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*2010 – 2020  
Goodhue County  
Comprehensive Local Water Management  
Plan*



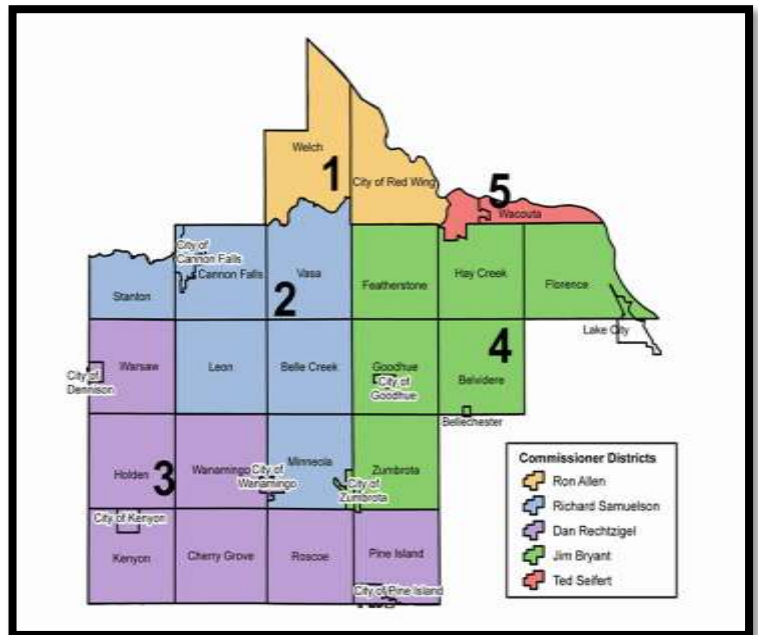
*-2010 to 2020 Water Plan Revision Prepared by Goodhue County Soil and Water Conservation District along with the Goodhue County Water Plan Advisory Committee Members-*

*Please Contact with Questions:*

Goodhue SWCD  
PO Box 335, Goodhue, MN 55027  
**651-923-5286 ext.4**

**Goodhue County Board of Commissioners**

Dan Rehtzigel, Richard Samuelson, Ted Seifert, Ron Allen, Jim Bryant\*



**Water Plan Advisory Committee**

Don Banks Goodhue SWCD Supervisor  
 Dan Bauer Appointed by Commissioner  
 Wally Gardiner Appointed by Commissioner  
 Jeff Tipton Appointed by Commissioner  
 Richard Ellingsberg Appointed by Commissioner  
 Mark Hinrichs Appointed by Commissioner  
 David Betcher Appointed by Commissioner  
 Nathan Keech Appointed by Commissioner  
 Cannon River Watershed Partnership

Zumbro River Watershed Partnership  
 Belle Creek Watershed District  
 Bear Valley Watershed District  
 Jim Bryant County Commissioner  
 Marc Mogan Prairie Island Indian Community  
 Richard Bauer Zumbrota Mayor  
 Michael Wozniak Goodhue Co. Planning/Zoning  
 Paul Drotos City of Red Wing  
 Beau Kennedy Goodhue SWCD

**Water Plan Technical Committee**

Beau Kennedy Goodhue SWCD  
 Thomas Steger NRCS  
 Mike Ahlrichs FSA  
 Willie Root County Public Works  
 Glen Roberson Goodhue SWCD  
 Jason Peterson Goodhue Co. Environmental Health

Paul Drotos City of Red Wing  
 Scot Johnson MNDNR  
 Michelle Schaefers BWSR  
 Justin Watkins MPCA  
 Lisa Hanni Goodhue County Land Use  
 Josh Finesgard Co. Feedlot Officer

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# Executive Summary

## Background of Water Plan Process

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Goodhue County is located in Southeastern Minnesota, approximately 40 miles southeast of the Twin Cities and 60 miles northwest of Winona. The county seat is located in Red Wing which is the largest city in the County of Goodhue with a population of 15,703. Surrounding counties include; Dakota County to the north, Wabasha County to the south and east, Dodge and Olmsted Counties to the south, and Rice County to the west. The county has an area of 438,454 acres of rural land with an average of 23 people per square mile.

This Water Plan update is Goodhue County's 4<sup>th</sup> revision of the original document. The original Goodhue County Comprehensive Local Water Plan was adopted in 1990 after a three year planning process. In 1995 the first revision of the Water Plan was completed. Then in 2005 the Water Plan was revised again. The 2005 to 2010 plan was a working document with many action items being accomplished. The 2005 revision was designed to be a 5 year plan. The revisions were built off the original 1990 plan; learning from its successes and failures. Through informational public meetings with citizens of the county and local officials, a list of water quality concerns were developed. The summary of this process is located in the appendix of this document.

## Plan Purpose:

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The purpose of the Local Water Management Plan is to address potential and existing water resource related issues and how these resources can be protected, sustained and enhanced in Goodhue County. The Local Water Management Act of Minnesota (Minn. Stat. 103B.301 to 103B.355) states that the following guidelines will be met in this document:

1. The plan must cover the entire county
2. The plan must address problems in the context of watershed units and groundwater systems.
3. The plan must be based upon principals of sound hydrologic management of water, effective environmental protection, and efficient management.
4. The plan must be consistent with local water management plans prepared by counties and watershed management organizations wholly or partially within a single watershed unit or groundwater system.
5. The plan must cover a five or ten year period. We have decided to develop a plan which will address the concerns of the county for the next 10 years (2010 to 2020).The Implementation Plan will focus on 2010 to 2015.

This update is intended to enhance the 2005 revision of the water plan to help protect both the surface water and groundwater of Goodhue County. On June 17<sup>th</sup>, 1997 Goodhue County delegated the duties of the Water Plan to the local Soil and Water Conservation District. Goodhue SWCD and the Goodhue County

Land Use Management staff agreed that the SWCD was better equipped to handle the day-to-day operations of the water plan and getting projects on the ground. The SWCD was able to take on the responsibility of updating, administering and implementing the County Water Plan ever since.

A balance of our natural resources, environmental habits, and growth must be obtained to achieve long term economic and ecological sustainability in the county. Through the implementation of the priority concerns developed for the 2010-2020 Water Plan update, a strong effort will be made to achieve said balance. The gathering of both the Technical and Policy Committees will continue to take place at least once a year. Meeting regularly gives the SWCD employees and the committee members an opportunity to see what has been accomplished and what projects will be addressed in the future.

