The St. Croix/Red Cedar River Basin Farmer-Led Watershed Council Project:

Utilizing Performance-Based Farmer-Led Watershed Councils to Reduce Phosphorus Runoff, Improve Water Quality and Enhance Agricultural Productivity

Prepared by: Julia Olmstead, June 3, 2013

Executive Summary

Project objectives: To improve water quality in the Red Cedar and St. Croix River basins through reduced phosphorus and sediment loading; to increase farmer knowledge on, and engagement with, water quality issues, including the adoption of conservation practices; to develop leadership around water quality among farmers in the selected sub-watersheds; and to develop a unique collaborative model of water quality improvement through farmer engagement that can be replicated in watersheds throughout the Upper Mississippi River Basin and nationwide.

Project methods: Phosphorus (P) pollution reductions and the expansion of farm conservation activities will occur by way of an innovative, farmer-directed conservation incentives program. We are currently developing farmer-led watershed councils in four target subwatersheds (HUC 12; ~10-15,000 acres) in Pierce, Polk, St. Croix, and Dunn Counties. Each watershed council will be given approximately $50,000 annually, with which they can design a conservation incentives program that achieves water-quality goals. The farmers themselves will determine the best paths to conservation success within their watershed, and will recruit and encourage other producers to participate. University of Wisconsin-Extension and conservation staff from the county land conservation departments will work closely with the farmer councils to provide technical assistance, facilitation, and education, as well as monitor the project's outcomes.

Participating partners:
Dunn County Land Conservation Department
Kinnickinnick River Land Trust
Pierce County Land Conservation Department
Polk County Land Conservation Department
St. Croix County Land Conservation Department
Tainter-Menomin Lake Association
University of Wisconsin-Extension
Wisconsin Department of Natural Resources
Wisconsin Farmers Union

Deliverables:

1. Phosphorus indices in each watershed.
2. Measureable reductions in P runoff.
3. Farmers will have increased knowledge of water quality issues, including the impacts of their management decisions on water quality.
4. Participating farmers will be recognized as conservation leaders, encouraging their continued participation and inspiring the transfer of best practices.
5. Project results will be shared at professional and public agricultural and watershed management meetings and conferences to encourage transfer of the model and approach.

Project Description: Utilizing Performance-Based Farmer-Led Watershed Councils to Reduce Phosphorus Runoff, Improve Water Quality and Enhance Agricultural Productivity

a. Project background:

The St. Croix and Red Cedar River Basins, situated in west central Wisconsin, each contain several impaired waterways, including fourteen total maximum daily load (TMDL) projects between the two. The land base in these basins is predominantly agricultural. Poorly managed farming systems that create excess nutrient and sediment run-off are a primary source of pollution. According to the U.S. Geological Survey, agriculture sources contribute more than seventy percent of the nitrogen (N) and phosphorus (P) pollution to the Gulf of Mexico via the Mississippi Basin.[1] Because these basins both drain into the Mississippi River, strategies to decrease agriculture's contribution to nutrient and sediment pollution would have a significant impact on improving water quality in the Upper Mississippi River Basin (UMRB) and further downstream.

There have been many attempts to reduce P and other nonpoint source (NPS) pollutants within these basins, with mixed results. Strategies to-date have largely focused on the development of technical tools for assessment and improvements, but have missed the human social factors – in essence, farmers internalizing the need for better water quality, and making long-term, coordinated management decisions based on that internalization – that are necessary for the widespread diffusion of those tools and sustainable water quality improvements.[2]

The U.S. Environmental Protection Agency recognizes the importance of citizen participation in successful long-term NPS strategies.[3] But the lack of progress in meeting TMDL and other NPS reduction goals in the affected basins demonstrates a need for an innovation to better engage farmers in environmental management. In Iowa, a Farmer-Led Watershed Council model that combines performance-based environmental management with farmer leadership and civic engagement has resulted in significant improvements in the Soil Conditioning Index (SCI) and Phosphorus Index (P index), reduced nitrogen use, and reduced sediment delivery, all due to participants' management changes.[4] This successful innovation, which has been replicated in several sub-watersheds in northeast IA with similar success, serves as the model for our project.

