ROCK RIVER
FECAL COLIFORM and TURBIDITY
TMDL IMPLEMENTATION PLAN

OCTOBER 2008

Submitted By:
Rock County
Soil Water Conservation District/Land Management Office

In cooperation with the Rock River Advisory Committee and
Rock River Technical Committee

wq-iw7-11c

Preface

This implementation plan was written by the Rock County Soil Water Conservation District (SWCD)/Land Management Office, with the assistance of the Advisory Committee, Technical Committee, and guidance from the Minnesota Pollution Control Agency based on the report 'Fecal Coliform and Turbidity TMDL Assessment for the Rock River'. Input for this implementation plan from all stakeholders of the Rock River watershed was strongly encouraged and facilitated by the development of an Advisory Committee. A Technical Committee comprised of local governments including counties, SWCDs, city, and rural water as well as state and federal agencies assisted Minnesota State University-Mankato in developing the TMDL Assessment. Technical Committee and the Advisory Committee members that helped shape this plan are:

Advisory Committee

Grant Binford	Cattle, Hog, Crop Farmer/Rock Nobles Cattlemans Assn.
Harold Ver Steg	Hog, Crop Farmer/Rock Co. Corn Soybean Assn.
Larry Bosch	Cow/calf, Crop Farmer
Mary Tilstra	Crop Farmer/Master Gardener
Bryce Stoltenberg	City Resident
Roger Talsma	Cattle, Crop Farmer
Bill & Merri Post	Dairy, Crop Farmer/Murray Co. Dairyman's Assn.
George Shurr	Retired Geology Professor
Kraig Rust	Cow/calf, Hog, Crop Farmer/Rock County Township Assn
Don Reker	Cattle, Crop Farmer
Chris Hein	Crop Consultant
Kevin Barnhart	Swine Specialist/Rock Co. Pork Producers Assn.
Andy Nesseth	Crop & Livestock Consultant

Technical Committee

Kelli Daberkow	Minnesota Pollution Control Agency
Scott Matteson	Minnesota State University-Mankato
Al Lais	City of Luverne Public Works
Dan Cook	Rock County Rural Water
Tom Kresko	Minnesota Department of Natural Resources
Mark Vaniman	US Fish & Wildlife Service
Kurt Halfmann	Natural Resources Conservation Services
Kyle Krier	Pipestone County Conservation & Zoning Office
Angie Raatz	Pipestone County Conservation & Zoning Office
Wayne Smith	Nobles County Environmental Office
Ed Lenz	Nobles County SWCD
Chris Hansen	Murray County Planning & Zoning
Eric Hartman	Rock County SWCD/Land Mgt
Arlyn Gerhke	Rock County SWCD/Land Mgt
Justin Decker	Rock County SWCD/Land Mgt
Doug Bos	Rock County SWCD/Land Mgt

Table of Contents

1.0 Implementation Plan Executive Summary

In 2005, Minnesota State University-Mankato Water Resource Center received funding to complete a Total Maximum Daily Load Assessment for the bacteria and turbidity impaired reaches of the Rock River. EPA approved the TMDL assessment in April 2008. Section 2 of this plan summarizes the findings of the TMDL assessment; the full report can be found online at www.pca.state.mn.us. Throughout the project, a technical committee assisted in providing input and information. It was important to the Technical Committee to engage the public in the process. This was completed through meetings, newsletters and newspaper articles.

A thirteen-member Advisory Committee was formed from stakeholder organizations and volunteers that were solicited at public meetings. The Advisory Committee and the Technical Committee met three times in six months to determine the best practices to correct the impairments of the Rock River. Appendix A contains all information regarding the stakeholder process including agenda, minutes and handouts from each of the meetings.

The first meeting was held on March 17, 2008 to bring all participants to the same level of understanding of the TMDL process by reviewing each possible management measure for fecal coliform and turbidity. The second meeting was held to conduct a ballot vote for the two best implementation strategies for each impairment, one ballot for fecal coliform and one for turbidity. Committee members were also asked to suggest direct action items to address these areas. The committees also discussed priority areas and determined that the entire watershed should be focused on but the Elk Creek is the only subwatershed that is shown to be impaired. Sections 4 and 5 of this plan discuss the potential implementation strategies that are available for reducing bacteria and turbidity. Section 6 is the direct result of the ballot voting and discussion of action items. Roles and responsibilities will change with each action item depending on the project and are explained in Section 7 along with a listing of the project partners. Section 8 lays out a ten-year timeline for the project. Probability of successfully completing the action items in the plan will depend on funding.

The success of this plan will also rely on the adaptability of this plan (Section 9). An annual meeting of the Technical and Advisory Committee is planned to review project progress, water quality data and new information that may develop.

The Rock River TMDL Implementation Plan has a total dollar figure of $11,864,640.00 if all action items were funded with $4,218,004.00 of cash, $646,636.00 of in-kind and $7,000,000.00 of low-interest loans (Section 10).

2.0 TMDL Report Summary

2.1 Project History

In 2005, Minnesota State University-Mankato Water Resources Center (MSUM WRC) applied for funding through the Environmental Protection Agency (EPA) to develop a Total Maximum Daily Load (TMDL) assessment for the impaired reaches in the Rock River Watershed (RRW). In late 2005, MSU WRC received funding to complete the project. In late 2006, the project began to take shape through the designation of a project lead at MSUM WRC and a project manager at the Minnesota Pollution Control Agency (MPCA). A Technical Committee was formed for the project. This group was comprised of staff from the following groups:

- City of Luverne
- Minnesota Department of Natural Resources
- Minnesota Pollution Control Agency
- Murray County Planning and Zoning
- Nobles County Environmental Services and Soil & Water Conservation District
- Natural Resources Conservation Service
- Pipestone County Planning and Zoning and Soil & Water Conservation District
- Rock County Land Management Office and Soil & Water Conservation District
- Rock County Rural Water System
- Water Resources Center, MN State University, Mankato
- US Fish and Wildlife Service

The Technical Committee met every two months and assisted with reviewing and providing input to the project workplan, outreach materials, and the draft TMDL report. An Advisory Committee was formed with concerned volunteers from the Rock River watershed in early 2008. The role of the Advisory Committee was to assist with the development of the implementation plan.

2.2 Watershed Characteristics

The RRW is located in the southwest corner of Minnesota (see Figure 2.1) and is a tributary to the Missouri River Basin. The Rock River originates in Pipestone County and flows south through Rock County into Iowa. The drainage area of the impaired watershed also includes portions of Nobles and Murray counties.

Overall, the RRW is a gently rolling landscape with occasional rock outcroppings. On average, RRW receives approximately 28 inches of precipitation annually. Based on year 2000 landuse statistics, approximately 95 percent of the landuse is agricultural. The RRW is dominated by cultivated land at nearly 76.7 percent. Pasture and hay lands account for another 18.6 percent. The only other land use and cover categories above one percent are wetlands at 1.7 percent and forest at 1.2 percent. It should be noted that conservation

easement lands are not included in the landuse inventory. These easement lands cover an estimated 1.5 percent of the watershed landscape.
The population of the impaired portion of RRW is estimated at 10,942 and contains portions of twelve incorporated communities and three unincorporated communities.

Recreational uses of the Rock River include fishing, swimming and canoeing. In addition, the corridor of the Rock River provides wildlife habitat, and as such is utilized by hunters and bird watchers.

An endangered fish species, the Topeka shiner, is found in the RRW. Topeka shiners prefer prairie stream headwater areas because these smaller streams tend to have cooler temperatures and good water quality. Larger rivers, although not the primary staging and resting areas for Topeka shiners, serve as critical migration routes. An important characteristic of good quality Topeka shiner habitat is the availability of clean gravel or sand substrates with vegetated banks of grasses and forbs. The Minnesota population of Topeka shiners is in better condition than those found in other states. The turbidity TMDL, when achieved, will help maintain and improve the habitat for the Topeka shiner.

Figure 2.1 Rock River Watershed

2.3 Impairments

2.3.1 Fecal Coliform Impairment

In 1994, the MPCA determined the Rock River, Elk Creek to Minnesota/Iowa border (Assessment ID: 10170204-501), was not meeting the aquatic recreation beneficial use with fecal coliform bacteria exceedences. The 11.8 mile impaired reach of Rock River extends from the Minnesota/Iowa border upstream to the confluence with Elk Creek and encompasses 355,625 acres. Table 2.1 summarizes 303(d) listing.

Table 2.1 Impaired Waters listings in the Rock River Watershed

Stream Name	Description	Parameter	Year Listed	MPCA River Assessment ID
Rock River	Elk Creek to Minnesota/Iowa Border	Turbidity	2002	10170204-501
Rock River	Elk Creek to Minnesota/Iowa Border	Fecal Coliform	1994	10170204-501
Rock River	Champepadan Creek to Elk Creek	Turbidity	2006	10170204-509
Elk Creek	Headwaters to Rock River	Turbidity	2006	10170204-519

2.3.2 Turbidity Impairment

Since 2002, there are three impaired reaches that do not meet the aquatic life beneficial use when using the turbidity water quality standard. The Rock River; Elk Creek to Minnesota/Iowa border (Assessment ID: 10170204-501), was placed on the 303(d) impaired waters list in 2002 based on monitoring data collected by the MPCA. The 11.8 mile impaired reach of Rock River extends from the Minnesota/Iowa border upstream to the confluence with Elk Creek and encompasses 355,625 acres. Table 2.1 summarizes the 303(d) listing.

In 2006, two additional reaches were added to the 303(d) list of impaired waters. These sites were listed based on the results of transparency tube volunteer monitoring data. Elk Creek, Headwaters to Rock River is a 41,151 acre watershed located across portions of eastern Rock County and western Nobles County. Rock River, Champepadan Creek to Elk Creek drains 276,845 acres from portions of Murray, Nobles, Pipestone and Rock counties. Table 2.1 summarizes the 303(d) listing.

2.4 Source Assessment

2.4.1 Fecal Coliform Source Assessment

The source assessment portion of the TMDL report was derived from various sources. There are four sources of fecal coliform bacteria: humans, wildlife, pets and livestock. To determine the human contribution of fecal coliform bacteria, the 2000 US census data was compiled for the watershed, then separated between rural and community residents. Wildlife density estimates were obtained from the Minnesota Department of Natural Resources – Wildlife Section. The pet population estimate was attained from the American Veterinary Medical Association. Livestock estimates were attained from county feedlot inventories. The amount of fecal coliform bacteria produced daily by each animal type was obtained from a variety of sources, which are all recommended in the Environmental Protection Agency's (EPA) guidance document *Protocol for Developing Pathogen TMDLs*. The estimated fecal coliform bacteria produced from each of the sources is shown in Table 2.2.

Table 2.2 Estimated percent of fecal coliform bacteria produced in RRW.

Type	Percent
Cats	0.10%
Dogs	0.09%
Canada Geese	<.01%
Wild Turkey	<.01%
Pheasants	<.01%
Deer	0.01%
Other wildlife	0.01%
Humans	0.15%

Type	Percent
Dairy	7.13%
Beef	40.73%
Swine	50.12%
Chicken	0.60%
Turkey	<.01%
Horse	<.01%
Sheep	1.07%

The total fecal coliform produced by each source type was categorized by application type/method. For humans, this meant calculating the number of people that had adequately treated and inadequately treated wastewater for both rural and urban

populations. For livestock, assumptions were derived from the Generic Environmental Impact Statement on Animal Agriculture, prepared by the Minnesota Environmental Quality Board. Manure application and pasture accounted for 71 and 26 percent, respectively, of fecal coliform bacteria application. Delivery assumptions were defined to account for the fecal coliform bacteria getting to the waterbody. Table 2.3 shows the final step in the source assessment that accounts for the fecal coliform bacteria contributors.

Table 2.3: Fecal Coliform Bacteria Contributors

Category	Source	Wet Conditions	Dry Conditions
Livestock	Pastures within 1000 ft. of Waterways	High Contributor	High Contributor
	Pasture greater than 1000 ft from Waterways	Low Contributor	Low Contributor
	Feedlots or Manure Stockpiles without Runoff Controls	Moderate Contributor	Low Contributor
	Surface Applied Manure	High Contributor	Low Contributor
	Incorporated Manure	Moderate Contributor	Low Contributor
Human	Inadequately Treated Wastewater	Low Contributor	Moderate Contributor
Pets		Low Contributor	Low Contributor
Wildlife		Low Contributor	Low Contributor

2.4.2 Turbidity Source Assessment

The analysis of water quality data, Geographic Information Systems (GIS), and landuse data were compiled to assess sources of turbidity.

Total Suspended Solids (TSS) is often used in determining turbidity TMDLs. Using a load duration curve, the highest TSS concentrations and loads are observed in the April through June period. This period often receives the majority of yearly runoff from a combination of snowmelt runoff and higher rainfall totals. The lack of crop canopy during this period leads to higher runoff rates from the agricultural lands. When storm flow samples were removed from the dataset, only seven percent of samples from the July through March period exceeded the loading capacity.

GIS mapping capabilities using landuse, soils, a Revised Universal Soil Loss Equation, and topography showed steeply sloped areas present in northern portions of the watershed. The mapping highlighted several areas in the upper watershed where steep slopes and increased soil loss was present. This information paired with the load duration curves indicates the sources of turbidity are related to overland runoff.

2.5 Measurable Water Quality Goals

2.5.1 Fecal Coliform Bacteria Measurable Water Quality Goals

The water quality standard for Class 2b streams for fecal coliform bacteria is as follows:

- organisms not to exceed 200 organisms per 100 milliliters (org/100 mL) as a geometric mean of not less than five samples in any calendar month,

- nor shall more than ten percent of all samples taken during any calendar month individually exceed 2000 organisms per 100 milliliters.

The standard applies only between April 1 and October 31. Recently, the fecal coliform water quality standard was changed to *E.coli*. The fecal coliform bacteria standard of 200 org/100 ml would be roughly equivalent to 126 *E. coli* bacteria org/100 mL. Therefore, to adapt the fecal coliform TMDL allocations based on future *E. coli* standards would require a multiplication factor of 0.63. Future monitoring will utilize the *E.coli* water quality standard geometric of 126 org/100 mL.

In order to determine percent reduction needed to meet the water quality standard, a simple equation is used and shown below.

$$\left(\frac{\text{monthly geomean-water quality standard}}{\text{monthly geomean}}\right) \text{ X } 100 = \text{percent reduction}$$

The monthly geomean calculated show that August and September exceeded the water quality standard. The geomean in August, using eight samples, was 520 org/100 mL. Using the equation above, the percent reduction needed to meet the water quality standard is 62 percent. For September, there were six samples collected and the geomean was 515 org/100 mL. A reduction of 63 percent is needed to meet the water quality standard.

2.5.2 Turbidity Measurable Water Quality Goals

The water quality standard for Class 2B streams for turbidity is 25 nephelometric turbidity units (NTU). Total suspended solids (TSS) and transparency (using a transparency tube) are two surrogates that can also be used. The TSS thresholds are 58 and 66 milligrams per liter (mg/L) in the Western Corn Belt Plains Ecoregion and Northern Glaciated Plains Ecoregion, respectively. Most of the Rock River watershed is located in the Northern Glaciated Plains Ecoregion. The surrogate standard for transparency is 20 centimeters.

To determine the TSS equivalent to the turbidity standard of 25 NTU, paired turbidity and TSS samples collected from the Minnesota/Iowa monitoring station (STORET ID S000-097) were compiled. Using the regression line equation, a TSS concentration of 74 mg/L was determined to be the surrogate value to the 25 NTU turbidity standard.

For a percent reduction, the 90th percentile TSS load for four flow regimes was compared to a loading capacity at the mid-point of each flow regime. The data indicate that the greatest reductions in TSS load will need to occur during higher flow periods. For highest flows, a 68 percent reduction is needed; for high flows, a 27 percent reduction is needed to meet the water quality standard.

2.6 Loading Capacity Allocations

2.6.1 Fecal Coliform Bacteria Allocations

Table 2.4 –Rock River: Elk Creek to Minnesota/Iowa Border Allocations

Drainage Area (square miles): 556										
Total WWTF Design Flow (mgd): 2.82	Flow Zone									
	High		Moist		Mid		Dry		Low	
	Monthly	Daily	Monthly	Daily	Monthly	Daily	Monthly	Daily	Monthly	Daily
	values expressed as trillion organisms per month/day									
TOTAL MONTHLY/DAILY LOADING CAPACITY	130.80	43.60	55.48	18.49	25.89	8.63	15.38	5.13	5.64	1.88
Wasteload Allocation										
Permitted Wastewater Treatment Facilities	0.63	0.21	0.63	0.21	0.63	0.21	0.63	0.21	0.63	0.21
Livestock Facilities Requiring NPDES Permits	0	0	0	0	0	0	0	0	0	0
"Straight Pipe" Septic Systems	0	0	0	0	0	0	0	0	0	0
Load Allocation	90.54	30.18	35.77	11.92	20.84	6.95	6.57	2.19	2.69	0.90
Margin of Safety	39.63	13.21	19.08	6.36	4.42	1.47	8.18	2.73	2.32	0.77
	values expressed as percent of total monthly/daily loading capacity									
TOTAL MONTHLY/DAILY LOADING CAPACITY	100%		100%		100%		100%		100%	
Wasteload Allocation										
Permitted Wastewater Treatment Facilities	0.5%		1.1%		2.4%		4.1%		11.2%	
Livestock Facilities Requiring NPDES Permits	0.0%		0.0%		0.0%		0.0%		0.0%	
"Straight Pipe" Septic Systems	0.0%		0.0%		0.0%		0.0%		0.0%	
Load Allocation	69.2%		64.5%		80.5%		42.7%		47.7%	
Margin of Safety	30.3%		34.4%		17.1%		53.2%		41.1%	

2.6.2 Turbidity Allocations (expressed in TSS)

Table 2.5 Rock River: Elk Creek to Minnesota/Iowa Border Allocations

Rock River: Elk Creek to Minnesota/Iowa Border AU ID: 10170204-501 Watershed Area: 355,625 acres / 556 sq. mi.	**Flow Zone** **High Flows**	**Moist Conditions**	**Mid-Range Flows**	**Dry Conditions**	**Low Flows**
	values expressed as tons TSS/day				
Total Daily Loading Capacity	173.05	62.71	25.67	12.97	6.35
Wasteload Allocation					
Wastewater Treatment Facilities and Industrial Facilities with Numeric Discharge Limits for TSS (NPDES)	1.76	1.76	1.76	1.76	1.76
Construction Stormwater (NPDES)	1.14	0.37	0.17	0.07	0.01
Industrial Stormwater (NPDES)	0.57	0.18	0.09	0.03	0.01
Wasteload Allocation Total	3.46	2.31	2.02	1.86	1.78
Load Allocation	111.91	36.32	16.77	6.61	1.39
MOS	57.68	24.08	6.88	4.50	3.18
	value expressed as percentage of total daily loading capacity				
Total Daily Loading Capacity	100%	100%	100%	100%	100%
Wasteload Allocation					
Wastewater Treatment Facilities and Industrial Facilities with Numeric Discharge Limits for TSS (NPDES)	1.02%	2.81%	6.86%	13.57%	27.72%
Construction Stormwater (NPDES)	0.66%	0.59%	0.66%	0.52%	0.22%
Industrial Stormwater (NPDES)	0.33%	0.29%	0.33%	0.26%	0.11%
Wasteload Allocation Total	2.00%	3.69%	7.85%	14.35%	28.05%
Load Allocation	64.67%	57.91%	65.35%	50.96%	21.87%
MOS	33.33%	38.40%	26.80%	34.70%	50.08%

