GREATER BLUE EARTH RIVER BASIN
FECAL COLIFORM TMDL REPORT

IMPLEMENTATION PLAN
September 2007

Submitted By:
Greater Blue Earth River Basin Alliance
(GBERBA)

Preface

The Greater Blue Earth River Basin Alliance (GBERBA) has written this plan, based on the report 'Fecal Coliform TMDL Assessment for 21 Impaired Streams in the Blue Earth River Basin'. Many meetings were held that included county environmental staff and SWCD staff. Other governmental agencies and commodity organizations with expertise in these fields participated in this plan development. We attempted to address all expressed concerns through the planning process. Expansion and acceleration of existing, accepted BMPs are the main focus of the implementation plan.

The plan was approved by the GBERBA Policy Board, which consists of elected County Commissioners and SWCD Board Members from the nine participating counties including Blue Earth, Cottonwood, Faribault, Freeborn, Jackson, Le Sueur, Martin, Waseca and Watonwan.

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1.0 Problem Statement

In 2006, 17 stream reaches in the Greater Blue Earth River Basin GBERB were listed as impaired on the Federal Clean Water Act 303(d) list for recreational/human contact use based on violations of water quality standards for fecal coliform bacteria. Reviews of water quality data collected as part of the BERB Total Maximum Daily Load (TMDL) study revealed another four streams were tested and qualify to be listed as impaired in 2008. The data assessment process revealed that 100% of stream reaches with adequate monitoring data in the basin qualify to be listed as impaired waters. Listed below are the 17 officially listed stream segments in the basin as of 2006.

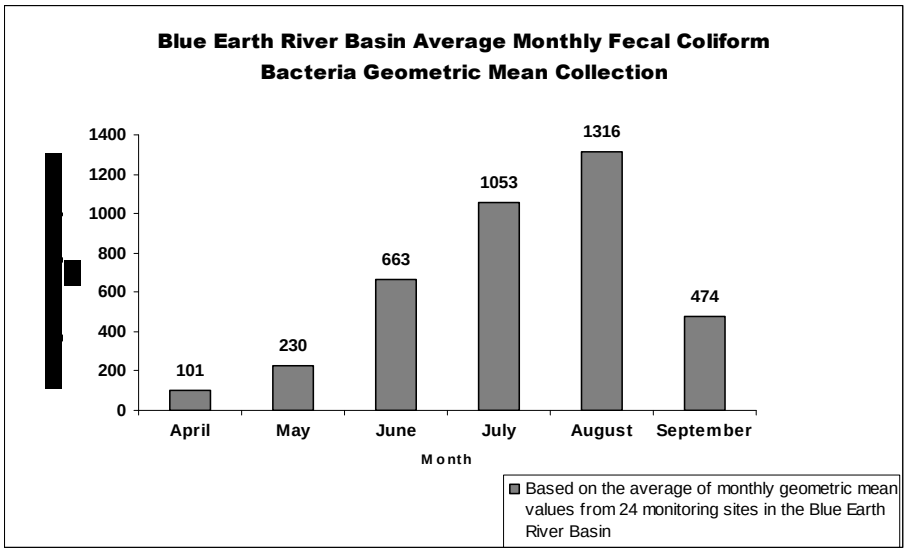
Table 1.0 – Fecal Coliform Bacteria Impaired Stream Reaches in the Greater Blue Earth River Basin

Stream Name	Description	Year Listed	MPCA River Unit ID
Blue Earth River Watershed			
Blue Earth River	W Branch Blue Earth River to Coon Creek	1994	07020009-504
Blue Earth River	Le Sueur River to Minnesota River	1994	07020009-501
Cedar Creek	T 104 R33W Section 6 West Line to Cedar Lake	2006	07020009-560
Cedar Creek	Cedar Lake to Elm Creek	2006	07020009-521
Center Creek	George Lake to Lily Creek	2006	07020009-526
Center Creek	Lily Creek to Blue Earth River	1996	07020009-503
Dutch Creek	Headwaters to Hall Lake	2006	07020009-527
Elm Creek	South Fork Elm Creek to Cedar Creek	2006	07020009-522
Elm Creek	Cedar Creek to Blue Earth River	1996	07020009-502
Judicial Ditch 3	Headwaters to Elm Creek	2006	07020009-505
Lily Creek	Headwaters to Center Creek	2006	07020009-525
Le Sueur River Watershed			
Little Beauford Ditch	Headwaters to Cobb River	2004	07020011-503
Watonwan River Watershed			
Watonwan River	Headwaters to North Fork Watonwan River	2006	07020010-514
Watonwan River	North Fork Watonwan River to Butterfield Creek	2006	07020010-512
Watonwan River	Butterfield Creek to South Fork Watonwan River	2006	07020010-511
Watonwan River	Perch Creek to Blue Earth River	1994	07020010-501
Watonwan River, South Fork	Willow Creek to Watonwan River	2006	07020010-517

Based on the water quality standards and the monthly geometric mean from the sample data, the majority of these streams will need an 80-90% reduction in fecal coliform levels to meet the standards of 200 CFU or less per ml. of water. In late 2007, or early 2008 the State of Minnesota is changing from fecal coliform to E. coli as the bacteriological water quality standard. Because of the strong relationship between fecal coliform and E. coli, this change will not affect the necessary reduction levels or implementation strategies.

Fecal coliform levels are typically highest during the summer months of June, July and August. Please refer to Figure 1.0 below.