In Iowa, these successes have occurred in HUC 12 or similar scale watersheds. Farmer councils were developed in each watershed. Iowa State Extension provided technical and financial resources to allow the farmers to determine the best conservation mechanisms for improved

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[1] Alexander, Richard B., Richard A. Smith, Gregory E. Schwarz, Elizabeth W. Boyer, Jacqueline V. Nolan and John W. Brakebill. 2008. "Differences in Phosphorus and Nitrogen Delivery to the Gulf of Mexico from the Mississippi River Basin." *Environmental Science & Technology* 42(3):822-830

[2] Morton, Lois Wright and Chich Yuan Weng. 2009. "Getting to Better Water Quality Outcomes: The Promise and Challenge of the Citizen Effect." *Agriculture and Human Values* 26(1):83-94

[3] U.S. EPA. 2008. *Handbook for Developing Watershed Plans to Restore and Protect Our Waters.* USEPA. Office of Water Nonpoint Source Control Branch. EPA 841-B-050005

[4] Morton, Lois Wright and Jean McGuire. 2011. "Getting to Performance-Based Outcomes at the Watershed Level" in *Pathways for Getting to Better Water Quality: The Citizen Effect* edited by L.L.W. Morton and S.S. Brown. New York: Springer.

water quality. In each watershed, farmers developed a set of performance-based incentives that they encouraged all producers within the watershed to adopt. The co-development of farmer leadership alongside strong technical support and facilitation has led to wide participation within the watersheds, increased adoption of conservation practices, and long-term commitment to these management strategies by farmers. The projects are all ongoing.

Our project, made up of four pilot sub-watersheds ranging from about 7,000 to 33,000 acres in the St. Croix and Red Cedar River basins, shares the approach with Iowa. *In this case, however, we have a significant opportunity to observe the effectiveness of this innovation across watersheds, as we are leveraging the technical and financial resources of county, state and non-governmental partners.* This is a unique opportunity to improve UMRB water quality and to further develop and promote a model for farmer engagement that can be spread to other watersheds nationwide.

b. Project objectives

This project will bridge conservation technical assistance with a focus on the role of social capital. University of Wisconsin-Extension, the Wisconsin Department of Natural Resources, the Land Conservation Departments of Dunn, Pierce, Polk and St. Croix Counties, and the Wisconsin Farmers Union are collaborating to significantly and sustainably reduce the predominant source of water quality impairments in the basins: nonpoint P pollution from cropland. **The goals of this project are to 1) improve water quality in the Red Cedar and St. Croix River basins through reduced P loading, 2) to increase farmer knowledge about and engagement with water quality issues, including the increased adoption of conservation practices, 3) to develop leadership around water quality among farmers in the selected sub-watersheds, and 4) to develop a unique collaborative model of water quality improvement through farmer engagement that can be replicated in watersheds throughout the Upper Mississippi River Basin.**

Specific objectives include:

1. The development of farmer-led councils in four pilot watersheds.
2. Phosphorus-loading inventories in each selected watershed. P indices, which rank the relative risk of surface water contamination resulting from P application on cropland, can help with the selection of management strategies that can be used to reduce this risk. We will seek to index as many fields as possible, although the farmer councils will determine goals for participation in P indexing.
3. Measureable reductions in P runoff, as indicated by reductions in P index values.
4. Increased adoption of conservation practices by farmers within the watershed.

We consider this project innovative for the following reasons:

1. We will allow farmers to decide the best paths to water quality and conservation goals, and then provide them with the technical resources to get there.
2. We are combining technical conservation practices with civic engagement and farmer-leadership development strategies at a watershed level.
3. We are leveraging multi-level and multi-location collaboration, including county conservation departments, university extension, the WI Department of Natural Resources, and non-governmental organizations.

c. Project methods

The project is based on a model of civic engagement that develops knowledge and creates leadership and action on water quality by farmers. We are currently developing farmer-led watershed councils in four target sub-watersheds in Pierce, Polk, St. Croix, and Dunn Counties. These sub-watersheds were selected because they have both high P-loads as well as a critical number of farmers receptive to leading projects to educate and involve their local farm community in soil conservation and phosphorus runoff reductions.