## **Summary of Priority Concerns**

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During the developmental process of the plan, the citizens and committee members of the LWMP agreed that priority concerns which were identified in the plan process would be best described if they were separated into two major land use headings; Urban/Residential and Rural/Agricultural Water Quality Concerns. The committee selected listing priority concerns under these two headings to allow the general public to read and understand what is being done where, as well as making action item referencing easier when applying for grants.

### **Urban/Residential Water Quality**

#### **-Erosion and Sediment Control**

The concern with erosion and sediment control in residential areas are directly related to stormwater management for purposes of this plan. Managing this issue in urban areas can be difficult but rewarding if stormwater retention and/or treatment can be accomplished. Impervious surfaces, altered land use and other factors affect the rates of stormwater runoff and natural erosion processes. Below is a summary of objectives that will be used to attempt to address this issue:

Objectives:

- ✓ Objective 1: Provide leadership, education and staff time to assist cities, townships, developers and landowners in developing and implementing environmentally sound stormwater management practices.
- ✓ Objective 2: Encourage maintenance on existing stormwater basins.
- ✓ Objective 3: Provide and seek financial incentives for implementing stormwater BMPs.

Estimated Cost: **\$418,500**

#### **-Septic System Compliance**

This concern will address the issue of septic system compliance in Goodhue County. The goal of this concern is to improve surface and groundwater quality by addressing septic system compliance in Goodhue County. Primarily individual septic systems and cluster housing developments will be the focus of this concern. The following are objectives that are proposed in this plan:

Objectives:

- ✓ Seek incentives from funding sources available which address septic system compliance in Goodhue County.

- ✓ Support septic system compliance efforts in Goodhue County and SE Minnesota.

Estimated Cost: **\$972,500**

### **-Groundwater Protection**

Municipal Wellhead Protection Plans address many of the concerns that committee members and the general public have with protecting groundwater. However, not all municipalities have Wellhead Protection Plans (WHP) or Drinking Water Supply Management Areas (DWSMA), or some plans are not being implemented. This Water Plan update will address the relationships that must be established between municipalities, SWCD staff and individual well landowners. The overall goal of these efforts is to maintain and/or improve the groundwater resource in Goodhue County. Below are objectives that will help in achieving the goal:

Objectives:

- ✓ Support and educate source water protection efforts in Goodhue County
- ✓ Continue to develop a baseline of nitrate levels in groundwater

Estimated Cost: **\$484,000**

### **-Impaired Waters**

This Priority Concern will address the various impairments which effect municipalities in Goodhue County. Listed impaired waters have been assessed by volunteers, local staff and state agencies mainly the MPCA. Stream assessments usually use existing water quality data and recent data collected on a stream reach for various parameters. Once a stream is listed as impaired on the 303d List, a TMDL must be developed for the identified impairment. A Total Maximum Daily Load (TMDL) is used to define the source of a pollutant, examines how much a given water body can receive and still sustain it's give use, and identifies how much reduction is needed of a pollutant to reach the goals identified in the TMDL. This concern will discuss practices which can be done by staff and landowners in urban areas to help address listed impairments. The objectives that will help achieve our goal of improved water quality are listed below.

Objectives:

- ✓ Educate urban residents on water quality impairments in Goodhue County
- ✓ Promote new and existing rules, ordinances and BMPs within cities which contribute to impaired waters

Estimated Cost: **\$424,500**

## **Rural/Agricultural Water Quality**

### **-Erosion and Sediment Control**

This plan will also address the issues with erosion and sediment control on agricultural and rural lands. In recent years farming practices have progressed rapidly in the way of implementing conservation practices while still achieving high yields. However, changes to land use and additional conservation practices may be necessary for agricultural land to continue to be profitable and sustainable. Reaching that sustainability through BMP promotion and implementation is needed. The goal of this concern is to reduce soil erosion from rural lands in order to improve surface water resources of Goodhue County.

#### Objectives:

- ✓ Establish and maintain stream and field vegetated buffers in accordance with Goodhue County Zoning Ordinance.
- ✓ Increase and maintain perennial vegetation on the landscape in Goodhue County
- ✓ Preserve, enhance and increase wetland resources in the Zumbro River and Cannon River watersheds.
- ✓ Provide technical and financial assistance to Goodhue County landowners interested in reducing erosion and sediment by implementing BMPs in an effort to improve water quality

Estimated Cost: **\$706,500**

### **-Feedlot Water Quality Improvement**

Goodhue County citizens identified runoff from feedlots as a priority concern. Feedlots that are not in compliance are seen as a significant problem due to the potential risk of groundwater and surface water quality degradation. Feedlot concerns are typically watershed specific and our activities will target priority areas such as; Karst areas, impaired watersheds, and riparian areas. Low-cost fixes are made available for small feedlots which do not meet state compliance standards along with education and training opportunities.

#### Goals:

- ✓ Provide feedlot owners and operators with proper education on feedlot compliance
- ✓ Provide financial and technical assistance to feedlot owner and operators to achieve feedlot compliance.
- ✓ Provide adequate local staffing to assist in achieving feedlot compliance.

Estimated Cost: **\$1,040,000**

### **-Nutrient Management**

Nutrient management plans mainly assist farmers with their agriculture land in an attempt to achieve the best sustainability between nutrient application and yields. These plans supply farmers with nutrient information on their cropland regarding application rates, residues, awareness of sensitive areas, and application overlapping. Over-applications of fertilizers and other chemicals, both in rural and urban settings, can have a negative effect on water quality. Also, landowners with up-to-date plans improve eligibility requirements for various federal programs.

Goals:

- ✓ Assist rural landowners in adopting and following comprehensive nutrient management practices.
- ✓ Identify sensitive features for nutrient applicators and decision makers in various GIS formats
- ✓ Educate private and commercial land applicators on the regulations, BMPs and benefits/risks of fertilizer application.

Estimated Cost: **\$165,000**

### **-Impaired Waters**

This priority concern is intended to address the stream TMDL impairments of Goodhue County as well as further assessing stream conditions. Surface water is a necessary resource for various industries, recreation and aquatic life. Land use and human impacts have degraded many of the streams in Goodhue County. However, many streams in Goodhue County have limited water quality data available and are not able to be fully assessed for impairments. The overall goal of this concern is to improve and protect water quality by assessing surface waters and listed impaired waters of Goodhue County.