Table 2.6 Rock River: Champepadan Creek to Elk Creek Allocations

Rock River: Champepadan Creek to Elk Creek AU ID: 10170204-509 Watershed Area: 276,845 acres / 433 sq. mi.	Flow Zone High Flows	Moist Conditions	Mid-Range Flows	Dry Conditions	Low Flows
	values expressed as tons TSS/day				
Total Daily Loading Capacity	134.710	48.820	19.980	10.090	4.940
Wasteload Allocation					
Wastewater Treatment Facilities and Industrial Facilities with Numeric Discharge Limits for TSS (NPDES)	1.560	1.560	1.560	1.560	1.560
Construction Stormwater (NPDES)	0.883	0.285	0.131	0.050	0.009
Industrial Stormwater (NPDES)	0.441	0.143	0.065	0.025	0.005
Wasteload Allocation Total	2.884	1.988	1.756	1.635	1.574
Load Allocation	86.926	28.092	12.864	4.955	0.896
MOS	44.900	18.740	5.360	3.500	2.470
	value expressed as percentage of total daily loading capacity				
Total Daily Loading Capacity	100%	100%	100%	100%	100%
Wasteload Allocation					
Wastewater Treatment Facilities and Industrial Facilities with Numeric Discharge Limits for TSS (NPDES)	1.16%	3.20%	7.81%	15.46%	31.58%
Construction Stormwater (NPDES)	0.66%	0.58%	0.65%	0.50%	0.18%
Industrial Stormwater (NPDES)	0.33%	0.29%	0.33%	0.25%	0.09%
Wasteload Allocation Total	2.14%	4.07%	8.79%	16.21%	31.86%
Load Allocation	64.53%	57.54%	64.38%	49.10%	18.14%
MOS	33.33%	38.39%	26.83%	34.69%	50.00%

Table 2.7 Elk Creek: Headwaters to Rock River Allocations

Elk Creek: Headwaters to Rock River AU ID: 10170204-519 Watershed Area: 41,151 acres / 64 sq. mi.	Flow Zone High Flows	Moist Conditions	Mid-Range Flows	Dry Conditions	Low Flows
	values expressed as tons TSS/day				
Total Daily Loading Capacity	20.020	7.260	2.970	1.500	0.730
Wasteload Allocation					
Wastewater Treatment Facilities and Industrial Facilities with Numeric Discharge Limits for TSS (NPDES)	0.180	0.180	0.180	0.180	0.180
Construction Stormwater (NPDES)	0.132	0.043	0.020	0.008	0.002
Industrial Stormwater (NPDES)	0.066	0.021	0.010	0.004	0.001
Wasteload Allocation Total	0.378	0.244	0.210	0.192	0.183
Load Allocation	12.972	4.226	1.960	0.788	0.177
MOS	6.670	2.790	0.800	0.520	0.370
	value expressed as percentage of total daily loading capacity				
Total Daily Loading Capacity	100%	100%	100%	100%	100%
Wasteload Allocation					
Wastewater Treatment Facilities and Industrial Facilities with Numeric Discharge Limits for TSS (NPDES)	0.90%	2.48%	6.06%	12.00%	24.66%
Construction Stormwater (NPDES)	0.66%	0.59%	0.67%	0.53%	0.25%
Industrial Stormwater (NPDES)	0.33%	0.30%	0.34%	0.27%	0.12%
Wasteload Allocation Total	1.89%	3.37%	7.07%	12.80%	25.03%
Load Allocation	64.80%	58.20%	66.00%	52.53%	24.29%
MOS	33.32%	38.43%	26.94%	34.67%	50.68%

3.0 Priority Management Areas

Given the limited amount of water quality data in the Rock River watershed, it is difficult to delineate specific areas of the watershed to focus on at this time. Although we do not know the contributions from each watershed, the Elk Creek Watershed is listed for different impairments and may need a focused approach.

Current and future water monitoring, along with advances in evaluation modeling, may assist with developing priority areas in the future. At this time, there will be no priority management areas defined until we can conduct future water monitoring.

4.0 Nonpoint Source Management Measures Alternatives and Analysis

This section provides implementation strategies targeted towards reduction of fecal coliform bacteria and turbidity. There are many implementation strategies that would work for both fecal coliform and turbidity. As fecal coliform and turbidity have several sources and pathways, several of the suggestions have the common goal of addressing both pollutants.

4.1 Evaluation of Management Measures Alternatives

Manure Management

- Development of Manure Management Plans (MMP): A MMP is a document that assists producers in managing rate, timing, location, form and method of all nutrient applications. Any producer with more than 300 animal units is required to complete a MMP. These plans are beneficial in that they match crop needs with correct application rate of each manure source and detail how application will be handled in special protection areas. The drawbacks are expense of writing or hiring the writing of a plan, time to record applications and to make changes as applications of nutrients change from the original plan. The cost to complete a MMP can vary from $500.00 to $2,000 for an initial plan and $200.00 to $1,000.00 per year to update, depending on size of operation and complexity of cropping rotation.
- Custom Application of Manure: This does account for a large percentage of manure application in the Rock River Watershed. The Custom Waste Applicator program is administered by the Minnesota Department of Agriculture with limited inspections due to budget restrictions. Recertification requires the applicators to attend training 2 out of 3 years or take an open book test. Training events are limited and not usually available in the southwest corner of Minnesota, making it difficult for applicators to receive the proper training. Minnesota Feedlot rules do not require a feedlot to complete a nutrient management plan if the manure is applied by a licensed Custom Waste Applicator. Given the limited oversight and lenient licensing and recertification program, there is the possibility of over-application and not following adequate set backs to sensitive areas. This is a relatively inexpensive management measure that requires staff time to inspect, calibrate, and collaborate with custom applicators to ensure proper manure application.
- Level III Land Application Inspections: Conducting a Level III Land Application Inspection on fields with manure application in sensitive areas would be a process to educate and evaluate correct manure application. Each County is required to inspect 7% of their registered feedlots each year. Focusing these inspections in the Rock River Watershed and performing a Level III Land Application inspection could be conducted at the same time a Level III feedlot inspection is performed. The cost to ensure setbacks are being met, best management practices are being followed as well as verifying that the correct amount of manure is being applied would add approximately $37,000 in additional time during site visits.

Implementing the following best management practices of a manure management plan would significantly reduce the amount of fecal material entering water bodies and also reduce the sediment that would cause turbidity. Research shows that incorporating all or some of these components can reduce bacteria from 50% to 90%. Costs of incorporating a manure management plan and best management practices can vary greatly. Costs will vary depending on factors such as cost of commercial fertilizer application in areas with limited manure application allowed, value of high value crops not grown in buffers vs grass (this part is unclear-buffers vs grass?), or even the cost of total containment structures for feedlots that cannot winter apply. Depending on the situation, the following best management practices and MN State Feedlot Rule requirements could also be relatively inexpensive.

- Observing setbacks: The MPCA has defined the following setbacks to perennial and intermittent streams, lakes, and drainage ditches for application of manure: 25 feet- no application, 25-300 feet- inject or incorporate within 24 hours. 0 to 300 foot from an open tile intake requires injection or incorporation within 24 hours also. It is fairly common to see these setbacks not being followed. The drawbacks would be the need for separate application of nutrients within the 25 feet of the water surface and adequate time to incorporate surface applied manure within 24 hours.
- Winter manure application: Winter application of manure can be a strong contributor of fecal coliform during snow melt if manure is not correctly applied. Applying too close to surface water, too high a rate of application or applying on fields that have slopes over 2% for liquid manure or 4% for solid manure can cause problems. Drawbacks to observing proper winter application would be not being able to spread in certain fields or not being able to spread manure over a complete field.
- Vegetative buffers: Vegetative buffers can be a very efficient method to filter runoff from fields with manure application. The permanent grass vegetation will trap nutrient laden sediment, fecal material and at the same time utilize the nutrients. One of the stronger deterrents to installing vegetative buffers is the loss of production acres.
- Incorporation of Manure: Immediate incorporation of manure or incorporating the manure within 24 hours will reduce the potential of fecal material runoff to surface water. Incorporation has a financial benefit by stopping loss of nitrogen. Research has shown that incorporation can also improve soil structure, which would help water infiltration and prevent runoff. Incorporation of manure within 24 hours is required for areas 25-300 feet from of a waterbody and within 300 feet of an open tile intake The draw backs would be additional time required to incorporate and possibly causing more potential bacteria since incorporation does not allow sunlight to kill the bacteria in the manure.
- Calibration of equipment: Calibration of manure application equipment will assist producers in making correct application of manure. Manure volume and density can vary greatly and calibration would prevent over application and still provide adequate nutrients for the crops grown. Technical assistance and scales would help producers weigh and calibrate their application equipment. A set of scales would cost

approximately $12,000.00 and take approximately three hours per site. Flow meters on liquid manure application equipment would also insure proper rates of application and cost approximately $12,000.00.

Feedlot Runoff reduction

- Feedlot fixes: There are approximately 684 feedlots in the RRW. They range from a few livestock to thousands of animals. Thirty-nine feedlots have greater than 1,000 animal units (NPDES permitted) and are not eligible for cost share dollars for corrections. State and federal requirements address several issues but there are still many feedlots that are operating at a level that could be contributing fecal coliform bacteria to nearby water bodies. Providing assistance for the repair and upgrade of these feedlots is essential to correcting the problem sites in a timely manner. Correcting the runoff would be 90 to 100 percent effective in reducing fecal coliform and can assist producers in better managing their manure. A drawback is the cost, and in some cases not having adequate space to install a runoff control structure. Costs for installing runoff control structures can range from $20,000-$100,000 which is prohibitive for many feedlot owners. Engineering and technical assistance can add 5-10 percent to the cost of a project.
- Inspections: A Level III Feedlot inspection requires a site visit and the use of the MinnFarm runoff evaluation model for open lots. Through this inspection process, feedlots needing corrective measures would be identified. This knowledge will assist in prioritizing sites needing correction. There are no drawbacks to performing the inspections, but there may be some trepidation on the feedlot owner's part in allowing site visits. Performing 684 site visits and analysis of each would cost approximately $90,000.00 to $100,000.00.

Pasture Management

- Rotational Grazing Systems: Livestock with access to streams pose a major risk of contaminating waters through direct deposit of fecal material either in the stream or along the banks. Livestock can also cause instability of stream banks, which leads to greater turbidity during higher flows. Research has shown that exclusion of livestock through fencing or controlled access can reduce fecal coliform bacteria and turbidity in the pastures by as much as 80 percent. The USDA Environmental Quality Incentive Program has funding for rotational grazing systems but it has had limited acceptance due to the program's numerous requirements. A simpler, less complicated system could be offered with better acceptance. This simpler system would have a stream crossing or remote watering component, a vegetative management component and a stream bank erosion component. The cost to offer this type of program would be approximately $90,000.00. The drawbacks to these systems would be the labor and expense of establishing and maintaining fencing along the stream corridor.

Structural Practices

Research has shown that water and sediment control basins, terraces, and stream J-hooks are all structural practices that can reduce runoff and soil erosion to reduce turbidity by

50% - 90% in the Rock River. Stream crossings in pasture systems have shown to reduce sediment delivery from bank erosion and stream bed degradation. Current cost share programs include the Environmental Quality Insurance Program (EQIP) that can provide up to 50 percent in cost share and is awarded on a competitive basis according to an environmental benefit index. The US Fish and Wildlife Service has provided up to 90 percent cost share for stream bank stabilization and J-hooks but has very limited funding, sometimes taking 2-3 years to get funding for a project.

- Terraces: Terraces break long slopes into shorter ones. As water makes its way down a hill, terraces serve as small dams to intercept water and guide it to an outlet. Terraces can be effective at reducing overland runoff that carries sediment and nutrients. Average costs for terraces usually run $2.50 per foot.
- Water and Sediment Control Basins: A water and sediment control basin is an embankment that is built across a depressional area of concentrated water runoff to act similar to a terrace. These basins trap sediment and water running off farmland above the structure. These structures help reduce gully erosion by controlling water flow within a drainage area. A drawback to both terraces and water and sediment control basins is spacing of each determines the width of tillage and planting equipment. Water and sediment basin costs can range from $2.50 per foot to $5.50 per foot depending on the design.
- Stream Barb or J-hooks and Rock Weirs: Stream bank sloughing or erosion is a large contributor to sediment delivery. Stream barb or J-hooks are installed where stream bank erosion is occurring. When installed, the barbs re-direct the energy of the stream back into the channel, reducing further stream bank erosion and also creating back water habitat for the Topeka shiner. Rock weirs will be installed where down cutting in the channel is a problem. The weirs will help prevent further head cutting in the stream. Research has shown that eliminating stream bank erosion can reduce turbidity by 90 percent. The drawbacks to stream barbs or J-hooks are that they are expensive to install and need technical assistance for correct placement. Installing enough J-hooks or stream barbs could cost $1.6 million with $160,000.00 in technical assistance. J-hooks can range in cost from $3,000 per structure to $5,000 depending on the size.
- Stream Crossings: When incorporated with remote watering and rotational grazing, stream crossings for cattle in a pasture situation have shown a 50-70 percent reduction in sediment delivery. Stream crossings can range in cost from $5,000 to $10,000 depending on stream size and width of the crossing.

Vegetative Practices

Vegetative practices minimize bacteria and sediment runoff from agricultural lands through increased infiltration and decreased pollutant transport. Research shows that these practices can reduce sediment ranging from 50% to 90%. Although not a grass based practice, conservation tillage will provide benefits that will ultimately reduce turbidity. Currently the US Fish and Wildlife offers financial assistance for wetland restorations with approximately 50% cost share. Practices that prevent soil erosion such as waterways and buffers may qualify for the NRCS's Environmental Quality Insurance

Program (EQIP) and could receive up to 50% in cost share dollars. The EQIP program also provides incentives for residue management and conservation tillage.

- Wetland Restorations: Wetlands are natural swamps, bogs, sloughs, potholes or marshes that have saturated soils and water loving plants. Wetlands are important as they provide wildlife habitat and serve as natural filter for agricultural and urban runoff. They also remove nutrients, pesticides and bacteria from surface waters and can act as efficient, low cost sewage and animal waste treatment practices. Wetlands slow overland flow and store runoff water, which reduces both soil erosion and flooding downstream. The cost of a wetland restoration would depend on the location of the site, the size of the wetland and design needed for restoration. Wetland restoration could range in cost from $10,000 for a simple, small acreage site to $30,000 for a larger more complicated site.
- Filter Strips or Grass buffers: Filter strips are strips of grass and trees and/or shrubs that slow water flow and cause contaminants like sediment, chemicals and nutrients to collect in vegetation. The nutrients and chemicals are then used by the vegetated filter strips, rather then entering water supplies and water bodies. Filter strips are often constructed along ditches, thus moving row crop operations farther from the stream. Riparian buffers are also strips of grass, trees and or shrubs but are usually established along the main stem of streams or high impact areas. The NRCS' Conservation Security Program offers incentives based on soil types to place sensitive acres along streams and waterways in permanent grass for 10 years and has a seeding and establishment component.
- Grassed Waterways: A grassed waterway is where a natural drainage way is graded and shaped to form a smooth, bowl shaped channel. This area is seeded to sod-forming grasses. Runoff water that flows down the drainage way flows across the grass rather than tearing away soil and forming a larger gully. An outlet is often installed to stabilize the waterway and prevent a new gully from forming. The grass cover protects the drainage way from gully erosion and can act as a filter to absorb some of the chemicals and nutrients in the runoff water. Grass waterways can range in cost from $2.50 per foot to $3.50 per foot depending on the width.
- Conservation Tillage and Residue Management: No-till, reduced-till, ridge till and zone tillage are all crop production methods that increase the amount of crop residue left on the surface of the soil. By increasing the crop residue on the surface many benefits to preventing soil erosion are realized. The increased residue improves soil structure, dissipates raindrop energy, improves water infiltration and lessens soil transport. Costs for implementing conservation or residue management can vary greatly depending on the cost of the equipment and the amount of acres that are using the equipment.

4.2 Selection of Management Measures

To obtain input and encourage public participation, an advisory committee was formed. A request for volunteers brought good representation from all major livestock groups,

certified crop advisors, suppliers, and private citizens. A list of the advisory committee members can be found in Appendix A. The Advisory Committee met jointly with the Technical Committee to form an implementation planning committee that provided broad representation from all interests in the Rock River Watershed. The committees met twice to provide analysis and reasoning of all management measures and chose those that would have the greatest impact on improving the impairments of fecal coliform and turbidity in the Rock River Watershed. The first meeting was to educate the advisory committee on the TMDL assessment process, the implementation plan process, current water sampling results and additional information to assist them in making an informed decision. After the first meeting, the committee was given resources to assist them with assigned homework to research general implementation strategies for reducing fecal coliform and turbidity. After researching the choices, their assignment was to bring their questions and top choices for implementation strategies to the second meeting. The second meeting reviewed the general implementation strategies and then each member voted on what they felt would have the greatest impact on improving the impairments.

The practice of Manure Management Planning received the most votes to reduce fecal coliform from a non-point source. Structural practices such as stream bank stabilization received the most votes to reduce turbidity from a non-point source with vegetative practices receiving a close second. Copies of the meeting agendas, homework assignments, resource lists, and ballots can be found in Appendix A.

Measure chosen to address fecal coliform:
Manure Management Planning

- Since manure application accounts for 71% of the fecal material in the Rock River Watershed, the proper management of manure application can greatly reduce fecal coliform bacteria contamination. By using the planning process and incorporating the best management practices (found in Section *4.1*, *Manure Management Planning)* that are outlined in a manure management plan, fecal coliform bacteria concentrations have been shown to be reduced from 30 percent to 75 percent.

Measures chosen to address turbidity:
Structural Practices

- Structural practices such as terraces, sediment basins, along with stream J-hooks all provide erosion control on fields and water courses. Research has shown that depending on soil type, cover and slope, structural practices can reduce sediment loading by 50%. The Advisory and Technical committees as well as other water quality personnel throughout the State feel that stream bank erosion is a very strong contributor of turbidity to the stream system of the Rock River. Stream barbs or j-hooks provide a measure of stream bank stabilization that can reduce sediment loading by up to 90%. Stream crossings or remote watering systems for grazing programs can also greatly improve stream bank stabilization.

Vegetative Practices

- Vegetative practices are a very cost effective method to control soil movement and sedimentation. Research has shown that properly placed buffers can reduce sediment

delivery from 50%-90%. They also remove nutrients, pesticides and bacteria from surface waters and can act as efficient, low cost sewage and animal waste treatment practices. The methods range from grassed waterways, grass filter strips to buffers, riparian buffers, conservation tillage, residue management as well as wetland restoration. This was chosen as the second most important method by the committees for controlling turbidity.

