Appendix J - Stormwater

Stormwater Section - Blue Earth County Water Management Plan

Concerns about stormwater

Development Patterns

Responsibility for Stormwater Management

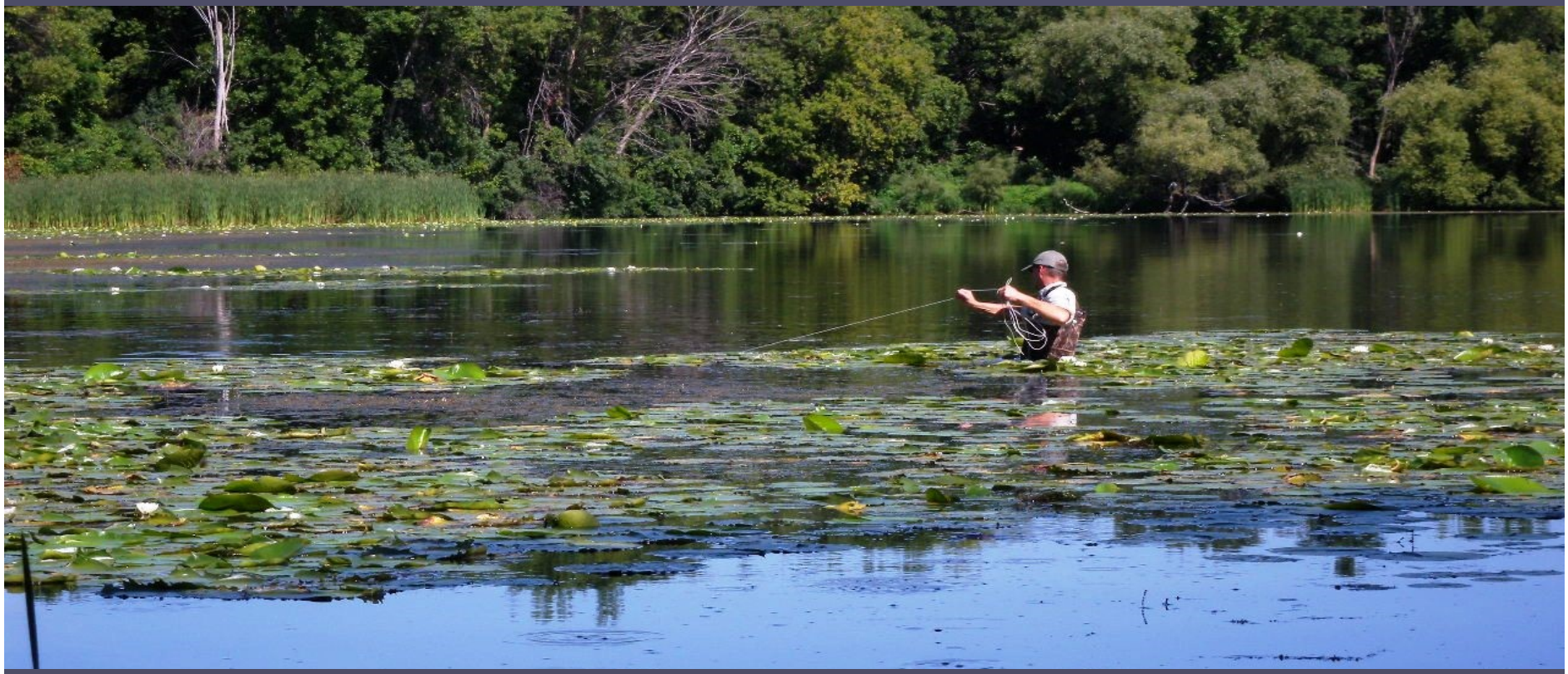
Priority Areas

- Lake watersheds
- Ravines, steep slopes, rivers and streams
- Regulated urban areas

Stormwater Management Challenges and Needs

Stormwater Management Goals and Strategies

Blue Earth County Water Management Plan 2017-2026
Stormwater Section



Appendix J — Stormwater
Blue Earth County Land Use Plan

Stormwater Management

Developed land and its effect on stormwater runoff and management is a concern both within and outside of municipalities in the county. Concerns about the potential adverse effects of stormwater runoff on water quality include altered hydrology, pollutants in runoff and construction site runoff.