- ✓ Assess surface waters in Goodhue County for their designated uses
- ✓ Address surface waters in watersheds that have stream impairment listings

Estimated Cost: **\$1,160,000**

## **Consistency with other Local Plans**

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The Water Plan made sure to examine several other water resource organization's documents, suggestions and plans during the updating process. The Plan accounts for the work of many agencies involved in the implementation of goals and objectives. The Goodhue County Comprehensive Land Use Plan is currently being revised by the Land Use Management Department. The Comprehensive Plan compliments the Comprehensive Local Water Plan directly and both plans will be adopted locally in 2010. Water quality objectives located in the Comprehensive Plan mirror the overall goal of the Water Plan. Besides the local Soil and Water Conservation District and the Land Use Department, the Goodhue County Environmental Health Services, Public Works, GIS Department and Public Health Services are involved with the updating and implementation process of the Plan.

### **Recommendation of Amendments to other plans**

*The Water Plan Advisory Members do not believe that other plans need amendments at this time. Plan amendments will be addressed during yearly gatherings with Advisory Members and suggestions/alterations will be noted.*



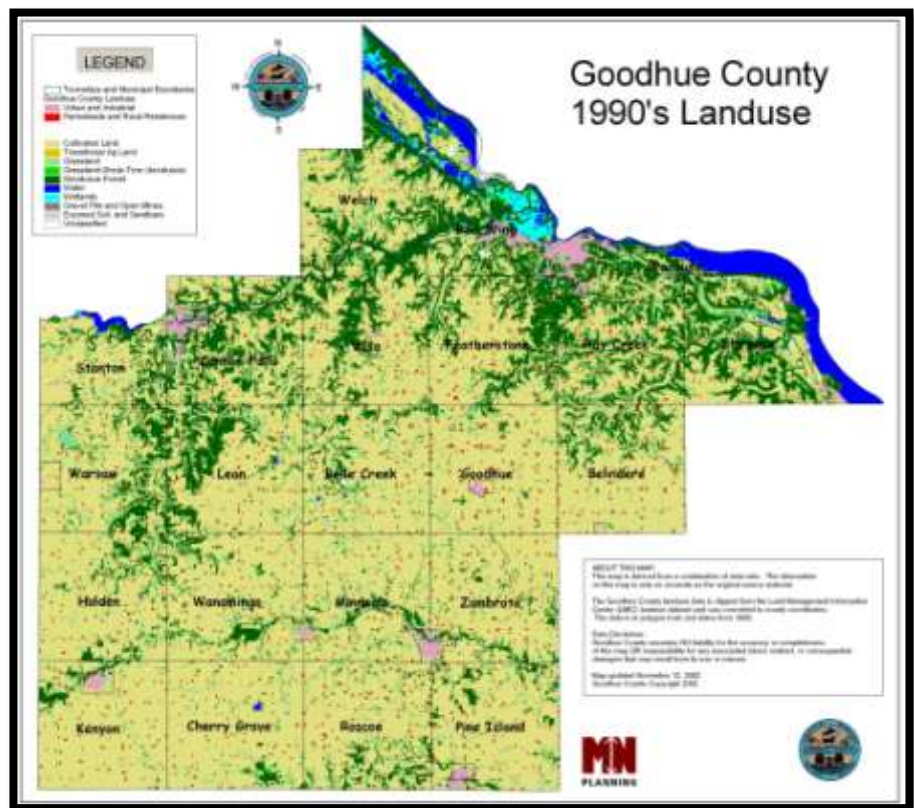
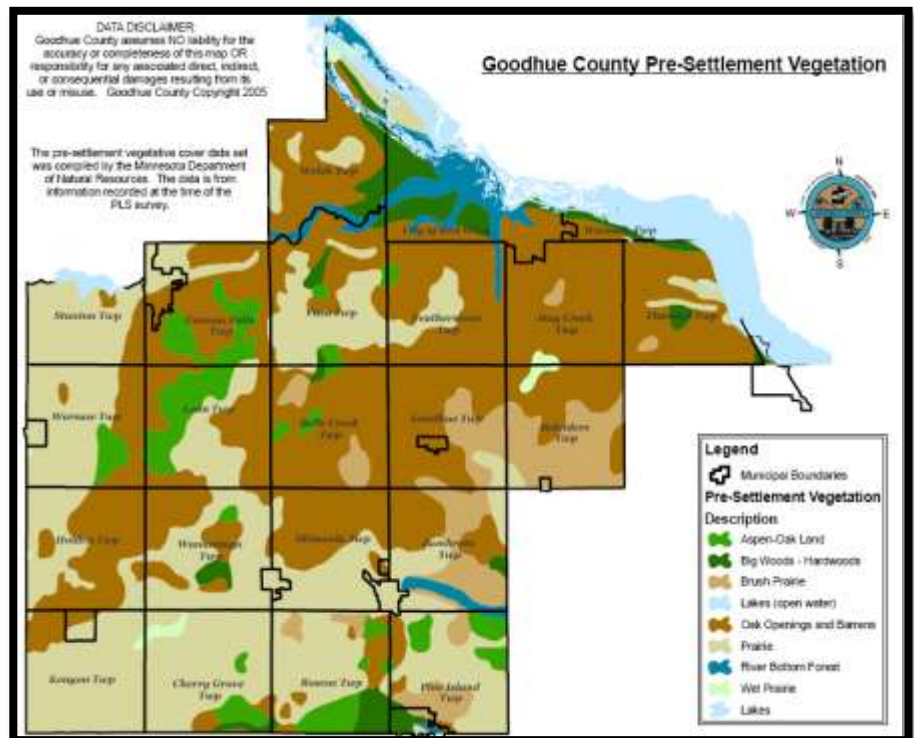
# Goodhue County and SE Minnesota

## Goodhue County Background

The original vegetation of Goodhue County consisted of native prairies, oak savannas, deciduous forests and emergent marshes. As of the early 1990's, only about 7% of those natural communities still exist in Goodhue County. That 7% is mainly located in areas where farming practices could not be implemented (too wet, steep slopes, etc.). Almost all the prairie land was converted into cropland or pasture. The original tall grass prairies are essentially gone except for one small < 40 acre tract located in Stanton Township. However, dry prairies can still be seen throughout the county. These prairies develop on bluff lands, rocky and sand grounds located on glacial till. Oak and aspen are found in abundance throughout the county in small groupings. Cottonwood, Maple, and Basswood trees can be found in moist soils, typically located near streams, ravines and floodplain forests.

