Great Lakes Basin Program GLRI Project

A Novel Hybrid BMP Auction Program, Shiawassee River

Size: watershed
Grant Amount: $270,000
Year awarded: 2012

Sponsor: Shiawassee Conservation District
Address: 1900 S. Morrice Road
City: Owosso
State: MI
Zip: 48867

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Submitted Project:

Size: watershed
Budget: $270,000
Savings: 5,600

Background

Sediment Sources
The 319 Mid-Shiawassee River Watershed Management Plan (2011) documents that sediment is the number one concern of the Watershed Steering Committee and cropland is the primary source of this pollutant. Overall, Steering Committee rankings for sediment sources are: 1) cropland, 2) gully erosion, 3) streambank erosion, 4) residential, 5) gravel roads, 6) Livestock (including horses), and 7) construction site runoff.

Readiness to Implement Project
What fund raising activities from other sources have you engaged in, including local public and private sources, to fund watershed projects? As part of this, list approved grants over $25,000 received from other sources within the past three years. Include the Grantor\'s name and a brief description of the projects.

The Shiawassee River Sediment Reduction Project grant was awarded by the Great Lakes Commission in 2010. This 3 year program addresses significant sources of erosion in the Shiawassee River watershed at four specific sites and includes a gypsum incentive program for increasing infiltration potential on clay-based agricultural soils and provide technical assistance to implement the project.

The Mid-Shiawassee River Watershed Planning Project grant was awarded by the Michigan Department of Environmental Quality Nonpoint Source Pollution Division in 2009. Utilizing 319 funds during this two year project, the Conservation District developed an EPA-approved Watershed Management Plan.

Michigan Water Stewardship Program/Michigan Agricultural Environmental Assurance Program (MAEAP) is a technical assistance grant awarded annually from the Michigan Department of Agriculture and Rural

Development since 1999. MAEAP is an innovative, proactive and voluntary program that provides technical assistance to farms of all sizes and all commodities to voluntarily prevent or minimize agricultural pollution risks by utilizing assessment tools including Crop*A*Syst, Farm*A*Syst, and Livestock*A*Syst.

The Shiawassee Conservation District Soil Conservationist technical assistance grant was awarded by the Michigan Department of Agriculture and Rural Development in 2012. This grant provides technical assistance for practice implementation and administrative activities associated with conservation Farm Bill programs.

Is there a state approved watershed plan (or one in development) that includes your designated implementation HUCs? If yes, does the watershed plan denote specific sediment reduction BMPs and list implementation locations for those BMPs?

The Mid-Shiawassee River Watershed Management Plan (WMP) was developed by the Shiawassee Conservation District and approved by the Michigan Department of Environmental Quality on September 19, 2011. The Shiawassee River at Mickles Creek Watershed, HUC 040802030208, State Road Drain Watershed, HUC 040802030207, and Middle Branch Shiawassee River Watershed, HUC 040802030206, are included in this WMP and considered a priority watershed for implementation of sediment reduction practices. The WMP defines specific locations of streams that suffer from excessive sedimentation and erosion. Specific sediment reduction BMPs and locations for these BMPs have been clearly defined and prioritized in the approved WMP.

What other on-going conservation activities are taking place in the HUCs? Are there any existing projects being implemented such as a Water Quality Act, or Section 319 project?

In 2010, the Great Lakes Commission awarded the Shiawassee Conservation District with a grant through the Great Lakes Basin Program for Soil Erosion and Sediment Control to fund the Shiawassee River Sediment Reduction Project. This project targets four specific sites identified in the WMP as contributing considerable amounts of sediment to the Shiawassee River. Also included in this project is an investigational incentive program involving the application of gypsum as a soil amendment to reduce soil loss by encouraging water infiltration in clay-based agricultural soils.

The Shiawassee Conservation District works in partnership with the USDA Natural Resources Conservation Service to utilize Farm Bill conservation programs such as EQIP, GLRI EQIP, AGO EQIP and CSP to address erosion issues when feasible.

What partnerships (outside of your organization) have you established to help implement this project? List your partners.

