SILVER CREEK WATERSHED PROJECT

Watershed Improvement Review Board Final Report

Project Name:	Silver Creek Watershed Project
Project Number:	WIRB 9005-002
Soil and Water Conservation District:	Clayton SWCD
Reporting Period:	January 1, 2010 – December 31, 2013
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Project Background

The Silver Creek Watershed Project is the latest of a series of water quality improvement initiatives undertaken by the Clayton Soil & Water Conservation District (SWCD). Silver Creek was targeted for improvement due to its inclusion on Iowa's list of impaired waters, and the potential for improvement due to a tradition of conservation work demonstrated by landowners within the watershed.

Silver Creek is located in northwest Clayton County. The watershed includes a total of 17,991 acres (28.1 square miles), and represents one of the most intensely cropped portions of the county. Cropland is broken only by roads and scattered areas of timber and small pastures that flank the stream corridor.

Silver Creek has appeared on Iowa's 303(d) list of Impaired Waters since 2002. Aquatic life in the stream is impacted by high concentrations of un-ionized ammonia, elevated levels of silt accumulation and sedimentation of rock substrates, low levels of dissolved oxygen, and a loss of flow to in-stream sinkholes. Total Maximum Daily Loads were established, and represent a drastic reduction in sediment and ammonia inputs. Primary pollution sources were identified as soil erosion from cropland and livestock with direct access to the stream.

Planning and development of the Silver Creek Watershed Project began in 2005. A project proposal was submitted for consideration under the joint Iowa Department of Natural Resources (DNR)/Iowa Division of Agriculture and Land Stewardship – Division of Soil Conservation (IDALS-DSC) FY2006 Water Quality Project Grant Application. The project was selected for Section 319, Water Protection Fund (WPF) and Watershed Protection Fund (WSPF) support.

The WIRB application for Silver Creek was submitted on August 14, 2009. WIRB supported project activities from January 1, 2010 through December 31, 2013. The following objectives were established to guide WIRB related initiatives:

- Promote stream corridor and sinkhole protection along critical areas of the watershed, and install buffer practices on an additional 30% of Silver Creek and its tributaries.
- Reduce sediment delivery to Silver Creek by at least 3,000 tons.
- Develop a series of news articles, newsletters, field days, and demonstrations to increase public understanding of water quality issues and to encourage public involvement and participation in water quality programs.

The core concept for water quality improvement is to buffer Silver Creek and its tributaries, eliminate direct livestock access to the stream, and accelerate the adoption of conservation practices that will reduce sediment delivery and manure runoff. No single practice will sufficiently reduce pollutant loads; a comprehensive package of practices is required to produce long term impacts. The ultimate goal is to accelerate the use of sustainable practices that will remove Silver Creek from Iowa's list of impaired waters.

Financial Accountability

The basis of the WIRB application was to lengthen the timeframe for watershed improvements that was begun through the FY2006 319/WPF/WSPF grant. When the WIRB application was submitted, the District was unsure if additional 319 funds could be secured. Ultimately, WIRB funds complemented grants from the 319/WPF/WSPF sources that were garnered during the FY2009 and FY2012 application periods.

WIRB provided a resource for project activities from January 1, 2010 through December 31, 2013. This represents a four year bridge between the start of the project on January 1, 2007 through its projected end date of June 30, 2016. Securing multiple grants allowed the Clayton SWCD to provide a stable series of cost share resources to Silver Creek landowners over a longer timeframe than what was originally expected.

The District split cost share applications among the WIRB, 319, and WSPF allocations as they were received. Based on guidance from DNR in March 2012, however; proposed conservation practices and administration costs were switched to 319 funding. This was in response to an impending recall of FY2006 and FY2009 Section 319 grant funds by EPA. WIRB funds were carried into the 2013 calendar year.

In order to utilize unspent WIRB funds, the District requested adjustments among the conservation practice line items within the WIRB budget on September 24, 2013. The intent of the request was to transfer unobligated funds to line items where expenses would be incurred prior to the end date of the project on December 31, 2013. Adjustments are reflected in Table 1:

Table 1: WIRB Application Budget and Expenditures

Grant Agreement Budget Line Item	Total Funds Approved	Total Funds as Amended	Total Funds Expended	Available Funds
Salary & Benefits	$120, 250	$92,010	$92,010	$0
Travel & Training	$500	$0	$0	$0
Supplies	$1,000	$294	$294	$0
Information & Education	$500	$1,706	$1,031	$675
Pasture Management	$1,200	$1,200	$0	$1,200
Streambank Protection	$6,000	$6,000	$0	$6,000
Terraces	$175,000	$204,507	$169,104	$35,403
Grade Stabilization Structures	$57,000	$57,000	$7,561	$49,439
Water & Sediment Control Basins	$4,500	$3,233	$3,233	$0
Total	**$365,950**	**$365,950**	**$273,233**	**$92,717**

Weather conditions impacted progress in 2013. The spring was unusually wet. While a sediment basin, three waterway projects, and two terrace systems were completed, most Silver Creek landowners struggled to plant crops in a timely manner and hesitated to attempt spring construction. The weather turned severely dry during the summer. By October, soil moisture levels were depleted and adequate packing of earth fill for structural practices could not be achieved. Abnormally high grain moistures delayed harvest. Rainfall recharged subsoil

moistures in November, but soils froze shortly after Thanksgiving. Five terrace projects were constructed, but represented a small portion of what was planned for the fall.