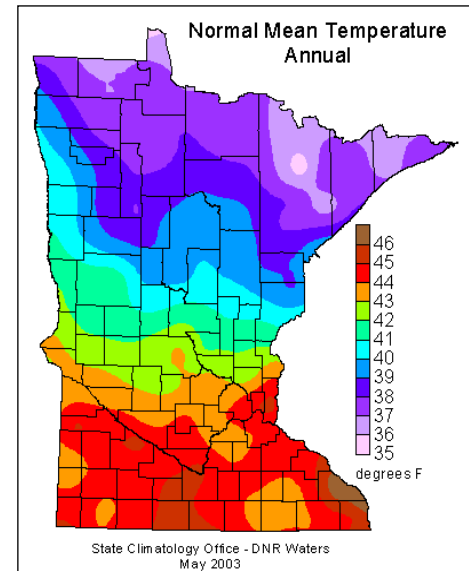
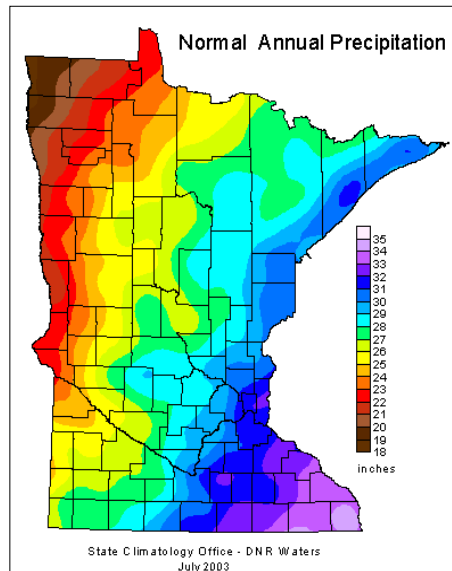
When comparing the two figures on the right, the changes in land use/land cover are clear. Row crop agricultural has taken over the majority of the lands which were previously wetland and prairie. Row crop agriculture typically leaves the ground bare for 6 months out of the year. The hydrology and erosion rates of waterways and receiving water bodies have been adversely affected by these farming practices.

Pre-settlement vegetation on the bluffs near Lake Pepin were typically short grass prairies. Within the past 150 years or so, natural wild fires have been

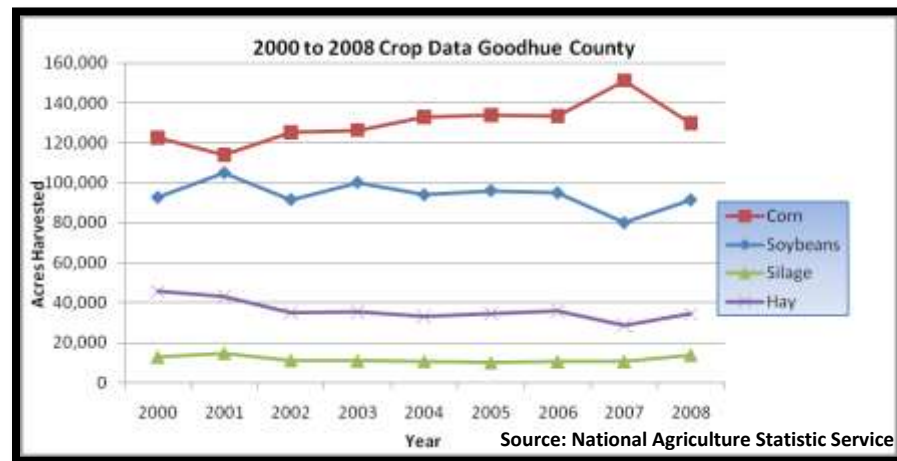


eliminated from the ecosystem. In turn, cedar trees and invasive species scatter the bluff sides in Goodhue County as well as other counties which lay adjacent to the Mississippi River in the southeast.

Goodhue County has an average annual precipitation that is approximately 32 inches. Goodhue County receives just a few more inches of rain a year compared to the western counties of the state. The annual mean temperature for Goodhue County is about 44 degrees Fahrenheit. The small change in precipitation and temperature across the state can have a large impact on the topography, land use and plant and animal diversity. For instance, a minor change in average soil temperature can have serious implications on what that land can sustain. More extreme rainfall events during the growing season in the past few years have led to some severe flood events. There are many land use practices available that reduce the direct effects of flooding. These practices include, buffer installation along streams, increase the percentage of perennial vegetation in watersheds, implement BMPs that retain the peak flow from storm events, etc. These topics will be discussed further in this plan.

