Project Title
Reducing Total Phosphorus and Sediment Loads in the Yahara Watershed Through Wisconsin’s Adaptive Management Option

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Collaborating Partners
Madison Metropolitan Sewerage District; Clean Lakes Alliance; Sand County Foundation; Yahara Watershed Improvement Network (Yahara WINS); University of Wisconsin-Madison

Funding Pool
Critical Conservation Area (Mississippi River Basin)

Brief Project Summary
Wisconsin is the first and currently the only state in the country to formally include an innovative, regulatory compliance option for addressing phosphorus, called Watershed Adaptive Management. The first adaptive management project in Wisconsin is currently underway in the Yahara watershed. Our primary goal in this proposal is to engage the agricultural community in this collaborative, watershed-based approach to meet water quality standards, by combining traditional and innovative practices to reduce phosphorus and sediment loads in surface waters located in the Yahara River watershed that have been identified as impaired by phosphorus and/or total suspended sediment in the Rock River Basin Total Maximum Daily Load (TMDL). A watershed plan will be developed, and conservation practices with an innovative delivery system will be implemented in eight sub-watersheds within the Rock River TMDL, targeting conservation practices and cost share assistance to agricultural producers located in the most critically identified areas. Four alternative conservation innovations will be implemented, paid for by partner funds. This project will enable a diverse coalition of partners, including agricultural producers, to expand the geographic scope of the adaptive management efforts, test innovative delivery approaches, and serve as a model for collaboration between the water, wastewater, and agricultural sectors.

Geographic Location
The Yahara River watershed is located in Dane County in southern Wisconsin (Figure 1), and is part of the Rock River sub-basin, and Mississippi River Basin. The Yahara watershed covers an area of 359 square miles with over 540 miles of rivers and streams, and connects four successive lakes. The watershed is home to some of the most productive agricultural land in the nation.

Project Start/End Date and NRCS Requested EQIP Funding
November 1, 2014 through September 30, 2019

Table 1. Funding to be provided through the NRCS EQIP program.

<table>
<thead>
<tr>
<th></th>
<th>Year 2014-15</th>
<th>Year 2015-16</th>
<th>Year 2016-17</th>
<th>Year 2017-18</th>
<th>Year 2018-19</th>
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<td>$240,000</td>
<td>$240,000</td>
<td>$240,000</td>
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<td>$100,000</td>
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NRCS Requested Total Funding = $1,740,000
Partner Provided Total Funding = $5,050,000
SOLUTIONS FOR A CLEANER YAHARA

Resource Concerns
While there are multiple and diverse sources of phosphorus and total suspended solids in the Yahara watershed, agriculture is the single largest source of both pollutants. Traditional implementation approaches, in which each source of phosphorus and sediment works independently to reduce loads, have not been able to achieve desired water quality outcomes. Our goal is to apply the Wisconsin Watershed Adaptive Management approach that, successfully implemented, would eliminate the need for new regulatory-driven requirements focused on the agricultural sector. The partnerships in place will facilitate an acceleration of the implementation of conservation practices through a cost-effective approach targeting areas that are critical in terms of soil and water health, as well as critical for building the capacity to scale up the Adaptive Management project to the entire Yahara watershed.

Project Goals
A key goal of the project is to move beyond standard conservation practice approaches to promote an ethic of phosphorus-efficient, lower-impact farming in the Yahara Watershed. The project has three main components: 1.) traditional NRCS conservation practices, 2.) four additional innovative practices to be funded by partners, and 3.) the development of a comprehensive watershed plan for delivery and implementation of practices. Together, these components will help us achieve water quality standards.

The project will rely heavily on voluntary practices implemented on privately owned land. Table 2 contains a list of conservation practices and implementation goals for each practice by year for this five-year project. Each practice in Table 2 will follow a combination of NRCS and Dane County cost-containment protocols to ensure that all practices are implemented in the most cost effective manner.