Figure 1.0 Basin wide Monthly Fecal Coliform Bacteria Geometric means

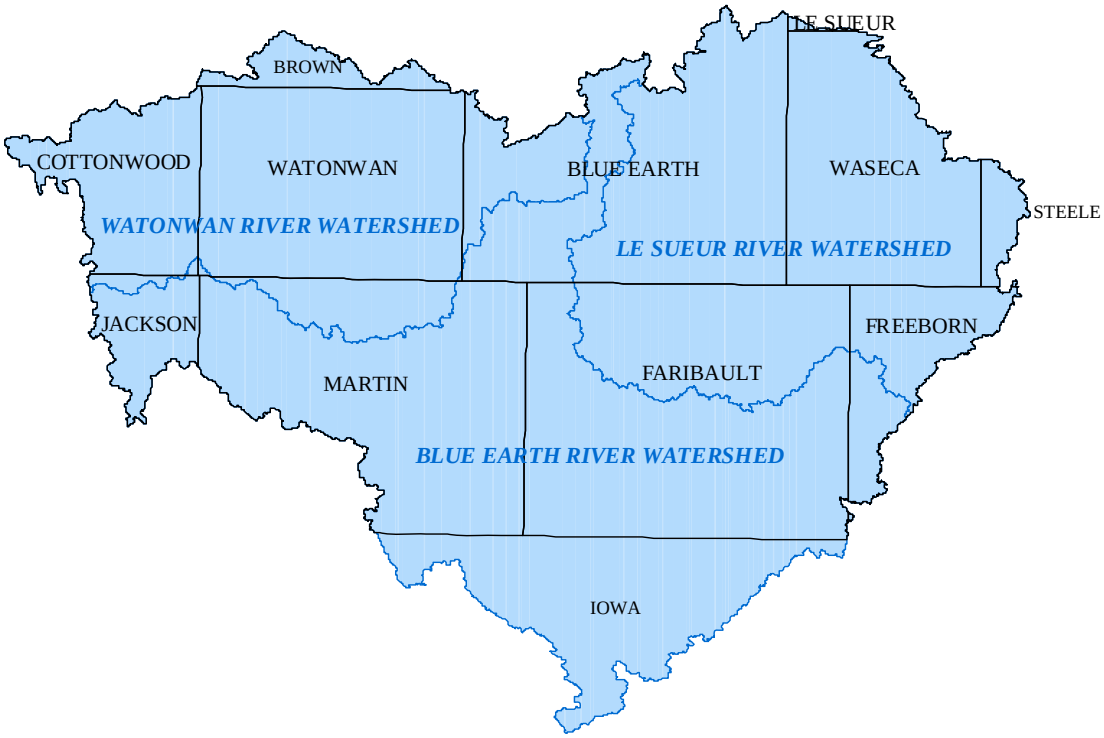


1.1 Target Watershed

The Greater Blue Earth River Basin (GBERB) is located across portions of 14 counties in south-central Minnesota and Northern Iowa. The basin includes three major watersheds, the Blue Earth, Le Sueur and Watonwan, which consists of 3,540 square miles (2.26 million acres) and includes 51 municipalities. The city of Mankato is largely down stream of the Blue Earth River and is not included in this plan. The basin has an estimated population of 92,202 with 60% living in cities and 40% in rural areas. Approximately 88% of the basin is used for agricultural purposes, dominated by corn and soybean production. Swine and cattle feedlots are also prevalent with over 2,300 facilities. Based on 2003 county feedlot inventories there are over 2.2 million swine in the basin.

The mouth of the Blue Earth River is an impaired reach for fecal coliform bacteria. With the ability of all stream reaches within the Greater Blue Earth River Basin to negatively impact the fecal coliform bacteria count at the mouth of the Greater Blue Earth River Basin, this implementation plan is written for the Greater Blue Earth River Basin as a whole.

Figure 1.1 Greater Blue Earth River Basin Map



1.2 Inventory of Fecal Coliform Sources

Table 1.2a is a population inventory of all fecal coliform producing animals in the Greater Blue Earth River Basin. (See TMDL study for methods and other details).

Table 1.2a Blue Earth River Basin Population Inventory

Animal Type	Animal Units	Individuals
Dairy	39,282	
Beef	92,456	
Swine	554,339	
Chicken	7,903	
Turkey	9,834	
Horse	800	
Sheep	1,397	
Humans		92,202
Cats		25,043
Dogs		22,007
Deer		12,744
Canadian Geese		15,771
Wild Turkey		3,859
Pheasants		100,000
Other Wildlife		N/A

As covered in the TMDL study, and discussed in section 1.3 below, a process to connect the inventory shown in Table 1.2a to more specific estimates of potential source contributions to

surface waters was followed. Table 1.2b shows the, "Major Contributors" of Fecal Coliform Bacteria in the Greater Blue Earth River Basin.

Table 1.2b Blue Earth River Basin – Major Contributors of Fecal Coliform Bacteria

Category	Source	Wet Conditions	Dry Conditions
Livestock	*Overgrazed Pasture near Streams or Waterways*	Low Contributor	*Moderate 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	**Human – Inadequately Treated Wastewater**	Low Contributor	**High Contributor**
Pets	Pets	Low Contributor	Low Contributor
Wildlife	Deer	Low Contributor	Low Contributor

1.3 Assumptions and Current Load Contributions

Livestock
Based on population inventories and the assessment procedures, nearly 99% of the fecal matter produced (not what may be delivered to waterways) in the Basin is from livestock manure. Of the fecal matter produced by livestock, 98% is applied to cropland as fertilizer. The remaining 2% is estimated to be deposited in pasture area or lost from feedlots without runoff controls. Of the manure applied to cropland an estimated 71% is incorporated and 27% is surface applied without incorporation. Runoff of manure from land application areas, pastures and livestock feedlots has the potential to be a significant source of fecal coliform bacteria and other pollutants.

Based on county feedlot inventories, there are an estimated 2,311 feedlots with 705,466 animal units in the basin. The dominant animal type in the basin is swine, accounting for 78.2% of total livestock animal units. The other major livestock animal types are beef (13.3%), dairy (5.4%), turkey (1.8%) and chicken (1.1%).

Pets
The American Veterinary Medical Association estimates there are 0.66 cats and 0.58 dogs per household in the United States. Based on an average household of 2.43 people, this equates to 25,043 cats and 22,007 dogs in the GBERB. High densities of pets in areas can lead to bacterial contamination of waterways; however pets are normally a minor contributor of fecal coliform bacteria contamination in the GBERB.