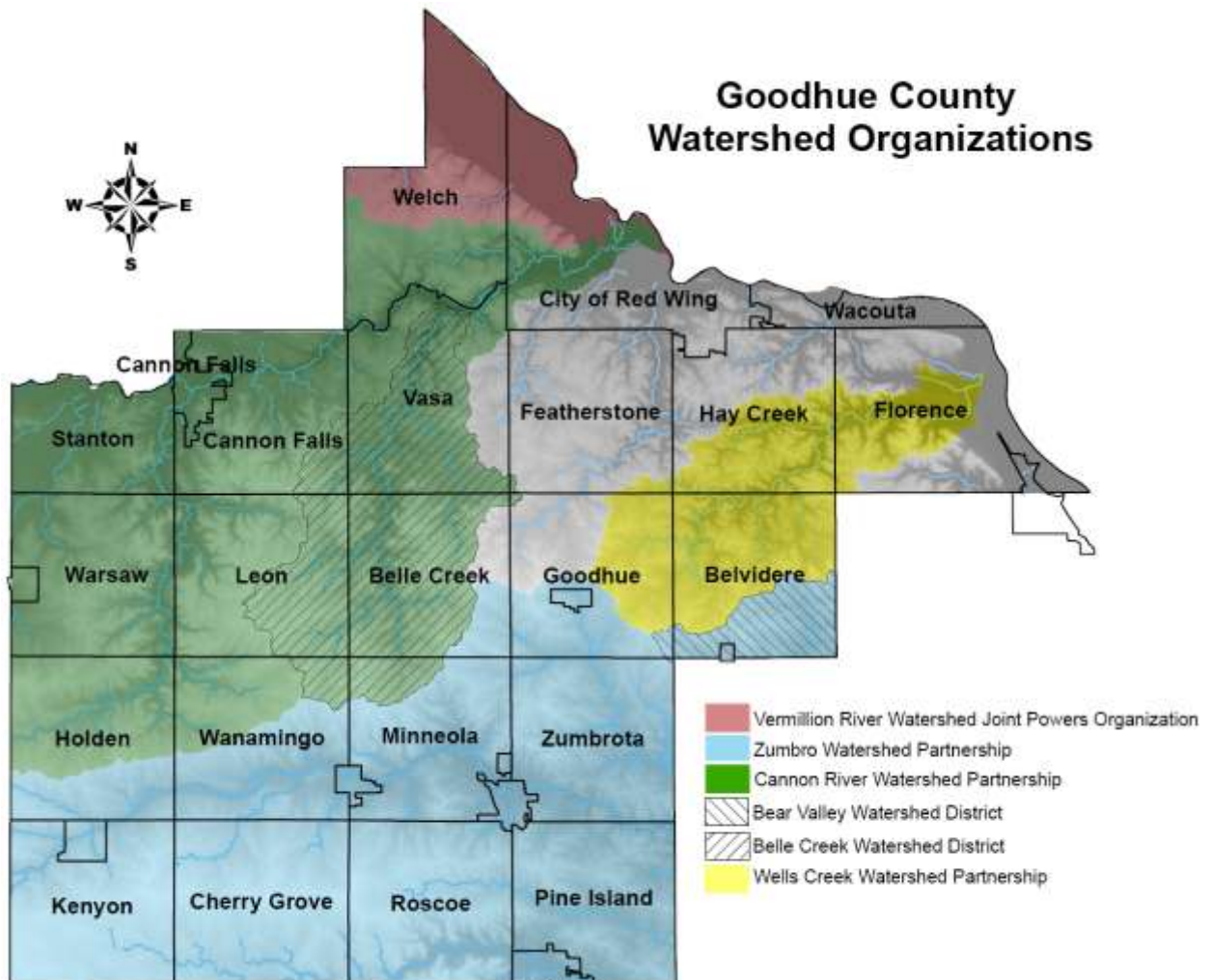


Goodhue County's economy is agriculturally driven with corn and soybeans being the largest commodity produced. Most years, corn acres make up nearly 32% of Goodhue County's total land area, while soybean acres total about 20%. The total acres of these two crops cover over 1/2 the area in Goodhue County each year. Although over the past 50 years hay and small grain acres have been reduced in a typical cropping rotation, the past 10 years or so do not reflect that trend. Silage acres have been relatively consistent harvesting around 10,000 acres per year. Knowing how many acres of crops are being produced and in what watersheds, can help with BMP promotion efforts. For instance, if silage is a crop frequently harvested in Belle Creek Watershed, cover crops and minimal tillage would be a topic to promote locally.



## SE Minnesota Watershed Groups

State agencies involved in the plan include the Department of Natural Resources, the Minnesota Pollution Control Agency and the Board of Water and Soil Resources. As a regional effort, the Southeast Minnesota Water Resources Board undertakes the challenge of improving the overall water quality of the SE 10 counties. The Board is made up of County Commissioners from each of the ten counties with water quality interests' in-mind. The Board exists to help sustain the quality of life in the ten counties of southeastern Minnesota by improving and protecting the water resources through coordination of local water planning efforts. Feedlot improvement grants and wastewater facilitation efforts are a few of the Board's accomplishments. Two watershed districts lay within Goodhue County; Bear Valley Watershed District and Belle Creek Watershed District, both have taxing authority and have board members who actively meet. Although each district has a watershed management plan, the main focus of each watershed district seems to be maintenance on existing structures. Wells Creek Watershed Partnership is also an active group which meets twice a year. The Wells Creek Board members host the meetings and everyone in the watershed is invited to attend. Their efforts will focus on stream habitat restoration and buffer implementation over next few years. The Lower Cannon River TMDL Implementation Plan was adopted fall 2009 for turbidity impairment. This plan was developed by the **Cannon River Watershed Partnership**. The County Water Plan and the Lower Cannon River TMDL Implementation Plan both have action items which address the specific concern of sedimentation in local streams and rivers. Other plans which contributed to the success of past water plans as well as this current update are:

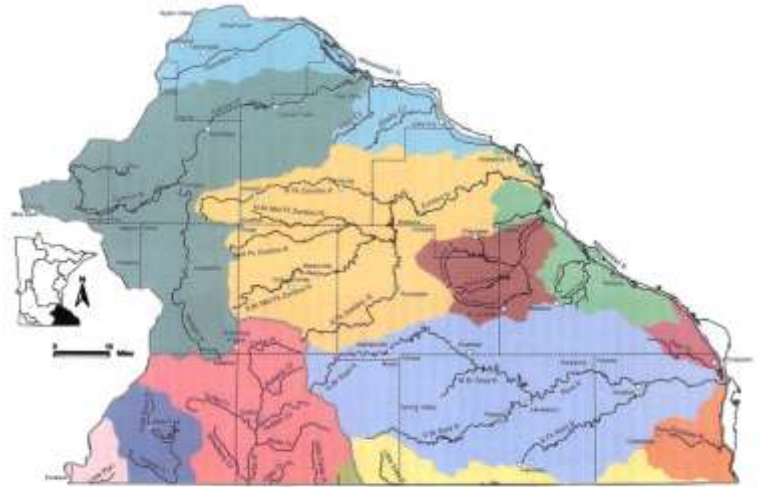




-**BALMM** – Basin Alliance for the Lower Mississippi in Minnesota, plan developed in 1997. This organization is comprised of 10 counties in the SE which continue to pursue the common goal of improving the water quality of the region.

- **Zumbro Watershed Partnership** – Zumbro Watershed Management Plan finalized in the fall of 2007. This plan addresses many of the concerns listed in the Goodhue County Water Plan as it relates to erosion and sediment control. The Zumbro Watershed is currently having a TMDL completed for turbidity impairment.

- **Vermillion River Watershed Joint Powers Board**- Watershed Management Plan adopted in 2006 and amended in 2008.



(See watershed maps in appendix for locations of watersheds in Goodhue County)

# Water Plan Assessment of Concerns

The priority concerns of Goodhue County water resources have been expressed by residents, water plan committee members and agency input. All comments and descriptions of the concerns have been documented in the Priority Concern Scoping Document located in the appendix of this plan.