Table 2. List of NRCS Conservation Practices Implemented by Year in the Yahara Watershed RCPP Project

<table>
<thead>
<tr>
<th>Conservation Practice</th>
<th>Units</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>Total Amount</th>
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<tr>
<td>Cover Crop</td>
<td>Ac</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>10,000</td>
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<tr>
<td>Diversions</td>
<td>Ft</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
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<tr>
<td>Grade Stabilization Structures</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Grassed Waterways</td>
<td>Ft</td>
<td>3,000</td>
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<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
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<tr>
<td>Nutrient Management</td>
<td>Ac</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
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<tr>
<td>Roof Runoff Structure</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Roofs and Covers</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
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<tr>
<td>Sediment Basins (Barnyards)</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
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<td>Stream Bank and Shoreline Protection</td>
<td>Ft</td>
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<td>1,000</td>
<td>0</td>
<td>0</td>
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<td>Terrace</td>
<td>Ft</td>
<td>1,000</td>
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<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
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<tr>
<td>Vegetative Treatment Area</td>
<td>Ac</td>
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<td>0</td>
<td>1</td>
<td>1</td>
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<td>3</td>
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<td>Waste Storage Facility</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
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<tr>
<td>Wetland Restoration</td>
<td>Ac</td>
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<td>4</td>
<td>0</td>
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<td>4</td>
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</tbody>
</table>

Adjustments to NRCS EQIP Terms
To insure the success of this project the following EQIP program adjustments are requested:

- Provide Nutrient management incentive payments to all acres operated by the producer if those acres reside in the Mississippi River Basin and the majority of operators lands are within the project area boundary.
• Allow for an exemption in implementing the NRCS 590 standard the first year that the producer signs up for this practice.
• Make all NRCS practices eligible regardless of whether they are core or supporting practices.

This project will advance the following four alternative conservation practices and will include methods for testing their effectiveness in improving water quality:
• Zero Tillage - provides extended no-till cost assistance to insure implementation for up to 10 years. The intent of this extended cost assistance is to provide security to the producer while they transition to a no-till system.
• Harvestable Buffers - is the establishment of perennial grass cover that can be harvested and utilized while maintaining the environmental benefits of grass buffer strips. Producers have the option of installing a buffer or a field border strip with a cool-season or native prairie grass mix.
• Drainage Ditch and Stream Dredging – is the removal of legacy sediment and phosphorus in ditches and streams. Eroded sediment and phosphorus from adjacent landscapes are often deposited in ditches and streams to be resuspended during significant storm events. This practice will aid in preventing the resuspension of legacy sediments and phosphorus that can often mask improvements in water quality.
• Community Manure Processing and Storage Pilot - is the construction of a regional manure storage structure to provide agricultural produces with a safe and temporary location for storing manure during critical times throughout the year. Producers will have an alternative solution to land applying manure should unforeseen circumstances arise.

The comprehensive watershed management plan will be funded by Sand County Foundation and be developed at the inception of the project. The plan will provide a baseline of relevant information as to water quality, agricultural land management, and farmer attitudes, and be a dynamic framework for progress toward healthy, safe and environmentally sustainable lakes, rivers and streams in the Yahara River watershed. The plan will be updated and reviewed biannually and will provide the foundation for transition of this project into a much longer Watershed Adaptive Management Project.

Maximizing effectiveness

Targeting priority areas

Data from the on-going adaptive management pilot project show that a large proportion of producers in the Yahara watershed are currently meeting state regulatory requirements and have adopted and begun implementing various conservation systems; however, just meeting the regulatory requirements will not ensure that water quality goals will be met. Increased frequency and intensity of rainfall events can increase runoff and limit potential improvements in water quality; therefore, we have been working together with producers to explore ways to engage the agricultural community to go above and beyond regulatory non-point requirements and find new techniques in which traditional and innovative conservation systems can be implemented and maintained.

To ensure cost-effective and results-oriented implementation, partners will first engage and work with those agricultural producers located in the most critical identified areas of the watershed, providing priority cost share assistance for implementing conservation practices. Critical areas are identified by soil and water health vulnerability as well as by geographic and demographic characteristics that will increase the capacity for expanding Adaptive Management full-scale. Should funds still be available, subsequent priority area projects will be funded until all funds are expended and/or project goals are met.