The $92,717 of available WIRB funds represents a huge opportunity cost for the Silver Creek Watershed Project. Having perfect hindsight, WIRB funds should have been targeted to practices supported by the 319 and WSPF resources during the 2010, 2011, and 2012 calendar years. Given the flexibility of multiple funding sources, the proposed practices will be completed in 2014. The water quality benefits will be realized, but the funding source that accelerates the process will change.

Silver Creek landowners and farm operators have made a major investment in water quality improvements. Contributions for each funding source are shown in Table 2. Landowner and EQIP contributions are influenced by a single animal waste management system completed in 2011. The steel roofed cattle feedlot involved a commitment of $104,560 of EQIP funds and over $745,000 by the landowner.

Table 2: Total Project Funding

Funding Source	Approved Application Budget	Actual Contributions
Landowners	$218,000	$903,069
WIRB	$365,950	$273,233
319 (DNR) & WPF/WSPF (IDALS-DSC)	$604,400	$597,177
CRP & EQIP (USDA)	$84,500	$140,660
IFIP (IDALS-DSC)	$20,000	$13,438
Total	**$1,292,850**	**$1,927,577**
WIRB Contribution	**28%**	**14%**

Environmental Accountability

Monthly water quality sampling has been conducted on Silver Creek since June 2011. Results are compared to forty-nine other stream sites from the Turkey River system. Funding for this effort was secured by RC&D for Northeast Iowa through a grant from the McNight Foundation. Samples were analyzed for concentrations of Ammonia Nitrogen, E. Coli Bacteria, Nitrate + Nitrite Nitrogen, and Total Phosphate. Field measurements included water temperature, pH, Dissolved Oxygen, Transparency, and Chloride.

Monthly sampling was expanded to four Silver Creek sites in 2013. When compared to the other Turkey River sites, Silver Creek shows higher than average levels of Ammonia and Phosphate. Stream clarity as measured by transparency is also below average. The results highlight the problems within the stream, confirm the processes that placed Silver Creek on Iowa's list of impaired waters, and target the watershed as a priority for further improvement.

DNR planned to survey fish species and conduct biological sampling on Silver Creek in August 2013. The sampling was cancelled due to lack of surface water flow, but will be attempted in 2014. A "Rapid Assessment of Stream Corridor Along Length" (RASCAL) was completed on

the major unnamed tributary of Silver Creek in May 2011. Data was added to that compiled during the RASCAL assessment of Silver Creek in December 2006. The RASCAL process will be repeated in 2016 for comparison with the archived data.

Table 3 summarizes the conservation practices completed in the watershed compared to the goals set forth in the original WIRB application. The far right column also summarizes cumulative watershed project efforts since January 1, 2007. A GIS map showing the location of completed practices is attached to this report.

Table 3: Summary of Completed Practices

Practice	Approved Application Goal	Total Complete 1/1/10 to 12/31/13	Percent Completed Versus Goal	Total Complete 1/1/07 to 12/31/13
CRP Buffers	45 Acres	36 Acres	80%	65.3 Acres
Resource Protection Fencing	3,000 Feet	0 Feet	0%	0 Acres
Pasture Management	60 Acres	0 Acres	0%	60 Acres
Streambank Protection	600 Feet	0 Feet	0%	450 Feet
Terraces	150,000 Feet	94,215 Feet	63%	198,780 Feet
Grade Stabilization Structures	5 Structures	2 Structures	40%	4 Structures
Grassed Waterways	4,000 Feet	10,495 Feet	262%	15,600 Feet
Animal Waste Mgmt. Systems	1 System	1 System	100%	1 System
Water & Sediment Control Basins	4 Basins	1 Basin	25%	1 Basin
Cover Crops	Not Established	338 Acres	NA	338 Acres

Some practices were popular, while others fell short of expectations. Several different buffer practices were established. CRP practices faced competition when commodity prices were favorable and cropland lease values increased. Based on a long history of concerns related to repeated flood events, landowners were not interested in creating permanent fences for livestock exclusion. Two pasture projects treated a high priority area along Silver Creek prior to the initiation of the WIRB grant in 2010. The system included an alternate water source and used a high tensile electric fence to remove cattle from the creek.