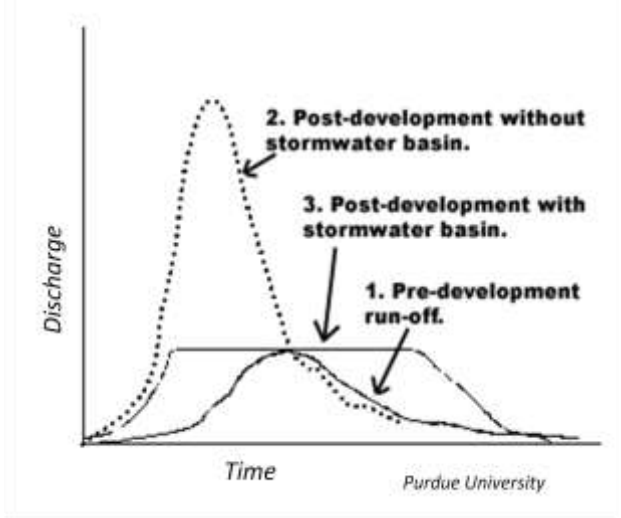
## Urban/Residential Water Quality

### Erosion and Sediment Control

This plan will focus on reducing the effects of erosion and sedimentation in urban areas. The causes of erosion and sedimentation in urban /residential areas will be covered in this section along with possible remediation practices. Erosion and sediment control is a priority concern in Goodhue County because of the negative impacts they can have on our streams and wetlands. Once soil particles become mobile (sediment), phosphorus and other elements also move. While phosphorus and other elements are key features in a healthy and fertile soil profile, in excess they pose a hazard to streams and wetlands. Sedimentation can be caused by many instances. In urban settings the majority of erosion and sediment comes from construction site activity, vegetation removal, bluff land impacts and increases in runoff volume. The increase of impervious surfaces leads to the increase of volume and rate of stormwater runoff unless otherwise treated. Extreme washouts and gullies can form when rate and volume reduction is not accounted for in the stormwater management process. Not only do these gullies cause a large amount of property damage, they also carry massive amounts of gully and streambank sediment which are then deposited in receiving water bodies like lakes, streams and major rivers. One of the main factors that contributes to the increase of flow volume and rate during an urban rain event is the amount of impervious surface within a given basin and/or watershed. So basically, the more impervious surface the higher that spike will be in that hydrograph. Major stream degradation can occur at impervious levels as little as 5 to 15% in a given urban watershed. Some examples of degradation are; damaging stream bank vegetation, extremely high velocities and volumes, channel widening, increased temperatures, and sediment loads. Increased stormwater temperatures have negative effects on fish communities in the receiving water bodies, especially the sensitive trout species in the several trout streams in Goodhue County. Generally temperature increases in stormwater are associated with water running off of hot pavement, parking lots and rooftops in the summer time. Places where urban stormwater enters a designated trout stream certain temperature reduction practices need to be in place. For instance Miller Creek in Duluth, Minnesota has cool underground stormwater retention structures which mix warm surface stormwater during a rain event before entering the stream. Goodhue County's Hay Creek and Spring Creek have a trout stream designation within the city limits of Red Wing.



The graphic below is a typical hydrograph which shows the relationship of a pre-development and post-development urban stormwater setting. Notice the spike, or 'bounce', of the post-development runoff curve when no treatment is present.

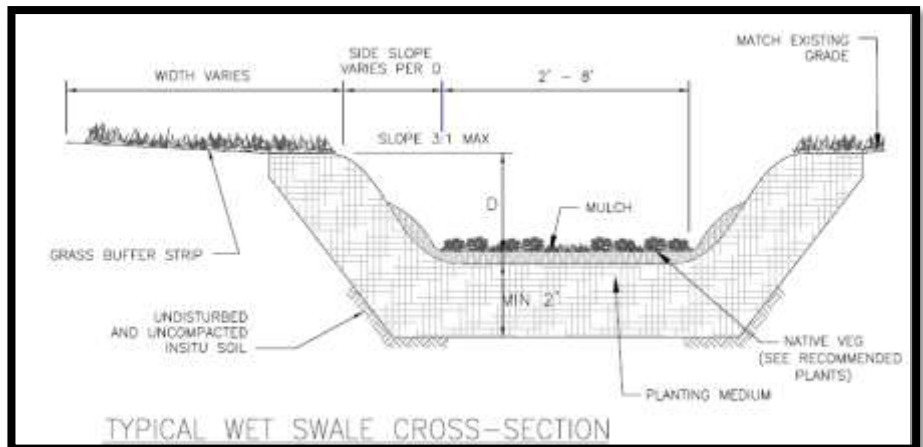


Below are BMPs and rules in place that address erosion and sediment control within municipalities. For more ideas on stormwater BMPs see the Minnesota Stormwater Manual <http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>

The photograph on the right shows a rain garden in action located at the Minnesota Arboretum in Chaska. Rain gardens allow stormwater from a parking lot, roof top, etc to be treated locally by a type of infiltration basin. This particular rain garden has an automated stormwater valve which allows excess rainwater to be diverted into a normal stormwater utility. This protects the rain garden from being inundated and washed out from prolonged rain events as well as being able to continue to convey water away from a given area.



The MPCA administers the NPDES program for stormwater control in construction, industrial and municipal settings. NPDES (National Pollution Discharge Elimination System) addresses pollution runoff from stormwater as mandated by the Clean Water Act. Larger municipalities adopt and implement mandated stormwater requirements by implementing a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP focuses on BMP installation to reduce the pollution potential from stormwater. Red Wing is the only city in Goodhue County that is an MS4. Six minimum goals must be addressed by this designation; public outreach and education, public participation, Illicit discharge identification and elimination, construction site runoff, post-construction site control and pollution prevention. Lake City is also taking a proactive approach to stormwater compliance and has developed a Grading and Stormwater Management Handbook for residences and contractors. The handbook outlines rules and regulations set in place by the City of Lake City that must be followed when dealing with construction projects.