One of the key innovations of this project is the leading role farmers will play, a strategy based on the successful participatory models of resident-led watershed projects developed by Iowa State Extension and others. The project coordinator (employed by University of Wisconsin Extension) and the county Conservationists will provide technical support, education and facilitation to the farmer councils, as well as a small pool of money, but will not dictate to farmers the best course of action to achieve water quality goals. The councils will decide how best to approach the task of water quality improvement in their watershed. They will have the freedom to select which conservation practices to incentivize, to create monitoring and evaluation plans, and to devise outreach strategies that are tailored to the particulars of their watersheds. In this way, farmers in the councils will become not only conservation leaders within their watersheds, but also strong advocates for the adoption of conservation practices and resources within their farming communities on water quality improvement through improved agricultural management. This type of participatory approach has shown sustained reductions in P and other water pollutants from agriculture.

This project combines the considerable strengths of the partners with current watershed management TMDL goals in a groundbreaking collaborative. Conceptually, it draws from research and resources on civic engagement from the University of Minnesota, Iowa State University's sociological work on farmer-led, performance-based watershed projects, and the concept of landscape disproportionality analysis from the University of Wisconsin.[5] Project partners have created a local- and county-led watershed management implementation project partnership within the Red Cedar and St. Croix River (WI portion) Basins. Because of the reach of the many partners involved in this collaboration, it promises to increase adoption of both the participatory model as well as the conservation practices themselves beyond the pilot watersheds and throughout the river basins.

Specifically, our methods are as follows:

Objective 1: The development of farmer-led councils in four pilot watersheds. The project coordinator from UW-Extension is working closely with conservation staff from the Land Conservation District offices in each of the four counties that contain the watersheds. Outreach began in February 2013, and the project team will continue to work with farmers both one-on-one as well as in council meetings.

Objective 2: Phosphorus-loading inventories in each watershed. To measure our progress, as well as for the farmer council to target the biggest P contributors, county conservation staff and UW-Extension nutrient management specialists will work with farmers to do P indexing on as many fields as possible within the watershed. The P Index assigns a number - 0, 1, 2, 4, 8 or 16 - to each of the conditions which can affect phosphorus losses, where 0 is the lowest P loss

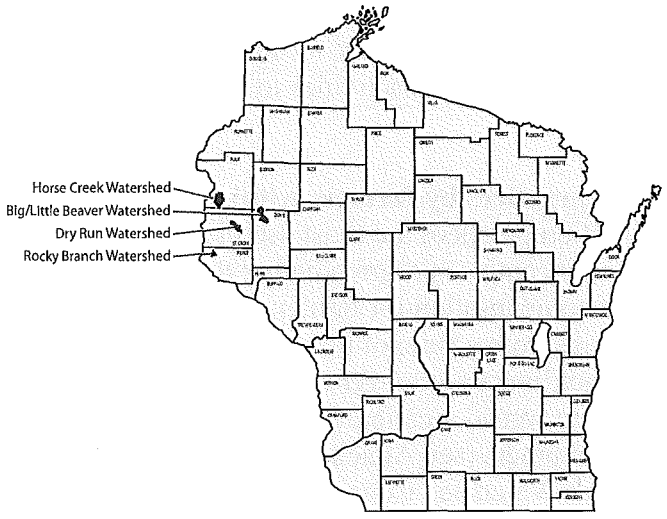
[5] Nowak, Pete, Sarah Bowen, and Perry E. Cabot. 2006. "Disproportionality as a Framework for Linking Social and Biophysical Systems." *Society and Natural Resources* 19:153-173

potential and 16 is the highest P loss potential. This is completed according to the probability of P loss from the site. Council members will take the lead to encourage non-participating or hesitant farmers to get involved.

Objective 3: Measureable reductions in phosphorus runoff. Several of the incentives we suggest to the farmer councils will result in P pollution reductions, including improved manure management, grass waterways, cover crops, grid sampling for precision agriculture methods, and others. We will be able to track these reductions via annual P index assessments as well as by leveraging already existing edge-of-field water monitoring sites that are located in each watershed. We will also encourage farmers to target conservation activities to the heaviest contributors to P loading within the watersheds.