5.0 Point Source Management Measures Alternatives and Analysis

This section also provides implementation strategies targeted towards reduction of fecal coliform bacteria and turbidity. There are many implementation strategies that would work for both fecal coliform and turbidity. We will include all strategies considered and prioritize those that we feel would make the most improvement. As fecal coliform and turbidity have several sources and pathways, several of the suggestions have the common goal of addressing both pollutants.

5.1 Evaluation of Management Measures Alternatives

Septic System Management

- Subsurface Sewage Treatment Systems or SSTSs treat sewage from individual dwellings. Research has shown that replacing a non-conforming system with proper drain fields would be 100% effective by providing nearly complete treatment of fecal coliform bacteria. Acceptable designs are described in Minn. R. ch. 7080. All counties in the Rock River watershed are responsible for enforcing these rules. Failing and non-compliant septic systems are a low contributor of fecal coliform load to the Rock River during wet conditions, but are a high contributor of the load during the periods between storms. The major deterrent would be cost and financing of the system. SSTS systems can range in cost from $6,000.00 for a simple design to $12,000.00 for a mound design. Financing of these systems can be difficult, especially for low-income households.

Municipal Sewage Control

- The impaired stream reach receives wastewater treatment facility discharge from nine communities. Holland and Luverne are continuous discharge facilities. The communities of Chandler, Edgerton, Hardwick, Leota, Magnolia and Woodstock utilize treatment ponds that can discharge from April 1 to June 15 and September 15 to December 15. These communities monitor their discharges and are regulated directly by Minnesota Pollution Control Agency. They are held to the allowable discharge limits under Minnesota State Rules. The community of Kenneth utilizes a community drainfield that is non-discharging. Lismore and Steen, two communities located partially in the watershed, discharge effluent outside the watershed boundary. The community of Hatfield has constructed a new treatment system, which will be a non-discharging system.
- There are three unsewered communities that lie at least partially in the watershed, Ash Creek (unincorporated), Kanaranzi (unincorporated) and Trosky (incorporated). Correction of the failing SST systems in the three communities could reduce the fecal coliform contribution to the Rock River.

MS4 Communities – Stormwater

- Cities with populations greater than 5,000 are required to have Municipal Separate Storm Sewer System (MS4) stormwater permits. However, there are no permitted

MS4 communities in the Rock River Watershed at this time. The City of Luverne is near the 5,000 threshold however, and if ever required to have a MS4 permit, a TMDL revision may be needed. Urban storm water discharges that carry fecal coliform bacteria as a result of pet waste can be addressed through better site design (or low impact development) and the use of Best Management Practices in urban areas.

National Pollutant Discharge Elimination System (NPDES) Livestock Facilities

- Livestock facilities that have been issued NPDES permits are allowed zero discharge and are permitted by Minnesota Pollution Control Agency. The watershed has 24 livestock facilities that have been issued NPDES permits. Land application of manure from these sites is regulated by the requirements of their permit. Discharge of fecal coliform from fields where manure has been land applied may occur at times. Such discharges are covered under Section 4.1 Manure Management and Planning of the non-point source section.

5.2 Selection of Management Measures

To obtain input and encourage public participation, an advisory committee was formed. A request for volunteers brought good representation from all major livestock groups, certified crop advisors, suppliers, and private citizens. A list of the advisory committee members can be found in appendix A. The Advisory Committee met jointly with the Technical Committee that provided broad representation from all interests in the Rock River Watershed. The committees met twice to provide reasoning and analysis of all management measures and chose those that would have the greatest impact on improving the impairments of fecal coliform and turbidity in the Rock River Watershed. The first meeting was to educate the Advisory Committee on the TMDL assessment process, the implementation plan process, current water sampling results and additional information to assist them in making an informed decision. After the first meeting, the committee received resources to assist them with assigned homework to research general implementation strategies for reducing fecal coliform and turbidity. After researching the choices, their assignment was to bring their questions and top choices for implementation strategies to the second meeting. The second meeting reviewed the general implementation strategies and then each member voted on what they felt would have the greatest impact on improving the impairments.

Correcting non-conforming septic systems received the most votes to reduce fecal coliform bacteria from a point source. Copies of the meeting agendas, homework assignments, resource lists, and ballots can be found in Appendix A.

Septic System Management

- The Advisory Committee and the Technical Committee felt that correcting failing SSTSs is one of the priority management measures for fecal coliform and would be 100% effective. According to county estimates, 72 percent (1084 households) of SSTSs in the watershed are non-conforming systems that can contribute fecal

coliform bacteria to the Rock River. This would include the unsewered communities of Ash Creek, Kanaranzi and Trosky. County staff has estimated the number of non-complaint systems based on the number of permitted systems and dwellings in the watershed. There is a need for a comprehensive inventory of septic system compliance in the watershed. Current administrative funding does not adequately allow for proper compliance inventorying or educational activities related to septic systems. It is recommended that funding be increased or that additional funding be obtained through available grant opportunities. While most homeowners may be willing to upgrade non-conforming systems, a major deterrent can be cost. As a means to help homeowners pay for new systems, many counties offer a Revolving Loan Fund. SWCD offices also provide low interest loans through the Ag BMP program. These programs typically offer loans over a five to ten-year period at three percent interest. Formerly, when funding was available, some dollars where used as an incentive with moderate success to encourage replacement of non-compliant SSTSs. An incentive or cost share would assist in encouraging residents to upgrade their SSTSs.

6.0 Identification and Summary of Implementation Objectives and Action Items

Objective 1. Nonpoint Source Management Measures

Task A: Manure Management Planning

Action A-1: Manure management workshops

- Educate producers on the importance of correct planning of manure application by hosting five workshops over ten years.
- Timeframe: Years 1, 3, 5, 7, and 9
- Person(s) responsible: Four-County SWCDs, Environmental Offices, NRCS, and University of MN Extension
- Total Costs: $6,800.00
    - Cash: $5,000.00
        - 100 attendees/workshop x $10.00/attendee x 5 workshops
    - Inkind: $1,800.00
        - 10 hrs/workshop x $36.00/hr x 5 workshops

Action A-2: Demonstration plot and field days

- Educate producers on the importance of correct planning of manure application by holding five field days over ten years. The demonstration site will have different rates of manure and application methods. Depending on the site, various manure application BMPs may be shown.
- Develop long-term agreement with landowner to install demonstration site and to work with an agronomist to develop various plots.
- Timeframe: Years 2, 4, 6, 8, and 10
- Person(s) responsible: Four-County SWCDs, Environmental Offices and NRCS, landowner, agronomist and University of MN extension
- Total Costs: $11,100.00
    - Cash: $7,500.00
        - 100 attendees/field day x $10.00/attendee x 5 field days=$5,000.00
        - $500.00/yr for landowner costs x 5 years=$2,500.00
    - Inkind: $3,600.00
        - 20 hrs/field day x $36.00/hr x 5 workshops

Action A-3: Level III Land Application Inspections

- Conduct Level III land application inspections along with the feedlot inspections that each county is required to complete each year.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices and NRCS
- Total Costs: $36,936.00
    - Cash: $0.00
    - Inkind: $36,936.00
        - 1.5 hours/site x $36.00/hour x 684 feedlots

Action A-4: Manure Management

- Provide a cash incentive to producers with less than 300 animal units, those who do not qualify for EQIP or those that we want to continue after the expiration of the EQIP program to use the services of a Certified Crop Consultant or agronomist to develop and maintain a written nutrient management plan. There are approximately 100 feedlots that would qualify for this incentive. The incentive will be offered for three years if the producer is shown to be following the plan.
- There is a need for better calibration of solid manure application equipment. Scale pads are a tool for measuring and calibrating solid manure application. These scale pads would be purchased by the project and housed by the Rock County SWCD/Land Management. The counties in the watershed would assist 100 producers in calibration.
- Flow meters on liquid manure application equipment would assist producers in accurate application of manure. The incentive would entice producers to utilize flow meters in application equipment.
- Years 1-5
- Person(s) responsible: Four-County SWCDs, Environmental Offices, NRCS, and Certified Crop Consultant or agronomist
- Total Costs: $172,200.00
    - Cash: $147,000.00
        - $1,100.00 incentive/producer for hiring a consultant to write and update a plan (up to $500.00 for first year, up to $300.00 for second and third year) x 100 producers= $110,000.00
        - $2,400.00/scale pad x 5 pads = $12,000.00
        - $5.00/acre incentive to use a liquid manure applicator with meter, maximum of 200 acres x 25 producers = $25,000.00
    - Inkind: $25,200.00
        - 100 hrs x $36.00/hr x 4 years for promotion and plan review = $14,400.00
        - 3 hrs x $36.00/hr x 100 producers for weighing and calibration of solid manure spreaders = $10,800.00

Action A-5: Custom Manure Application Inspections

- The Minnesota Department of Agriculture (MDA) leads this program to insure appropriate manure application for commercial applicators.
- Provide local support as needed for the program through inkind time. It estimated that each county will spend 10 hours per year inspecting applicators and applications.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices and NRCS, and MDA
- Total Costs: $14,400.00
    - Cash: $0.00
    - Inkind: $14,400.00
        - 40 hrs x $36.00/hr x 10 years

Action A-6: Custom Manure Applicator Recertification Workshops

- Commercial Animal Waste Technicians are required to attend two 4-6 hour workshops every three years to recertify their custom applicators license. It is estimated that each county will spend 10 hours per year to facilitate annual training.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices and NRCS, MDA, and University of MN extension
- Total Costs: $15,900.00
    - Cash: $1,500.00
        - 15 applicators x $10.00/applicator for materials x 10 years
    - Inkind: $14,400.00
        - 40 hrs x $36.00/hr x 10 years

Task B: Structural Practices Installation

Action B-1: Install structural management measures

- Provide up to 25% cost share in addition to the 50% cost share provided by the EQIP program or $1,250 per terrace system whichever is less.
- Provide up to 25% cost-share in addition to the 50% cost share provided by the EQIP program or $1,000 whichever is less for sediment control basins.
- Provide up to 90% cost-share or $5,000 whichever is less for stream J-hooks.
- Provide up to 90% cost-share or $5,000 whichever is less for stream crossings.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices, Non-point Engineering Services, USFWS, NRCS, and BWSR
- Total Costs: $1,402,500.00
    - Cash: $1,275,000.00
        - 8 terrace projects x $1,250.00/structure = $10,000
        - 75 sediment control basins x $1,000.00/structure = $75,000.00
        - 228 stream J-hooks x $5,000.00/structure= $1,140,000.00
        - 10 stream crossings x $5,000.00/structure=$50,000.00
    - Inkind: $127,500.00
        - Technical and engineering assistance estimated at 10 percent of project cost.

Task C: Vegetative Practices Installation

Action C-1: Install vegetative management measures

- Provide up to 25% cost-share in addition to the 50% cost share provided by the EQIP program or $2,000 whichever is less for grassed waterways.
- Provide a cash incentive of $50.00/acre for grass filter strips, buffers, and riparian buffers in addition to the per acre provided by the CRP program.
- Provide a cash incentive of $10.00 per acre for 200 acres of conservation tillage or high residue management for 3 years in addition to the cost share provided by the EQIP program.
- Partner with US Fish and Wildlife to provide up to 90% cost-share or $10,000 whichever is less for wetland restoration.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices, NRCS, and BWSR
- Total Costs: $990,000.00
    - Cash: $900,000.00
        - 20 waterways x $2,000.00/structure=$40,000.00
        - $50.00/acre of buffers x 920 acres x 10 years=$460,000.00
        - $10.00/acre of conservation tillage x 10,000 acres x 3 years = $300,000.00
        - 10 wetland restorations x $10,000.00/wetland =$100,000.00
    - Inkind: $90,000.00
        - Technical and engineering assistance estimated at 10 percent of project cost.

Objective 2. Point Source Management Measures

Task A: Subsurface Septic Treatment System (SSTS) Management

Action A-1: SSTS Compliance Inventory

- According to county estimates, 72 percent of SSTS in the watershed are non-conforming systems that can contribute fecal coliform bacteria to the Rock River. A compliance inventory of existing systems would provide useful information to project partners for planning and funding efforts. A licensed inspector will be hired to conduct the inspections and provide a GPS location for each site. Each county will map the SSTSs in their portion of the watershed.
- Timeframe: Year 1
- Person(s) responsible: Four-County SWCDs, Environmental Offices
- Total Costs: $62,940.00
    - Cash: $61,500.00
        - 1 hour/site x $36.00/hour x 1,500 inspections=$54,000.00
        - 10 miles/site x 1,500 sites x $.50/mile=$7,500.00
    - Inkind: $1,440.00
        - 40 hours for mapping and reporting x $36.00/hour

Action A-2: SSTS Upgrades

- A need for financing SSTSs is apparent and would be addressed with an MDA Agricultural Best Management Practices Loan Program, MPCA State Revolving Fund Loan Program or county tax assessment.
- A cash incentive of $1,000.00 would also be available dependant on funding opportunities.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices, and MDA
- Total Costs: $8,144,000.00
    - Cash: $1,000,000.00
        - 1000 systems x $1,000 cash incentive/system installed
    - Inkind: $144,000.00
        - 4 hours/SSTS for design and inspection x 1,000 systems x $36.00/hr
    - Loan: $7,000,000.00
        - $7,000/SSTS loan x 1,000 systems

Action A-3: Low Income Financial Aid

- It is estimated that 7 percent of the households within the watershed are below the poverty level and would not be able to afford replacing their SSTS. This would equate to 76 systems. This action would finance the total cost of the system.
- Timeframe: Years 1-10
- Person(s) responsible: Four-County SWCDs, Environmental Offices
- Total Costs: $618,944.00
    - Cash: $608,000.00
        - 76 systems x $8,000.00/SSTS
    - Inkind: $10,944.00
        - 4 hours/SSTS for design and inspection x 76 SSTS x $36.00/hour

Objective 3. Monitoring

Task A: Water quality monitoring

Action A-1: Long-term Trend monitoring

- Conduct monitoring to determine improvements in water quality. Monthly sampling from May-September for *E. coli*, total suspended solids, turbidity, total phosphorus, total nitrate-nitrite nitrogen, total kjeldahl nitrogen and ammonia nitrogen as well as field tests of dissolved oxygen, pH, temperature, water height and visual observations at key points on the Rock River. Lab analysis is estimated at $45.00 per sample for 5 samples with $10.00 shipping and $10.00 for ice per sampling occasion.
- Person(s) responsible: Four County SWCDs, Environmental Offices, City of Luverne, and Rock County Rural Water
- Timeframe: Years 1-10
- Total Costs: $48,900.00
    - Cash: $16,500.00
        - 6 sampling occasions/year x $250.00/sampling occasion x 10 years=$15,000.00
        - 50 miles/sampling occasion x 6 sampling occasions x 10 years=3,000 miles x $.50/mile=$1,500.00
    - Inkind: $32,400.00
        - 15 hours/month x 6 months/year x 10 years x $36.00/hour

Action A-2: Effectiveness monitoring

- Conduct monitoring to determine improvements in water quality at 10 locations of main tributaries prior to their entry to the Rock River. Five samples would be taken monthly from April-October for *E. coli*, turbidity, total suspended solids as well as field tests of dissolved oxygen, pH, temperature, water height and visual observations at these key points entering the Rock River. A technician would be hired to conduct the sampling in years 5 and 10 of the implementation plan.
- Person(s) responsible: Four County SWCDs, Environmental Offices
- Timeframe: Year 5, Year 10
- Total Costs: $69,020.00
    - Cash: $66,500.00
        - 5 sampling occasions/ site x $50.00/sampling occasion x 10 sites/month x 7 months x 2 years=$35,000.00
        - 50 miles/site x 10 sites x 7 months x 2 years=7,000 miles x $.50/mile=$3,500.00
        - 5 samples/month x 10 sites x 2 hrs/sampling occasion x 7 months x 2 yrs=1,400 hours x $20.00/hour = $28,000.00
    - Inkind: $2,520.00
        - 5 hours/month x 7 months/year x 2 years x $36.00/hour for data entry and analysis

Action A-3: MPCA's Milestone monitoring

- MPCA collects samples monthly for 12 months, twice in five years. The site is located on the MN/IA border. Parameters analyzed through this monitoring: transparency, turbidity, conductivity, nitrogen, temperature, pH, dissolved oxygen, *E. coli*, chlorophyll, total suspended solids, biological oxygen demand, mercury, phosphorus, chloride, sulfate, carbon, and color.
- Timeframe: 2009, 2011, 2014, 2016, 2019
- Person(s) responsible: Rock County LMO, MPCA
- Total Costs: $180.00
    - Cash: $0.00
    - Inkind: $180.00
        - 1 hr/sampling year for analysis x $36.00/hour x 5 years

Action A-4: MPCA's Minnesota Watershed Loading Study

- Assist with the Minnesota Watershed Loading Study by collecting water samples. Samples are collected 25 times/year at the railroad bridge in Luverne. Sampling parameters: transparency, turbidity, conductivity, nitrogen series, temperature, pH, dissolved oxygen, total suspended solids, suspended volatile solids, phosphorus, chloride, sulfate, calcium, and magnesium.
- Timeframe: Years 1-10
- Person(s) responsible: Rock County LMO, MPCA
- Total Costs: $18,000.00
    - Cash: $0.00
    - Inkind: $18,000.00
        - 50 hrs/year x $36.00/hr x 10 years

Action A-5: MPCA's Intensive Watershed Monitoring

- MPCA collects fish, invertebrate, water quality and habitat samples once every ten years. This monitoring is conducted throughout the watershed over a two-year period. The four counties will assist with sampling as needed.
- Timeframe: 2011
- Person(s) responsible: Four counties SWCDs and Environmental Offices, MPCA
- Total Costs: $900.00
    - Cash: $0.00
    - Inkind: $900.00
        - 25 hr x $36.00/hr

Action A-6: Volunteer monitoring

- Utilize volunteers to take transparency readings along Rock River and its tributaries.
- Timeframe: Years 1-10
- Person(s) responsible: Four County SWCDs and Environmental Offices, sportsman organizations, private citizens, and MPCA
- Total Costs: $15,000.00
    - Cash: $600.00
        - promotional items and supplies for volunteers
    - Inkind: $14,400.00
        - 4 hr/mo/volunteer x 4 volunteers x 60 months x $15.00/hr

Task B: Research

Action B-1: DNA fingerprinting

- Conduct water sampling to use DNA markers for hogs, cattle and humans to identify *E. coli* sources in the Rock River. Use robot assisted automated analysis of water samples 2 times per month for 8 months from one site on the Rock River for 2 years.
- Timeframe: Years 1-2: sample collection, Year 2-3: analysis of samples
- Person(s) responsible: Four County SWCDs and Environmental Offices, University of Minnesota, MPCA
- Total Costs: $53,600.00
    - Cash: $39,200.00
        - 2 samples/mo x 8 mos x 2 yrs = 32 samples x $1,200/sample=$38,400.00
        - 50 miles/sampling occasion x 16 sampling occasions x $.50/mile x 2 yrs=$800.00
    - Inkind: $14,400.00
        - 25 hrs/month sampling x 8 months/yr x $36.00/hr x 2 yrs