**This drawing shows how a grassed swale should be constructed. Wet and dry swales can be constructed in place of curb and gutter systems which help filter pollutants and reduce runoff quantities. (Source MN Stormwater Manual)**

The NPDES permits, as well as other local erosion ordinances help make sure that the proper erosion control measures are taken to minimize the amount of sediment and other pollutants leaving a construction site. During construction events, and shortly after, land can become highly susceptible to erosion and sedimentation. Best Management Practices (BMPs), when installed properly, can effectively reduce the amounts of erosion and sedimentation leaving construction sites. Erosion control practices are designed to slow water and soil from precipitation events through products like mulch, fiber blankets, hydro-seeding, ground covers, etc. Sediment controls include practices like installing silt fences, sedimentation ponds, etc. which all help capture soil particles washing away from the site.

## Impaired Waters

Goodhue County has many water bodies listed on the Clean Water Act Section 303(d) list. These water bodies have been identified to have a pollutant source which can limit a stream or lakes designated use. Designated uses for a stream or lake include recreation/fishing, irrigation, swimming or industrial uses. When a pollutant inhibits the use of one or more of these designations, the stream/lake goes on the impaired waters list. Once a stream/lake is on the impaired waters list, the State of Minnesota is required to conduct a Total Maximum Daily Load study. The TMDL addresses the source(s) of the pollutant and determines how much of that pollutant a given water body can receive and still be able to meet water quality standards. The TMDL drives the Implementation Plan for a given impairment. The TMDL Implementation Plan set goals and objectives for actions that must be taken on the land in order to reach the calculated reductions laid out in the TMDL.

Below is the 2008 list of impaired waters in Goodhue County. A 2010 list of impaired waters is currently in a draft format and will not be approved by the EPA prior to the adoption of this version of the Water Plan. After the 5 year implementation review of this Water Plan, The most current version of the impaired waters list will be included in the plan. The majority of stream impairments in Goodhue County come from sediment. Turbidity is the cloudiness of a

water column caused by suspended sediment, organic particles and other pollutants. Causes of turbidity in Goodhue County stem mainly from agricultural runoff, construction sites and streambank erosion. Waters with increased amounts of turbidity typically carry increased levels of phosphorous and bacteria. The increase of suspended sediment also can limit and/or kill fish and shell fish species. Constant increases of turbidity in our streams and rivers contribute to the hypoxia phenomenon in the Gulf of Mexico.

Each impaired water body listed all lie within the boundaries of Goodhue County. It is important to note that, when possible, priority should be given to these water bodies when BMP funding is available. When a documented impairment is noticed,

The 2008 list of Impaired Waters in the County are provided in the table below.

Reach	Assessment Unit ID #	Affected Use	Pollutant/Stressor
Vermillion R/Vermillion Slough, Hastings Dam to Mississippi R	07040001-504	Aquatic Consumption	Mercury in Fish Tissue
Vermillion R/Vermillion Slough, Hastings Dam to Mississippi R	07040001-504	Aquatic Consumption	PCB <sup>1</sup> in Fish Tissue
Vermillion R/Vermillion Slough, Hastings Dam to Mississippi R	07040001-504	Aquatic Life	Turbidity
Hay Creek T111 R15W S4, west line to Mississippi R	07040001-518	Aquatic Life	Turbidity
Mississippi R St Croix R to Chippewa R (WI)	07040001-531	Aquatic Consumption	Mercury in Fish Tissue
Mississippi R St Croix R to Chippewa R (WI)	07040001-531	Aquatic Consumption	PCB <sup>1</sup> in Fish Tissue
Mississippi R St. Croix R to Chippewa R (WI)	07040001-531	Aquatic Consumption	Perfluorooctane Sulfonate (PFOS) in Fish Tissue
Mississippi R St Croix R to Chippewa R (WI)	07040001-531	Aquatic Life	Turbidity
Cannon R Pine Cr to Belle Cr	07040002-502	Aquatic Recreation	Fecal Coliform
Cannon R Pine Creek to Belle Creek	07040002-502	Aquatic Life	Turbidity
Prairie Creek Headwaters to Cannon R (Lk Byllesby)	07040002-504	Aquatic Recreation	Fecal Coliform
Prairie Creek Headwaters to Cannon R (Lk Byllesby)	07040002-504	Aquatic Life	Turbidity
Cannon R Northfield Dam to Lk Byllesby inlet	07040002-509	Aquatic Recreation	Fecal Coliform
Cannon R Northfield Dam to Lk Byllesby inlet	07040002-509	Aquatic Consumption	Mercury in Fish Tissue



actions and land treatments should be taken to address the impairment properly. Actions to address specific impairments are listed in the implementation plan.

Cannon R Northfield Dam to Lk Byllesby inlet	07040002-509	Aquatic Life	Turbidity
Little Cannon R (Goodhue County) T111 R17W S18, west line to Cannon R	07040002-526	Aquatic Life	Turbidity
Belle Creek Headwaters to Cannon R	07040002-527	Aquatic Life	Turbidity
Unnamed creek (Trout Brook) Unnamed cr to Cannon R (trout stream portion)	07040002-567	Aquatic Life	Turbidity
Spring Creek T113 R15W S27, south line to Hay Creek	07040002-571	Aquatic Life	Turbidity
Little Cannon R (Goodhue County) T110 R18W S10west line to T111 R18W S13, east line	07040002-589	Aquatic Life	Turbidity
Cannon R North branch of split to Vermillion R	07040002-646	Aquatic Life	Turbidity
Zumbro R, Middle Fork Headwaters to N Br M Fork Zumbro R	07040004-522	Aquatic Life	Turbidity
<b>Lakes</b>	<b>Assessment Unit ID #</b>	<b>Affected Use</b>	<b>Pollutant/ Stressor</b>
Byllesby	19-0006-00	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
Pepin	25-0001-00	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators
<sup>1</sup> Polychlorinated Biphenyls			
The list of impaired waters will be updated in 2010.			