Wildlife
According to population estimates and monitoring data, wildlife normally is not a significant contributor of fecal coliform bacteria contamination in the GBERB. Conditions when wildlife can be a significant source include isolated areas of high density and during low flow/drought conditions.

Human
Human waste can be a significant source of fecal coliform contamination during low flow periods. Subsurface sewage treatment systems that are not functioning properly can allow untreated or partially treated sewage into waterways. Emergency bypasses from wastewater treatment facilities are a source of bacteria and other pollutants. A high priority will be placed on preventing human waste from entering waterways, as human pathogens are often found to be highly communicable.

The 2000 census data indicated that the GBERB has an estimated human population of 92,202. The urban population is 55,370 (60%) and the rural population is 36,832 (40%).
An estimated 39% of Subsurface Sewage Treatment Systems SSTS in the GBERB are allowing inadequately treated wastewater into waterways. The systems that discharge inadequately treated wastewater via drainage tile directly into waterways are often termed "straight pipe" systems. Most "straight pipes" are tied to existing agricultural drainage tile. There are an estimated 5,500 straight pipe individual sewage treatment systems across the basin.

As of 2005, there were 938 individuals living in six unsewered incorporated communities in the basin. In addition, another 1,532 individuals lived in unsewered unincorporated communities in the Basin. It is assumed a similar 39% of septic systems in these communities have inadequate treatment of wastewater, and using 2.4 people per household this equates to another 400 straight pipe systems.

As the number of compliant SSTS increases, there will likely be an increase in the volume of septic tank septage generated. Minnesota rules require each SSTS owner to pump their septic tank regularly. While septage handling practices have not been identified as a wide spread problem at this time, managing increased volume of septage could be a concern in the future.

Municipal bypasses are emergency discharges of partially or untreated human sewage from waste water treatment facilities. Municipal bypasses usually occur during periods of heavy precipitation, when waste water treatment facilities become overloaded. Municipal bypasses typically last from a few hours to a few days. There were 38 reported municipal bypasses in the basin from 2000 through 2004.

Storm Water
Runoff of storm water can adversely impact both water quality and quantity from urban areas. This runoff can affect our water resources physically, chemically and biologically.

Fecal coliform concentrations in storm water runoff from urban areas can be as great as or greater than those found in cropland runoff, grazed pasture runoff, and feedlot runoff (USEPA, 2001). Approximately 34,000 acres or 1.5% of the basin is urbanized.

2.0 Project Team and Public Support

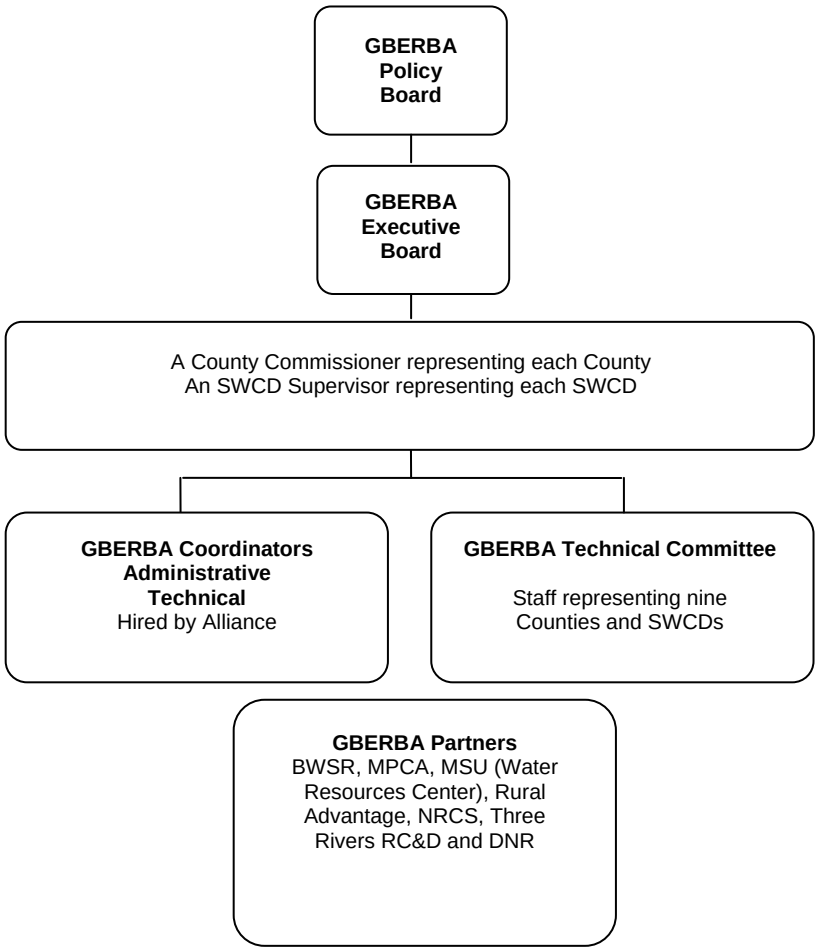
The Greater Blue Earth River Basin Alliance (Alliance) was formed during the summer of 2003. Two local natural resource groups The Blue Earth River Basin Initiative and the South Central Minnesota Comprehensive Water Planning Project, joined forces to form the Alliance. The Alliance consists of County Commissioners and Soil and Water Conservation Supervisors and their staff from nine counties. These counties are: Blue Earth, Cottonwood, Faribault, Freeborn, Jackson, Le Sueur, Martin, Waseca and Watonwan. The Iowa counties and Brown and Steele counties in Minnesota are not members of the Alliance at this time. These counties decided not to join at this time due to the minimal amount of land these counties contribute to the watershed.