Action B-2: Social Indicators

- Hire a student intern to conduct a Social Indicator Study to identify and provide information about key social issues in the Rock River Watershed.
- Utilize a consultant from the University of Minnesota to organize and assist with analysis.
- Timeframe: Year 1: conduct study, Year 2: analyze data, Year 3-10 implement social indicator options.
- Person(s) responsible: Four County SWCDs and Environmental Offices, University of Minnesota, MPCA
- Total Costs: $14,320.00
    - Cash: $8,560.00
        - Consultant facilitation=$2,000.00
        - 185 student intern hrs x $16.00/hr=$2,960.00
        - 4,000 surveys printed x 2 mailings x $0.25/survey = $2,000
        - Postage=$1,600.00
    - Inkind: $5,760.00
        - 160 hrs x $36.00/hr

Objective 4. Education and Outreach

Task A: Website Development

Action A-1: TMDL project website

- Development of a website for the Rock River Watershed TMDL project. The webpage will be linked from each county's web site as well as MPCA's TMDL webpage.
- Timeframe: Years 1-10
- Person(s) responsible: Four County SWCDs, Environmental Offices
- Total Costs: $4,800.00
    - Cash: $1,200.00
        - $120.00/yr for website hosting x 10 yrs
    - Inkind: $3,600.00
        - 10 hrs/year x $36.00/hr x 10 years for development and updates

Task B: Printed media

Action B-1: Bi-annual Newsletter

- The Rock River Watershed would publish a newsletter twice a year and include information to update the watershed residents about the Rock River TMDL process. Rock County Rural Water System and City of Luverne will also include updates in their newsletters.
- Timeframe: Years 1-10
- Person(s) responsible: Four County SWCDs, Environmental Offices, NRCS, City of Luverne, Rock County Rural Water
- Total Costs: $31,520.00
    - Cash: $20,000.00
        - $2,000.00/year for printing and postage x 10 yrs
    - Inkind: $11,520.00
        - 32 hrs/yr x $36.00/hr x 10 years

Action B-2: TMDL Brochure

- Develop a color brochure promoting best management practices and educating residents on the importance of the TMDL process.
- Timeframe: Year 1-2
- Person(s) responsible: Technical Committee
- Total Costs: $2,520.00
    - Cash: $1,800.00
        - 4,000 brochures print & mail x $0.45/brochure= $1,800.00
    - Inkind: $720.00
        - 5 hrs/co x 4 counties x $36.00/hr

Task C: Project Coordination and Promotion

Action C-1: Public Events

- Each county will promote the objectives at one public event annually such as a County Fair or Open house.
- Timeframe: Years 1-10
- Person(s) responsible: Four County SWCDs, Environmental Offices
- Total Costs: $13,520.00
    - Cash: $2,000.00
        - $50.00 booth rent x 4 counties x 10 years
    - Inkind: $11,520.00
        - 32 hrs x $36.00/hr x 10 yrs

Action C-2: Advisory Committee

- Conduct annual meetings of the Advisory Committee to provide updates and gather input.
- Timeframe: Years 1-10
- Person(s) responsible: Four County SWCDs, Environmental Offices, and Advisory Committee (13 members)
- Total Costs: $6,200.00
    - Cash: $1,000.00
        - $100.00/meeting for materials x 10 years
    - Inkind: $5,200.00
        - 2 hrs/meeting/member x $20.00/hr x 10 meetings x 13 members.

Action C-3: Technical Committee

- Semiannual meetings of the Technical Committee to provide updates, gather input and provide direction for adaptive management of the TMDL Implementation Plan.
- Timeframe: Years 1-10
- Person(s) responsible: Technical Committee (16 members).
- Total Costs: $24,040.00
    - Cash: $1,000.00
        - $100.00/year for materials x 10 years
    - Inkind: $23,040.00
        - 2 hrs/meeting/member x $36.00/hour x 20 meetings x 16 members

Action C-4: Administrative

- Rock County has assumed the lead in development of the TMDL Implementation plan and will continue in this role until member counties feel a need to develop a more formal organization. Rock County will continue to develop grant applications; facilitate and coordinate Rock River TMDL Implementation projects including work plan development and reporting; as well as hosting and planning Technical and Advisory Committee meetings. Rock County will fund the time needed by applying for administrative funding when possible with 50 percent grant funded and 50 percent inkind
- Timeframe: Years 1-10
- Person(s) responsible: Rock County SWCD/Land Management
- Total Costs: $86,400.00
    - Cash: $43,200.00
        - Grant Applications: 40 hrs/yr x 10 yrs x $36.00/hr=$14,400.00
        - Facilitation and Coordination: 80 hrs/yr x 10 yrs x $36.00/hr=$28,800
    - Inkind: $43,200.00
        - Grant Applications: 40 hrs/yr x 10 yrs x $36.00/hr=$14,400.00
        - Facilitation and Coordination: 80 hrs/yr x 10 yrs x $36.00/hr=$28,800

Table 6.0 Summary of Objectives, Timeline, Costs, and Partners

To achieve the fecal coliform and turbidity reductions needed, a 10-year period was chosen. The 10-year goal is considered attainable assuming adequate funding is available. All dollar figures are in today's costs and figures will be reviewed, as project needs change.

	Action Item	Estimated Costs (Cash and Inkind)	Timeline*	Estimated Load Reduction	Partners**
Objective 1: Non-point Source Measures					
Task A **Manure Management**	Manure Management Workshops	$6,800	Years 1,3,5,7,9	30-75% removal rate of fecal coliform depending on proximity to Rock River[1,2,3]	U of MN Extension, 4-co. Environmental offices, SWCDs, and NRCS
	Demonstration Plots & Field Days	$11,100	Years 2,4,6,8,10		Landowner, agronomists, U of MN Extension, 4-co. Environmental offices, SWCDs, and NRCS
	Level III Land App Inspections	$36,936	Years 1-10		4-co. Environmental offices, SWCDs, and NRCS
	Manure Management Incentive	$172,200	Offer program for Years 1-5, Incentive paid up to Year 7.		Agronomists, 4-co. Environmental offices, SWCDs, and NRCS
	Custom Manure Application Inspections	$14,400	Years 1-10		MDA, 4-co. Environmental offices, SWCDs, and NRCS
	Custom Manure Applicator Recertification Workshops	$15,900	Years 1-10		U of MN Extension, MDA, 4-co. Environmental offices, SWCDs, and NRCS
Task B **Structural Practices Installation**	Cost Share for terraces, sediment basins, stream J-hooks and stream crossings	$1,402,500	Years 1-10	100%-stream bank, 50%-basins and structures-reduction in sediment yield[1]	Nonpoint Engineering Services, USFWS, 4-co. Environmental offices, SWCDs, BWSR and NRCS
Task C **Vegetative Practices Installation**	Cost Share for waterways, buffers, conservation tillage & wetland restorations	$990,000	Years 1-10	50-90% reduction in sediment yield[1,2,3,4,5,6]	4-co. Environmental offices, SWCDs, BWSR and NRCS

	Action Item	Estimated Costs (Cash and Inkind)	Timeline*	Estimated Load Reduction	Partners**
Objective 2: Point Source Measures					
Task A **Subsurface Septic Treatment System (SSTS) Management**	SSTS Inventory	$62,940	Year 1	Not Applicable	4-co. Environmental offices and SWCDs
	SSTS Financing Program	$8,144,000	Year 1-10	99% removal rate of fecal coliform[9]	MPCA, MDA, 4-co. Environmental offices, and SWCDs
	Low Income Financial Aid	$618,944	Year 1-10	99% removal rate of fecal coliform[9]	4-co. Environmental offices and SWCDs
Objective 3: Monitoring					
Task A **Water Quality Monitoring**	Long-term Trend Monitoring	$48,900	Year 1-10	Not Applicable	City of Luverne, Rock County Rural Water System, 4-co. Environmental offices, SWCDs, and NRCS
	Effectiveness Monitoring	$69,020	Year 5,10		4-co. Environmental offices, and SWCDs
	MPCA Milestone Monitoring	$180	Year 1-5		Rock County LMO & MPCA
	MPCA Minnesota Watershed Loading Study	$18,000	Year 1-10		Rock County LMO & MPCA
	MPCA's Minnesota Intensive Watershed Monitoring	$900	2011		MPCA, 4-co. Environmental offices, and SWCDs
	Volunteer Monitoring	$15,000	Year 1-10		Volunteers, MPCA , 4-co. Environmental offices and SWCDs
Task B **Research**	DNA Fingerprinting	$53,600	Year 1-3	Not Applicable	U of M Extension, MPCA, 4-co. Environmental offices and SWCDs
	Social Indicators	$14,320	Years 1, 2		U of M Extension, MPCA, 4-co. Environmental offices and SWCDs

	Action Item	Estimated Costs (Cash and Inkind)	Timeline*	Estimated Load Reduction	Partners**
Objective 4: Education and Outreach					
Task A **Website Development**	TMDL Informational Website	$4,800	Year 1-10	Not Applicable	MPCA, 4-co. Environmental offices and SWCDs
Task B **Printed Media**	Monthly Newsletter	$31,520	Year 1-10	Not Applicable	City of Luverne, Rock County Rural Water System, 4-co. Environmental offices and SWCDs
	TMDL Brochure	$2,520	Year 1, 2		City of Luverne, Rock County Rural Water System, MPCA, 4-co. Environmental offices and SWCDs
Task C **Project Promotion**	Public Event Promotion	$13,520	Year 1-10	Not Applicable	4-co. Environmental offices and SWCDs
	Advisory Committee	$6,200	Year 1-10		Advisory Committee, 4-co. Environmental offices and SWCDs
	Technical Committee	$24,040	Years 1-10		Technical Committee
	Administrative	$86,400	Years 1-10		Technical Committee, 4-co. Environmental offices and SWCDs
Total funding needed:		**$11,864,640**			

*The timeline is run on a yearly length basis rather than specifically identified years due to not knowing when funding will become available. By using this method, it is easier to adapt the time frame when funding becomes available. Another factor that would affect the timeline may be due to different funding sources having varying funding deadlines. The timeline would start when funding became available.
**Roles and responsibilities of each partner can and will vary with each action item. With a 10-year time line there will be a tremendous amount of change, depending on funding, program availability and landowner interest. As this Implementation Plan is reviewed and adapted, responsibilities may change. Each agency or organization will be responsible for their individual programs where they could assist in the described measures. When applying for funding for each action item, a detailed work plan will address responsibilities for each part of the program.

7.0 Roles and Responsibilities of Project Partners

SOIL & WATER CONSERVATION DISTRICTS (SWCD) and COUNTY ENVIRONMENTAL SERVICES (CES): Each County SWCD and CES of Rock, Pipestone, Nobles and Murray Counties will support and commit its departments to activities assigned to them by the project's implementation plan for the purpose of protecting and improving water quality and quantity in the Rock River Watershed. These activities would range from reducing pollutant loadings, improving water quality, restoring wildlife species, and increasing public awareness. All legal requirements of the executed Grant and Loan Agreements are the responsibility of the project sponsor.

CITY of LUVERNE: City of Luverne supports the Rock River watershed in continuing the implementation plan of the Rock River TMDL for the sole purpose of protecting and improving water quality and quantity in the Rock River Watershed. The City will support the project by providing funding for water sampling and other inkind services including attending TMDL Implementation advisory meetings and other services as needed.

ROCK COUNTY RURAL WATER: Rock County Rural Water supports the Rock River watershed in continuing the implementation plan of the Rock River TMDL for the sole purpose of protecting and improving water quality and quantity in the Rock River Watershed. The Rock County Rural Water will also provide funding for water sampling and other inkind services including attending TMDL Implementation Plan Advisory meetings.

NATURAL RESOURCES CONSERVATION SERVICE (NRCS): The NRCS offices in Rock, Nobles, Murray, and Pipestone Counties support the Rock River TMDL Implement Plan as a means to improve and protect water quality and quantity in the Rock River watershed. They will also provide input by attending TMDL Implementation Plan Advisory meetings as well as offer and administer USDA programs that address the tasks outlined in the TMDL Implementation Plan.

SOUTHWEST PRAIRIE JOINT POWERS ENGINEERING SERVICES (SWJPO): The SWJPO also known as the non-point engineering services will provide technical and engineering services for many of the objectives listed in the TMDL Implementation plan including; feedlots, stream bank stabilization, and other structural practices.

DEPARTMENT OF NATURAL RESOURCES (DNR): The DNR fully supports the Rock River TMDL Implementation Plan. DNR will participate in activities that promote environmental educational efforts and application of those practices within the watershed, as well as assist in monitoring the effects upon the Rock River Watershed fish and endangered species.

US FISH AND WILDLIFE SERVICE (USFWS): The USFWS fully supports the Rock River TMDL Implementation Plan. The USFWS will provide technical assistance for and attempt to secure funds to be used to protect and restore key wetland areas and

stream bank stabilization projects, both of which will provide multiple benefits including water quality improvement, water retention, wildlife habitat and endangered species habitat.

UNIVERSITY OF MINNESOTA EXTENSION and ROCK COUNTY EXTENSION: The University of Minnesota Extension and Rock County Extension provide research and information on best management practices, assist in education through publications and workshops, and serve as an information resource.

MINNESOTA POLLUTION CONTROL AGENCY: The MPCA will be a valuable resource during the implementation phase. They offer grant and loan programs for restoration, provide oversight and regulatory roles in feedlots, SSTS, stormwater and WWTP actions, monitor water quality, and provide expertise in monitoring. The MPCA also serves as a member on the Technical Committee.

MINNESOTA DEPARTMENT of AGRICULTURE (MDA): The MDA will continue their role in licensing Commercial Waste Applicators by providing training, recertification and oversight in the licensure of the custom manure applicators. The MDA will also continue promoting and providing education on best management practices for preventing sedimentation, erosion, and manure application.

BOARD OF WATER AND SOIL RESOURCES (BWSR): The BWSR will provide technical resources in restoration of wetlands, buffer programs, feedlot design, and streambank stabilization. BWSR will also serve an integral part of the Technical Committee and provide assistance in securing funding for the Implementation plan.

8.0 Timeline*

Rock River TMDL Implementation Plan														
		Year	1	2	3	4	5	Evaluate	6	7	8	9	10	Evaluate
OBJECTIVE 1: Non-point Source Management Measures														
Task A	**Manure Management**													
	Manure Management Workshops		X		X		X	X		X		X		X
	Demonstration Plot and Field Days			X		X		X	X		X		X	X
	Level III Land Application Inspections		X	X	X	X	X	X	X	X	X	X	X	X
	Manure Management		X	X	X	X	X	X	X	X				
	Custom Manure Applicator Inspections		X	X	X	X	X	X	X	X	X	X	X	X
	Custom Manure Applicator Workshops		X	X	X	X	X	X	X	X	X	X	X	X
Task B	**Structural Practices Installation**													
	BMP installation		X	X	X	X	X	X	X	X	X	X	X	X
Task C	**Vegetative Practices Installation**													
	BMP installation		X	X	X	X	X	X	X	X	X	X	X	X
OBJECTIVE 2: Point Source Management Measures														
Task A	**Subsurface Treatment System Management**													
	SSTS Compliance Inventory		X											
	SSTS Financing Program		X	X	X	X	X	X	X	X	X	X	X	X
	Low Income Financial Aid		X	X	X	X	X	X	X	X	X	X	X	X

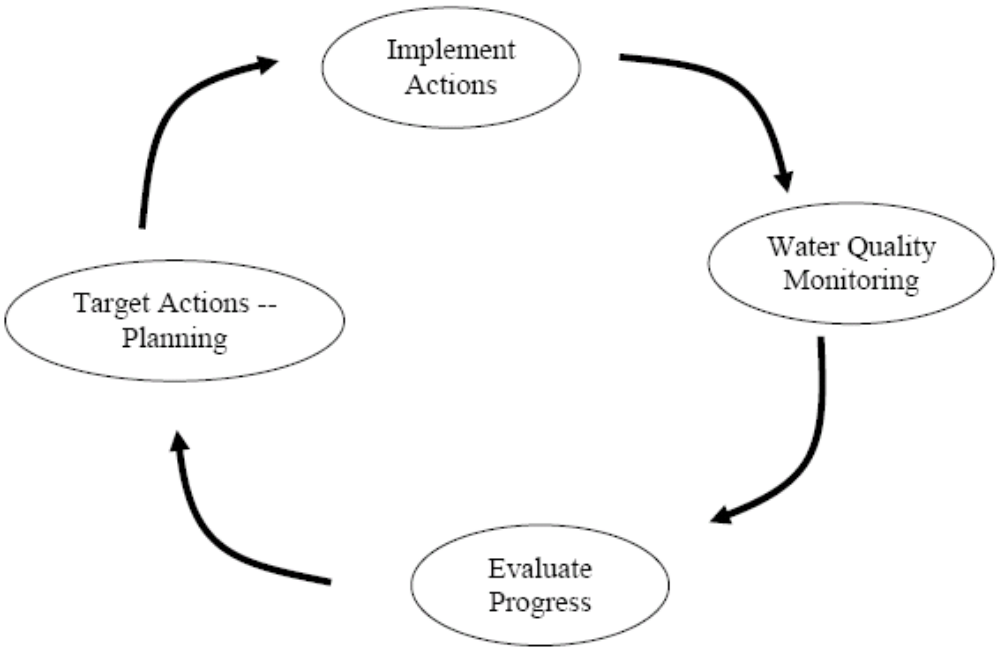
	Year	1	2	3	4	5	Evaluate	6	7	8	9	10	Evaluate
OBJECTIVE 3: Monitoring													
Task A	**Water Quality Monitoring**												
	Long term Trend Monitoring	X	X	X	X	X	X	X	X	X	X	X	X
	Effectiveness Monitoring					X	X					X	X
	MPCA Milestone Monitoring	X	X	X	X	X	X						
	MPCA Watershed Loading Study	X	X	X	X	X	X	X	X	X	X	X	X
	MPCA Intensive Waterhed Monitoring			X									
	Volunteer Monitoring	X	X	X	X	X	X	X	X	X	X	X	X
Task B	**Research**												
	DNA Fingerprinting	X	X	X			X						
	Social Indicators	X	X	X	X	X	X	X	X	X	X	X	X
OBJECTIVE 4: Education and Outreach													
Task A	**Website Development**												
	TMDL Informational Website	X	X	X	X	X	X	X	X	X	X	X	X
Task B	**Printed Media**												
	Biannual Newsletter	X	X	X	X	X	X	X	X	X	X	X	X
	TMDL Brochure	X	X				X	X	X				X
Task C	**Project Promotion**												
	Public Events	X	X	X	X	X	X	X	X	X	X	X	X
	Advisory Committee	X	X	X	X	X	X	X	X	X	X	X	X
	Technical Committee	X	X	X	X	X	X	X	X	X	X	X	X
	Administrative	X	X	X	X	X	X	X	X	X	X	X	X

*The timeline shows the activities listed in Years 1 – 10 of this implementation plan. It is the intent and hope of the project partners to begin implementation activities as soon as possible, preferably in 2009. This is dependant on funding though.