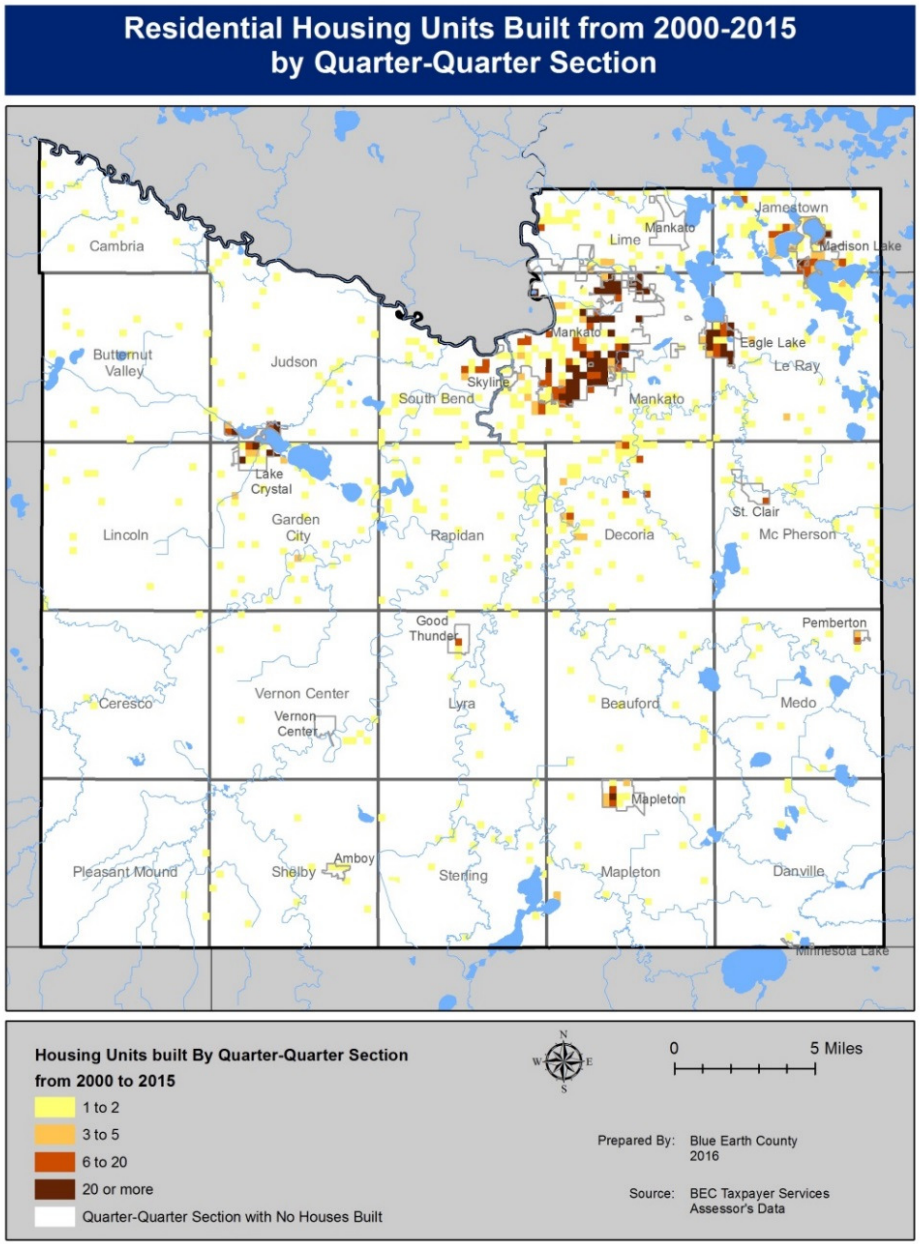
Altered hydrology. Impervious surfaces, site grading and drainage can alter hydrology, increase runoff and cause erosion and flooding. Increased runoff is usually collected and channelized into ditches, drainage ways, storm sewers and road gutters designed to quickly move water away from developed areas.

Pollutants. Stormwater runoff carries with it fine sediment and pollutants from paved surfaces and lawns, such as nitrogen, phosphorus, bacteria, oil, pesticides and metals and sands or salts used on icy roads.

Construction Site Runoff. When stormwater drains off a construction site, it carries sediment, phosphorus and other pollutants that harm lakes, streams and wetlands. The U.S. Environmental Protection Agency estimates that 20 to 150 tons of soil per acre is lost every year to stormwater runoff from construction sites.

Development Patterns

Most new development in the county is occurring in municipalities. Outside of municipalities, the most attractive areas for development are in sensitive areas near ravines, rivers, streams, lakes and wetlands. The map to the right displays new construction density in quarter-quarter sections (40 acres) between 2000 and 2015.



Responsibility for Stormwater Management

Local government units are responsible for regulating stormwater management to protect water quality and prevent flooding and damage to infrastructure from stormwater. Through regulation of stormwater, erosion and sedimentation, communities can enhance and protect water resources. Subdivision and zoning ordinances and local permitting are examples of regulations to manage stormwater.

The County's and many local jurisdictions' stormwater regulations were adopted when awareness of stormwater management for water quality was just beginning 20 years ago. For example, the County Land Use Plan, adopted in 1998, states "To minimize negative impacts from storm water runoff, the County will enact development standards for stormwater management to insure no net increase in runoff."

Updating local regulations may be needed to address priorities for managing stormwater for water quality, potential flooding and erosion and sedimentation.

Priority Areas

Priorities for stormwater management are in areas of the county prone to erosion and runoff due to slope and soil drainage characteristics, lake watersheds and regulated, urbanized areas.

Lake watersheds

In addition to managing water quality volume of stormwater runoff rate and volume to reduce erosion and sedimentation, managing stormwater runoff to reduce phosphorus is needed throughout lake watersheds.

Lake shoreland development is greatest around Madison, Duck, Ballantyne, George, Crystal and Loon. Ensuring there is effective stormwater management in lake watersheds in the county is mainly the responsibility of Blue Earth County, the City of Madison Lake and the City of Lake Crystal.

In many residential areas of these lakes, the shore and bluff impact zones have impervious surface connections to the lake that transport fine sediment, nutrients and other pollutants. Natural vegetation in most shoreland areas of these lakes has been converted to impervious surfaces and mowed lawns resulting in less filtration and infiltration and loss of critical habitat. Shoreland vegetation protects the lake from the effects of polluted runoff, stabilizes the soil along the lake's edge, and provides habitat, shelter, food, and cooling shade for fish.

The sources of phosphorus and sediment in these lakes do include agricultural sources as the watershed area contains significant cropland. The impact of stormwater runoff from residential land use should not be ignored in watershed restoration. The Minnesota Stormwater Manual states that "Urban and urbanizing lakes receive higher phosphorus loads than non-urban lakes because urban watersheds, particularly those under construction, produce higher unit area phosphorus loads from stormwater runoff, compared to other watersheds."

