

FINAL PROJECT REPORT
Thornapple River Watershed Monitoring Project - #3003-VSM2006-03

Grantee: Barry Conservation District

Goals and Objectives:

The goals of the Thornapple Watershed Monitoring Project are 1) to gather data on potential critical areas to provide a valid assessment of the Thornapple River Watershed, 2) to determine locations where remedial actions will have the most beneficial effects, 3) to increase public awareness and involvement in watershed and water quality issues, and 4) to establish a trained and committed network of volunteers to conduct an annual monitoring program beyond the scope of the proposed project.

Goals and Objectives

- 1) Gather data on potential critical areas to provide a valid assessment of the Thornapple River Watershed
 - i) Complete the outlined work plan in accordance with the proposed timetable
 - ii) Characterize key rivers and streams and their ecosystems
 - iii) Pinpoint pollutants, sources, and causes affecting water quality in these water bodies
- 2) Determine locations where remedial actions will have the most beneficial effects
 - i) Establish baseline data for critical areas
 - ii) Assess potential for water quality improvement through remedial actions to determine 5-10 sites for implementing Best Management Practices
- 3) Increase public awareness and involvement in watershed and water quality issues
 - i) Publicize the monitoring process and results through at least 10 press releases
 - ii) Develop a regional volunteer network consisting of residents of all watershed counties
 - iii) Engage at least 3 related organizations in the volunteer monitoring process
- 4) Establish a trained and committed network of volunteers to conduct an annual monitoring program beyond the scope of the proposed project.
 - i) Train 10 team leaders to assist in monitoring program
 - ii) Involve an additional 20 citizen volunteers for each monitoring event
 - iii) Achieve a 50% retention rate for citizen volunteers
 - iv) Receive favorable evaluations regarding the educational value of the volunteer monitoring events

Project Summary:

Data was gathered through both road-stream crossing surveys and macroinvertebrate monitoring from June, 2006 to September, 2009, following the project work plan. The project was extended from its original timeline to include the fall, 2009 monitoring session. One hundred and sixty five road-stream crossing sites throughout the watershed were surveyed by trained project partners. A total of 21 sites were monitored for macroinvertebrates, with 62 total samples taken during the course of five monitoring sessions. After the first session in fall, 2006, two sites were abandoned due to safety reasons. Site 1, on the mainstem of the Thornapple River, proved too deep to safely wade. Site 11, Fall Creek at Campground Road, was too full of sediment to navigate. No suitable sites on the same channels were found to replace these. Following the second session in spring, 2007, a third site, Lower Mud-Collier Creek at Barger Rd. (Site 7), was also abandoned due to a combination of high water and sediment loading. A replacement site, 7a, upstream of the Barger site, was chosen in fall, 2007 and continues to be an active monitoring site. During the course of the monitoring project, additional sites within the watershed were added to the original 12 as team leaders gained experience and volunteer numbers increased. Throughout the project period, flooding in the watershed and unseasonable weather caused scheduling changes for monitoring dates, sometimes meaning a reduction in the number of available volunteers. However, despite these obstacles, monitoring was carried out during each session.

At this point in the project, only five of the requisite six macroinvertebrate monitoring sessions have been conducted on the original monitoring sites. Others have two to four sessions

completed. Until six sessions are completed, monitoring results are still considered preliminary. However, preliminary data do show a distinction between consistently good to excellently rated sites such as those on Fall Creek and Lacey Creek, good to fair sites such as Cedar Creek and Mud-Collier Creek, and fair to poor sites like the unnamed tributary on Tricklewood Drive. This preliminary data help to establish baselines for stream health from which improvements due to Best Management Practice adoption (or conversely, decline from increased pollutant source loads) can be measured. Not only the macroinvertebrate measurement, but also the visual assessment aspect of stream monitoring has been a valuable indicator, specifically in the case of Quaker Brook, where macroinvertebrate scores have steadily decreased over the monitoring period, and substrate imbeddedness has increased from 0-25% to greater than 50%. Though the cause is not known, the Barry Conservation District is now working with the USDA-NRCS, Barry County Drain Commissioner and MDNR to investigate potential sources of this developing problem.