9.0 Adaptive Management Process

The implementation actions outlined in this management plan will decrease the turbidity and fecal coliform loading to the Rock River. However, at this stage it is not known exactly how many practices will be installed, and what those practices will consist of. Since the cumulative effect on water quality therefore is also unknown, a continual process must happen that evaluates instream water quality and then tailors the implementation actions to the findings.

As practices are being implemented in the watershed, instream water quality will be monitored to evaluate the impact that the implementation actions have on turbidity and fecal coliform concentrations in the Rock River. If water quality is improving, this suggests that the current approach is working and the same course will be followed. If water quality is not improving, this suggests that the approach being taken is not sufficient, or is targeted to the wrong sources. In this case, the approach will be evaluated and adjusted so that tangible instream water quality improvements can be realized. This process is referred to as adaptive management.



To be successful, this plan must be adaptable to data from current and future research. Practices or programs that are proven successful in reducing fecal coliform and or turbidity in other watersheds will need to be incorporated into this plan. There may be programs that are not even in the planning stages that may be offered and will need to be analyzed and possibly incorporated. The best analysis of effects, public perception and ultimately the success of each current or future objective would come with participation of our technical and advisory committees. As funding is secured and objectives are accomplished, a meeting of this workgroup would assist in analyzing the successes and future steps of the program.

10.0 Budget

Objective 1 Nonpoint Source Management Measures								
Cost Category	*Unit Cost*	*Unit*	*Quantity*	*Unit*	*Cash*	*In-Kind*	*Loan*	*Total*
Task A Manure Management Planning								
Action A-1: Manure Management Workshops								
Workshops	$ 1,000.00	Meeting	5	Meeting	$ 5,000.00			$ 5,000.00
Staff Time	$ 36.00	Hour	50	10 hrs/year		$ 1,800.00		$ 1,800.00
Action A-2: Demonstration Plot & Field Days								
Field Days	$ 1,000.00	Field Days	5	Field Days	$ 5,000.00			$ 5,000.00
Landowner Plot Costs	$ 500.00	Year	5	Years	$ 2,500.00			$ 2,500.00
Staff Time	$ 36.00	Hour	100	20 hrs/year		$ 3,600.00		$ 3,600.00
Action A-3: Level III Land Application Inspections								
Staff Time	$ 36.00	Hour	1026	hours		$ 36,936.00		$ 36,936.00
Action A-4: Manure Management								
Manure Mananagement Plan Incentives	$ 1,100.00	producer	100	producers	$ 110,000.00			$ 110,000.00
Staff Time	$ 36.00	Hour	400	hours		$ 14,400.00		$ 14,400.00
5 weigh pad scales	5	scales	2400	scale	$ 12,000.00			$ 12,000.00
Flow Meter Incentive	$ 1,000.00	producer	25	producers	$ 25,000.00			$ 25,000.00
Staff Time	$ 36.00	Hour	300	hours		$ 10,800.00		$ 10,800.00
Action A-5: Custom Manure Application Inspections								
Staff Time	$ 36.00	Hour	400	hours		$ 14,400.00		$ 14,400.00
Action A-6: Custom Manure Applicator Workshops								
Workshops	$ 150.00	Meeting	10	Years	$ 1,500.00			$ 1,500.00
Staff Time	$ 36.00	Hour	400	hours		$ 14,400.00		$ 14,400.00
Task B Structural Practices Installation								
Action B-1: Install Structural Practices								
Terrace Projects Cost-share	$ 1,250.00	project	8	projects	$ 10,000.00			$ 10,000.00
Sediment Control Basins Cost-share	$ 1,000.00	structure	75	structures	$ 75,000.00			$ 75,000.00
Stream J-hooks Cost-share	$ 5,000.00	structure	228	structures	$ 1,140,000.00			$ 1,140,000.00
Stream Crossing Cost-share	$ 5,000.00	structure	10	structures	$ 50,000.00			$ 50,000.00
Technical Assistance	10% of cost					$ 127,500.00		$ 127,500.00
Task C Vegetative Practices Installation								
Action C-1: Install Vegetative Practices								
Grass Waterways Cost-share	$ 2,000.00	waterway	20	waterways	$ 40,000.00			$ 40,000.00
Buffers Incentive	$ 500.00	acre	920	acres	$ 460,000.00			$ 460,000.00
Conservation Tillage, Residue Mgt Incentive	$ 30.00	acre	10,000	acres	$ 300,000.00			$ 300,000.00
Wetland Restoration	$ 10,000.00	wetland	10	wetlands	$ 100,000.00			$ 100,000.00
Technical Assistance	10% of cost					$ 90,000.00		$ 90,000.00
SUBTOTAL Nonpoint Source Management Measures					$ 2,336,000.00	$ 313,836.00	$ -	$ 2,649,836.00

Objective 2 Point Source Management Measures								
Cost Category	*Unit Cost*	*Unit*	*Quantity*	*Unit*	*Cash*	*In-Kind*	*Loan*	*Total*
Task A Subsurface Septic Treatment System (SSTS) Management								
Action A-1: SSTS Compliance Inventory								
Inventory	$ 36.00	Hour	1500	sites	$ 54,000.00			$ 54,000.00
Mileage	$ 0.50	mile	15000	miles	$ 7,500.00			$ 7,500.00
Staff Time	$ 36.00	Hour	40	hours		$ 1,440.00		$ 1,440.00
Action A-2: SSTS Upgrades								
Financial Incentive	$ 1,000.00	System	1000	Systems	$ 1,000,000.00			$ 1,000,000.00
Staff Time	$ 36.00	Hour	4000	hours		$ 144,000.00		$ 144,000.00
Low Interest Loans	$ 7,000.00	System	1000	Systems			$ 7,000,000.00	$ 7,000,000.00
Action A-3: Low Income Financial Aid								
Financial Assistance	$ 8,000.00	System	76	Systems	$ 608,000.00			$ 608,000.00
Staff Time	$ 36.00	Hour	304	hours	$ 10,944.00			$ 10,944.00
SUBTOTAL Point Source Management Measures					$ 1,680,444.00	$ 145,440.00	$ 7,000,000.00	$ 8,825,884.00

Objective 3 Monitoring								
Cost Category	*Unit Cost*	*Unit*	*Quantity*	*Unit*	*Cash*	*In-Kind*	*Loan*	*Total*
Task A Water Quality Monitoring								
Action A-1: Long-term Trend Monitoring								
Water Sample Lab Costs	$ 250.00	sample	60	samples	$ 15,000.00			$ 15,000.00
Mileage	$ 0.50	mile	3000	miles	$ 1,500.00			$ 1,500.00
Staff Time	$ 36.00	Hour	900	hours		$ 32,400.00		$ 32,400.00
Action A-2: Effectiveness Monitoring								
Water Sample Lab Costs	$ 50.00	sample	700	samples	$ 35,000.00			$ 35,000.00
Mileage	$ 0.50	mile	7000	miles	$ 3,500.00			$ 3,500.00
Student Intern Wages	$ 20.00	Hour	1400	hours	$ 28,000.00			$ 28,000.00
Staff Time	$ 36.00	Hour	70	hours		$ 2,520.00		$ 2,520.00
Action A-3: MPCA Milestone Monitoring								
Staff Time	$ 36.00	Hour	5	hours		$ 180.00		$ 180.00
Action A-4: MPCA MN Watershed Loading Study								
Staff Time	$ 36.00	Hour	500	hours		$ 18,000.00		$ 18,000.00
Action A-5: MPCA Intensive Watershed Monitoring								
Staff Time	$ 36.00	Hour	25	hours		$ 900.00		$ 900.00
Action A-6: Volunteer Monitoring								
Promotional Items and Supplies					$ 600.00			$ 600.00
Volunteer Time	$ 15.00	Hour	960	hours		$ 14,400.00		$ 14,400.00
Task B Research								
Action B-1: DNA Fingerprinting								
Sample cost	$ 1,200.00	sample	32	samples	$ 38,400.00			$ 38,400.00
Mileage	$ 0.50	mile	1600	miles	$ 800.00			$ 800.00
Staff Time	$ 36.00	Hour	400	hours		$ 14,400.00		$ 14,400.00
Action B-2: Social Indicators								
Consultant Facilitation					$ 2,000.00			$ 2,000.00
Student Intern Wages	$ 16.00	Hour	185	hours	$ 2,960.00			$ 2,960.00
Survey Printing and Postage	$ 0.45	Surveys	8000		$ 3,600.00			$ 3,600.00
Staff Time	$ 36.00	Hour	160	hours		$ 5,760.00		$ 5,760.00
SUBTOTAL Monitoring					$ 131,360.00	$ 88,560.00	$ -	$ 219,920.00

Objective 4 Education and Outreach								
Cost Category	*Unit Cost*	*Unit*	*Quantity*	*Unit*	*Cash*	*In-Kind*	*Loan*	*Total*
Task A Website Development								
Action A-1: TMDL Website								
Website Hosting	$ 120.00	Year	10	Years	$ 1,200.00			$ 1,200.00
Staff Time	$ 36.00	Hour	100	Hours		$ 3,600.00		$ 3,600.00
Task B Printed Media								
Action B-1 : Bi-annual Newsletter								
Printing and Postage	$ 2,000.00	Year	10	Years	$ 20,000.00			$ 20,000.00
Staff Time	$ 36.00	Hour	32	Hours		$ 11,520.00		$ 11,520.00
Action B-2 : TMDL Brochure								
Printing and Postage	$ 0.45	Brochure	4000	Brochures	$ 1,800.00			$ 1,800.00
Staff Time	$ 36.00	Hour	20	hours		$ 720.00		$ 720.00
Task C Project Coordination and Promotion								
Action C-1: Public Events								
Booth rent	$ 200.00	Event Cost	10	Years	$ 2,000.00			$ 2,000.00
Staff Time	$ 36.00	Hour	320	hours		$ 11,520.00		$ 11,520.00
Action C-2: Advisory Committee								
Meeting Materials	$ 100.00	Mtg Costs	10	Years	$ 1,000.00			$ 1,000.00
Volunteer Time	$ 20.00	Hour	260	hours		$ 5,200.00		$ 5,200.00
Action C-3: Technical Committee								
Meeting Materials	$ 100.00	Mtg Costs	10	Years	$ 1,000.00			$ 1,000.00
Staff Time	$ 36.00	Hour	640	hours		$ 23,040.00		$ 23,040.00
Action C-4: Administration								
Grant Applications	$ 36.00	Hour	40	hours	$ 14,400.00			$ 14,400.00
Staff Time	$ 36.00	Hour	40	hours		$ 14,400.00		$ 14,400.00
Facilitation and Coordination	$ 36.00	Hour	80	hours	$ 28,800.00			$ 28,800.00
Staff Time	$ 36.00	Hour	80	hours		$ 28,800.00		$ 28,800.00
SUBTOTAL Education and Outreach					$ 70,200.00	$ 98,800.00	$ -	$ 169,000.00

	Cash	In-Kind	Loan	Total
SUBTOTAL Nonpoint Source Management Measures	**$ 2,336,000.00**	**$ 313,836.00**	**$ -**	**$ 2,649,836.00**
SUBTOTAL Point Source Management Measures	**$ 1,680,444.00**	**$ 145,440.00**	**$ 7,000,000.00**	**$ 8,825,884.00**
SUBTOTAL Monitoring	**$ 131,360.00**	**$ 88,560.00**	**$ -**	**$ 219,920.00**
SUBTOTAL Education and Outreach	**$ 70,200.00**	**$ 98,800.00**	**$ -**	**$ 169,000.00**
GRAND TOTAL	**$ 4,218,004.00**	**$ 646,636.00**	**$ 7,000,000.00**	**$ 11,864,640.00**

11.0 References

[1]An evaluation of structural best management practices 20 years after installation by Bracmort, Kelsi Simone, Ph.D., Purdue University, 2004, 242 pages; AAT 3150743
Applying 2003 land use resulted in a 35-59% sediment reduction and a 25-29% total P reduction when no BMPs were implemented compared to the 1975 land use.

[2]Riparian Buffer Systems in Crop and Rangelands by Richard C. Schultz, Thomas M. Isenhart and Joe P. Colletti Agroforestry and Sustainable Systems: Symposium Proceedings August 1994
Riparian forest and grass communities can filter up to 90 percent of the sediment entering them from the uplands. The vertical structure of the standing plants and the organic litter provide frictional surfaces which slows water flow causing the sediment to be deposited (Magette et al. 1989; Dillaha et al. 1989; Cooper et al. 1987; Lowrance et al. 1986, 1988; Peterjohn & Correll, 1984; Brinson et al. 1981; Mahoney & Erman 1984).

[3]Osmond, D.L., J.W. Gilliam and R.O. Evans. 2002. Riparian Buffers and Controlled Drainage to Reduce Agricultural Nonpoint Source Pollution, North Carolina Agricultural Research Service Technical Bulletin 318, North Carolina State University, Raleigh, NC.
The effectiveness of well maintained grass riparian buffers for sediment removal maybe as high as 90 to 95%.

[4]EPA's A Farmer's Guide To Agriculture and Water Quality Issues
The U.S. Geological Survey has documented nearly 50% reductions in suspended sediment loads from the Maumee River Basin (Ohio) following adoption of conservation tillage on ~55% of the cropland acreage in the basin. Bacteria reductions of 30-70% have been reported after filtering barnyard and feedlot runoff through vegetated filter strips. Studies of vegetated filter strip treatment of cropland runoff have been contradictory. Some studies have reported up to 90% reduction in bacteria counts in runoff after passage through a filter strip.

[5]A Review of BMPs for Managing Crop Nutrients and Conservation Tillage to Improve Water Quality By Richard Fawecett, Ph.D. Edited and Updated by Tim Smith *No-till has sometimes dramatically increased water infiltration and reduced runoff. Edwards et al. (1988) compared season-long water runoff from a 0.6-acre watershed with a 9% slope that had been farmed for 20 years in continuous no-till corn to a similar conventionally tilled watershed. Over four years, runoff was 99% less under the long-term no-till. No-till has reduced runoff well even under extreme conditions. A no-till watershed on a 21% slope had almost no soil erosion and held water runoff to levels similar to a conventional tillage watershed of only 6% slope during a once- in-100 yr storm of 5 in. (12.7 cm) in 7 hr (Harold and Edwards 1972).*

[6]Conservation Technology Information Center –Conservation Buffer fact sheet
Buffers can reduce up to 80% of sediment and up to 60% of pathogens are removed from runoff.

[7]National Management Measures to Control Nonpoint Source Pollution from Agriculture EPA 841-B-03-004, July 2003 *Strategy A: Ungrazed 40/L Strategy B: Grazing without management for livestock distribution; 20.3 ac/AUM. 150/L Strategy C: Grazing with management for livestock distribution: fencing and water developments; 19.0 ac/AUM. 90/L Strategy D: Intensive grazing management, including practices to attain uniform livestock distribution and improve forage production with cultural practices such as seeding, fertilizing, and forest thinning; 6.9 ac/AUM. 920/L.*

[8]National Management Measures to Control Nonpoint Source Pollution from Agriculture EPA 841-B-03-004, July 2003 *Concentration reductions in barnyard and feedlot runoff treated with solids separation - Percent Total Solids reduction Ohio-basin only 49-54%, Ohio-basin and vegetative infiltration 82%, Canada-basin only 56%, Canada-basin and vegetative infiltration-90%.*

[9]ONSITE WASTEWATER TREATMENT MANUAL US EPA 2002 Gerba-1975; *99-99.99% reduction in fecal coliform.*

12.0 Appendix A

Stakeholder Process

A Technical Committee was developed at the start of the Rock River TMDL Assessment process and provided representation from local state and federal agencies. Exhibit A lists the members. The Rock River TMDL Technical Committee placed a high priority on public input in all processes of the Rock River TMDL Implementation plan writing process. From the beginning, the Technical Committee requested public input into the process through newsletters and newspaper articles. One process used was to invite all Rock River stakeholder organizations, as well as the residents of the Rock River watershed, to attend public meetings on January 24, 2008 for the Rock River TMDL Assessment. Request for Input forms were sent along with the invite and were also handed out at the public meetings to garner input for ideas for the implementation plan. Exhibit B includes the invitation, addresses, and handouts. A thirteen member Advisory Committee was formed from the Rock River stakeholder organizations and volunteers that were solicited at the public meetings. Exhibit 3 lists the members of the Advisory Committee.

The Advisory Committee and the Technical Committee started a process to determine the best practices to correct the impairments of the Rock River. Two meetings were held on March 17, 2008 and March 26, 2008. The first meeting's primary goal was to bring all participants to the same level of understanding of the TMDL process. This meeting was targeted at the Advisory Committee although the Technical Committee members were also invited. Highlights of the TMDL Assessment report were reviewed, as well as current water sampling efforts and results. Frequently asked questions of the TMDL process and the details of the implementation planning process were covered. Members of both committees were sent home with information and web sites on best management practices and general implementation strategies for correcting the impairments of the Rock River. The Committee was also asked to complete a homework assignment by reviewing the information and determining the best strategy for cleaning up the Rock River. The agenda, minutes, handouts homework assignment, and presentations are provided in Exhibit 4.

The second meeting's goal was to cover questions that committee members had after researching information on implementation strategies and chose the best ones for correcting the Rock River impairments. The Advisory and Technical committees were both invited and strongly encouraged to attend. After a review of the proceedings of the first meeting, a representative from BWSR presented information on the Clean Water Legacy Act and possible funding and programs that could be used in the implementation process. The implementation strategies where reviewed, explained and discussed. To come to a consensus as a group, a ballot vote was taken for the two best implementation strategies for each impairment, one ballot for fecal coliform and one for turbidity. Committee members were also asked to suggest direct action items to address these areas. The agenda, minutes, ballot and presentations are provided in Exhibit 5.

Exhibit 5 displays the results of the voting, which determined that manure management, and non-conforming septic systems were the general implementation strategies chosen for correcting the fecal coliform impairment with 11 votes and 7 votes respectively. Direct action items listed included winter manure application, financial incentive for nutrient management planning, enforcing setbacks, applicator calibration and education for manure management. Non-conforming septic systems had inventory of septic systems, financial incentives based on income, and low interest loans as direct action items.

Structural practices received 10 votes and vegetative practices received 9 votes for correcting the turbidity impairment. Direct action items listed for structural practices included livestock crossings, stream bank stabilization structures, financial incentives, and sediment basins. Vegetative practices had larger buffer width, buffers, conservation tillage and financial incentives for buffers as direct action items.

The implementation strategies chosen for each impairment are utilized to develop this Rock River Implementation Plan. The Advisory Committee and the Technical Committee received copies of this implementation plan for review and met on August 27, 2008 to provide comments (Exhibit 6). After making revisions suggested from the group, this plan was submitted to MPCA for review in September 2008.