2.1 Agency Roles and Responsibilities

The organization consists of a Policy Board that oversees the Alliance. An Executive Board and Technical Committee are under the Policy Board. A Joint Powers Agreement is on file.

The water quality impairment of excessive fecal coliform bacteria loading in the GBERW is being addressed by coordination efforts of the Alliance as shown in the organizational structure in Figure 2.0. The Alliance will act as the sponsor of the TMDL Implementation Plan.

Figure 2.0 Organizational Chart Greater Blue Earth River Basin Alliance



As evident from Table 2.0, a large number of agencies at the local, state and federal level are responsible for the source-reduction management activities. However, the key strategies of the implementation plan for fecal coliform source reduction are built on a foundation of local government and local watershed organization activity. This effort will be coordinated by the Greater Blue Earth River Basin Alliance of which each county and SWCD are members.

Table 2.0 Agency Roles and Responsibilities for Fecal Coliform Source Reduction Categories

Source Reduction Category	Leading Local Agencies	Leading State Agencies	Leading Federal Agencies
Manure Management	Counties, SWCDs, Extension	MPCA, MDA, BWSR	NRCS
Feedlot Runoff	Counties, SWCDs	MPCA, BWSR	NRCS
Pasture Management	SWCDs, Extension	BWSR, MDA	NRCS
ISTS	Counties	MPCA, PFA, BWSR (AgBMP Loans)	EPA
Small Communities with Inadequate Wastewater Treatment	Counties	MPCA, PFA	EPA, USDA Rural Development
Stormwater	Counties, SWCDs, Municipalities	MPCA	EPA
Municipal Wastewater	Municipalities	MPCA	EPA
Shoreland Management	Counties, SWCDs	DNR, MPCA	NRCS, USFWS
Conservation Tillage	SWCDs, Extension	BWSR, University of Minnesota	NRCS

2.2 Roles of MPCA and BWSR

Under Minnesota Clean Water Legacy Act legislation passed in 2006 and 2007, somewhat distinct roles in impaired waters work have been identified for the MPCA and BWSR. The MPCA has primary responsibility for decisions to list waters as impaired. Subsequent to listing, the MPCA also has responsibility for scheduling and initiating the TMDL studies that are completed in response to impairment listings. While the TMDL studies may be done on contract by local units of government, watershed organizations, and consultants, the MPCA is ultimately responsible for submittal of the studies to USEPA for their approval. The MPCA has established a policy that following approval by USEPA, an implementation plan should be completed within one year. The implementation plan is approved by MPCA regional management. In general, the MPCA believes that implementation planning is best done by those who will be most involved in carrying out the plan. In the case of largely rural watersheds (such as the Greater Blue Earth) where the water quality solutions are mainly voluntary and education-based, organizations such as GBERBA are perhaps the best positioned to do this implementation planning.

Following approval of the implementation plan, the watershed becomes eligible for state Clean Water Legacy and federal funding designated to address impaired waters with a completed TMDL study and implementation plan. BWSR is the lead agency for the distribution and oversight of Legacy funds. Current practice is an annual competitive grant application and award process. For those projects receiving grants, BWSR maintains a project oversight role, including financial and water quality BMP tracking.

Implementation planning should not be viewed strictly as a means to funding. Good implementation plans can help focus on-going (and already funded) activities of state agencies, local units of government, watershed projects, universities, and others. These activities include the wide range of state and local regulatory work that is related to water, water monitoring, local water planning, outreach and research.

2.3 Integration with Existing Programs

Through the first round of Clean Water Legacy funding the Alliance has integrated several positions into the watershed. These positions were established to help address dissolved oxygen concerns in the lower Minnesota River. There work however will have broader water quality benefits, including bacterial reductions.

The Faribault SWCD has secured an Urban Outreach Specialist to work with the non MS4 (municipal separate storm sewer system) communities of Faribault and Martin Counties to help them address their storm water issues. The Urban Outreach Specialist is working to educate the elected officials and residents of the communities about the need for better storm water management. This will be accomplished by promoting the use of better site design techniques and best management practices. The position will have the opportunity to branch out into the nine counties of GBERBA.

The Cottonwood SWCD has secured a Nutrient Management Specialist focusing on the 300≤ animal unit feedlots in the GBERB. After the training and classes have been completed the Nutrient Management Specialist will be meeting with every feedlot officer in the nine counties and work with them and their livestock producers.

A Conservation Agronomist is hired in conjunction with the MN Extension Service and Rural Advantage. This Extension Educator will focus on education and applied research around sustainable farming systems that promote higher levels of non-point source pollution mitigation practices. A major focus of this position will be to promote Precision Conservation on working lands. Precision Conservation is a term that was adopted to mean higher level BMP's are applied to strategically targeted environmentally sensitive areas within the agricultural landscape. Across the watershed it is estimated this would equate to 5 to 10% of the landscape. These areas should be 'working lands' and provide economic return back to the farm family, instead of 'retired' land.

The Alliance was also successful in acquiring funding to help accelerate the SSTS programs in each participating county.

New and existing technology could be used to aid in targeting and prioritizing the BMP dollars, to ensure they are used wisely. The MN Department of Agriculture (MDA), in particular is leading efforts to analyze watershed behavior using aerial radar and computer modeling.

2.4 Public Participation and Involvement

Public participation in the GBERB will be locally driven by the nine participating counties and SWCDs in the basin.

An adaptive management style will be used with this plan. At five year intervals the GBERBA Technical Committee will formally look at newly learned information and make appropriate changes to the plan with consultation from MPCA.

Ongoing testing and research projects will be the basis to continue the focus in specific areas or will be used to redirect efforts into new directions. One such project that will provide needed information is the Evaluation of Nutrient and Bacteria Transport from Manured Lands Project. This project is coordinated by the Water Resources Center, Minnesota State University – Mankato, and will provide solid information moving forward. Another project being initiated by the MDA involves "fingerprinting" of bacteria found in water to more clearly identify contributing sources.