Ravines, steep slopes, rivers and streams

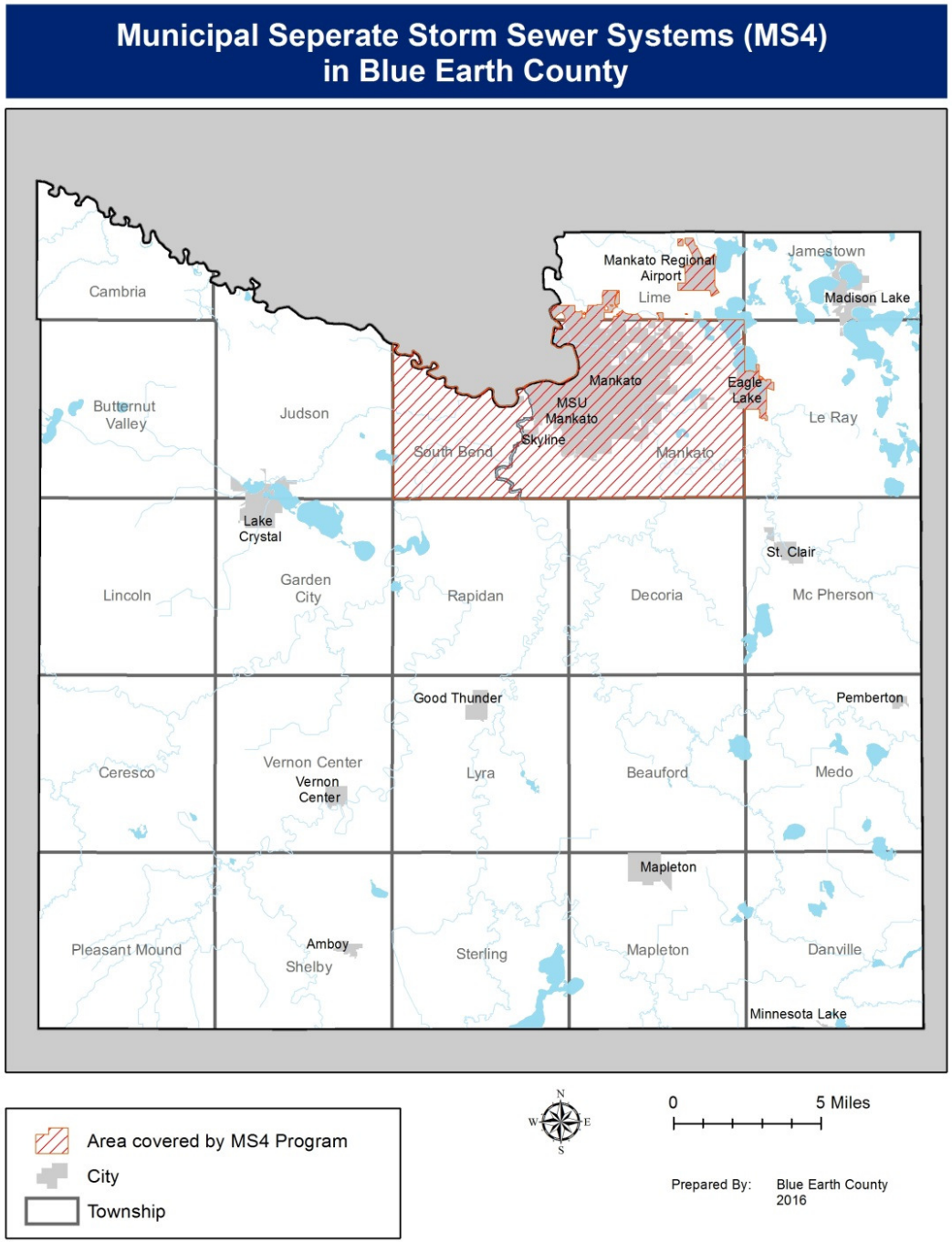
Ravines and river and stream corridors are prone to near channel erosion yet continue to be attractive for residential development. Altered hydrology and erosion in ravine watersheds in the county is a significant source of sediment in the Blue Earth, Le Sueur, Middle Minnesota River watersheds. A County GIS analysis of ravine erosion shows there are more than 300 ravines where there was more than five feet of erosion between 2005 and 2012. Ravine and near channel erosion are assessed in more detail in the Near Channel Erosion section of this plan.

Regulated Urbanized Areas
MS4 - Municipal Separate Storm Sewer System

Prior to 2016, the only MS4 jurisdiction in the county was the City of Mankato. The MPCA added to the Mankato MS4 the City of Eagle Lake, City of Skyline, Mankato Township, South Bend Township and Minnesota State University Mankato.

The jurisdictions in the county with regulated Municipal Separate Storm Sewer Systems (MS4) are shown on the map to the right and include the following:

MS4	Watersheds
City of Mankato Mankato Regional Airport	Middle Minnesota Blue Earth Le Sueur
Mankato Township	Middle Minnesota Blue Earth Le Sueur
City of Eagle Lake	Le Sueur
City of Skyline	Blue Earth Middle Minnesota
South Bend Township	Blue Earth Middle Minnesota
Minnesota State University Mankato	Indian Creek Middle Minnesota



Mankato Area Regional MS4 Stormwater Management Association

An MS4 management association was forming in 2016 for the purpose of meeting the requirements and goals of the NPDES MS4 Permit in an efficient and effective manner with consistent

implementation and regulations across participating agency boundaries. The members of the association include:

- City of Mankato
- Blue Earth County
- Mankato Township
- South Bend Township
- Minnesota State University Mankato
- MNDOT District 7
- Nicollet County

Other public entities which may benefit from collaborative partnerships that may result in improved services or cost savings to the residents of the region are encouraged to participate in the Association as nonvoting members.