Objective 4: Increased adoption of conservation practices by farmers within the watershed. The farmer councils will determine which conservation practices are most useful and attractive to farmers within the watershed. They will create an incentives program before the start of the growing season, which will offer small amounts of compensation for farmers to adopt conservation practices. Farmers will be able to choose from a suite of incentive options the council has put together, which can include, but is not limited to: cover crop trials, corn stalk nitrate testing, nutrient management planning, manure spreader calibration, grass waterways, phosphorus indexing, grid sampling, bioreactors, and others (see Attachment A: Sample of Performance-based Incentives from the Hewitt Creek Watershed Council project). A key component of the project model is the leadership taken by farmers in influencing each other. The council farmers will play a lead role in encouraging other farmers to become involved, using field days, mailings to other farmers, and one-on-one conversations.

d. Location and size of project area



There are four sub-watersheds: St. Croix River Basin: Horse Creek Watershed, in Polk County, WI; Dry Run Creek Watershed, in St. Croix County, WI; Rocky Branch Watershed, in Pierce County, WI. Red Cedar River Basin: Big/Little Beaver Watershed, in Dunn County, WI. The watersheds all drain eventually into the Mississippi River.

Watershed overviews:
Horse Creek: Begins with intermittent streams in the town of Osceola. Encompasses Lotus, Horse, and Cedar Lakes, and drainages from Round, Church Pine, Wind, Big and Mud Lakes. Watershed is 32,790 acres total with about 11,000 of it is cropped, a mixture of agriculture, forest, and wetlands. 50 operators, mostly corn-soybean operations and a handful of dairies including one CAFO.

Dry Run Creek: Dry Run Creek begins in the town of Emerald with a series of intermittent streams. The Dry Run flows into the South Fork of the Willow River, which discharges into the St. Croix River in Hudson, WI. 18,200 acres, 13,800 is cropped predominantly agriculture, with some forest. 42 operators, mostly grain operations, some dairies and one large CAFO.

Rocky Branch Creek: Watershed begins in the city of River Falls. Intermittent and perennial streams flow north into the Kinnickinnic River, which flows southwest into the St. Croix River. Watershed is 7,043 acres, mixture of agriculture, forest, and wetlands. 15 operators, many crop-livestock operations.

Big/Little Beaver Creek: Watershed encompasses Big and Little Beaver Creeks and Vance Creeks, both flow into the Hay River, which enters the Red Cedar River at Tainter Lake. The Red Cedar River flows into Lake Menomin and eventually into the Chippewa River. Watershed is 26,493 acres, mixed agriculture and forest land. 25 mixed crop-livestock operations.

f. Project Action Plan and Timeline

Table 1: Project tasks and timeline 2013-2014

Action/Milestone	2013			
	Q 1	Q 2	Q 3	Q 4
Objective 1: Development of farmer-led councils in four pilot watersheds				
One-on-one meetings				
Farmer-council meetings				
Outreach plan developed by farmers				
Objective 2: P loading inventories in each watershed				
UW-Extension and county Land Conservation Departments develop P indices with farmers				
Farmer outreach to encourage other farmers				
Objective 3: Measureable reductions in phosphorus runoff				
Farmer councils develop incentives program				
Incentives program enrollment				
Incentivized activities implemented with help of counties and UW-Extension				
Objective 4: Increased adoption of conservation practices by farmers within the watersheds				
Farmer councils develop incentives program				
Incentives program enrollment				
Incentives program enrollment				
Field days				

g. Project management

The project team, excepting Julia Olmstead who was hired by extension for this project in January 2013, has worked together on this project and others for several years. We will have regular project meetings to be sure we are meeting deadlines and benchmarks. We also have regular check-ins and communications with other project partners, including the Wisconsin Department of Natural Resources. Government entities (UW-Extension and county government) will play leading roles in the project. Non-government partners, including the Wisconsin Farmers Union, which will administer the grant, will also play key roles. We have strong support and partnerships as well with other non-governmental organizations, including the Tainter/Menomin Lake Association and the McKnight Foundation. UW-Extension and the Wisconsin DNR, in close communication with the Project Director, will oversee monitoring of the project's outcomes and progress.