2.5 Education and Outreach

Local residents, landowners and farm operators will be kept appraised of conservation work being implemented through their local units of government. The Greater Blue Earth River Basin Alliance through their coordinators will be participating in county fairs and work at distributing information for news releases and mass mailings. Alliance members will report on a monthly basis through Policy/Executive and Technical Meetings.

2.6 Communicating Lesson to Others in State and Beyond

Through the Greater Blue Earth River Basin Alliance monthly meeting for the Policy/Executive Boards and Technical Committee our State and Federal Partners will be kept informed of our progress.

Reporting through MPCA 319 and Clean Water Legacy Grants will be completed as requested through written and E-Link reporting systems.

3.0 Set Goals and Identify Solutions

Section 303(d) of the Clean Water Act (CWA) provides authority for completing Total Maximum Daily Loads (TMDL's) to achieve state water quality standards and/or designated uses. A TMDL is a calculation of the maximum amount of pollutant that a water body can receive while still meeting water quality standards and/or designated uses. It is the sum of the loads of a single pollutant from all contributing point and non-point sources. In general, the TMDL is developed according to the following relationship:

$$TMDL = WLA + LA + MOS$$

Where:

TMDL	=	Total Maximum Daily Load
WLA	=	Waste Load Allocation (point source)
LA	=	Load Allocation (non-point source)

MOS = Margin of Safety (may be implicit and factored into conservative WLA or LA, or explicit.

3.1 Existing vs. Desired Uses of Waters of Concern

The single focus of this TMDL is on fecal coliform impairment. The current fecal coliform concentrations in the Blue Earth River system pose an unacceptable health threat to human body contact recreation. The goal is to reduce the fecal coliform concentrations to levels that do not pose a health risk for the designated use of swimming and wading, and promote these recreational activities.

3.2 Water Quality Goals and Source Reductions Needed

The goal of this plan is to reduce the fecal coliform bacteria in all stream reaches and at the mouth of the Blue Earth River to a monthly geometric mean of 200 organisms per 100 ml of water or below.

From Figure 1.0 we see the composite totals of 24 monitoring sites throughout the basin show a July total of 1053 cfu and an August total of 1316 cfu per 100 ml of water.

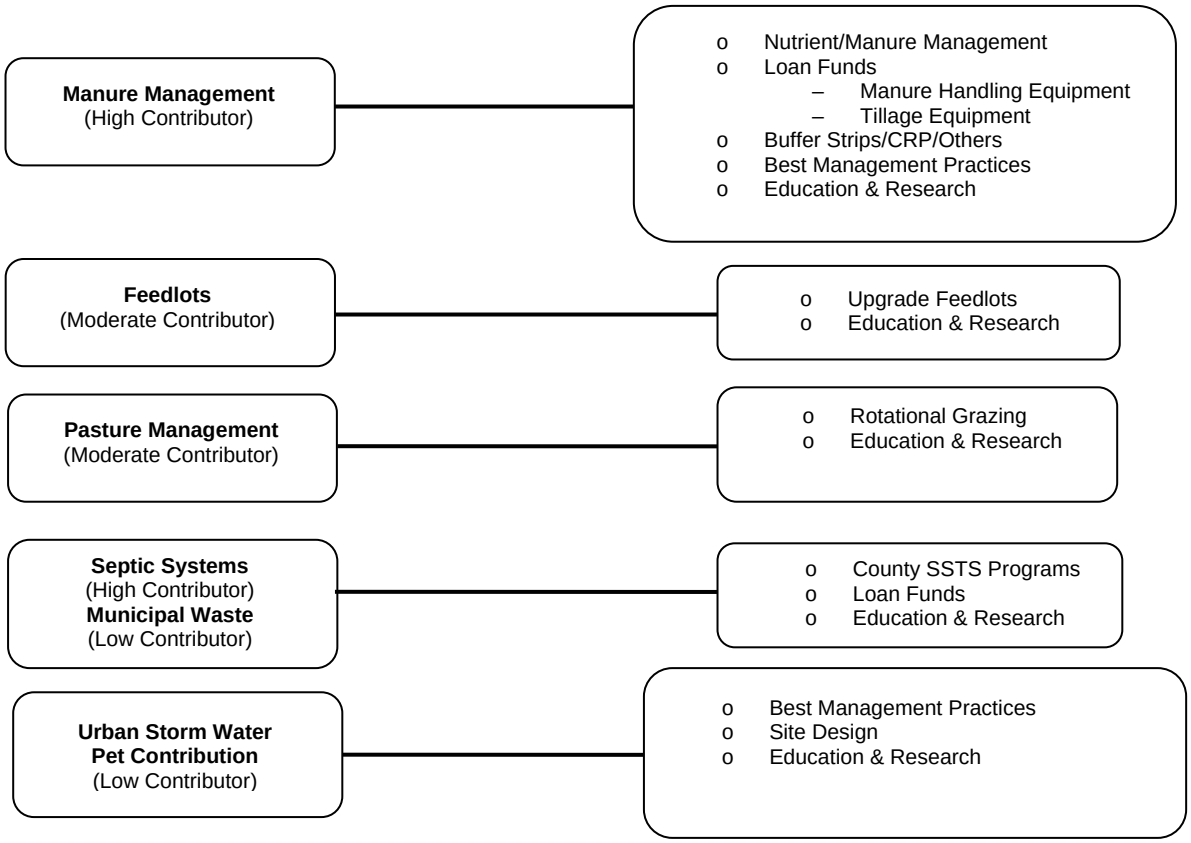
A target of 180 cfu per 100 ml of water will be used showing a 10% margin of safety from the 200 cfu standard. Given this, an 80% reduction in July and an 87% reduction in August will be required.

To achieve an 80%+ reduction in fecal bacteria all sources that can be affected by improved best management practices must be addressed.

4.0 Implementation Management Measures

The implementation strategies that will be employed for each of the contributing sources outlined in Table 1.2b are shown below in Figure 4.0. This chart is an easily interpreted list of proposed management practices.