The association will be contracting much of the work from the City of Mankato.

MS4 Description and Purpose

A municipal separate storm sewer system (MS4) is a conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, storm drains, etc.) that is also:

- owned or operated by a public entity (which can include cities, townships, counties, highway departments, universities, etc.) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes
- designed or used for collecting or conveying stormwater;
- which is not a combined sewer; and
- which is not part of a publicly owned treatment works.

The primary goal of the MS4 general permit is to improve water quality by reducing pollutants in stormwater discharges. Specifically, the program aims to ensure proper management of stormwater discharges into waters of the state.

MS4 Regulation

Stormwater discharges associated with MS4s are subject to regulation under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS). Through the MS4 General Permit, the system owner or operator is required to develop a stormwater pollution prevention program (SWPPP) that incorporates best management practices (BMPs) applicable to their MS4. The MS4 general permit is a requirement, but also a tool in the hands of city, township and county officials who want to improve the quality of lakes and rivers that receive their stormwater discharges.

Stormwater Pollution Prevention Plan (SWPPP)

Pollution prevention is a “front-end” method to decrease costs, risks, and environmental concerns. In contrast to managing pollution after it is created, pollution prevention reduces or eliminates pollutants and wastes at its source.

The NPDES/SDS General MS4 Permit requires each regulated MS4 to develop, implement and enforce a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must be designed and managed to reduce the discharge of pollutants from storm sewer systems to the maximum extent practicable (MEP). As part of the SWPPP, an MS4 must define best management practices (BMPs) appropriate for its community that address the following six Minimum Control Measures (MCM):

MCM 1 - Public Education and Outreach
MCM 2 - Public Participation/Involvement
MCM 3 - Illicit Discharge Detection and Elimination
MCM 4 - Construction Site Stormwater Runoff Control
MCM 5 - Post-construction Stormwater Runoff Control
MCM 6 - Pollution Prevention/Good Housekeeping for Municipal Operations

The MS4 Minimum Control Measures for pollution prevention are many of the same strategies identified in State plans for sediment and nutrient reduction statewide and in local watersheds.

MS4 – SWPPP - Impaired waters and TMDLs

MS4 Permittees with assigned Waste Load Allocations (WLA) as part of a Total Maximum Daily Load (TMDL) project approved by US EPA prior to the effective date of the latest Permit reissuance must address additional information in their Stormwater Pollution Prevention Program (SWPPP). Permittees must develop a compliance schedule that outlines interim milestones it will achieve during the permit term, strategies for continued implementation beyond the permit term, and target dates to achieve the applicable WLAs.

TMDLs

In 2016 there were two TMDLs approved by the US EPA in the MS4 area: Lower MN DO and the GBE Fecal TMDL. The Greater Blue Earth River Fecal Coliform TMDL includes urban stormwater strategies but no WLA or goals for municipal sources.

New TMDLs - New TMDLs are expected during the ten-year planning period.

Sediment – The MPCA Minnesota River Turbidity TMDL Project was drafted and awaiting approval.

The Le Sueur WRAPS does not contain goals for MS4 permittees but does include goals for non-point source city/residential contributions and stormwater.

River Eutrophication - In 2016 MPCA River Eutrophication Standards were proposed. The draft River Eutrophication standards show the lower reaches of the Le Sueur, Blue Earth and the Minnesota River upstream of the Blue Earth River are impaired.

Nitrogen - In 2016 the MPCA nitrogen standards were still in development. The Blue Earth, Le Sueur and Middle Minnesota River watersheds rank in the top four contributing watersheds for nitrogen in the Minnesota River Basin.

MS4 – Nonpoint Source Pollution

Nonpoint sources of nutrients, erosion and sediment within and draining to Mankato Township and South Bend Township MS4 jurisdictions are a concern. Nonpoint sources of pollution are expected to be the major source of pollution in these MS4 jurisdictions since future development is currently restricted by orderly annexation agreements and the Urban Fringe Overlay District.