Road-stream crossing (RSX) data has been extremely valuable in assisting with the determination of critical areas in the Thornapple River Watershed. Alongside the TRW monitoring project, the Barry Conservation District is also developing a Watershed Management Plan for the Thornapple Watershed. Data from RSX surveys has been used along with soil, land use, land cover and other data sets to develop preliminary maps of pollutant risk areas. Substrate percentages help to identify subbasins where high sediment loads exist. Culvert problem identification from RSX surveys identifies subbasins where road infrastructure and/or stream crossing maintenance issues may be contributing to pollutant and hydrologic function issues. Temperature readings, stream canopy and presence or absence of overhanging vegetation have helped to identify areas where temperature is a concern, as well as potential sources of high temperatures, which are especially important in the watershed's designated trout streams. Similarly, RSX data has helped to pinpoint areas where cattle access, riparian management and natural causes may be contributing to pollutant loads.

While prioritization of critical areas within the watershed has not been finalized, as the BCD is awaiting fish study data, preliminary ranking is as follows:

Preliminary Critical Area Prioritization

Rank	Subbasin	Major Pollutants & Sources	Rationale
1	Thornapple River @ Butternut Creek	High nutrient and sediment loading – cropland indicators, channelization	High levels of nutrient and sediment loading.
2	Thornapple River @ Little Thornapple River	High sediment loading – RSX structural problems, livestock proximity & access, channelization	High level of sediment loading consistent throughout the subbasin.
3	Lower Quaker Brook	Sediment and nutrient loading, declining habitat – cropland indicators, riparian management, hydrologic instability	Managed trout stream is showing instability, increased turbidity and sediment loads and declining macroinvertebrate populations.
4	Lower High Bank Creek	Sediment and nutrient loading – cropland indicators, livestock proximity & access.	Half of the lower portion of this stream is designated to support trout, but pollutant loads are compromising habitat.

Rank	Subbasin	Major Pollutants & Sources	Rationale
5	Thornapple River @ Lacey Creek	Sediment and nutrient loading - livestock proximity & access, riparian management, RSX structural problems, bank erosion	Multiple sources of sediment and nutrient loading.
6	Thornapple River @ Glass Creek	Sediment and nutrient loading - Livestock proximity & access, riparian management, channelization	Multiple sources of sediment and nutrient loading.
7	Thornapple River @ Turner & Bassett Creeks	Sediment loading and excessive temperatures – cropland indicators, lack of canopy and instream cover	Designated trout streams showing habitat decline.
8	Thornapple River @ Railroad Dredge	Sedimentation and nutrient loading – riparian management, cropland indicators, channelization	Mixed agriculture and new development area with sediment and nutrient problems
9	Glass Creek	Sedimentation – high levels of streambank erosion	High quality coldwater stream in need of protection.
10	Upper High Bank Creek	Potential high temperatures - lack of stream canopy and instream cover	Designated trout stream with minimal canopy and cover.

Ranking critical areas in the watershed is a difficult process, and these preliminary rankings take into consideration not only water quality issues, but the availability of programs, resources and partner agencies and organizations that can aid in the implementation of best management practices in these areas. Given the rural, agricultural setting of the watershed, agricultural BMP's can be applied to large areas to improve water quality. Significantly, visual assessment through the RSX surveys also revealed watershed-wide issues of poor residential riparian management, including vegetation removal, exposed soils and lack of buffers along streams. Similarly, aging road-stream crossing structures, culvert misalignment and obstruction, and erosion at crossing sites are widespread enough to be considered as major nonpoint sources. These issues may have been underestimated or underrepresented in the sources and causes of sediment and nutrient loading without the RSX survey program.