A series of six streambank protection projects targeted to 1,000’ of severely eroding banks was cancelled by a landowner shortly before construction in 2012. Considerable time had been expended for survey and design. The site was identified as a priority for project action during the RASCAL assessment in 2006, and remains a target for treatment. In addition to the grade stabilization structure projects that were completed, five other sites were surveyed. Due to a lack of available earth fill, shallow depth to bedrock, or estimated construction costs, the projects were cancelled.

Terraces were popular, but the amount completed was reduced by a significant increase in construction costs. While local earth moving and tile contractors are very efficient, they were forced to increase the cost of their services due to a substantial rise in fuel and materials costs. The original WIRB budget included an estimated cost of $4/foot of constructed tile outlet terraces in 2009. In 2014, the county average cost will approach $6/foot.

Grassed waterways were successful when used where adjacent land treatment was adequate, especially in conjunction with no-till planting systems. Water and sediment control basins were not popular. Most landowners objected to the size of proposed basins and asked for other alternatives. Animal waste management systems represent a major long term investment. The number of livestock operations within the watershed has declined dramatically in the last twenty years, while livestock numbers at each site have grown, adding to the cost of treatment. Incentives for cover crops were not included the project application, but the practice has gained popularity since 2012. Cover crops will be a major focus of ongoing project efforts.

Progress Toward Project Objectives

A comparison of project accomplishments versus the objectives set forth in the original project application follows:

Objective: Promote stream corridor and sinkhole protection along critical areas of the watershed, and install buffer practices on an additional 30% of Silver Creek and its tributaries.

New and reenrolled filter strips buffer 16,825' of Silver Creek and its tributaries; and cattle have been removed from 4,900' of the stream channel. Buffer practices protect an additional 19% of the total length of Silver Creek and its tributaries.

Objective: Reduce sediment delivery to Silver Creek by at least 3,000 tons.

Based on estimates determined through the use of the "Pollution Delivery Calculator", the practices installed during the last four years have reduced sediment delivery from sheet, rill, and gully sources by 3,469 tons.

Objective: Develop a series of news articles, newsletters, field days, and demonstrations to increase public understanding of water quality issues and to encourage public involvement and participation in water quality programs.

The project attempted a variety of information and education methods. Most proved successful when targeted to specific issues and audiences.

Program Accountability

The experience of past and ongoing water quality initiatives provided a basis for increased landowner participation in efforts to improve Silver Creek. The watershed was included in one of Iowa's initial water quality improvement projects, the Big Spring Demonstration Project. Structural and management practices that resulted from Big Spring provided an example that landowners were willing to follow.

The major barrier encountered was connecting potential benefits within individual operations with what had already been proven successful on neighboring farms. A variety of outreach strategies were utilized (direct mailings, newsletters, field days) which were centered on

producing individual on-farm planning contacts. The planning visits allowed project staff to learn the needs of watershed landowners and farm operators, and respond to their personal conservation objectives. When new conservation practices were discussed, examples were reviewed on a neighbor's farm. Much of the project's success can be traced to cooperators that were willing to talk to their neighbors and show them the projects that they had undertaken.

Weather conditions have an uncontrolled influence on progress. In northeast Iowa, construction is limited to a few weeks in the spring prior to planting and approximately two months after harvest and the point where soils freeze. Contractor availability and staff time for layout is at a premium. Ultimately, the number of favorable fall construction seasons has a huge impact on progress.

The project has successfully accelerated the task of building awareness of water quality issues and potential solutions within Silver Creek. The amount, type, and diversity of practices demonstrated and applied within the watershed was excellent. Based on the experience of the project, the following action items were established to guide future water quality initiatives:

Continue to turn landowner interest into visible changes on the watershed landscape. While progress has been made, there remains a huge need for conservation improvements. The continued focus of efforts to improve Silver Creek is centered on converting landowner interest into permanent practices.

Seek to involve new project cooperators and partnerships. During an on-farm visit, a landowner commented that he might not have considered any work unless he had been contacted personally by the project coordinator. Personal contacts have the greatest potential to involve non-traditional cooperators in SWCD activities. New cooperators that have a good experience will keep coming through the door even after a watershed project has ended.

Identify additional alternative funding sources to continue project efforts. Only a small portion of the practices that were completed would have been possible without WIRB or the other watershed project resources. Watershed improvement activities in Silver Creek Watershed Project will continue through a series of initiatives:

a) A Clean Water State Revolving Fund Water Resource Restoration Project grant was secured by the City of Monona in 2013. The grant funds a permeable parking lot near the Monona aquatic center. The District will demonstrate urban conservation practices for the first time.
b) A Watershed Implementation Grant (319/WSPF/WPF) supports additional structural and buffer practice installations in the watershed. Cost share resources will be available to Silver Creek landowners through June 30, 2016.
c) A Water Quality Initiative Targeted Waters Demonstration Project grant provides incentives for cover crops and no-till through December 30, 2016. The objective is to create a local model for nitrogen and phosphorus loading reductions.

Map 1: Location of Practices Completed