Figure 4.0 Greater Blue Earth River Basin Implementation Strategies



These implementation strategies will include but are not limited to the Best Management Practices listed in Table 4.0.

Table 4.0 Best Management Practices

Conservation Practice	MN Practice Code
Composting Facility	317
Contour Buffer Strips	332
Diversion	362
Fence	382
Filter Strip	393
Grade Stabilization Structure	410
Grassed Waterway	412
Nutrient Management	590
Pasture and Hay Planting	512
Prescribed Grazing	528
Residue Management	345, 329, 346
Riparian Forest Buffer	391
Roof Runoff Management	558
Runoff Management System	570
Sediment Basin	550
Terrace	600
Use Exclusion	472
Waste Storage Facility	313
Waste Treatment	629
Water and Sediment Control Basin	638
Watering Facility	614
Tile Intake Replacement	N/A

4.1 Manure Management

Land application of manure studies have shown that buffer strips, immediate incorporation and maintenance of surface residue have been demonstrated to reduce manure and pathogen runoff. The new state feedlot rules (Minn. R. ch. 7020) requires keeping records of manure application and management planning. These records will be used extensively to determine priorities for implementing controls. For any feedlots requiring a permit, the new feedlot rules require that manure management plans be developed. These include feedlots in the following categories:

- Feedlots with more than 300 animal units planning new construction or expansion;
- Feedlots where there is a pollution hazard not corrected by the Open Lot Agreement;
- The feedlot has been designated a CAFO or more than 1000 animal units or direct man-made conveyance to waters;
- Feedlots that have more than 300 animal units and is applying manure in sensitive areas, including: a) soil P levels exceeding 120/150 ppm Olsen/Bray, or half of those values within 300 feet of public waters; b) vulnerable drinking water supply management areas; or c) slopes exceeding 6 percent within 300 feet of waters.
- Feedlots with 300 to 1000 animal units and is not hiring a certified manure applicator.

Manure Composting
Manure composting will be encouraged in the information and education program. There are several environmental advantages to composting manure. Advantages include: 1) the destruction of pathogens, 2) the conversion of manure to dry material (Manure is spread uniformly as a fertilizer and its nutrient content remains intact. It also reduced the risk of over-applying nutrients.), and, 3) When combined with the separation of liquids and solids, composting reduces the amount of storage needed. With education, technical support and financial assistance manure composting can significantly reduce manure runoff. This strategy can be cost effective with larger facilities where fixed costs can be spread over larger production in watersheds where fecal coliform impairment is high.

Conservation Tillage
Conservation tillage is another cost-effective management practice that can significantly reduce fecal coliform bacterial loading in the GBERB. A balance between immediate incorporation of fecal matter as fertilizer into the soil and the need for surface residue cover for erosion control must be weighed however. The University of Minnesota published a document entitled: “Tillage Best Management Practices for Water Quality Protection in Southeastern Minnesota.” This publication can be used in both promoting conservation tillage and determining the BMP in this implementation phase of the TMDL.

Buffers
The stream/ditch buffer practice is thought to be on of the best controls in the TMDL implementation strategy. Stream buffers will be the last barrier to the stream when the limiting production and manure management techniques fail. Buffers also offer multiple benefits towards water quality.

Buffers can be installed through the existing Conservation Reserve Program (CRP) with a 10-15 year contract. Another new project is the Productive Conservation on Working Lands through Three Rivers RC&D. This program will help assist landowners who desire to grow a new crop or are already growing a new crop. Producers would be eligible for crop establishment payments as well as marketing and research services. In addition landowners growing a long-term perennial woody crop are encouraged to sign up for a 4% interest revolving loan that will cover the expenses of long-term agro-forestry crops.

Long term goals incorporate the Madelia Renewable Energy Project and the Biomass Energy Production System being developed by the Madelia Project and Rural Advantage. Concepts of the projects are to have landowners’ plant alternative crops, especially non-row crops and woody species on riparian and erosion sensitive areas. These crops will then be harvested and processed.

Other
The installation of Best Management Practices is another method of preventing runoff from fields entering directly into surface water. See Table 4.0.

4.2 Feedlots or Manure Stockpiles without Runoff Controls

Feedlots are a significant source of fecal coliform bacterial loading during the wet season or summer. According to the newly revised state feedlot rules through the Open Lot Agreement, feedlots of 300 animal units or less can come into compliance in two phases: 1) reduce feedlot runoff by 50 percent through the use of a standard set of water diversions and filters (roof gutters, clean water diversions, picket fences and grassed buffers), by October 2005; and 2) achieve full compliance with state feedlot rules by October 2010. The 2005 goal has likely not been met, progress has been made but not at the rate to achieve the targeted dates.

Inspection and Enforcement
Strategies of the implementation plan call for determining priorities for feedlot inspection, assistance and enforcement. The following steps are appropriate to achieve reduced loading of fecal coliform bacteria from feedlots:

- Identify priority areas.
- Prioritization and identification of feedlots by proximity to the stream and secondly by magnitude of the loading source.
- Perform financial needs analysis on each identified feedlot to determine the amount of funding needed to bring each feedlot into compliance.
- Identify and coordinate funding sources to address the financial needs as previously determined. Programs such as State Cost-Share and NRCS EQIP will be utilized as funding sources.

Based on a survey of county SWCDs and Environmental offices, the Minnesota Department of Agriculture (MDA) estimates that roughly 34 percent of feedlots need upgrades to meet state regulations (MDA, 2003). In the same report, MDA estimates that approximately four out of every five (79%) of the feedlots needing upgrades need open lot upgrades and the other 21% have other problems not associated with open lot runoff (e.g. unlined manure storage structures). Most feedlots with open lot runoff are from smaller beef, dairy and swine feedlots, with much fewer instances of non-compliance observed for moderate and large sized feedlots (Mulla et al., 2001). (Information from Technical Memorandum – Subject – Final Detailed Assessment of Phosphorus Sources to Minnesota Watersheds – Feedlot Runoff).