The Shiawassee Conservation District has long standing established partnerships with the USDA Natural Resource Conservation Service, Shiawassee County Drain Commission, Shiawassee County Farm Bureau, and local media. In addition, the Shiawassee Conservation District has a long standing history of built trust and working relationships with Shiawassee County farmers and landowners. These partnerships are an important asset to the District and will be beneficial in the implementation of this project.

The Shiawassee Conservation District has recently established a relationship with Dr. A. Pouyan Nejadhashemi, professor of Biosystems & Agricultural Engineering at Michigan State University. In the course of working with Dr. Nejadhashemi, the District has come to understand the value of BMP auctions. This, in turn, has led to a working partnership in order to implement this project.

For watershed projects only, is there an established watershed council or steering committee involved with the project? If yes, briefly describe the mission of the group. When was it established, how often does it meet, what

is the average attendance at the meetings? If not, what is your plan for broad based community involvement in implementing the project?

The Shiawassee Conservation District historically works in partnership with steering committees on watershed projects. Most recently, a steering committee was established for a two year project beginning in 2009, to provide guidance in developing an updated watershed management plan for the Mid-Shiawassee River Watershed. For this project, the steering committee will meet as needed to stay informed of the progress, assist in promotion of the project, and will be an important part of the kickoff event.

Public meetings and targeted mailings will be conducted to inform landowners within the project areas of BMPs and BMP auctions. Updates will be presented during monthly meetings of the Shiawassee Chapter of the Michigan Township Association meetings. Project information and updates will be showcased at the Shiawassee Conservation District Agricultural Tour and at various display events including the Shiawassee County Fair. These updates and information sharing opportunities will encourage community involvement in this project.

Project Work Area
HUC: 040802030208 - Mickels Creek-Shiawassee River, Michigan
HUC: 040802030207 - Sawyer Drain-Shiawassee River, Michigan
HUC: 040802030206 - Osburn Drain-Shiawassee River, Michigan

Total Area: 60816
Agricultural Area: 41765
Forest Area: 3313
Urban Area: 10100

Priority Areas:
Mickles Creek Watershed, HUC 040802030208 covers 24,654 acres of predominately agricultural land use, with minimal amounts of rural residential and natural areas.

Sawyer Drain Watershed, HUC 040802030207 covers 13,968 acres of predominately agricultural land use with minimal amounts of forests, wetland, urban, open space, residential areas, lakes, and commercial services. This watershed has been effectively drained through a network of county drainage channels for agriculture and rural development. The drop in elevation between upland areas and the Shiawassee River is drastic and accelerates streamflow in these managed drains.

Osburn Drain Watershed, HUC 040802030206 covers 22,194 acres of predominately agricultural land use. The Mid-Shiawassee River Watershed Management Plan (WMP) (2011) documents that within the Mickles Creek Watershed, HUC 040802030208, Sawyer Drain Watershed, HUC 040802030207, and the Osburn Drain Watershed, HUC 040802030206 sediment caused by excessive erosion is a dominant pollutant, and that farmers are commonly not utilizing conservation tillage practices and buffer strips in their farming operations.

Implementation

Implementation Strategy
Do you have the staff resources to accomplish the project?

The Shiawassee Conservation District's (SCD) mission is to provide for the care, informed usage, and protection of natural resources by creating awareness of conservation issues and by being the leader in providing innovative assistance. Strong leadership and responsible use of funds has been demonstrated by the District's participation and success for over 60 years in many different conservation programs. With an

accumulation of over 36 years experience, the SCD staff is very capable of successfully implementing the objectives of this proposed project.

The types of BMPs you are planning to install i.e. tree planting, easements, conservation tillage, streambank, hay in rotation, sediment basins, buffers, equipment purchases, other

A large number of BMPs are recommended to solve nonpoint source pollution problems in the Mid-Shiawassee River Watershed; however, specific BMPs will be critical to meeting the goals of the Watershed project. Potential BMPs to be used and recommended by the Mid-Shiawassee River WMP (2011) to control erosion/sediment include filter strips, grassed waterways, conservation cover, conservation crop rotation, residue management; no-till and strip till, streambank/shoreline protection, grade stabilization structures, critical area plantings, and wetland restoration and enhancement.

Timeline for implementation

After performing a detailed modeling study and an outreach program, the implementation will be executed from the start of the second year through the end of the third year of the project.