TMDL Technical Committee Member List

Kelli Daberkow
Minnesota Pollution Control Agency
Kelli.Daberkow@state.mn.us

Scott Matteson
Mankato State University
scott.matteson@mnsu.edu

Al Lais
City of Luverne
Public Works
alais@cityofluverne.org

Dan Cook
Rural Water Manager
dcook@IW.NET

Tom Kresko
DNR Area Hydrologist
tom.kresko@dnr.state.mn.us

Mark Vaniman
US Fish & Wildlife
Mark_Vaniman@fws.gov

Kurt Halfmann
Natural Resources Conservation Services
kurt.halfmann@mn.usda.gov

Kyle Krier
Pipestone Co. Conservation & Zoning
Kyle.Krier@mn.nacdnet.net

Angie Raatz
Pipestone Co. Conservation & Zoning
Angie.Raatz@mn.nacdnet.net

Wayne Smith
Nobles County Environmental Office
Wsmith@co.nobles.mn.us

Ed Lenz
Nobles County SWCD
Edward.Lenz@mn.nacdnet.net

Chris Hansen
Murray County Planning & Zoning
chansen@co.murray.mn.us

Eric Hartman
Rock County SWCD/Land Mgt
Eric.Hartman@mn.nacdnet.net

Arlyn Gerhke
Rock County SWCD/Land Mgt
arlyn.gehrke@co.rock.mn.us

Justin Decker
Rock County SWCD/Land Mgt
Justin.Decker@mn.nacdnet.net

Doug Bos
Rock County SWCD/Land Mgt
Douglas.bos@mn.nacdnet.net

Exhibit 2

Rock County Land Management Office

311 West Gabrielson Road Ste 5
Luverne, MN 56156
24 hour Fax: (507) 283-5006

Soil & Water (507) 283-8862 **Zoning** **Ag Inspection** **Environmental** **Transfer Station** (507) 283-5005

MEMO

TO: Rock River Stakeholder Organizations

RE: Impairments of the Rock River

The Rock River has been listed on the EPA 303(d) list as an impaired stream because it exceeds the Federal water quality standards for fecal coliform and turbidity. EPA requires an assessment to be developed that addresses the Total Maximum Daily Load (TMDL) of pollutants. Rock, Nobles, Pipestone, and Murray Counties, in partnership with Mankato State University and MPCA, have developed a TMDL assessment. It's on the web at http://www.pca.state.mn.us/water/tmdl/project-rockriver.html. The next step is to write an implementation plan. The implementation plan will spell out activities that can be done to correct these impairments of the Rock River.

We would like your input on developing the implementation plan over the next few months. The implementation plan is a long-range plan that will address many land use issues ranging from land application of manure, overgrazing pastures, failing septic systems, and soil erosion.

On **January 24**, there are two public meetings scheduled in Edgerton and Luverne for the general public to learn and comment on the Rock River TMDL assessment. These meetings will provide you with valuable background information that will be used in subsequent meetings**. It would be very beneficial for you to attend one of these meetings**. The Edgerton meeting will be at the ambulance garage, 1000 S. Main, starting with an informal open house at 2:30 p.m. followed by a presentation at 3 p.m. The Luverne meeting will be at the Rock County Family Services building, 2 Roundwind Road, with an open house at 6:30 p.m. and presentation at 7 p.m.

Your organization has a stake in future land use concerns in the watershed of the Rock River. If you are unable to attend the public meeting or are not interested in providing input for the implementation plan, please let me know. Thank you in advance for your interest and we look forward to seeing and/or meeting you on the 24th.

Enclosed you will find an input form you may bring to the meeting or send in if you are unable to attend. Also enclosed is a newsletter with more information about the project.

Sincerely,

Doug Bos, Asst Director
Rock County SWCD/Land Management Office

Exhibit 2

Suggestions for Improving the Rock River
By addressing fecal coliform bacteria and turbidity

Coliform Bacteria-
Causes can include feedlot runoff, non-compliant septic systems, improper land application of manure, cattle in streams and wildlife.

Turbidity-
Causes can include soil erosion from fields, urban runoff from precipitation, and stream bank erosion.

Possible solutions & programs;

-High residue crop farming, i.e. -no-till, strip-till, minimum till.
-Conservation practice structures, i.e. –sediment basins, terraces, waterways.
-Grass buffers along streams and watercourses.
-Rain gardens and storm water retention ponds to absorb storm water in cities.
-Stream bank stabilization and diversion structures.
-Pasture management i.e. -stream crossings, rotational grazing, exclusion fencing.
-Feedlot runoff control structures.
-Nutrient management and planning for manure application.
-Septic replacement program.

Your input is valuable to developing a comprehensive implementation plan! Please list any ideas, choices and/or other suggestions that will decrease the bacteria and turbidity in the Rock River. (Please use the back of this form if needed.)

☐ Or, we do not wish to be part of the Implementation Plan process but would like to be on the mailing list for public meetings and notices.

Name: _____
Agency/Group representing: _____
Address: _____
_____

Exhibit 2

Rock County Cattleman's
Grant Binford
1377 170th ave
Luverne, MN 56156

Rock County Pork Producers
Kevin Barnhart
1305 N Kniss Ave
Luverne, MN 56156

Rock County Dairy Association
Ron & Ava Christians
1927 181st Street
Luverne, MN 56156

Rock County Corn and Soybean
Darla Faber
815 N McKenzie St.
Luverne, MN 56156

Rock County Pheasant Forever
Jeff Weinke
1302 Northview Drive
Luverne, MN 56156

Rock County Turkey Federation
Dan McGuire
Box 26
Magnolia, MN 56158

Blue Mound State Park-Park Partners
Ben Vander Kooi
127 E Main
Luverne, MN 56156

Brandenberg Foundation
Dave Smith
211 E Main
Luverne, MN 56156

Rock County Farm Bureau
Pete Bakken
138 121st Street
Garretson, SD 57030

Lynn Darling
Nobles SWCD Board
26197 260th
Rushmore, MN 56168

Marvin Zylstra
Nobles Co. Commissioner
17665 Paul Ave.
Worthington, MN 56187

Craig Nienkirk
Nobles Planning and Zoning
1409 Elmwood Ave.
Worthington, Mn 56187

Steve Brake
Nobles Planning and Zoning
12171 Erickson Ave.
Wilmont, MN 56185

Jerry Lonneman
Lincoln-Pipestone Rural Water
28021 State Hwy 91
Adrian, MN 56110

Nobles County Farmers Bureau
Dean Christopherson
32732 Quine Ave.
Worthington, MN 56187

Farmers Union
Tim Henning
16284 190 St.
Adrian, MN 56110

Lakes Association
Genny Turner
1806 South Shore Drive
Worthington, MN 56187

Jim McGowan
Okabena-Ocheda Watershed Board
670 W. Shore Drive
Worthington, MN 56187

Norm Gallagher
Nobles Co. Commissioner
1108 S. Shore Drive
Worthington, MN 56187

Vern Lestico
Nobles Co. Commissioner
730 Thompson Ave
Worthington, MN 56187

Dave Benson
Nobles Co. Commissioner
26461 320th St.
Bigelow, MN 56117

Larry Hyink
Nobles Planning and Zoning
29581 Nystrom Ave.
Worthington, Mn 56187

Steve Hansberger
Nobles Planning and Zoning
23810 220th St.
Worthington, Mn 56187

Robert Demuth, JR
Nobles Planning and Zoning
1234 Oxford St.
Worthington, Mn 56187

Michael Hoeft
Nobles Planning and Zoning
21832 Monroe Ave
Reading, MN 56165

Richard Brake
Nobles Board of Adjustment
1117 Collegeway
Worthington, MN 56187

Robert Kirchner
Nobles Board of Adjustment
38832 200th St.
Brewster, MN 56119

Exhibit 2

Larry Jansen
Nobles Board of Adjustment
1600 S Shore Dr.
Worthington, MN 56187

Beaver Creek Sportsman's
Arlyn Gehrke

Wayne Smith
Nobles County Public Works Dept.
PO Box 187
Worthington, MN 56187

Jim Knips
13510 Chaney Ave.
Lismore, MN 56155

Richard Nelsen
12947 US Hwy. 59
Fulda, MN 56131

Kevin Norskog
Kanaranzi-Little Rock Watershed
PO Box 327
Adrian, MN 56110

Brent Feikema
Nobles Planning And Zoning
15344 120th St
Lismore, Mn 56155

Gerald Erstad
Nobles Planning and Zoning
774 Dugdale Ave.
Worthington, MN 56187

Paul Shilling
Nobles Planning and Zoning
1904 Willow Ave.
Worthington, MN 56187

James Gruye
Nobles Planning and Zoning
28510 320th St.
Bigelow, MN 56117

Connie Frahm
Kanaranzi-Little Rock Watershed
438 200th Ave
Ellsworth, MN 56129

Diane Thier
Nobles Co. Commissioner
628 Nevada Ave.
Adrian, MN 56110

City of Chandler - Alvin Vis
PO Box 37
Chandler, MN 56122

Vern Suedkamp
Nobles SWCD Board
26028 St Hwy 91
Adrian, MN 56110

Beaver Creek Archers
1945 Engebretson Avenue
Slayton, MN 56172

Pheasants Forever - John Giese
3015 Pine Avenue
Slayton, MN 56172

Pork Producers - Jeff Boerboom
1036 111th Street
Hadley, MN 56151

Cattleman's Association - Dennis Swan
1825 110th Avenue
Balaton, MN 56115

Ducks Unlimited - Wendy Kruger
2611 Broadway Avenue
Slayton, MN 56172

Dairy Association - Dave Schwartz
1323 U.S. Highway 59
Slayton, MN 56172

Driftbreaker's Club - Earl Linder
66 South Shore Drive
Slayton, MN 56172

Cameron Township - Gail Ness
152 131st Street
Woodstock, MN 56186

Chanarambie Township - Connie Post
635 30th Avenue
Chandler, MN 56122

Fenton Township - John Busman
776 1st Street
Chandler, MN 56122

Leeds Township - James York
709 State Highway 30
Lake Wilson, MN 56151

Moulton Township - Karen Bruxvoort
497 41st Street
Chandler, MN 56122

Townships in the watershed

Murray County Commissioners

Friends of the Casey Jones Trail Amy Hoglin

Exhibit 2

How Do We Address the Issues of the Rock River?

In other words, how should the TMDL implementation plan be written to fix these impairments?

IMPAIRMENTS

Turbidity- Measurement of water clarity. Caused by soil particles, organic materials, and algae. *50% of Rock County's water samples (1997-2006) exceeded the standard of 25 NTU

Causes:

- Soil erosion from fields, construction sites, etc.
- Eroding stream banks and gullies.
- Decaying plants and animals.
- Urban runoff.
- Wastewater and septic system discharge

Possible Fixes:

- High residue crop farming, i.e. –no-till, ridge till, minimum till.
- Conservation practice structures, i.e. –sediment basins, terraces, waterways.
- Grass buffers along streams and watercourses.
- Rain Gardens and storm water retention ponds to absorb storm water in cities.
- Stream bank stabilization and diversion structures.

Fecal Coliform Bacteria-is a group of bacteria that passes through the fecal excrement of humans, livestock and wildlife. *Concentrations of fecal coliform were 2.5 times the acceptable limits during August and September each year.

Causes:

- Wildlife in streams.
- Non compliant septic systems.
- Uncontrolled feedlot runoff.
- Manure application during rainy periods
- Livestock watering in streams.
- Animal waste from parking lots and streets delivered via a storm water system.

Possible Fixes:

- Feedlot runoff control structures.
- Nutrient management and proper manure application.
- Pasture Management, i.e. –Steam crossings, rotational grazing, exclusion fencing.
- Repair septic systems.

To meet water quality standards, fecal coliform needs to be reduced 60% during August and September and turbidity needs to be reduced 68% during high flows.

Exhibit 2

Suggestions for Improving the Rock River
By addressing fecal coliform bacteria and turbidity

Coliform Bacteria-
Causes can include feedlot runoff, non-compliant septic systems, improper land application of manure, cattle in streams and wildlife.

Turbidity-
Causes can include soil erosion from fields, urban runoff from precipitation, and stream bank erosion.

Possible solutions & programs;

-High residue crop farming, i.e. -no-till, strip-till, minimum till.
-Conservation practice structures, i.e. –sediment basins, terraces, waterways.
-Grass buffers along streams and watercourses.
-Rain gardens and storm water retention ponds to absorb storm water in cities.
-Stream bank stabilization and diversion structures.
-Pasture management i.e. -stream crossings, rotational grazing, exclusion fencing.
-Feedlot runoff control structures.
-Nutrient management and planning for manure application.
-Septic replacement program.

Your input is valuable to developing a comprehensive implementation plan! Please list any ideas, choices and/or other suggestions that will decrease the bacteria and turbidity in the Rock River. (Please use the back of this form if needed.)

☐ Or, we do not wish to be part of the Implementation Plan process but would like to be on the mailing list for public meetings and notices.

Name: _____
Agency/Group representing: _____
Address: _____
_____

Rock River TMDL
Advisory Committee

Grant Binford
Rock County Cattlemens
1266 170th Ave
Luverne, MN 56156
grbinford@myclearwave.net

Harold Ver Steg
1644 201st Street
Hardwick, MN 56134

Larry Bosch
372 140th Ave
Steen, MN 56173

Mary Tilstra
583 110th Ave
Luverne, MN 56156
507/283-4019
mary@tilstra.com

Bryce Stoltenberg
1273 131st Street
Luverne, MN 56156
b_a_s_71@hotmail.com

Roger Talsma
293 50th Ave
Chandler, MN 56122
507/443-5524

Bill & Merri Post
392 61st Street
Chandler, MN 56122
507/879-3489
Merri 507/227-5995
merripost@iw.net

George Shurr
1803 11th Street
Ellsworth, MN 56129

Kraig Rust
2005 151st Street
Kenneth, MN 56147

Don Reker
Rock SWCD Board
496 181st Street
Jasper, MN 56144

Chris Hein
SWMN Coop
403 S Freeman
Luverne, MN 56156

Kevin Barnhart
1305 N Kniss Ave
Luverne, MN 56156
kbarnhart@iw.net

Andy Nesseth
Extended Ag
507 Milwaukee St
Lakefield, MN 56150
extag@frontiernet.net

Exhibit 4

Rock County Land Management Office

311 West Gabrielson Road Ste 5
Luverne, MN 56156
24 hour Fax: (507) 283-5006

Soil & Water **Zoning** **Ag Inspection** **Environmental** **Transfer Station**
(507) 283-8862 (507) 283-5005

CHANGE IN DATE AND TIME

March 7, 2008

MEMO

To: All Advisory and Technical TMDL Planning Committee members,

Concerning: Meeting on TMDL Implementation Plan writing process

When: **Monday, March 17**, 2008, 1:30pm

Where: Rock County **Law Enforcement Center,** 1000 Blue Mound Ave, Luverne

This will be the first joint meeting of the TMDL Implementation plan writing process with both the Advisory Committee and the Technical Committee. The first meeting will be structured to inform and educate on the why and how of the TMDL process. We will be having a second meeting in the following week to bring the process together. Our hopes are to have about a 2 hour meeting. We want to thank you for volunteering to be part of an important process to improve water quality on the Rock River.

You will have some take home materials from the meeting to help you in making informed decisions on the inputs you provide. If you have any questions or comments or cannot attend please contact our office at 507/283-8862 ext. 3 or e-mail me at Douglas.bos@mn.nacdnet.net.

Enclosed you will find an information sheet that was used to request information for the TMDL process.

HOPE THIS STILL WORKS FOR YOU!

Thank you,

Doug Bos
Asst. Director
Rock County SWCD/ Land Mgt

PS. We will have the second meeting on March 26th, at 1:30 at the same location

Rock River TMDL Implementation Plan Development Meeting Structure and Overview

- **We are not here to argue whether or not the Rock River should be listed-it is and we have the opportunity to get money to clean up the river.**

- **Look forward; utilize current sampling information to document existing problem and improvements from actions taken.**

- **Development of an Implementation Plan.**

  Our purpose in these two meetings is to:

  - **Educate the Advisory Committee on the TMDL report, concerns, current monitoring, and funding sources**
  - **Provide the Advisory Committee with additional information so they can make educated decisions when voting.**
  - **Bring together the Advisory Committee and Technical Committee to vote for one general implementation strategy for fecal coliform and one general implementation strategy for turbidity**
  - **Define discuss, and choose direct actions that will reduce the fecal coliform and turbidity in the Rock River.**

  The information from the two meetings will be included in the plan along with:

  - **Reasoning and analysis of all management measures.**
  - **Identification of project objectives**
  - **Roles and responsibilities**
  - **Timeline**
  - **An evaluation plan**
  - **Budget**

- **This plan will have "Adaptable Management". It will be flexible enough to adapt to new data and test results.**

- **The implementation plan is how we can access funding for programs and cost share.**

- **We have a tight timeline and a lot of work so you will have homework; you will come back with questions which we encourage.**

- **Agenda**

Rock River TMDL Implementation Plan Development Agendas

Introductory Meeting – March 17, 2008 1:30 pm
Law Enforcement Center, Luverne

- Meeting Structure and Overview
  - Doug Bos, Rock County Land Management Office

- TMDL Report-What does it tell us?
  - Scott Matteson, MN State University-Mankato Water Resources Center

- Answers – Most Frequently Asked Questions
  - Kelli Daberkow, Minnesota Pollution Control Agency

- Current Water Sampling Efforts and Results
  - Arlyn Gerhke, Rock County Land Management Office

- Homework assignment and next meeting details
  - Doug Bos, Rock County Land Management Office

Input Meeting – March 26

- Clean Water Legacy Act, the funding and programs
  Matt Drewitz- Board of Water and Soil Resources

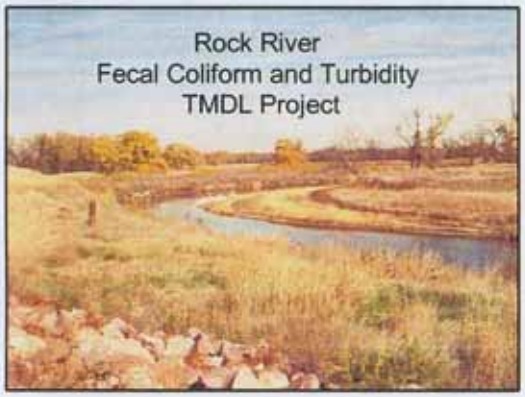
- General Implementation Strategies-questions and answers- All

- Ballot Voting for General Implementation Strategies for
  Turbidity and Fecal Coliform

- Discussion of Direct Action Items- All

- Next Steps- Doug

MSUM Presentation 03/17/2008



What is a TMDL?