These provisions are considered adequate to achieve the 80%+ fecal coliform bacteria loading from feedlots.

4.3 Managed Rotational Grazing

Overgrazed pastures, allowing cattle unrestricted access to steams, and the reduction of pastureland are practices that contribute greatly to fecal coliform loading. Rotational grazing allows cropped pasture grasses to re-grow and as a result, reduces surface runoff and increased incorporation of water and nutrients into the soil.

Well-managed rotational grazing is both economically feasible and environmentally friendly. Rotational grazing as opposed to conventional grazing significantly reduces both sedimentation and fecal coliform concentrations in water downstream.

- Pasture Forage Plant Identification
- Fencing for Livestock
- Livestock Watering Systems
- Planning Rotational Grazing Systems
- Strategies for Maximizing Forage Production

- Pasture Monitoring
- Sensitive Areas Identification and Management

Riparian buffers will be placed in priority areas which were deemed appropriate and/or existing buffers will be increased. Cattle and other livestock will be restricted from streams and fenced in wherever possible. Cattle and other livestock will have to be watered by other means if they are kept out of the streams by fences and the riparian buffers will have to be maintained by spraying to prevent interference with crops. Riparian buffers should reduce runoff proportional to their size and strategic placement. Riparian buffers and rotational grazing have available funding for new projects through NRCS Environmental Quality Incentives Program (EQIP). Additional funding may be needed to supplement EQIP grants.

The NRCS Grazing Specialist will be utilized as a key player and resource as these efforts move forward.

4.4 Septic System Management

Subsurface Sewage Treatment Systems or SSTS with proper drain fields provide nearly complete treatment of fecal coliform bacteria. Acceptable designs are described in Minn. R. ch. 7080. All counties in the Blue Earth River TMDL are responsible to enforce these rules. Failing and non-compliant septic systems are a low contributor of fecal coliform load to the BERB during wet conditions, but are a high contributor of the load during the periods between storms. Properly functioning SSTS and Municipal Wastewater Treatment Facilities provide nearly complete control of fecal coliform bacteria from these sources. Fecal coliform loading from these sources can be reduced in proportion to the faulty SSTS that are fixed.

4.5 Urban Storm Water Runoff

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 BMPs in urban areas. Common techniques and practices include: infiltration basins, grass channels/vegetative swales, detention/retention ponds, urban forests, street sweeping, snow management and catch basin cleaning, among others. Promotion of better site design and BMPSs can be accomplished through education. The Urban Outreach Specialist is working with non MS4 communities in two of the basin member counties to address urban storm water issues, educate elected officials and residents about the importance of storm water management, and promote the use of BMPs and improved site design techniques. There are three MS4 communities in the watershed and they are Fairmont, Mankato and Waseca. These three MS4 communities are regulated under the national pollutant discharge elimination system (NPDES) and are required to have pollution prevention plans for storm water.

4.6 Municipal Sewage Control

Bypass discharges of sewage treatment plants are regulated under the Clean Water Act Phase II Storm Water Program and are the responsibility of MPCA. Many urban areas are experiencing aged and failing sanitary infrastructure, cross connections, and illegal and improper sump pump and downspout connections to the sanitary sewer. This creates inflow and infiltration (I/I) problems. I/I increases the amount of water in the sanitary sewer and contributes to the need for emergency bypass discharges of sewage treatment plants. I/I can be addresses through the replacement of failing infrastructure, fixing cross connections and disconnecting sump pumps and down spouts from the sanitary sewers.

5.0 Implementation Monitoring and Evaluation

Continued bacterial monitoring will be needed in the basin to assess if reductions in fecal contamination are being achieved. Currently there are three types of surface water monitoring projects in the BERB.

Clean Water Partnership Projects

The majority of bacteria monitoring data collected over the past ten years is attributed to the three current Clean Water Partnership (CWP) projects in the basin. The Lilly Center Creek, Maple River and Watonwan River CWP projects were all diagnostic studies that began in 2000/2001. These studies were conducted to determine the sources of surface water pollution and degree of impairment of basin streams. The three projects are all now in a second, "implementation" phase of the CWP program. The projects now focus efforts on implementing best management practices that will improve surface water quality. The projects continue surface water monitoring to assess how BMP implementation is impacting water quality. This monitoring includes fecal coliform bacteria and/or E.coli bacteria. The three basin CWPs are currently funded through 2009. Monitoring after 2009 will be dependant on future funding.

Interagency Water Monitoring Initiative (IWMI)

The IWMI was formed in 1998 with the focus of assessing the water quality of four streams in the BERB and two locations along the Minnesota River. The program was implemented by Metropolitan Council and coordinated along with the Department of Agriculture and the Minnesota Pollution Control Agency. While the IWMI did sample for a wide variety of sample parameters, bacteria was not included because of sample holding time issues. In 2005, Metropolitan Council transferred the monitoring stations to the Water Resources Center at Minnesota State University, Mankato. The WRC plans to begin collecting bacteria samples in 2006 at the four original BERB sites, as well as two new sites. The IWMI is a biannually funded program and as such on a two year work plan. Bacterial monitoring after 2007 will be dependent on available funding.

Minnesota Milestone River Monitoring Program

The Minnesota Milestone River Monitoring Program was implemented to collect water quality data at designated rivers over a long period of time. The data are used to obtain a long term understanding of river health in Minnesota. The program was initiated in 1953 by the Water Pollution Control Commission. In 1967 the Minnesota Pollution Control Agency took over the program which now includes more than 80 monitoring sites. The BERB has three Milestone sites, the Blue Earth River in Mankato, the Watonwan River near Garden City and Center Creek near Fairmont. These sites were established in 1967, 1968 and 1974 respectively. The Milestone Program tests each of Minnesota's ten basins twice in a five-year period. This monitoring is conducted monthly, April through September. Monitoring is scheduled for the BERB in 2006 and 2009. This monitoring includes fecal coliform and/or E.coli bacteria.