Priority areas identification process

Priority areas identification process is based on a recently published study (Giri, S., A.P. Nejadhashemi, and S.A. Woznicki, 2012, Evaluation of Targeting Methods for Implementation of Best Management Practices in the Saginaw River Watershed, Journal of Environmental Management, 103: 24-40). The three HUC 12 subwatersheds that ranked the highest in the Shiawassee River watershed are 040802030206, 040802030207, and 040802030208. This project will focus efforts on agricultural fields with high erosion potential as identified by the High Impact Targeting (HIT) tool and the Soil and Watershed Assessment Tool.

Incentive methods

In recent decades, more attention has been paid to nonpoint sources of pollution. The recent National Water Quality Inventory (EPA-2009) reports that agricultural nonpoint source (NPS) pollution is the leading source of water quality impairment in the U.S. and the adoption of agricultural best management practices (BMPs) is the most effective and practical means of preventing or minimizing pollution. Because of this, there are currently many cost-share and incentive programs in place through various government agencies. However, despite many years of effort and hundreds of millions of dollars spent on BMPs, many producers and landowners still choose not to participate and/or adopt BMPs (Smith et al., 2007). One of the main challenges that conservationists are facing today is the question of how water resource issues can be addressed while considering stakeholder inputs, economic feasibility, and environmental benefits.

Building on these findings, Smith, Nejadhashemi, and Leatherman (2009) introduced an innovative and highly flexible approach \"BMP Auction\" for addressing erosion and reservoir sedimentation concerns in the Pomona Lake Watershed in Kansas. The BMP Auctions are a market-based approach for supporting BMPs to improve water quality. BMP auctions are modeled after a traditional reverse auction format with many sellers (agricultural producers) and one buyer (i.e. environmental agency/Shiawassee Conservation District). The stages of a BMP Auction are:

1. Farmers submit bids to supply the targeted watershed with water quality improvements in the form of cropping management BMPs.
2. Bids are ranked by amount of water quality improvement generated per dollar.
3. The producers who offer water quality improvements at lowest price are contracted first.
4. The process is repeated until a water quality improvement goal is reached or funds are exhausted.

BMP Auctions identify and purchase the most cost-effective water quality improvements for a specified budget. The results of this study were published in 2009 in the Journal of Extension 47(4) titled “Using a BMP Auction as a Tool for the Implementation of Conservation Practices”. Since the introduction of the BMP Auction concept, the program was successfully implemented in many watersheds, such as Marais des Cygnes, Upper Arkansas, Toronto, Tuttle Creek, Eagle Creek, etc. In 2010, two grants were sponsored by the Great Lakes Commission to develop the BMP Auctions for the Pinnebog and River Raisin watersheds in Michigan. The programs were well received by farmers and landowners in these two watersheds and more than 200 bids have been submitted for the Auction program to date. We are expecting the number of applications to increase to more than 500 bids by the end of the program (2013). It is important to note that, in general, people who have signed up for this program are aware of existing cost-share and incentive programs from various agencies but have still decided not to participate. Therefore, the BMP Auction program can play an important role in advocating implementation of sediment control practices while optimizing resources such as dollars spent per ton of sediment reduction.

Despite the overall success of the BMP Auction programs, Nejadhashemi and his colleagues learned from their experiences working on the two Michigan BMP Auction projects, the BMP Auction can be improved by allowing the producers to submit the bids both in terms of tons of sediment reduced over the lifetime of the BMPs or directly identify the price for desired BMPs. Therefore, we are not only targeting the fields that are highly erosive (in the form of fixed dollar amount per ton of sediment reduction) but also targeting the fields that may be less erosive but contribute the most to sediment yield at the watershed outlet (through the original BMP Auction procedure). The new Auction program is called the Hybrid BMP Auction.

The first step in the BMP Auction is to estimate the pollutant load from different fields within the study area. Water quality modeling will guide the Shiawassee Conservation District staff to work one-on-one with producers to identify the sources of soil erosion on their farms and propose potential BMPs to address those sources.