Over the course of the project period, 11 press releases were published regarding the MiCorps monitoring program. In addition, handouts were distributed at watershed events and local fairs, and emails about the program were shared with watershed planning and assistance groups. Partnerships were developed and strengthened with four main support groups during the project. Several members of the Thornapple River Watershed Steering Committee, oversight group for the Thornapple River Watershed Management Plan project, eagerly involved themselves in the project, attending a one-day RSX training seminar and assisting with RSX surveys. The Barry-Eaton Health Department lent five of its Environmental Health staffers to the project to assist with RSX surveying as well. The Eaton Conservation District assisted with RSX surveys and macroinvertebrate monitoring throughout the project. The Thornapple River Watershed Council has provided strong volunteer support for macroinvertebrate monitoring.

From these four groups the program developed the bulk of its volunteers, including 12 trained RSX surveyors and eight trained macroinvertebrate monitoring team leaders. Two team leader training opportunities were provided during the program, with additional side-by-side monitoring sessions conducted with each leader before they managed their own team. Two leaders have since moved to other locations across the state, but six still continue their commitment to the project.

In addition to the RSX surveyors and team leaders, 42 macroinvertebrate monitoring volunteers have lent their time and support to the project. Each attends a one-hour training session provided before each monitoring event. Initial macro volunteers were largely family and friends of team leaders, but over the last two years, they have been replaced by citizen volunteers with a commitment to the project and the resource it studies. As with any volunteer project, finding the 'fit factor' is somewhat difficult. Though some volunteers had an interest in the watershed, the physical nature of the work may not have suited them. Others with a genuine interest have difficulty juggling schedules to make themselves available. After five sessions, it now seems that we have a solid, core group of six leaders and 12 volunteers to carry out the program, though our mailing list contains over 50 names of volunteers and friends who want to keep updated. Core volunteers are almost evenly distributed between the three major counties in the watershed, Kent, Barry and Eaton. The Watershed Council has increased its commitment to the project for 2009 and hopes to add two team leaders and at least four volunteers to the ranks by the end of the year.

Though our goals for volunteer recruitment and retention have fallen a bit short of the mark, all volunteers have consistently provided positive evaluations of their experience and comments that have helped to improve the volunteer program. We have increased the flexibility of the monitoring schedule to include monitoring over two weekends for each session. This has provided the added benefit of allowing volunteer groups to meet at locations closer to their homes and the streams they monitor, and still provides the coordinator the opportunity to meet with the volunteers and provide pre-monitoring training.

Project Benefits:

At this juncture, the highest benefit of the project has been the public education opportunity it has provided. More than simply reading about water quality and river ecosystems, sixty-two watershed residents have received hands-on education in these areas. Beyond these volunteers, many more have heard about the program through press releases, presentations and classroom experiences. In the course of the project one watershed introduction to the Hastings Womens' Club, one macroinvertebrate monitoring education session to the Institute of Learning in Retirement at Kellogg Community College, and one water quality monitoring information session at the workshop, "Get Connected: Conservation Opportunities for Private Landowners" held at the Pierce Cedar Creek Institute. Additionally, five K-12 classroom opportunities provided education and hands-on activities related to benthic monitoring for 132 students in the watershed region. Student feedback for these classroom visits was very positive, with the two participating school districts requesting assistance in building benthic monitoring and watershed studies into their curricula.

Environmental impacts of the project are perceived as longer-range goals. Surveying and monitoring alone cannot alter the factors that are degrading water quality. However, the data provided by these studies is currently being used to support a comprehensive watershed management plan that will direct resources toward water quality improvement. The baseline data collected through this project will also aid in measuring water quality change in the future.

Partners and Contributions:

Initial partners in the Thornapple River Watershed Monitoring Project were the Thornapple River Watershed Council, the Thornapple River Watershed Steering Committee and MSU Extension at Kellogg Biological Station (KBS). Both watershed groups were willing to supply team leaders for survey and monitoring events, with KBS providing oversight and training. The watershed groups not only provided team leaders, but also were instrumental in recruiting volunteers from their own volunteer and employment bases. This proved incredibly helpful. KBS fell

Project Partners:

- Thornapple River Watershed Council
- Thornapple River Watershed Steering Committee
- MSUE - Kellogg Biological Station
- MDEQ – Grand Rapids
- Barry-Eaton District Health Department
- Eaton Conservation District

somewhat short of its commitment due to staffing decreases and new cost-saving requirements instituted during the initial phase of the state budget crisis that caused staff to be unavailable for travel and after-hours or weekend commitments. KBS was, however, able to provide a lot of phone, email and resource support for the program. To fill the void left by KBS, Michigan Department of Environmental Quality Water Bureau staff provided much of the needed oversight, training materials and education for volunteers.