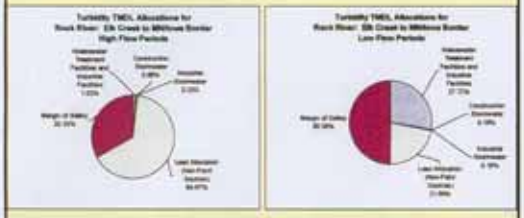
"Total Maximum Daily Load" is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources." - US EPA

Fecal Coliform TMDL Allocations for Rock River at MN/Iowa Border

High flow vs. Low flow

Turbidity TMDL Allocations for Rock River at MN/Iowa Border

High flow vs. Low flow



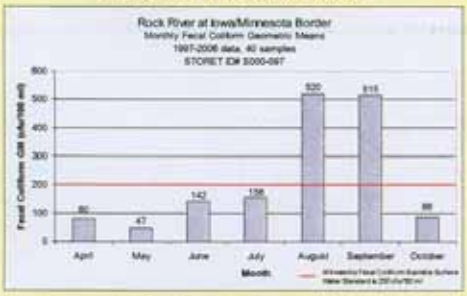
MSUM Presentation 03/17/2008

What is fecal coliform bacteria?

Fecal coliform bacteria live in the digestive tract of warm-blood animals (humans, pets, farm animals, and wildlife) and are excreted in the feces.

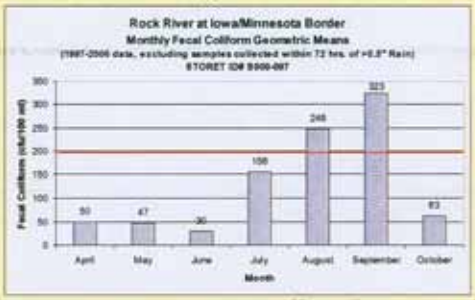
Where is the Rock River Impaired for Fecal Coliform?

What levels of fecal coliform are found in the Rock River?



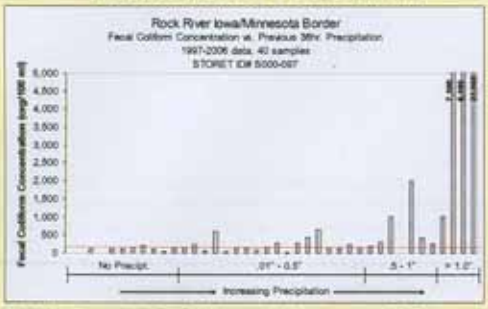
The Rock River qualified to be listed as impaired during July and August.

Seasonal Changes in Fecal Coliform



As water temperature increases, the ability of fecal coliform to survive increases. In most rivers, concentrations are highest in July and August.

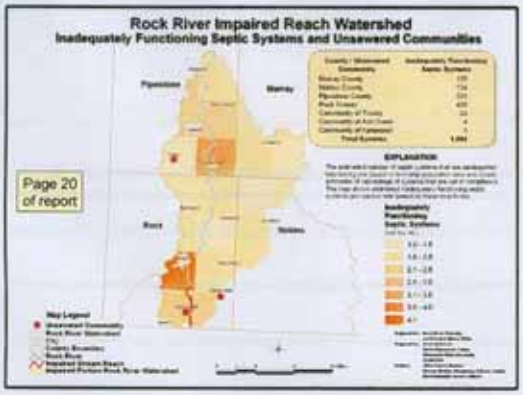
Precipitation and Fecal Coliform



The highest concentrations of FC occurred during storm runoff. On average, concentrations are ten times higher during storm runoff.

Sources of fecal coliform bacteria in the Rock River Watershed

MSUM Presentation 03/17/2008



Wastewater Treatment Facilities

Plant Violations and Bypasses
(2002-2006)

Violations

Hatfield – 29 (treatment system now in place)
Edgerton – 2 in 2006
Holland – 2 in 2004, 1 in 2005

Bypasses

Woodstock, March 31, 2006 was the only reported bypass. This was following 3.5" of precipitation.

All WTF's in the watershed are regulated by Minnesota Pollution Control Agency.

Stormwater Runoff

Fecal coliform bacteria concentrations in urban runoff can be as great or greater than those found in cropland, grazed pasture, and feedlot runoff (EPA, 2001).

However, <2% of the watershed land cover is urban.

Open Feedlots

The majority of the 684 livestock facilities are confined operations with little runoff to surface water. Still, there is a significant number of open feedlots, some of which have pollution problems and pose a risk of fecal contamination.

Open Feedlots with pollution problems

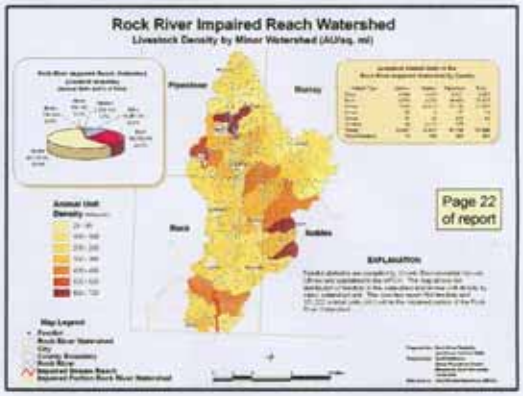
Land Application of Manure

Land application of manure can be another source of fecal contamination, depending on:

- how the manure is managed
- rate and time of application
- observance of setbacks from surface water
- timely incorporation to avoid major runoff following a rain
- residue management

Injected Manure

Surface Applied Manure



3

MSUM Presentation 03/17/2008

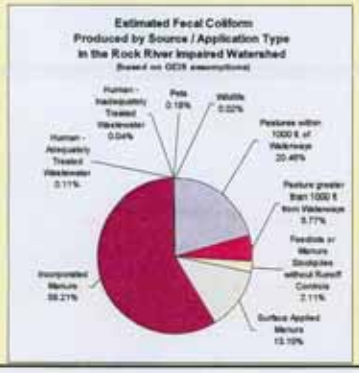
Livestock with Access to Streams

Cattle that access streams can be a direct source of fecal contamination to surface waters.

Wildlife

Wildlife can also contribute to bacterial contamination (e.g. Canada geese, deer, wild turkeys, pheasants)

Conditions when wildlife can be a significant source include isolated areas of high density and during low flow/drought conditions



Page 31 of report

Category	Source	Wet Conditions	Dry Conditions
Livestock	Pastures within 1000 ft. of Waterways	High Contribution	High Contribution
	Pasture greater than 1000 ft from Waterways	Low Contribution	Low Contribution
	Feedlots or Manure Stockpiles without Runoff Controls	Moderate Contribution	Low Contribution
	Surface Applied Manure	High Contribution	Low Contribution
	Incorporated Manure	Moderate Contribution	Low Contribution
Human	Inadequately Treated Wastewater	Low Contribution	Moderate Contribution
Pets		Low Contribution	Low Contribution
Wildlife		Low Contribution	Low Contribution

Page 32 of report

Rock River Impairment
Turbidity

Turbidity

Turbidity is the measurement of water clarity.

Why is it a concern?

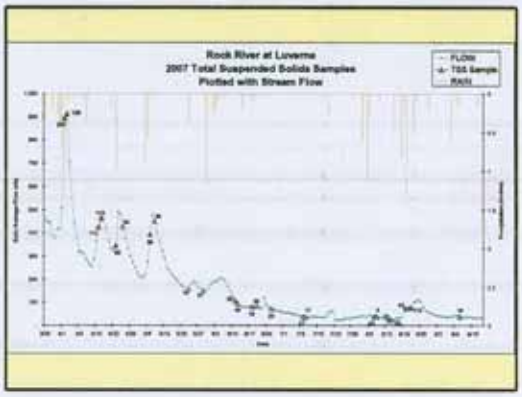
High turbidity:

- Limits light penetration and inhibit healthy plant growth on the stream bottom.
- Makes it difficult for aquatic organisms to find food.
- Affect gill function of aquatic organisims.
- Elevated amounts of sediment can cause spawning habitat to become covered.

MSUM Presentation 03/17/2008

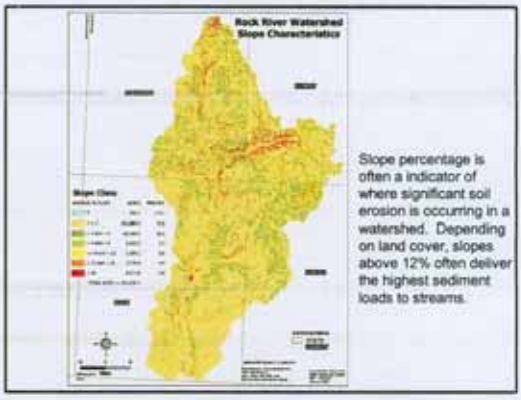
Where is the Rock River Impaired for Turbidity?

40% above standard | 96% above standard | 90% above standard



Sources of Turbidity

- Wastewater Treatment Facilities - Effluent solids and nutrients
- Feedlots near streams – Runoff of sediment
- Livestock overgrazing in riparian zone
- Row Cropland
- Ditches/Channelization – Increased runoff causing stream instability
- Impervious surfaces
- Construction
- Bluff, Bank and Channel Erosion – Natural or Accelerated



Slope percentage is often a indicator of where significant soil erosion is occurring in a watershed. Depending on land cover, slopes above 12% often deliver the highest sediment loads to streams.

Questions?

Kelli Daberkow
Minnesota Pollution Control Agency
507-537-6497
kelli.daberkow@pca.state.mn.us

Scott Matteson
Water Resources Center, MSUM
507-389-5338
scott.matteson@mnsu.edu

Presentation for 03-17-08 meeting

TMDL Process Review

- Public Comment Period
  - Opportunity for public to comment on TMDL
  - December 31, 2007-January 31, 2008
  - Public meetings held January 24, 2008 in Edgerton and Luverne
- Received 8 letters regarding the TMDL
  - 1 landowner
  - 1 county
  - 2 state agencies
  - 1 university
  - 3 agricultural groups

Most common comments

- Fecal coliform
  - Assumptions
  - Seasonality
  - Water quality standard
- Turbidity
  - Assumptions
  - Monitoring
  - Water quality standard

Most common comments

- Implementation Plan
  - More defined
  - Stakeholder involvement
- Reasonable Assurance
  - Adaptive management

What can you do with that?

- Concerns that more monitoring needs to be done.
  - To better target the impairment.
- The implementation plan needs to reflect your voice as a stakeholder.
  - Be creative!
- Adaptive management needs to be a part of the implementation plan.
  - Going to Plan B when new data or research is available.

Rock LMO Presentation 3/17/2008

Rock County
Surface Water Project

TMDL Advisory Committee Meeting
March 17, 2008

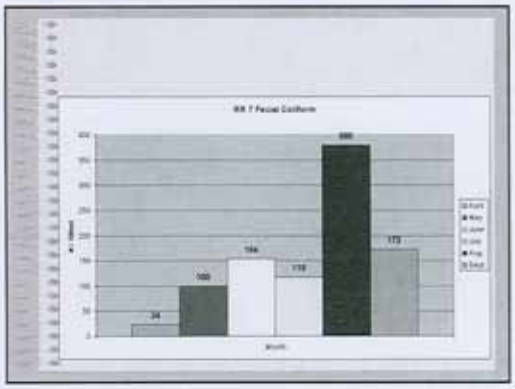
Rock County
Surface Water Project

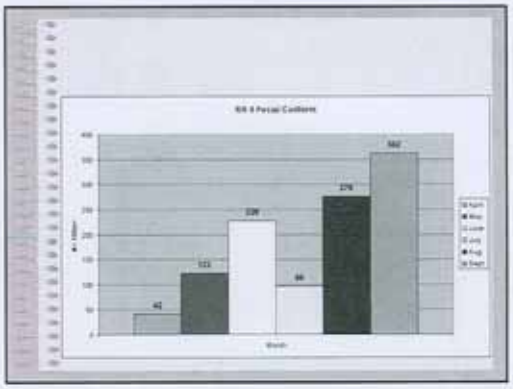
- City of Luverne
- Rock County Rural Water
- Rock County Land Management

- Project started in 2007
- 4 Sampling Points on the Rock River
- 1 Sampling Point on the Mud Creek
- Sampled once a month April - September

Rock County
Surface Water Project

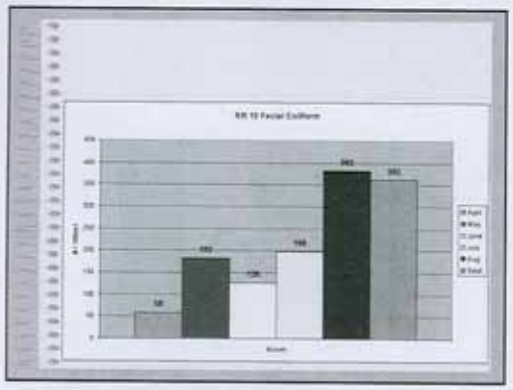
- 28 Samples of the Rock River
- Total Phosphorous
- Nitrite + Nitrate Nitrogen
- Ortho Phosphorous
- TSS
- Transparency Tube
- Fecal Coliform

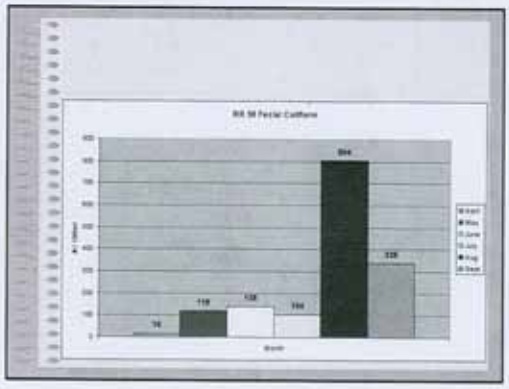




1

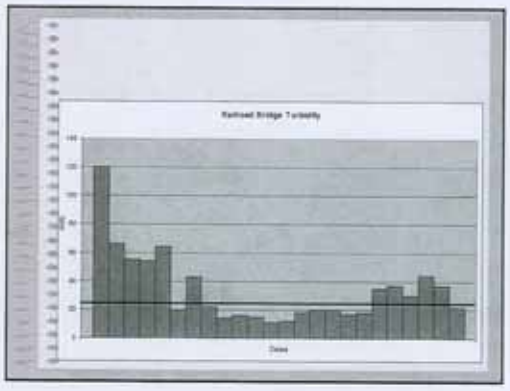
Rock LMO Presentation 3/17/2008





MPCA Load Study

- Railroad Bridge by City Park
- 25 Samples from April – September 2007
- pH, Temperature, Dissolved Oxygen, Transparency, Total Suspended Solids, Turbidity, Sulfate, Chloride, Nitrate+Nitrite, Total Phosphorus, Ortho Phosphorus, Total Kjeldahl Nitrogen



Questions????

Handouts at March 17, 2008 Advisory Committee meeting

A Conservation Catalog-Practices for the Conservation of Pennsylvania's Resources
http://www.pa.nrcs.usda.gov/news/FTPPublications/conscatalog.pdf

MPCA's Why treat sewage? factsheet
http://www.pca.state.mn.us/publications/wq-wwists1-10.pdf

MPCA's Bacteria: Sources, Types and Impacts on Water Quality
http://www.pca.state.mn.us/publications/wq-iw3-20.pdf

Best Management Practices for Pathogen Control in Manure Management Systems
http://www.extension.umn.edu/distribution/livestocksystems/components/8544.pdf

Resources for fecal coliform and sediment reduction

Protecting Water Quality from Agricultural Runoff
This is a fact sheet about how agricultural runoff affects water quality (March 2005, EPA 841-F-05-001).
http://www.epa.gov/owow/nps/Ag_Runoff_Fact_Sheet.pdf

Low-Cost Conservation Practices
http://wrc.umn.edu/publications/lowcost.pdf

Your guide to 30 conservation and environmental farming practices
http://www2.ctic.purdue.edu/Core4/CT/Choices/Choices.html

Agriculture EPA Sites
http://www.epa.gov/owow/nps/agriculture.html

MDA Conservation Practices Site
http://www.mda.state.mn.us/protecting/conservation/practices.htm

National Management Measures to Control Nonpoint Source Pollution from Agriculture
EPA 841-B-03-004, July 2003
http://www.epa.gov/owow/nps/agmm/index.html

A Review of BMPs for Managing Crop Nutrients and Conservation Tillage to Improve Water Quality
By Richard Fawecett, Ph.D.
http://www.conservationinformation.org/publications/nutrientlong.pdf

Runoff Water Quality and Crop Responses To Variable Manure Application Rates By: Neil C. Hansen
http://wrc.umn.edu/research/competitivegrants/archives/reports/2001hansen.pdf

Managing Grazing in Stream Corridors, MN Department of Agriculture
http://www.mda.state.mn.us/news/publications/animals/livestockproduction/grazing.pdf

Riparian Buffers & Controlled Drainage to Reduce Agricultural Nonpoint Source Pollution
http://www.soil.ncsu.edu/lockers/Osmond_D/web/RiparianBuffers.pdf

Conservation Buffer Facts
http://www.conservationinformation.org/?action=learningcenter_core4_conservationbuffer

Facts about individual sewage-treatment systems--Sewage treatment in a soil system
http://www.pca.state.mn.us/publications/wq-wwists1-11.pdf

University of Minnesota Septic Research
http://septic.umn.edu/Research/index.html

Homework Assignment-Fecal Coliform

Please choose one of the following general implementation strategies that you believe would have the biggest improvement on the *Fecal Coliform* impairment on the Rock River? Reference Pages 60-63 of TMDL report.

Feedlot Runoff Reduction

Manure Management Planning

Non-conforming Septic Systems

Pasture Management

Vegetative Practices
Examples: Wetland Restorations, Filter Strips, Riparian Buffers, Grassed Waterways, and Rain Gardens

Other (Please list) _____

Of the general implementation strategy you chose above; please list direct actions, ideas, thoughts, and solutions that would address fecal coliform bacteria. Example: If you chose #4, a direct action would be cattle exclusion on watercourses.

Questions To Ask;

Homework Assignment-Turbidity

Please choose one of the following general implementation strategies that you believe would have the biggest improvement on the *Turbidity* impairment on the Rock River?
Reference Pages 60-63 of TMDL report.

Feedlot Runoff Reduction

Manure Management Planning

Pasture Management

Vegetative Practices
Examples: Wetland Restorations, Filter Strips, Riparian Buffers, Grassed Waterways, and Rain Gardens

Structural Practices
Terraces, Water & Sediment Control Basins, Diversions, Grade Control Structures, Stream Bank Stabilization

Other (Please list) _____

Of the general implementation strategy you chose above; please list direct actions, ideas, thoughts, and solutions that would address fecal coliform bacteria. Example: If you chose #4, a direct action would be cattle exclusion on watercourses.

Questions To Ask;

Minutes of 3/17/08 meeting

Present; Andy Steensma, Bryce Stoltenberg, Bill & Merri Post, George Schurr, Grand Binford, Chad Hoff, Larry Bosch, Chris Hein, Kraig Rust, Mary Tilstra, Ed Lenz, Al Lais, Dan Cook, Kurt Halfmann, Arlyn Gehrke, Justin Decker, Scott Matteson, Kelli Daberkow, and Doug Bos.