The next step is the actual auction process, in which an auction form is provided to producers farming in the watershed. In this form, producers are asked to provide information on the location of their farms, the types of conservation practices they would like to implement or the price per ton of sediment reduction, and the requested funding to cover costs of starting and maintaining the conservation practice. Once the auction forms are collected, different water quality models will be used to determine sediment loads at three scales:

1) Sediment loads before and after BMP implementation for an individual field are estimated using field scale models such as the Revised Universal Soil Loss Equation, Version 2 (RUSLE2) and the Agricultural Policy Environmental EXtender (APEX) developed by the USDA.

2) The second set of models (such as the GIS-based Spatially Explicit Delivery Model developed by USGS and Gridded Surface Subsurface Hydrologic Analysis developed by USACE) will be used to account for sediment deposition in overland flow after leaving the field and before reaching the closest stream channel.

3) Sediment reduction at the outlet of the watershed will be determined by performing in-stream sediment routing using the Soil and Water Assessment Tool (SWAT) developed by USDA-ARS, which is the most cited watershed model in the world.

The above modeling procedure will be performed by Dr. Nejadhashemi who originally developed the BMP Auction with his colleagues at Kansas State University.

The above information will be used to rank the bids by the amount of water quality improvement (sediment reduction) per dollar granted. In the next step, the sediment load reduction (at the watershed outlet) for each

field is divided by the amount of the requested funds. This calculation will be repeated for every submitted conservation plan. Those producers whose plans improve water quality the most for the least cost will receive grant funding (lowest cost/ton of sediment reduced). The auction managers can decide which bids to fund and which not to fund based upon the predetermined auction design. The process starts by funding the most cost effective bid and is repeated until the funds are exhausted, or bids will be cut off when they fail to meet a certain cost-effectiveness level.

The Shiawassee Conservation District has received written support for this project from Michigan Department of Agriculture and Rural Development (MDARD). MDARD will provide services from the Michigan Agricultural Environmental Assurance Program grant funded Technician to work one-on-one with producers to identify on-farm soil erosion sources and propose potential BMPs to address those sources using the Crop*A*Syst tool, as well as program support from MDARD Regional Coordinator. This letter of support is available to GLC upon request.

Reference:
EPA, 2009. National Water Quality Inventory: Report to Congress. Office of Water. Washington, DC 20460, Report EAP841-R-08-001
Smith, C.M., J.M. Peterson, and J.C. Leatherman, 2007. Attitudes of Great Plains Producers about Best Management Practices, Conservation Programs, and Water Quality. Journal of Soil and Water Conservation 62: 97A-103A.
Smith, C.M., A.P. Nejadhashemi, and J.C. Leatherman, 2009. Using a BMP Auction as a Tool for the Implementation of Conservation Practices, Journal of Extension 47(4).

Technical Assistance
Technical assistance will be required to perform the following activities:

- Field visits with farmers to identify sources of erosion
- Crop*A*Syst tool will be utilized during one-on-one field visits with farmers in order to determine what BMPs would best address resource concerns
- Prepare conservation plan for farmers, including GIS mapping, inventory and evaluation, survey, design, and layout
- Oversee implementation of BMPs
- Match – In-kind. An Shiawassee Conservation District technician funded through the Michigan Environmental Assurance Program will work one-on-one with producers to identify on-farm soil erosion sources and propose potential BMPs to address those sources using the Crop*A*Syst tool.

BMPs
Name: Alternate 1
Type: Agronomic/Cover-based
Acres: 4000
Cost: 160000

Description:
Potential BMPs to be used and recommended by the Mid-Shiawassee River WMP (2011) to control erosion/sediment include filter strips, grassed waterways, conservation cover, conservation crop rotation, residue management; no-till and strip till, streambank/shoreline protection, grade stabilization structures, critical area plantings, and wetland restoration and enhancement.

Start Date: October 2013

This project was funded by the Great Lakes Restoration Initiative, and is maintained through the Great Lakes Basin Program for Soil Erosion and Sediment Control at the Great Lakes Commission.

End Date: September 2015
Incentive Method: Hybrid BMP Auction
Incentive Rates: 30.00
Total Soil Savings: 5600

Media Campaign

Kickoff:

The kickoff event will be held at the Baker College Owosso Campus Welcome Center and Auditorium. A presentation will outline the goals and the expected outcomes of the project. Program materials will be provided to attendees and will include a depiction of the watershed area and a description of potential BMPs as well as anticipated benefits.