As the project progressed, additional partners came on board to strengthen the project. The Barry-Eaton District Health Department found shared interest in the idea of watershed assessment and lent staff to assist with RSX surveys. The Eaton Conservation District also came on board in 2007 and has increased its staff and volunteer contributions to the monitoring effort each season. A new project within the watershed, the Nashville Dam Removal, has raised interest in watershed events amongst the Nashville community, and as the dam project progresses, it is anticipated that new volunteers from that area may join the monitoring project.

From the project thus far, two key lessons emerge: plans are springboards for action – not foundations, and partnerships breed opportunities. In regards to the first lesson, the project outline provided the Barry Conservation District (BCD) with a beginning point, a strategy to approach the monitoring and survey project, but as it was undertaken, an attitude of flexibility allowed for changes that made the program more functional and productive for the many people involved. The plan was designed by one agency to direct the actions of many individuals, some unknown to us at that point. As volunteers joined the project, each brought valuable suggestions and ideas that shaped the plan into a viable program in which they were comfortable participating. Timing, communication strategies and organization all underwent modifications to meet the needs and interests of the participants. The second lesson was a happy surprise in that as this project and other watershed efforts grew to become a major focus of the BCD, the watershed became an area of interest among unexpected groups like the Women's Club. A casual suggestion by one of the volunteers to another group with which he was involved yielded the classroom opportunity with the Institute of Learning in Retirement. A progress report on watershed activities to the Barry County Commission led to four classroom visits to Maple Valley High School, and an invitation to Thornapple Township to get involved in the River Clean-up instigated a great three-class macro identification session with Thornapple-Kellogg Elementary's 5th graders. Since undertaking this project, the BCD's support network of partners has grown tremendously, with friends of the watershed extending from the river's headwaters to its confluence with the Grand. As the project continues to progress, the BCD looks forward to connecting with new partners and finding new opportunities to join efforts in improving our shared water resource.

Products:

Products generated in this project include the following:

- 11 press releases (attached)
- 4 event flyers (attached)
- 1 volunteer evaluation instrument (attached)
- 62 macroinvertebrate monitoring reports (available at www.micorps.net)
- 165 road-stream crossing surveys (available at www.micorps.net)

Sustainability:

Due to the nature of the endeavor, to provide baseline and continuing data on stream water quality within the watershed in order to determine changes due to BMP structural and management practices, the monitoring aspect of the project is intended to continue until at least 2016. The RSX survey aspect, proposed on a five-year rotation, is scheduled for the 2011-2012 period. At this juncture, the outlook on sustainability is positive. Major project partners, the Thornapple River Watershed Steering Committee, the Thornapple River Watershed Council and the Eaton Conservation District have pledged long-term support in continuing and growing the project. As the watershed management plan nears completion, energy about and interest in proposed improvements continue to increase support. A new partner, Ada Parks and Recreation,

has expressed strong interest in support and future development of the monitoring project in the lower reaches of the watershed. The BCD Board of Directors and project partners now see the project as part of their annual plan of work, and its results as an impetus for action in their local and watershed communities. BCD staff will be compensated for time on the project through regular operating funds. It may be necessary to seek a small grant, through MiCorps or another entity for project supplies in the next three years. The BCD will also seek funding for future RSX monitoring through sources including 319 grants.



Students from Maple Valley High School get a lesson in collecting and sorting macroinvertebrates



A volunteer macro monitoring crew poses after collecting samples



A volunteer teaches her son about stream substrate during an RSX survey



D-net sampling on Black Creek



Surveying a tributary of Cedar Creek



Measuring the 300' sampling area



Volunteers sort macros in the field



Taking pH and temperature readings on High Bank Creek