Stormwater Challenges and Needs

Soils

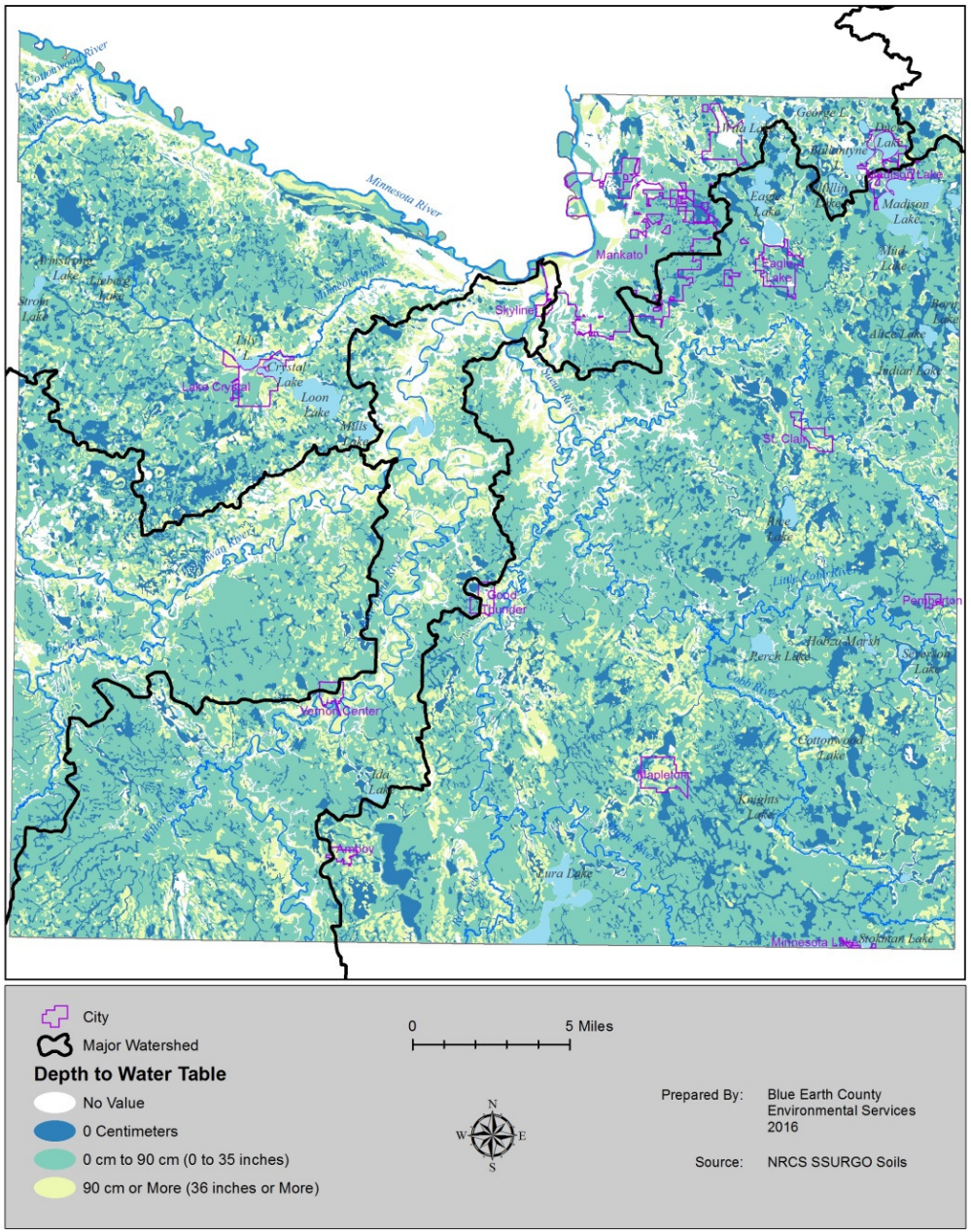
Soil permeability, high water tables, hydrologic soil groups. Most of the soils in developing areas of the county are poorly-drained or very poorly-drained and have a depth to water table less than 36 inches. Hydrologic Group D soils do not absorb as much water and have a high run-off potential, and have a layer of high clay content near the surface or are shallow soils over bedrock or other material which does not absorb water. Limited infiltration presents a challenge for managing stormwater. These soil conditions are poorly suited for stormwater infiltration practices like rain gardens.

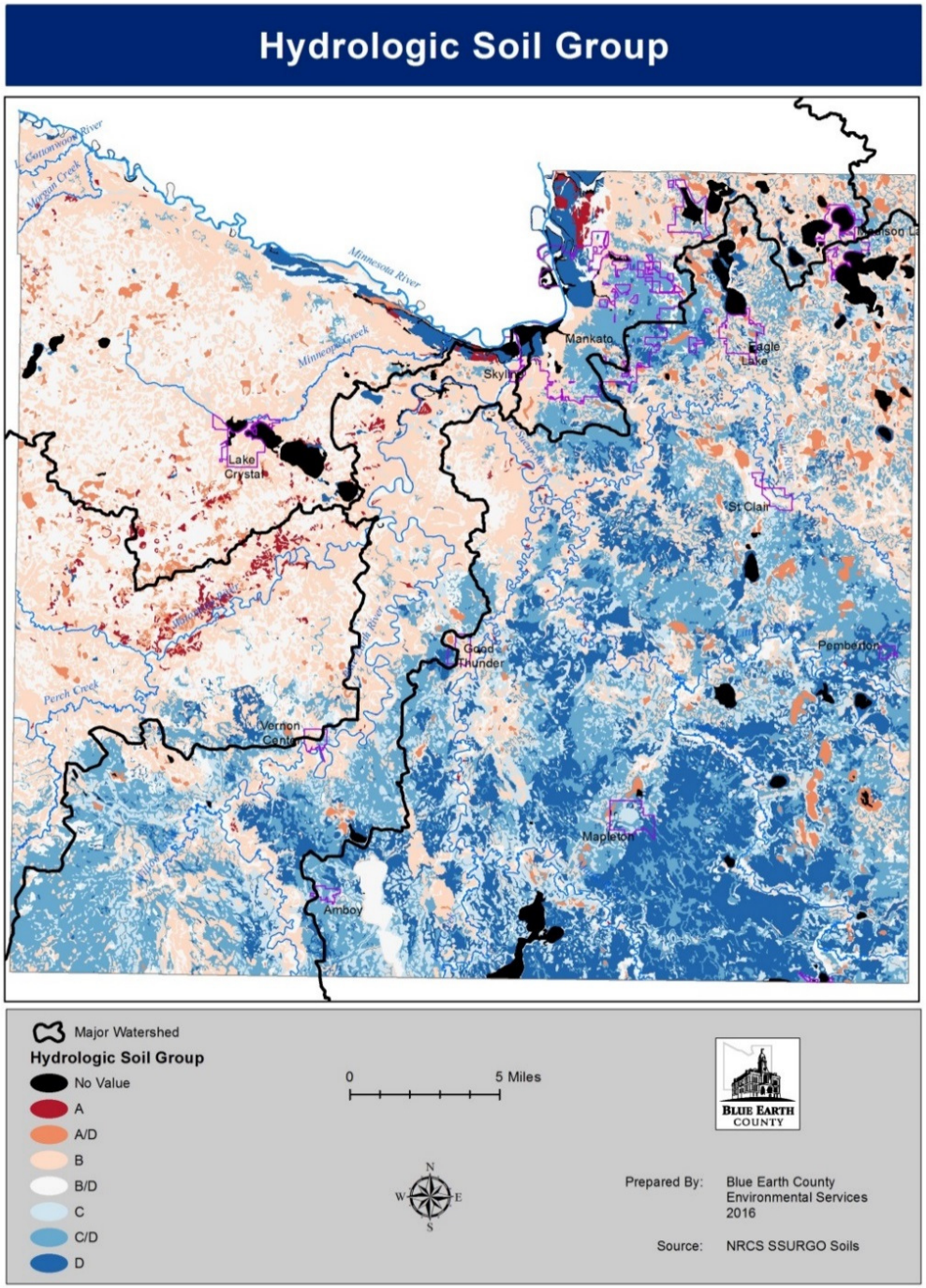
Maps on this page and the following page display depth to water table and hydrologic soil groups in the county, according to the USDA Soil Survey.

