 will have developed at least one video featuring the MARB Watershed Leadership Network to share with HTF.
* By Spring 2020 SERA-46 will have reaffirmed or established new liaisons between SERA-46 and at least 3 other multistate committees addressing SERA-46 and HTF Shared Priorities
* By Spring 2021 SERA-46 will have developed and implemented a strategy for collaboration with the agriculture and food industry, including farmers, fishermen, and restaurateurs.

**Objective 2**: *Strengthen the knowledge base for the discovery of new tools and practices as well as for the continual validation of recommended practices.*

* Strengthen the science base that informs our understanding of the efficacy of nutrient and water management strategies at multiple temporal and spatial scales.
* Refine and increase the use of appropriate nutrient and water decision support tools for better decision-making.
* Promote environmental assessment research to improve soil and water quality.

The above objectives are achieved through the activities listed below -

SERA-46 continues to meet with HTF/CC by having representation at CC calls to hear needs and issues. The members serve on state-level hypoxia working groups to prioritize state action plans.

In August 2022, the International Drainage Symposium was held in Des Moines, IA. This brought together researcher, engineers, NGOs, and agency personnel to discuss and learn from others about drainage needs and research. This included numerous presentations on drainage water quality, drainage design, and edge of field practices. Over 200 attendees representing 13 countries.

Monitoring:

Through partnerships with multiple universities, efforts to monitor water quality have focused on two pilot watersheds: the Embarras River (HUC 8: 05120112) monitored by the University of Illinois, and the Big Sunflower River (HUC 8: 08030207) monitored by Mississippi State University. Historic data available through USGS as well as current data gathered by these monitoring efforts are used as components when constructing water quality models to assess water quality improvements due to conservation implementation within the entire Mississippi River Basin. This year, Mississippi State University ceased water quality monitoring Big Sunflower River watershed after cover crop termination per the original proposal and data has been organized and analyzed. Preliminary results of the monitoring and comparison with historical data was presented in a poster presentation at the MS Water resource Conference April 12-14. The University of Illinois has completed monitoring of the Embarrass River watershed associated with bioreactor implementation and is currently working through data management and analysis. Summary analysis is underway.

Water quality monitoring continues within individual state research and extension activities, such as Discovery Farms project in both Arkansas and Wisconsin. Also, related, the strip trial research, education, and demonstration program has been ongoing since 2016 in Missouri. The “MU Certified” Strip Trial Program is a grower-focused program designed to help Missouri farmers and crop advisors compare on-farm management decisions and practices in a low-cost, low-risk setting. University staff work with farmers to implement field-scale, side-by-side comparisons of management practices on their farm. All farmers get a personalized summary report of results from their field. Additionally, results are summarized across multiple sites and years, so all Missouri farmers have access to impartial information to guide decisions and evaluate new management practices.

Farmer exchanges:

In addition to providing an exchange forum among farmers, the Farmer-to-Farmer Summit described below under Objective 3 also informs researchers and research priorities about realities of utilizing university research results. The 2022 Basin-wide Stewardship Summit provided insights for field researchers exploring conservation practices.

Activities to date meet and surpass the proposed SERA-46 milestones for Objective 2 listed below:

* By Spring 2020, SERA-46 will have met with HTF/CC members for hearing needs and issues as well as sharing the proposed goals and activities
* By Fall 2020, SERA-46 will have identified key areas of needed emphasis based on SERA/HTF engagement and state summaries of research efforts.
* By Spring 2021, SERA-46 will have produced a summary paper and begun some multistate research/validation efforts.

**Objective 3**: *Improve the coordination and delivery of educational programming and increase the implementation effectiveness of nutrient management strategies for agricultural and non-agricultural audiences.*

* Customize educational programming (and information sharing) to the learning styles of the various audience segments - Farmers, Farm Advisors, Agencies, Extension Agents, and the public.
* Increase the emphasis on social science factors in targeting educational methods to increase conservation adoption and effectiveness.

Farmer to Farmer Summit:

One of the prominent goals to improve the delivery of educational material is for farmers to engage in farmer-to-farmer communication. To this end, the current SERA-46 project (with financial support from USEPA) has planned and held a series of field days encouraging that communication which we dubbed our Farmer-to-Farmer exchanges. After a 28-month hiatus from in-person exchanges due to the pandemic, a Basin-wide Land Stewardship Summit, was hosted in Elkhorn, WI June 20-22, 2022. Over 60 individuals registered for the event with approximately 50 in attendance including farmers, farm advisors, agencies representative, non-profit organizations, landowners, and academics. We had a dynamic program of farmer leaders as speakers that demonstrated their on-farm stewardship. Topics addressed: cover crops decision making, planting and termination practices, and general experiences with different equipment, cover crop species, planting, and termination strategies; farmer experiences around initiating and sustaining farmer-led watershed groups; and experiences with field trials and applying research insights on working farms.

Conservation Demonstration Expansion across the MARB:

Multiple SERA-46 participants have support demonstration of proper conservation techniques across the basin. These demonstrations provide a powerful tool when advocating for the adoption and implementation of conservation practices. Among recent demonstrations, the University of Illinois has installed a denitrifying bioreactor at a demonstration site in Rock Island County. The drainage area for this project is roughly 90 acres and could remove around 240 pounds of nitrogen per year, 25% of the watershed nitrate load. A cover crop program also helps distribute cover crop seeds to farmers which have been very successful. The University of Kentucky has been producing virtual content (field days, videos) designed to highlight different grazing management conservation practices and where they’re needed on the landscape. Additional content is emerging through the OneGoodIdea platform noted below.