Personal invitations will be mailed to Tim Eder, Great Lakes Commission Executive Director, Senator Debbie Stabenow, Senator Carl Levin, State Representative Glardon, State Senator Hune, Congressman Camp, Congressman Rogers, local partners from NRCS, DNRE and MDARD, Shiawassee County Commissioners, steering committee, local media including newspapers and radio, and key watershed stakeholders. The invitees will be given an opportunity to make comments during the event.

Ongoing:

Created to serve as stewards of natural resources, Michigan\'s Conservation Districts take an ecosystem approach to conservation and protection. Conservation Districts are referred to as “gateways” in their local communities. They provide linkages between land managers and a host of conservation service providers that include state, federal and local governments, and conservation organizations.

The Shiawassee Conservation District (SCD) continually scans the needs of our local communities, working in partnership with others involved in conservation, to set local priorities, and develop action plans to solve natural resource problems. SCD has served communities in Shiawassee County and beyond in this capacity for the past 62 years, providing the public a point of access when questions arise on how to manage natural resources. By offering sound conservation technical assistance, the SCD has become the leading source for citizens in managing their private lands for a cleaner, healthier Michigan.

Awareness of this and all District programs underlies the mission of the SCD, which is to provide for the care, informed usage, and protection of natural resources by creating awareness of conservation issues and by being a leader in providing innovative assistance. Since 1948, the SCD has successfully campaigned for conservation of our natural resources. These established tactics will continue and include the following measures for the project.

1. The general public/media
   - SCD will ensure all activities that occur throughout this project will be recognized and accomplishments highlighted through a promotion and outreach campaign. Outreach activities will include:
   - Quarterly press releases in local newspapers with topics ranging from specific project profiles and updates on project activities, to general practice information that reduce sediments.
   - Articles included in SCD newsletter, distributed on a bi-annual basis to the SCD mailing list reaching a market of more the 2,900 households.
   - Articles included in SCD Annual Report published in local newspaper, reaching a market of 63,000 households. The SCD Annual Report will also be available on SCD website.
   - Updates and information available on SCD website and regularly updated on social media.

- Participation in various display events throughout the year including SCD Annual Meeting, SCD Annual Agriculture Field Day, SCD bi-annual tree fundraiser, Shiawassee County Fair, and various educational workshops hosted by SCD and partners.
- Public service announcements and interviews with local radio station Z92.5fm, The Castle.
- Information will be provided to adults and youth community members through group presentations at local schools, youth camps, community groups, and other events.

2. Landowners/landusers:

Farmers will be reached through targeted mailings, phone calls, personalized invitations, and one-on-one assistance with individuals who walk in the SCD office or stop by the SCD educational booth at display events including the SCD Annual Agricultural Field Day, Shiawassee County Fair, and the SCD Annual Meeting. Additionally, the SCD will continually provide updates and general education to landowners and farmers through email listserv updates, social media, SCD newsletter, SCD website, and one-on-one discussions with farmers enrolling in Farm Bill conservation programs and/or other District programs.

3. Elected officials

Elected officials are, and will remain, aware of Conservation District activities and assistance provided to the residents of Shiawassee County. The SCD regularly attends and gives updates at monthly meetings of the Shiawassee Chapter of the Michigan Township Association, which are attended by elected officials and county and municipal agency representatives. The project will be a regular component of these meetings. Elected local and State officials are sent personalized invitations, and historically attend SCD events, including the Annual Meeting and Annual Agricultural Field Day. Information and updates will be available on the SCD website, as well as on SCD social media pages. These practices of personalized invitations and continuous updates will be utilized to involve elected officials in activities occurring throughout the project.

End:
Press releases will be sent to local newspapers at the completion of the project describing the project goals, highlights, and outcomes. This information will also be made available on the SCD website, as well as included in SCD Annual Report.

This project was funded by the Great Lakes Restoration Initiative, and is maintained through the Great Lakes Basin Program for Soil Erosion and Sediment Control at the Great Lakes Commission.

Great Lakes Commission des Grands Lacs

Keeping It On the Land

Great Lakes Basin Program for Soil Erosion and Sediment Control
www.glc.org/basin