Highly Erodible Land

Development near ravines, rivers, streams and some lakes is located on or near highly erodible land or potentially highly erodible land. The USGS *Landslide Overview Map of the Conterminous United States* shows that the river corridors and ravines in the county have a medium susceptibility but low incidence of landslides but are more susceptible to landslides than most parts of the state.

Depth to Water Table





Local Stormwater Management Needs

To effectively address stormwater management for water quality purposes, technical staff, regulations, education and training will be needed. The following is a summary of local stormwater needs.

Construction Sites

Development that disturbs less than one acre is exempt from MPCA NPDES Construction General Permit requirements. There are many sites in the county that do not meet this threshold but where development is occurring in sensitive areas where bare soil or new site grading greatly increase runoff and erosion, especially during the construction phase but may continue post construction.

Compliance with MPCA NPDES Construction General Permit requirements in the county is spotty. The MPCA does not review the SWPPP required for the permit nor does the MPCA typically conduct inspections in this area.

There are ongoing problems at many construction sites outside of the City of Mankato, regardless of whether the owners/contractors have MPCA NPDES permits and a SWPPP. Encroachment on wetlands, shoreland and bluff impact zones are ongoing problems. This concern may be better addressed at the local level with county or township level stormwater ordinances or standards.

Erosion and Sediment Control Training

Construction contractors need training on erosion and sediment control practices as well as regulations. Training programs may vary from formal classroom settings to independent study and testing, to hands-on site work experience.

Training Topics

The following list of regulatory and BMP training topics is from the MPCA Pollution Prevention and the MS4 Program.

- NPDES requirements and the MPCA's permit process

- Permanent and temporary erosion and sediment control BMPs
- Site phasing
- Construction entrances
- Protecting natural vegetation and undisturbed areas
- Low impact development
- Temporary diversions
- Sediment retention basins
- Dewatering
- Perimeter control
- Stockpile protection
- Surface roughening and slope tracking
- Minimize slopes
- Storm drain inlet protection
- Outlet protection
- Temporary and permanent stabilization
- Specific BMPs related to working near or around water

Education

Watershed management techniques rely on stewardship and cooperation of all individuals in watersheds to reduce phosphorus and other pollutants running off or discharging to the lake, rivers, streams and wetlands. Frequently, individuals are unaware that their activities are causing water problems. They may be quite willing to take corrective action if they understand what to do and why.

The Crystal Waters Project has worked to educate and engage citizens with a website, newsletter and community events promoting best practices in the city and shoreland areas. The Crystal Waters Project continues to work reestablishing vegetation in shoreland areas like Robinson Park (Plant the Park) and leaf- raking events in Lake Crystal.

Local units of government also need periodic education about stormwater management. Training and information about shoreland ordinances and stormwater management for elected and local officials from the City of Lake Crystal, City of Madison Lake and Blue Earth County are a priority.

Retrofits

In developed areas of the county, retrofits are needed in some watersheds. While rain gardens and other infiltration practices have limited application in the county due to soil characteristics, there are areas in some lake watersheds where soils are suitable. For example, the Madison Lake Association worked to establish a large rain garden for intercepting and treating a portion of the city's stormwater with a direct discharge to the lake.

Retrofitting can be used to achieve highly effective stormwater management that reduces runoff volume, increases ground water recharge, improves surface water quality and helps mimic pre-development hydrology. Retrofits such as rain gardens and swales are versatile because they can be constructed in small areas and easily integrated into existing residential and commercial sites.

Retrofitting is a way to rehabilitate watersheds that have a significant amount of imperviousness and little stormwater treatment. When properly designed, constructed, and maintained, BMP retrofits can increase the aesthetics of an area by providing green space and/or stormwater educational opportunities. Retrofitting has the potential to protect resources that may be experiencing increased pressure from other areas of the watershed. Stormwater retrofits are generally employed to:

- fix past mistakes and maintenance problems;
- solve chronic flooding problems;
- serve as stormwater demonstration and education opportunities;
- trap trash and floatables;
- reduce runoff volumes to combined sewers;
- restore stream corridors;
- reduce specific pollutants;
- reduce downstream channel erosion;
- support stream restoration efforts; and/or
- recharge shallow ground water.