Table 2: Project Personnel and their roles

Key Project Personnel	Roles and Responsibilities
Julia Olmstead will serve as the project director. She is the Farmer-Led Watershed Council Coordinator and Educator with University of Wisconsin-Extension. She has master's degrees in plant breeding, sustainable agriculture and journalism, and experience working with stakeholder groups around agriculture conservation initiatives.	Olmstead will be responsible for general oversight of the project, reports, the project blog and communications with NRCS. She will also have primary responsibility for convening and facilitating the farmer-led councils, and will participate in all other tasks.
Tom Quinn is the Executive Director of the Wisconsin Farmers Union, and a former dairy farmer. He has decades of administrative experience and in agriculture.	Quinn will oversee external grant management and accounting.
Paul Kivlin is a nutrient management specialist with University of Wisconsin-Extension. He is an expert in nutrient management, phosphorus indexing, and water quality monitoring.	Kivlin will oversee phosphorus indexing, water monitoring, and will coordinate with county conservation staff for nutrient management practices.
Robert Heise is Conservationist for St. Croix County. He oversees the county conservation planners.	Heise will oversee technical support for the Dry Run Creek watershed. His division is devoting ¼ staff time to support the Dry Run Creek watershed council.
Dan Prestebak is Conservationist for Dunn County. He oversees the county conservation planners.	Prestebak will oversee technical support for the Big/Little Beaver watershed. His division is devoting ¼ staff time to support the Big/Little Beaver watershed council.
Tim Ritten is Conservationist for Polk County. He oversees the county conservation planners.	Ritten will oversee technical support for the Horse Creek watershed. His division is devoting ¼ staff time to support the Horse Creek watershed council.
Rodney Webb is Conservationist for Pierce	Webb will oversee technical support for the

County. He oversees the county conservation planners.	Rocky Branch watershed. His division is devoting ¼ staff time to support the Rocky Branch watershed council.

h. Project deliverables/products

1. A model for developing farmer-led watershed councils for water quality
    a. Fact sheets outlining the process
    b. Samples of incentives programs and outreach materials
    c. A regularly updated blog aimed at practitioners seeking guidance and examples of watershed-based conservation work with farmers

2. Conservation practice adoption
    a. With farmers as our guides and "experts", we will know more about what works in which watershed, and what are attractive and feasible conservation practices for long-term water quality improvements
    b. Farmers will serve as educators and leaders within their communities around water quality and conservation practices
    c. Participating farmers will be publicly recognized as conservation leaders

3. Reductions in phosphorus pollution and other conservation improvements
    a. Using edge-of-field water monitors, phosphorus indices and other measures, we will track changes in nutrient and sediment pollution that result from this project

4. Benchmarking tools that are useful to both conservation professionals, as well as to farmers
    a. We will develop and implement monitoring and tracking procedures that mark progress on water quality improvements and link best management practices to those improvements
    b. A "best management practice tracking tool" will be developed that can be used by others

i. Benefits or results expected and transferability

The above deliverables will have benefits that range from the very local to national. The development and refinement of a collaborative model for creating farmer awareness, engagement and leadership around water quality will be useful for NRCS staff and other practitioners seeking to do similar work both in the Upper Mississippi River Basin and beyond. The model needn't be limited to agriculture. It could also be used as a template for similar civic engagement work with forested landowners, within fisheries, or other arenas. Fact sheets, a blog, and other written and online materials will make this model more accessible to others and facilitate transferability.

Our method for increasing conservation practice adoption – by outfitting farmers to be leaders within their own agricultural communities, will have multiple benefits. The first is, of course, an increase in conservation, which will have positive outcomes for water and soil quality, among other environmental benefits. It will also help to inform NRCS and Extension staff, along with other practitioners, of the practices that bear the most fruit with farmers, in terms of what they will most readily adopt and what creates a desire to make a change. We will document this process to facilitate transferability and to inform the work of others.