- Doug Bos opened the meeting by reviewing the purpose of the meetings and the meeting structure.
- Scott Matteson from Minnesota State University-Mankato Water Resources Center gave a power point presentation on what the TMDL Assessment Report means to the Rock River watershed.
- Kelli Daberkow from MPCA gave a presentation of Most Frequently Asked questions concerning the TMDL assessment and implementation process.
- Arlyn Gehrke presented information on past and current water sampling efforts on the Rock River including sampling sites and sample results. There was a fair amount of discussion on the water sampling that showed the Rock River as impaired. The current sampling point locations were examined and the current sampling results did still show the limits for the EPA listing were still being exceeded.
- Doug Bos presented the group with their homework assignment and a list of resources for researching information. He then explained the process for the members to use in determining what they thought would be the best implementation strategy would make the most improvement for each impairment.

Meeting ended at 3:30 pm

Exhibit 5

Rock County Land Management Office

311 West Gabrielson Road Ste 5
Luverne, MN 56156
24 hour Fax: (507) 283-5006

Soil & Water **Zoning** **Ag Inspection** **Environmental** **Transfer Station**
(507) 283-8862 (507) 283-5005

March18, 2008

MEMO

To: All Advisory and Technical TMDL Planning Committee members,

Concerning: Final Input Meeting on TMDL Implementation Plan action items

When: **Wednesday, March 26**, 2008, 1:30pm

Where: Rock County **Law Enforcement Center,** 1000 Blue Mound Ave, Luverne

I think we had a very productive first meeting and I am encouraged by your interest in finding actions to improve the water quality of the Rock River. This memo is a reminder for our next meeting where we will start with Matt Drewitz from Board of Water and Soil Resources presenting information on funding opportunities that will be available to the Rock River Watershed. We will then move on to discuss strategies and actions that we will use in developing an Implementation Plan.

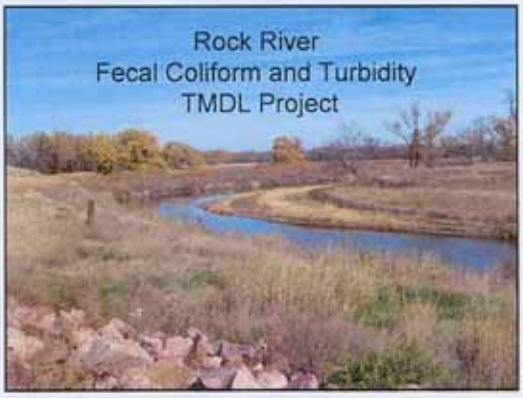
I hope you have time to review the data we gave you. We know it is a lot of information, but think that it will provide you with a basis to help you make an informed decision. If you have any questions or comments or cannot attend please contact our office at 507/283-8862 ext. 3 or e-mail me at Douglas.bos@mn.nacdnet.net.

Thank you,

Doug Bos
Asst. Director
Rock County SWCD/ Land Mgt

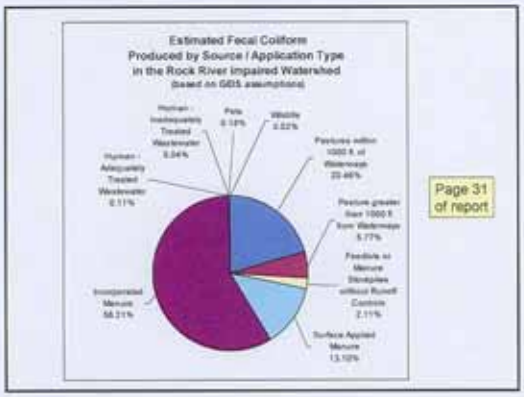
PS. We will have the second meeting on March 26th, at 1:30 at the same location

Presentation for March 26, 2008



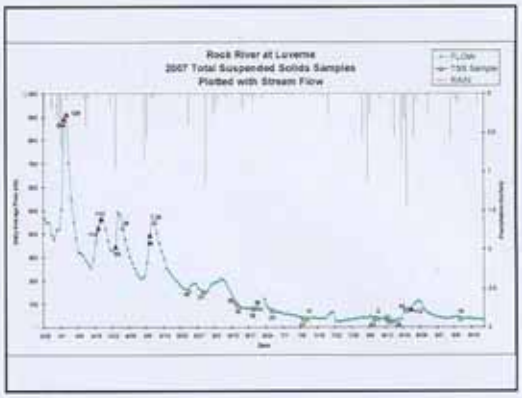
Sources of Fecal Coliform

- Wastewater Treatment Facilities
- Noncompliant Septic Systems
- Unsewered Communities
- Open Feedlots
- Livestock in riparian zone
- Manure Application
- Wildlife
- Stormwater from cities



Sources of Turbidity

- Wastewater Treatment Facilities - Effluent solids and nutrients
- Feedlots near streams – Runoff of sediment
- Livestock overgrazing in riparian zone
- Row Cropland
- Ditches/Channelization – Increased runoff causing stream instability
- Impervious surfaces
- Construction
- Bluff, Bank and Channel Erosion – Natural or Accelerated



The Clean Water Legacy Act: Relationship to the Rock River and TMDL Implementation Planning

March 26, 2008

Matt Drewitz
BWSR Clean Water Specialist
Cell phone: 507-766-5020
Office phone: 507-359-6076
E Mail: matt.drewitz@bwsr.state.mn.us

1

The Purpose of the Clean Water Legacy Act

Protect, restore, and preserve the quality of Minnesota's surface waters by providing authority, direction, and resources to achieve and maintain water quality standards for surface waters as required by section 303(d) of the Clean Water Act.

2

Clean Water Legacy (CWL) Act is…

…Minnesota's strategy to meet the Federal Clean Water Act (CWA)

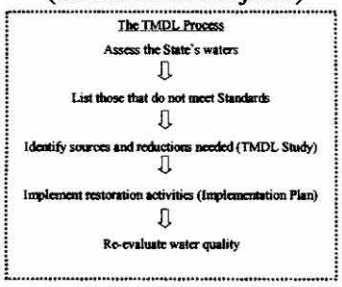
3

CWL Act: Dual Approach

- Restoration: actions, including effectiveness monitoring, that are taken to achieve and maintain water quality standards for impaired waters in accordance with an approved TMDL **(ex. Rock River TMDL).**
- Protection: implementation of measures to prevent waters from becoming impaired and to improve waters that are listed as impaired but have no approved TMDL addressing the impairment.

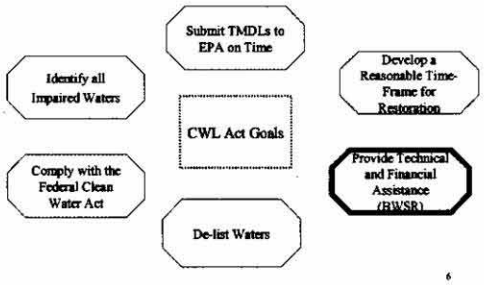
4

TMDL Process Overview (Restoration Projects)



5

CWL Act Implementation Goals



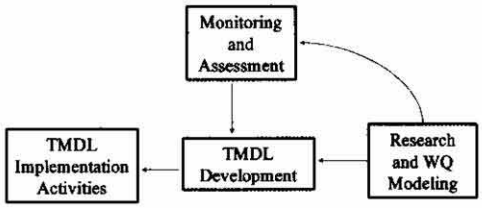
6

Creation of State Clean Water Council (CWC)

- Council was created to advise on the administration and implementation of the CWL Act
- 19 citizens on the Council
- Agencies (BWSR, MPCA, DNR, MDA) represented on the Council, but are ad hoc members that do not vote

7

What is being Funded through the CWL Act?



8

Where is CWL Act Funding Going Currently?

- Most funding going towards TMDLs:
  - TMDL development (MPCA)
  - Water quality monitoring (MPCA/DNR)
- Other funding dedicated to implementation and research:
  - Implementation funding (BWSR C-S and Technical assistance) (MCC funds fit in here)
  - Ag research (MDA)
  - Infrastructure upgrades (Public Facilities Authority)

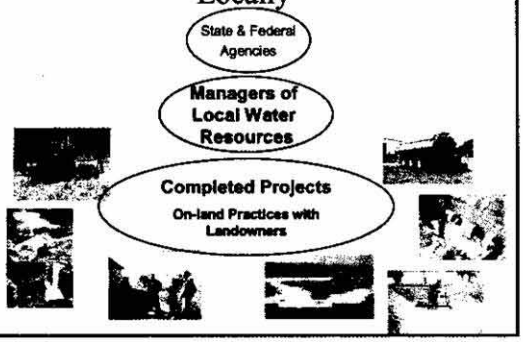
9

CWL Implementation Funding

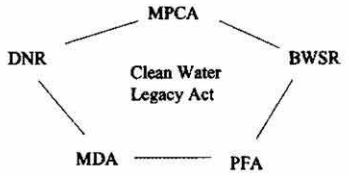
- Strategy for implementation funding
- First two years of funding…results
- Future funding
- How the Rock River can prepare for implementation and funding

10

Strategy: Delivering Conservation Locally



Strategy: Multi-Agency Approach



12

Strategy: Leveraging Funds

- Match State funds with Federal funds (EQIP, MPCA 319)
- Local buy-in from landowners (cost share)
- Local organizations contributing

13

Strategy: Ranking of Implementation Projects

- Relationship to a TMDL or water plan
- Measurable results and estimated effect
- Leveraging of CWL funding
- Tracking project effectiveness
- Readiness to proceed
- Coordination and cooperation

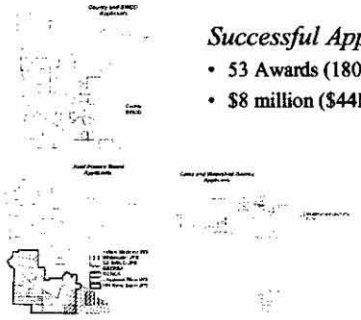
14

Types of Funds Available in the FY07 Competitive CWL Allocation

- Cost share and incentives
- Technical assistance and engineering
- Public Interest Lands (bonding funds)
- Land and River Management grants
- 319 Grants
- AgBMP Loans

15

FY07 CWL Applications



Successful Applicants

- 53 Awards (180 applicants)
- $8 million ($44M requests)

16

Sampling of BMPs that will be Implemented with BWSR CWL Funds Statewide

- 20 shoreland Restorations
- 8,000 Ac Forest Stewardship
- 25 shoreland protection
- 13 Manure storage facilities
- 100 acres of filter strips
- 12 livestock exclusions
- 10 grassed waterways
- 11 sediment basins
- 55 inlet structures
- 5600 ft stream bank protection
- 12 rain gardens
- 5 miles Field Windbreaks
- 100 acres of buffer strips
- 14 sediment control structures
- 1000 ac conservation tillage incentives

17

FY 2008-2009 CWL Interagency Competitive Implementation Funds

- Cost share and incentives (BWSR)
- Technical assistance and engineering (BWSR)
- Protection lake and river management grants(BWSR)
- ISTS/SSTS Inventory and Installation Funds (BWSR/MPCA)
- 319 Grant Funds (MPCA)
- AgBMP Loans (MDA)

18

FY08 CWL Funds Available vs. Requests

Agency Funds	Available	Requests
MDA Ag BMP Loan	$1,000,000	$2,985,300
MPCA 319 Grant	$1,000,000	$1,979,160
BWSR Cost Share Grant	$558,000	$2,162,775
BWSR Technical Assistance and Engineering Grant	$815,000	$5,013,248
BWSR Lake and River Management Grant	$850,000	$8,440,669
BWSR/MPCA SSTS Inventory Grant	$988,000	$1,403,669
BWSR/MPCA SSTS Installation Grant	$1,000,000	$5,108,800
Totals	$6,211,000	$27,093,521

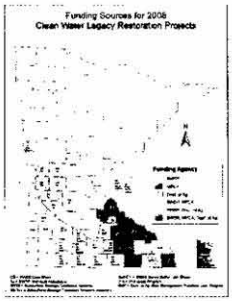
19

Who Applied for Funds?

- 144 applications (102 Protection, 42 Restoration)
- 52 from SWCDs
- 32 from Counties
- 27 from Cities
- 16 from Watershed Districts
- 15 from Joint Power Organizations
- 2 from "other"

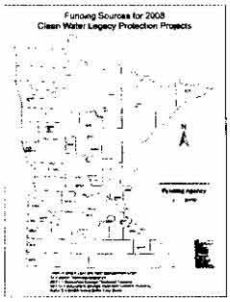
20

Restoration Project Distribution



21

Protection Project Distribution



22

Other CWL Funds: BWSR Direct Appropriations of Implementation Funds

- Minnesota Conservation Corp
- Ag Hydro Restoration Project
- Feedlot Water Quality Management Grants

23

FY09 (Fall 2008) Competitive Grants for CWL Restoration Projects

- BWSR Cost Share and Technical Assistance
- MPCA 319 Grants
- …potential legislative appropriations during session (BWSR bonding proposal unlikely)

24

Future CWL Funding Sources

- Dedicated funding through constitutional amendment…future?
- General fund appropriations made permanent…future?
- General fund one-time, limited appropriations…now

25

How can the Rock River Watershed Prepare for Future Funding Cycles?

- Finish TMDL and Implementation Plan to get into the funding door
- Prioritize what needs to get funded first
- Develop a list of projects to be initiated
- Apply for funds
- Implement funds to meet TMDL goals

26

Questions and Comments

BWSR CWL Website:
http://www.bwsr.state.mn.us/CWL/index.html

27

Fecal Coliform Ballot

Please circle the implementation strategy you believe would have the biggest improvement on the *Fecal Coliform* impairment on the Rock River?

- **Feedlot Runoff Reduction**
- **Manure Management Planning**
- **Non-Conforming Septic Systems**
- **Pasture Management**
- **Vegetative Practices**
- **Other (Please list) _____**

Direct Action Items for the Strategy for Chosen

Exhibit 5

Turbidity Ballot

Please circle the implementation strategy you believe would have the biggest improvement on the *Turbidity* impairment on the Rock River?

- **Feedlot Runoff Reduction**
- **Manure Management Planning**
- **Pasture Management**
- **Vegetative Practices**
- **Structural Practices**
- **Other (Please list) _____**

Direct Action Items for the Strategy for Chosen

Results of Ballots:

Fecal Coliform Strategy:

Feedlot Runoff Reduction	4
Manure Management Planning	11
Non-Conforming Septic Systems	7
Pasture Management	2
Vegetative Practices	1
Others:	Fix Non-conforming Septic Systems, UV Light treatment

Direct Action Items for the Chosen Management Measures:

- Winter Application
- Education
- Incentives for small operations
- Enforcement of set backs to sensitive areas
- Calibration of application equipment
- Inventory of septic systems
- Low interest loans for replacing septic systems
- Monetary incentives for low income households to replace septic systems

Turbidity Strategy:

Feedlot Runoff Reduction	0
Manure Management Planning	0
Pasture Management	3
Vegetative Practices	9
Structural Practices	10
Others:	Residue Management and restricting road culvert sizing

Direct Action Items for the Chosen Management Measures:

- Livestock stream crossings
- Stabilization structures on stream banks
- Education of corrections needed and land use changes
- Increase incentives for buffers
- Water and sediment basins
- Waterways
- Larger buffers along streams
- Conservation tillage

Exhibit 5

Minutes of 3/26/08 meeting

Present; Bill & Merri Post, Andy Stensma, Peter Bakken, Diane Thier, Andy Nesseth, Ed Lenz, Steve Woltjer, Larry Bosch, Chris Hein, Mary Tilstra, Jim Knips, Don Reker, George Shurr, Kevin Barnhart, Chad Hoff, Dan Cook, Kurt Halfmann, Justin Decker, Arlyn Gehrke, Matt Drewitz, Kelli Daberkow, Doug Bos.

- The meeting was started by Doug Bos reviewing the main points of the TMDL Assessment Plan PowerPoint presentation and the TMDL plan outline.
- Matt Drewitz from the Board of Soil and Water Resources gave a presentation on the Clean Water Legacy Act and possible funding for implementation plan programs and projects. There was good discussion of implementation strategies and questions that committee members had were answered.
- Ballots were passed out and the members chose the best implementation strategy for each impairment. After the ballots were tabulated, direct action items were discussed.
- Closing the meeting, Doug discussed the next steps, which will include; developing a rough draft, sending out the rough draft to the committees for comment, and holding a joint meeting of the committees to discuss changes needed for the final draft.

Meeting ended at 3:30 pm.

Draft TMDL Implementation Plan Meeting
August 27, 2008
Agenda

I. Plan Overview

2.0 TMDL Report Summary
3.0 Priority Management Areas
4.0 Non point Source Management Measures Alternatives and Analysis
    Evaluation of management measures
    Selection of the management measures for the Rock River
5.0 Point Source Management Measures Alternatives and Analysis
    Evaluation of management measures
    Selection of the management measures for the Rock River
*6.0 Identification and Summary of Implementation Objectives and Action Items
    Really the most important part of today's meeting
7.0 Roles and Responsibilities of Project Partners
    Can change with each project or objective
8.0 Timeline
    Approximation of timelines for each objective
9.0 Adaptive Management
    Importance on being adaptive to water testing results and opportunities that arise
10.0 The Budget
    What these objectives can cost!
Appendix A
    This explains the process that got us here. All the examples of the meeting agendas and ballot voting results are included also

II. Section 6.0

Management Measures and Action Items

- *Are these good action items?*
- *Will they be successful? Why or why not?*
- *What are some other ideas?*
- ***Most importantly, this plan needs to be adaptive!***

III. Where Do We go From Here?

- Future funding- Clean Water Legacy, other grant opportunities.
- Committee meetings- possible annual meetings to analyze.
- Structure of the Rock River Watershed organization

Thank you, Thank you, Thank you, Thank you, Thank you

Exhibit 5

Minutes of 8/27/08 Draft TMDL Implementation Plan meeting

Present: Kraig Rust, Don Reker, George Shurr, Mary Tilstra, Bryce Stoltenberg, Roger Talsma, Chris Hein, Dan Cook, Andrew Nesseth, Richard Bakken, Arlyn Gehrke, Kelli Daberkow, Doug Bos

- The meeting started with an overall review of the Draft Implementation Plan sections and structure. Also included was a brief review of the TMDL assessment and objective prioritization process that brought us to this point. There were a few grammatical changes and suggestions that the group pointed out.

- The main focus of the meeting was on Section 6-Management Measures and Action Items. The group reviewed and discussed each action item. Attendees from the Technical Committee and Advisory Committee felt that water quality monitoring at key locations such as where major tributaries entered the Rock River should be a component of the implementation plan. The committees felt that our actions would be more effective if we could focus on the areas of the watershed causing the problems. The committees also felt that some type of prioritization of each practice based on proximity to the surface waters of the watershed should be used to award funding for practices to make more efficient use of funding.

- The future need for an advisory committee was discussed. The committees felt that an annual meeting to evaluate and adapt the plan would be good. The committees also felt that meeting when funding opportunities became available would assist in making an effective application and adoption of the programs.

- Future structure of this Rock River watershed organization was discussed as well as future funding opportunities.

- A meeting in early October was tentatively scheduled to review Clean Water Legacy Act application and prioritize action items.