Retrofit programs can be effectively implemented on both public and private properties. Municipally driven projects can be used as examples to encourage private landowner participation.

The following list of retrofit BMPs are examples categorized based on the likely application of each. Individual project constraints will dictate which BMP is the most appropriate in a given situation. Descriptions of these practices and design recommendations can be found in the Minnesota Stormwater Manual.

- **Intensive land use retrofit BMPs**
  - Cisterns
  - Stormwater tree pits
  - Permeable pavers
  - Underground sand filters
  - Impervious cover conversion
  - Stormwater planter
  - Sub-grade storage/infiltration
- **Residential retrofit BMPs**
  - Pond (new or alteration of existing system)
  - French drains
  - Rain barrels
  - Rain gardens
  - Small and large bioretention
  - Water quality swale
  - Structural sand filter

Retrofit BMP maintenance considerations can be substantial, vary considerably based on the type of practice installed, and are paramount to the short and long term success of the BMP function.

Priority Areas for Retrofits

Stormwater retrofits are a priority for addressing water quality in Madison Lake and Lake Crystal watersheds and developed shorelands of all lakes. Stormwater retrofits for water storage is a priority in most municipalities in the county.

Wetlands

Wetlands provide water storage functions that are important in developing watersheds. Stormwater runoff and sedimentation decreases the wetland storage capacity and impacts wetlands habitat functions. Encroachment on wetlands during and after development is an ongoing problem in the county. Buffers and buffer ordinances are needed to protect wetlands in developed areas to ensure wetlands continue to provide important water storage functions.

Stormwater staff

Trained stormwater or water quality staff is needed to review development applications (i.e. certified professionals in stormwater quality, SWCD staff, professional engineers trained in Minimum Impact Development Standards,).

During the ten year planning period, there may be opportunities to develop coordination with the Mankato Regional Mankato Area Regional MS4 Stormwater Management Association to review development applications outside of the MS4.

Stormwater Management System Maintenance and Inspections

Outside of municipalities most stormwater ponds and retention basins platted in subdivisions are located on private property. Long term maintenance of these basins is problematic as there is little if any maintenance or oversight to ensure the ponds function as designed over time. Common problems are ponds and basins filling with sediment due to lack of maintenance, encroachment on wetlands and stormwater retention sites with structures, or removal of vegetation.

Stormwater Standards and Ordinances

There is need and interest among some jurisdictions in the county to update ordinance requirements to manage the rate and volume of stormwater discharge, channel protection sizing, accounting for all drainage in the watershed where development is proposed, nutrient

reduction in lake watersheds and other management and maintenance needs to address bluff protection.

Often a combination of ordinances and education is needed to positively change land management practices. These ordinances or regulations set minimum standards for land and water protection. Ordinances may include:

- Erosion and sediment control
- Stormwater management
- Open space
- Vegetated buffers
- Shoreland setbacks
- Bluff setbacks
- Limitations on the use of phosphorus in fertilizers

Sample ordinances for Minimum Impact Development (MID), Low Impact Development (LID) and Better Site Design are available to assist local governments in the county update stormwater ordinances.

During the ten-year planning period, there may be opportunities for coordination among small communities to update stormwater regulations. There may also be opportunities for coordination with the Mankato Regional Mankato Area Regional MS4 Stormwater Management Association to adopt or modify ordinances used by the City of Mankato to regulate and control erosion and sediment as listed in the Mankato regional MS4 agreement:

- Erosion and Sediment Control Ordinance
- Grading Manual
- Land Disturbance Permit Application
- Storm Water System
- Nuisance Abatement

Stormwater Management Goals and Strategies

Goal: Ensure community resilience with stormwater management systems that effectively provide flood water and stormwater attenuation to prevent flooding and protect water quality.

Education and Training Strategies

STRATEGY: PUBLIC EDUCATION AND TRAINING.

Action: Support lake associations and the City of Lake Crystal and City of Madison Lake's education efforts to reduce illicit discharge, manage yard waste and lawn chemicals and to restore shoreland vegetation to filter pollutants and provide critical habitat.

MS4 Action: Mankato Area Regional MS4 Stormwater Management Association will conduct annual stormwater meetings, maintain a website, and consider public input.

STRATEGY: CONTRACTOR TRAINING.

Action: Support contractor training in coordination with the Mankato Area Regional MS4 Stormwater Management Association, City of Lake Crystal, City of Madison Lake and other jurisdictions.

Potential Training Topics

Source: Pollution Prevention and the MS4 Program

- NPDES requirements and the MPCA's permit process
- Permanent and temporary erosion and sediment control BMPs.
- Site phasing
- Construction entrances
- Protecting natural vegetation and undisturbed areas
- Low impact development
- Temporary diversions
- Sediment retention basins
- Dewatering
- Perimeter control
- Stockpile protection
- Surface roughening and slope tracking
- Minimize slopes
- Storm drain inlet protection
- Outlet protection
- Temporary and permanent stabilization
- Specific BMPs related to working near or around water

STRATEGY: TRAINING LOCAL OFFICIALS.

Action: The County will partner with local municipalities to conduct periodic training on shoreland and stormwater management for elected and appointed officials and staff.

Priority Jurisdictions: City of Madison Lake, City of Lake Crystal, Blue Earth County.

Action: Interested local officials will participate in the MS4 Mankato Area Regional MS4 Stormwater Management Association meetings.