Because the model promotes long-term change, in time the improvements will have a significant impact on water quality within the watersheds themselves, and as part of the Mississippi River Basin.

j. Goals and Progress

Goal	Completed?	Notes
Year 1: 2013		
Hire Coordinator	Yes	
Civic Engagement Training	Yes	
Establish Councils	Yes	
Soil Testing	No	Will begin summer 2013
Start collecting baseline data	No	Will begin summer 2013, water and soil quality testing equipment purchased
Secure additional funding	No	Lake Protection Grant (WI DNR) and Conservation Innovation Grant (NRCS) applications pending
Establish additional monitoring sites	No	Two edge-of-field monitors purchased for Pierce and Dunn counties
Year 2: 2014		
Create incentive and payment programs with councils	No	
First-round incentives sign-up	No	
Secure additional funding	No	
Increased participation	No	
Peer-to-peer education and sharing	No	
Engage Barron County	No	
Year 3: 2015		
Goals from Year 2 plus complete PIs	No	
Year 5: 2018		
Participation-Ownership-Awareness: 80% of acres and producers enrolled, strong leadership and identity	No	
Solid, long-term funding source	No	
Expansion: councils forming in other watersheds	No	
Reductions: TMDL goals met for sub-watersheds	No	
Recognition	No	

Attachment A: Sample of Performance-based Incentives
Source: Hewitt Creek Watershed Council, 2013, Iowa State Extension,
http://hewittcreek.files.wordpress.com/2011/06/performance-indices-hewitt-13.pdf

Approved 1/8/13

2013 HEWITT CREEK PERFORMANCE-BASED FARM and WATERSHED ENVIRONMENTAL MANAGEMENT PROGRAM

Please check activities you wish to complete. (Deadline April 1/first-come subject to funding). [Payments near July 1 and December 1 may be prorated if participation exceeds $45,000].

PHOSPHORUS INDEX (PI) Maximum $10.00/A. See P Index explanation on back of this page.

____$500 first year payment if the weighted whole farm P Index is less than a phosphorus loss risk of 3 (2-5 is medium risk). All field scores weighted by the field size and risk of P loss from each field to attain a weighted average farm P-index.
____$100 paid for annual data and P-index review after the first year.
____$150 bonus if the P-index is 2 or less (low) or for each 0.3 reduction in P Index.
____$10 per management area or field tested for soil test P, at least 10 acres per sample (max 4/yr for 5 years). Not to be included with grid sampling.

SOIL CONDITIONING INDEX (SCI) Maximum $10.00/Ac. See back for SCI explanation.

____$200 first year payment per 0.1 SCI above 0 for whole farm weighted average of all fields. Example: A weighted average farm SCI of 0.4 will provide a payment of $800.
____$100 per 0.1 SCI for annual data and SCI review after the first year.
____$200 paid for each 0.1 improvement in the annual SCI.

NITROGEN PERFORMANCE MANAGEMENT (Corn Stalk Nitrate-Nitrogen analysis)

____$400 payment if the farm weighted average analyses does not exceed 1,700ppm.
____$200 bonus if the weighted average (Max. 50 acres/field) is less than 1,300ppm.
____$100 for the first two NO_3N samples and $40 for each additional sample (max 4 samples).

OTHER INCENTIVES

____$200 First time manure application calibration and manure analysis.
____$50 Additional manure analyses taken and results reported by project cooperators (first time calibration required).
____$20 Per acre up to 40 acres for fall cover crop on corn silage or soybean stubble.
____$300 Grid sampling and variable rate fertilizer application (40 acres/year for 5 years).
____$200 Install a below-feedlot grass filter, pre-lot water diversion or roof gutters.
____$200 Managed grazing (5 or more paddocks).
____$200 Septic system up-grade. Low interest revolving fund loans available (515-242-6043).
____$200 Farmstead or Streambank Assessment (first time self assessment or changes-improved assessment).
____$0.50/ft., maximum 1,200 ft., new, repaired or reconstructed waterways, headlands, or buffers, minimum 30' width. Must be maintained for 5 years, may be hayed or grazed, minimum 25# brome/acre or comparable seeding.
____$200 Install fabric during waterway installation and repair.
____$2000 New or improved feedlot runoff controls –consulting with Extension Ag Engineer.

WATERSHED ENVIRONMENTAL PERFORMANCE

____$200 Bonus for achieving 85% of the land in the watershed enrolled in performance program. Payable to cooperators earning $500 or more watershed improvement incentives per farm operation.

Name	Address	Phone
	Email address	Cell Phone