Leveraging resources and ongoing initiatives

Through this project, we will leverage technical information and participation from other significant local water quality initiatives in our region. The Wisconsin Department of Natural Resources and EPA-
approved Rock River Total Maximum Daily Load (TMDL) includes a quantitative and geographically targeted analysis for phosphorus and sediment. In addition, multiple Soil and Water Assessment Tools (SWAT) modeling projects have been conducted in the watershed. The upper portions of the watershed have been the focus of two previous Mississippi River Basin Initiative projects and three priority watershed projects. As a subwatershed of the Upper Mississippi River, we also note that implementation of the Rock River TMDL in our watershed will go above and beyond the 45% reduction goal of the Mississippi River Hypoxia Task Force. These on-going efforts provide a robust dataset to support future activities, and a foundation for collaborative efforts that can be scaled throughout the watershed.

Additional efforts have been conducted to more accurately identify critical phosphorus and sediment contributing areas within the Yahara Watershed. These include conducting detailed SWAT modeling of the Yahara Watershed, with the most recent modeling effort being completed in June of 2014. Our project will use the updated information from these modeling efforts to prioritize and target resources to improve water quality and meet water quality objectives.

**Ensuring Conservation Practice Implementation**

*Supported Solutions*

Project partners have held multiple surveys and informational meetings specifically asking agricultural producers in the project area which practices and conservation systems they are most likely to adopt and implement. Of those agricultural producers surveyed, respondents indicating they are or would be willing to implement a conservation practice are as follows:

- 90% for Nutrient Management Planning, 50% for cover crops, 90% for roofs over feed lots, 55% for terraces, 80% for roof runoff structures, 90% for grassed waterways, 35% for harvestable buffers, and 70% for drainage ditch/stream dredging.

**Innovative Conservation Delivery**

In order to ensure a high percentage of practice implementation, this project will use an advanced approach to deliver systems, building on approaches that are already successfully utilized in our watershed. This includes:

- Traditional financial and technical assistance provided through the various federal, state, and local programs, which can be stacked and leveraged to offer cost share assistance to cover up to 90% of the costs for eligible practice implementation,
- Reverse auction bids for phosphorus reduction,
- No interest (0%) loans, and
- Farmer-led conservation initiatives.

**SUCCESSFUL PARTNERSHIPS**

*Proven Agricultural Relationships*

- Dane County and collaborating partners have a strong working relationship with agricultural producers in the watershed as well as a proven track record with assisting producers with various federal, state, and local cost assistance programs. In 2013 the County administered and allocated over 1 million dollars through various cost share programs. Dane County has also aided 60 to 80% of the landowners within the project area in the development and implementation of conservation plans and practices.
- The Clean Lakes Alliance (CLA), a non-profit watershed partner, helped found and supports an affiliated, active farmer-led organization in the watershed, Yahara Pride Farms. Their focus has included fostering the creation and growth of a farmer-to-farmer model of conservation farming, education, and outreach; and expanding educational and outreach opportunities that bring together farmers, agribusiness, researchers, local government staff, and urban residents.
Innovative Collaboration

- The Yahara Watershed Improvement Network (Yahara WINs) brings together over 30 partners (9 Towns, 9 Villages, 5 Cities, 4 NGO’s, 3 Government Agencies, and 3 Utility Companies) and is working collaboratively to pilot the first adaptive management project in Wisconsin. Led by Madison Metropolitan Sewerage District, these partners are working together on innovative and cost effective efforts to reduce phosphorus and total suspended sediment at a watershed scale.
- The CLA and Yahara Pride Farms, bring new innovation, strategy and financing capacity to water quality improvement efforts in the Yahara watershed. CLA is a key partner in Yahara WINs, and will play a critical role in the proposed project by engaging the community as a whole on outreach and education activities focused on improving water quality, with a particular emphasis on phosphorus and total suspended sediment.
- Eight University of Wisconsin-Madison research faculty from four departments will provide scientific guidance to the project with respect to project scope; establishing measurable, achievable goals; designing conservation practices that will lead to specific environmental outcomes; planning farmer-led outreach; and assessing results. An outcome of this work will include specific suggestions for NRCS and partners to integrate flexibility, farmer participation, and jointly defined and targeted landscape outcomes into program delivery.