Farmer-Led Watershed Conservation Demonstration & Protection Mini-Grant Program:

Building on activities of the past three years, in 2022, four additional (and final) mini-grants were distributed to farmer-led groups in the Mississippi River Basin. Funded proposals this year included: [1] Environmental Initiative & Cannon River Ag Collaborative (MN): The partnership also includes 6 Soil and Water Conservation districts and aims to build a tour of farms employing soil health practices to enhance community understanding of how conservation effects agriculture and water quality. [2] Champaign Soil and Water Conservation District (IL): The proposal adopts many of the same approaches of the successful 2021 application, which aims to host a field day that features conservation and nutrient loss reduction efforts with farmer leaders. [3] Bluegrass Greensource (KY): The proposal focuses work on Hinkston Creek, which is priority watershed to convene a farmer-to-farmer event and watershed leadership training with 5 farmer leaders and engaging FFA Junior Conservation Team. [4] The Wetlands Initiative (IL): The proposal aims to have a field day that features a tile treatment wetland that has already been installed, which will serve as a demonstration for nutrient loss reduction stewardship.

More information about the program can be found on Mississippi State University’s REACH website [here](https://www.reach.msstate.edu/grant-application.php). We also started mapping mini grants to demonstrate the spatial distribution and impact. The project [StoryMap](https://storymaps.arcgis.com/stories/8792e581f536482cac65276d378202ea) can be found here:

One Good Idea Platform & Campaign:

One Good Idea was conceived as a multimedia clearinghouse of information that features farmers’ ideas and experiences with practices that are helping them improve their soil, land, and bottom lines.

The website hosts videos and podcasts by farmers, for farmers, backed by research.

The platform continues to receive content, grow, and engage audience members through the development and dissemination of newsletters. A strategic board for OGI was convened which includes project team members, producers, and other stakeholders. In addition, a content review committee has been formed, which includes producers, Extension personnel and other professionals. A formal content review process provides a scientific review of content received. The website and its content can be accessed at <https://goodideafarm.org/>, and has social media on [YouTube](https://www.youtube.com/channel/UCYnEAj5RnIXkH6WJ8vcorCA), [Facebook](https://www.facebook.com/goodideafarm/), and [Twitter](https://twitter.com/GoodIdeaFarm).

Activities to date meet and surpass the proposed SERA-46 milestones for Objective 3 listed below:

* By Spring 2020, SERA-46 will have reported to the HTF on farmer-led watershed activities and demonstration efforts throughout the MARB
* By Fall 2020, the HTF will have identified and expanded information of model programs working with farmers to at least one state.
* By Spring 2021, SERA-46 will have developed an online platform for communicating farmer-led watershed activities, decision support tools, and information related to conservation effectiveness- aggregating farmer resources

**Impacts:**

Project impacts during this period have focused around advancing research and farmer engagement related to nutrient management, conservation practices, and nutrient loss reduction. Related initiatives overlapped through efforts such as the North Central Soil Health Team and North Central Regional Water Network, plus others. Broad issues addressed include: Sediment and Nutrient Loss Reduction,

Conservation Practice Tracking for the Mississippi River Basin, Decision Support Tools for Nutrient and Sediment Management, Innovative Approaches to Manure Management, Land Use of Riparian Ecosystems in the Northern Great Plains, Nitrogen Management in Tile Drained Landscapes, and

Systems Approaches in Water and Nutrient Management Education.

**Publications:**

Collaborations/Sponsored Projects/Publications as a result of SERA-46 involvement March 2022-July 2023.

Conference presentations:

2023 Universities Council on Water Resources (UCOWR) Annual Conference, Special Session: “Strategies to enhance farmer-led conservation delivery and adoption for nutrient loss reduction.” Including presentations by Amanda Gumbert (UKY), Jenny Seifert (UW), Beth Baker (MSU), Mike Daniels (UArk), Rachel Curry, Laura Chistianson, Reid Christianson (UIUC), Ellen Gilinsky (NGRRE, IL), Brittany Isidore (UW).

Publications

Arel, C., Brye, K.R., Fryer, M. and Daniels, M. (2022). Cover Crop Effects on Near-Surface Soil Aggregate Stability in the Southern Mississippi Valley Loess (MLRA 134). Agricultural Sciences, 13, 741-757. https://doi.org/10.4236/as.2022.136048.

Feyereisen G.W., Hay C.H., Christianson R.D., Helmers M.J. (2022) Frontier: Eating the Metaphorical Elephant: Meeting Nitrogen Reduction Goals in Upper Mississippi River Basin States. Journal of the Asabe 65:621-631. DOI: 10.13031/ja.14887.

Lebeau, S., K. Brye, M. Daniels, and L. Wood. 2023. Cover Crop Effects on Infiltration, Aggregate Stability, and Water Retention in the Lower Mississippi River Valley. Agrosyst. Geosci. Environ. Vol 6(1): 1-14. <https://doi.org/10.1002/agg2.20341>.

Wardropper, C., K. Genskow, A. Lavoie, D. Franklin, E. Usher, A. Wilke, J. Arbuckle, D. Jackson- Smith, L. Prokopy, A. Rissman. 2023. Policy process and problem framing for state Nutrient Reduction Strategies in the US Upper Mississippi River Basin. Journal of Soil and Water Conservation. Vol 78(1):70-81. doi:10.2489/jswc.2023.00025