MS4 Action: The MS4 Mankato Area Regional MS4 Stormwater Management Association will train local staff on illicit discharge.

Land Use Management and Local Controls

STRATEGY: LAND USE PLAN.

Policy: Ensure community resilience with stormwater management programs, better site design and projects that protect communities from flooding, flash flooding and protect water quality.

County Land Use Plan Action: "To minimize negative impacts from storm water runoff, the County will enact development standards for stormwater management to insure no net increase in runoff."

STRATEGY: LAND USE AND STORMWATER POLICIES AND ORDINANCES.
Action: Work with multiple jurisdictions to evaluate existing and potential stormwater ordinances and policies and determine if uniform approaches are desired to develop or administer local stormwater regulations, such as

- Erosion and sediment control – Grading and Construction
- Stormwater management
- LID, MIDS, Green Infrastructure, Better Site Design Ordinances and Standards
- Open space
- Vegetated buffers
- Shoreland setbacks
- Bluff setbacks
- Limitations on the use of phosphorus in fertilizers

Action: Research existing stormwater guidance and regulations in Minnesota.

Action: Prepare and adopt changes to policies and ordinances in participating jurisdictions to help ensure that stormwater and its pollutants do not negatively impact surface waters.

Action: Seek funds for interested local communities and watersheds to develop ordinances and policies for stormwater management.

Action: Develop local funding mechanisms and seek funds to establish technical staff positions and/or services to implement stormwater ordinances and standards.

MS4 Action: To implement the SWPPP in accordance with the regional MS4 agreement, the County will develop additional ordinances and documents necessary to support the MS4 program. The County may also choose to adopt or slightly modify the following Mankato ordinances and programs:

- Erosion and Sediment Control Ordinance
- Grading Manual
- Land Disturbance Permit Application
- Storm Water System
- Nuisance Abatement

Erosion Control Strategies

Large amounts of soil can be eroded from unprotected construction sites, more than 20 tons per acre according to the MPCA website and EPA. Construction site erosion is regulated by the MPCA for disturbances more than one acre or part of the common plan of development. Many construction sites in the county impact less than one acre.

STRATEGY: CONSTRUCTION SITE EROSION.
Action: The County will continue to require site owners/contractors obtain required MPCA construction stormwater permits.

MS4 Action: The MS4s will review sites plans and conduct construction site inspections.

Stormwater Management Approaches

STRATEGY: GREENPRINT - GREEN INFRASTRUCTURE.
Green infrastructure consists of an interconnected network of open spaces and natural areas (such as forested areas, floodplains and wetlands) that improve water quality while providing recreational opportunities, wildlife habitat, and other community benefits. At the site scale, green infrastructure consists of site-specific management practices (such as interconnected natural areas) that are designed to maintain natural hydrologic functions by absorbing and infiltrating precipitation where it falls. Additional information on green infrastructure is available on EPA's Managing Wet Weather with Green Infrastructure website. (Source: EPA)

Action: Seek funds and develop local funding mechanisms to design and implement green infrastructure practices with interconnected wetlands, water storage, vegetated swales and buffers, trails, parks and open space to protect water quality and prevent pollution.

Priority Areas: Indian Creek Watershed, Eagle Lake Watershed, Madison Lake Watershed, Lake Crystal watershed, Greenprint priority corridors and wetland complexes. Other municipalities may be interested during the planning period.

Stormwater Management System Strategies

STRATEGY: EXISTING STORMWATER RETENTION BASINS.

Maintenance of stormwater management systems is critical to their functioning as designed to protect water quality and prevent erosion and flooding. There are many stormwater retention basins on private property in older subdivisions and development in unincorporated areas that have never been inspected.

Action: The County will conduct an inventory and assessment of stormwater retention systems on privately-owned land outside of MS4 jurisdictions and develop means for inspecting these systems.

MS4 Action: Mankato Area Regional MS4 Stormwater Management Association members and other MS4s will inspect structural pollution control devices annually and ponds and outfalls within the permit cycle.

STRATEGY: STORMWATER RETROFITS.

Action: Support stormwater retrofits in areas with residential and urban development where water storage, flow attenuation, flood water storage or nutrient treatment functions are needed for water quality or to prevent flooding or erosion downstream.

Priority Areas and Watersheds: Stormwater retrofits are a priority for addressing water quality in Madison Lake, Duck Lake, Lake Ballantyne and Lake Crystal watersheds and developed shorelands of all lakes in the county. Stormwater retrofits for stormwater retention and floodwater attenuation is a priority in all municipalities in the county.

STRATEGY: CONSTRUCTED WETLANDS AND WATER QUALITY TREATMENT WETLANDS.

Action: Constructed wetlands, stormwater wetlands or water quality treatment wetlands should be considered in watersheds where water storage, flow attenuation, flood water storage or nutrient treatment functions are needed to address water quality concerns or to prevent flooding or erosion downstream.

Priority Areas and Watersheds: Constructed wetlands, stormwater wetlands and water quality treatment wetlands are a priority for addressing water quality in Madison Lake, Duck Lake, Lake Ballantyne and Lake Crystal watersheds. Constructed wetlands, stormwater wetlands and water quality treatment wetlands are a priority for stormwater retention and floodwater attenuation functions Indian Creek watershed, Le Sueur River watershed, Blue Earth River watershed and Middle Minnesota River watershed in Mankato, Eagle Lake, Madison Lake and all municipalities and townships in the county and where there is flooding or downstream erosion due to increased precipitation and loss of water storage in the watershed. (see Flooding and Near Channel Erosion sections of this plan.)