MEASURING SUCCESS
Success of the project will be measured in a number of ways including both metrics on the adoption and implementation of conservation practices and the impact practices have on water quality. Specific deliverables will include:

- number of producers contacted,
- number of cost share agreements,
- percent of cropland under Nutrient Management Plans
- number and amounts (acres, ft, number, etc.) of practices implemented,
- amount of cost share funds expended,
- modeled reductions in sediment and phosphorus runoff reduced by practices and corresponding improvements in water quality,
- pounds of total suspended solids and phosphorus reduced from reaching surface waters,
- water quality analyses on changes in numerous constituents, and
- analysis and relationship between modeled water quality improvements and monitored water quality data.

A robust water quality monitoring program is critical to document progress toward meeting applicable numeric water quality criterion and load reductions for total phosphorus (TP) and total suspended solids (TSS) specified in the Rock River TMDL. Monitoring in support of this RCPP grant request will build off of the monitoring network currently in place to support the adaptive management program and other water quality initiatives in the Yahara watershed. This includes water quality monitoring at five (5) USGS gaging stations, twelve (12) sites monitored directly by Madison Metropolitan Sewerage District, and twenty two (22) sites monitored through a volunteer citizen monitoring program administered by the Rock River Coalition and funded through the Yahara WINS adaptive management project. This project will also incorporate edge of field monitoring sites to evaluate specific nutrient and sediment reductions from various innovative practices including harvestable buffers and zero tillage.

FINANCIAL CONTRIBUTIONS
The estimated cost for completion of the 5-year project is $6,780,000. Dane County and partners are requesting a total of $1,740,000 (26%) from NRCS over five years. Of this, $1,240,000 will be used for financial assistance through the NRCS –EQIP program to assist producers in implementing conservation practices. These funds will be leveraged with $5,050,000 (74%) in total contributions (direct and in-kind).
provided by partnering organizations over the same five-year period. Of the $5,050,000; $2,500,000 will be used to provide financial assistance for NRCS practices and cover up to 90% of the cost for implementation. Partner financial assistance will also be used to fund harvestable buffers, zero tillage, ditch/stream dredging projects, a regional community manure processing and storage site, and water quality monitoring.

**Partner Technical Assistance**

Technical assistance funding requested from the NRCS for the duration of the project is $500,000. This funding will be leveraged with $300,000 in technical assistance funding provided by the partners. Funding from NRCS for technical assistance will be used for the design, review, construction, and certification of conservation practices implemented according to NRCS FOTG standards and specifications. Technical assistance dollars associated with partner contributions will be used for both NRCS contracted practices as well as those practices needing technical assistance that are funded through partner financial assistance.

**Additional Financial Assistance**

Monitoring: Yahara WINs participants will contribute $1,250,000 in water quality monitoring over the duration of the project.

Outreach and education: Partners are allocating $500,000 to continue to conduct outreach and education programs to the many agricultural produces located throughout the project area. These programs include farmer-led conservation test trials and demonstrations.

Planning: Sand County Foundation will fund the development of a comprehensive watershed management plan, which will be updated and reviewed biannually and will provide the foundation for transition of this project into a much larger Adaptive Management Project.

Partners will be contributing $500,000 in administrative and miscellaneous expenses. This funding will aid in covering expenses to update current record keeping systems and models in order to more accurately track and evaluate improvements in water quality as a result of conservation systems. This project will expand on current efforts to convert conservation practice records into spatially referenced components that can be incorporated into the most recent evaluation and assessment tools (RUSLE2, SNAP Plus, SWAT, etc.). Partner administrative and miscellaneous funding will also be used to continue development of a refined field scale Triangular Irregular Network (TIN) SWAT model that will aid in the prioritization and quantification of conservation practice oriented water quality benefits with consideration given to individual practice and systems landscape position.

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<tr>
<th>Total 5 Year Budget</th>
<th>NRCS Request</th>
<th>Partner Provided</th>
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<td></td>
<td>Cost</td>
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<tr>
<td>Conservation Practice FA</td>
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</tr>
<tr>
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<td><strong>Totals</strong></td>
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<td><strong>Percent Contributions</strong></td>
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