As mentioned previously, the majority of bacterial monitoring in the basin is by grant based projects that are funded every two to three years. It is important that these projects maintain funding so that effectiveness monitoring continues into the future.

The leadership of the implementation will be sponsored by the Greater Blue Earth River Basin Alliance Policy and Executive Committees. They will have the responsibility to direct the Alliance Administrative and Technical Coordinators. The plan implementation will be accomplished through the daily oversight by the Coordinators and formally through the monthly Alliance Policy or Executive Committee meetings and the monthly Technical Committee meetings. Our partners consisting of Soil and Water Conservation Districts, County Commissioners, County and SWCD staff, Board of Water and Soil Resources, Department of Natural Resources, Water Resource Center – MSU, Rural Advantage, and Minnesota Pollution Control Agency will be kept informed through the monthly Technical and Administrative meetings.

Best Management Practices Operation and Maintenance Plan: Each practice will have a program dictated life span and will be monitored by their respective agency or local unit of government. The Conservation Reserve Program will be monitored and reported by the Farm Service Agency. The Environmental Quality Incentives Program will be monitored by the Natural Resources Conservation Service. State cost-share program projects and state easements will be inspected and reported by the local Soil and Water Conservation Districts. Individual Sewage Treatment Systems will be inspected and reported by the County.

Local residents and landowners are also responsible for the maintenance of projects that are located on their property. Spots checks are a component of all cost-shared projects.

Quality Assurance: The Greater Blue Earth River Basin Alliance through their participating counties will assure the quality of all management practices by adhering to all state and federal rules and guidelines for SSTS, feedlots, municipal wastewater treatment systems, manure management plans, storm water management plans, rotational grazing systems, livestock exclusion systems, and riparian buffer strips. The University of Minnesota has the guidelines for conservation tillage.

Inspection and enforcement of management measures put in place are important. The Greater Blue Earth River Implementation will include measures to ensure that the environment strategies put in place are effective in reducing fecal coliform bacterial loading in the Greater Blue Earth River Basin.

6.0 Summary of Practices and Costs

To achieve the fecal coliform reductions needed, a 15 year time frame was chosen. The 15 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.

Implementation Category	Implementation Practice	Implementation Partners	Staff/ C-S/Loan Needed Over 15 Years	Staff/ C-S/Loan Needed Per Year	Comments
4.1 Manure Management	Nutrient Management Loan Funds Buffer Strips Best Management Practices Education & Research	Landowners Counties and SWCDs Natural Resources Conservation Service MN Pollution Control Agency MN Department of Agriculture	$34 Million in Ag BMP Loans $2.7 Million in Cost-Share for BMPs **Staff $4.05 Million County Feedlot .5 FTE	$2.25 Million in AgBMP Loans $180,000 In Cost-Share for BMPs **Staff $270,000 County Feedlot .5 FTE	Loan funding through the State Revolving Loan Funds for tillage and manure handling equipment Cost-Share funding .5 FTE staff needed in each County. .5 = $30,000
4.2 Feedlot or Manure Stockpiles (Without Runoff Controls)	Upgrade Feedlots Education & Research	Feedlot Owners Counties and SWCDs Natural Resources Conservation Service MN Pollution Control Agency	$3.25 Million Cost-share Labor Costs $83,000 for County/SWCD Employees	$220,000 Cost-Share at 75% Labor Costs $5,760.00	130 feedlots basin wide upgrades at an average of $25,000 9 feedlots per year 130 completed in 15 years Labor 16 hrs per site
4.3 Managed Rotational Grazing	Rotational Grazing Education & Research	Landowners Natural Resources Conservation Service	***Staff	***Staff	Staff time for 15 years

4.4 Septic System Management	County ISTS Programs Loan Funds Education & Research	Homeowners Counties and SWCDs Cities and Municipalities MN Pollution Control Agency MN Department of Agriculture	$59 Million in Loans Labor Costs $2.36 Million County Employees	$3.93 million in Loans Labor Costs $157,000	5,900 straight pipe systems to be updated. Need to upgrade 393 per year to complete in 15 years Labor 10 hrs per site
4.5 Urban Storm Water Runoff and Municipal Sewage Control	BMPs Site Design Education & Research	Residents SWCDs Cities and Municipalities MN Pollution Control Agency	1.15 Million Cost-Share Labor Costs $1.35 Million	$76,500 BMP Cost-Share Labor Costs $90,000 2 FTE	$1,500 per 51 communities (Non MS4)
TOTAL	LOANS		$93 Million	$6.2 Million	
TOTAL	COST-SHARE		$7.1 Million	$.476 Million	
TOTAL	LABOR		$7.84 Million	$.523 Million	
GRAND TOTAL Total funding needed to achieve goal			$107.9 Million	$7.2 Million	

******Adequate guidelines and ordinances appear to be in place in each county for manure management. A shortage of staff to provide the needed over site in this area is seen as the critical shortfall in the delivery system. A staff position of .5 FTE is needed in each county to work with livestock producers on a regular basis to ensure manure plan compliance.

*******With the addition of the .5 FTE Feedlot position in each county, the additional staff will work with producers to promote Rotational Grazing. This will help to connect the grazers with the NRCS Grazing Specialist.

7.0 Summary of Monitoring and Evaluation

Category	Activity	Activity Partners	C-S/Loan Needed For 15 Years	C-S/Loan Needed Per Year	Comments
Program Evaluation	E-Link Reporting E-Link Reporting	GBERBA County/SWCD MPCA BWSR Partners	$450,000 Staff	$30,000 .5 FTE Staff	15 years
Water Quality Monitoring	Collect, analyze and report water quality	MPCA	$75,000	$15,000	Water quality monitoring through testing
GRAND TOTAL			**$525,000**	**$45,000**	