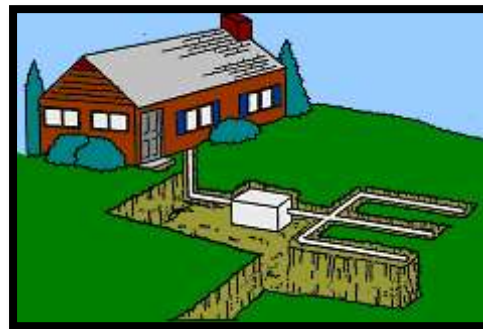
The amount of impervious surface and stormwater retention play a large role in stream quality in and around cities. Like before mentioned in the Erosion and Sediment Control section, stormwater rate and volume increase as human impacts in a given basin increase. Gullies and streambank erosion occur when rate and volume reduction are not addressed. Turbidity impairments in streams are common when these conditions exist in Goodhue County. The City of Red Wing is tucked into the steep landscape surrounding the Mississippi River. Grading the top and toe of bluff areas can weaken the hillside and be major sources of erosion. Implementing proper bluff setback regulations and BMPs in these areas is critical when protecting these slopes and managing stormwater runoff. NPDES permit holders like Red Wings' MS4 and industrial facilities and wastewater treatment plants all must meet limited effluent standards on parameters listed as impairments in a receiving water body. The Lake Pepin TMDL process is currently underway for two impairments; turbidity and excessive nutrients. Lake Pepin in the Mississippi River drains nearly half the state of Minnesota and along with a small portion of NW Wisconsin. The Mississippi River is one of Minnesota's greatest resources and restoration and protection is needed to ensure future generation enjoyment. Reductions of turbidity and nutrients will need to be regulated in the future to reach the load reductions goals that are developed in the TMDL process. Models have shown that target reductions are needed during spring high flows for Turbidity, while eutrophication reductions are needed during summer low flows. Site-specific standard for TSS



(Total Suspended Solids) were developed for tributaries to the Mississippi. Reductions in TSS from 20% in the Upper Mississippi to 50% in the Minnesota River are needed to meet a 32 mg/l median concentration in the Mississippi River. Further discussion on listing and addressing impaired waters will be discussed in the Rural/Agricultural portion of the Water Plan and specific actions will be listed in the implementation plan.

## **Septic System Compliance**

Residences that live within a municipality generally have water and waste water treatment available to them. They typically pay a monthly bill which is a fee for the treatment service. Rural residences on the other hand need to rely on individual treatment systems to treat their wastewater locally. Subsurface Sewage Treatment Systems (SSTS) treat wastewater so that harmful pollutants such as excessive phosphorous, nitrates and fecal coliform do not reach our ground and surface water. Failing septic systems can cause Fecal Coliform to enter our streams and drinking water. If consumed, symptoms can include cramps, nausea, diarrhea and more. Treatment systems, when installed properly, can filter almost all harmful pollutants from wastewater, but can be expensive. Many SSTS systems are failing across the County. The Goodhue County Land Use Department states that there are roughly 5,500 SSTS systems within the County. Of the 5,500 systems, approximately 3,600 have little record of treatment system age, type, or function. This is a major concern with local officials, County staff and the general public in Goodhue County. Not knowing the compliance rate of our septic systems is cause for concern for our groundwater resource. A number of unsewered communities scatter the County as well, including communities such as Vasa, Old Frontenac, Lake Byllesby and a section of homes along St. Paul Road near Zumbrota. These communities have little or no record on file, small rural lots and are in need of a combined system to treat waste.



Source: MPCA

What is Goodhue County doing about septic system compliance?

Currently Goodhue County is following the MN Rule 7080 requirements. Also, Goodhue County Environmental Health Department requires a landowner to conduct a compliance inspection of their existing SSTS when a bedroom is added to a home or if the amount of water usage generated from a home alteration results in a significant increase in volume. Goodhue County can also utilize the Minnesota State Rule of addressing an Imminent Threat to Public Health (ITPH). ITPH are systems that are straight-piping raw sewage directly to the surface water and groundwater. If identified, these systems must be fixed within a time frame set out by the State of Minnesota and the County. Locating and addressing these systems have been very limited in the past. Another method of upgrading septic systems is implementing a Point of Sale requirement in the County. Any home with a septic system must be inspected and, if needed, corrective actions taken prior to the sale of the home/property. Currently Goodhue County does not have the Point of Sale requirement. It will be one of the goals of the 2010 to 2020 Water Plan to adopt this regulation in Goodhue County.

## **Groundwater Protection**

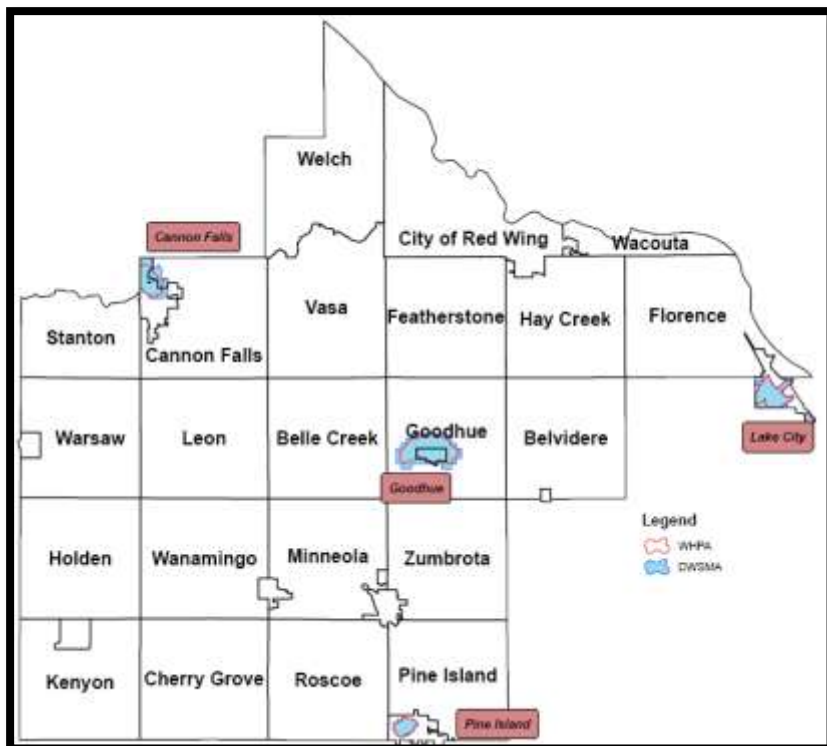
The Minnesota Department of Health is the state agency responsible for making efforts to protect our groundwater (drinking water). Efforts like the Wellhead Protection Program (WHP) is designed to help protect a public drinking water supply. In order to protect a supply of water that is constantly recharging, a geographic area must first be delineated to determine where your source water is coming from. This area is known as the Drinking Water Supply Management Area and follows parcel boundaries, roads, and geographic landmarks which allow the general public to visualize the recharge zone. The



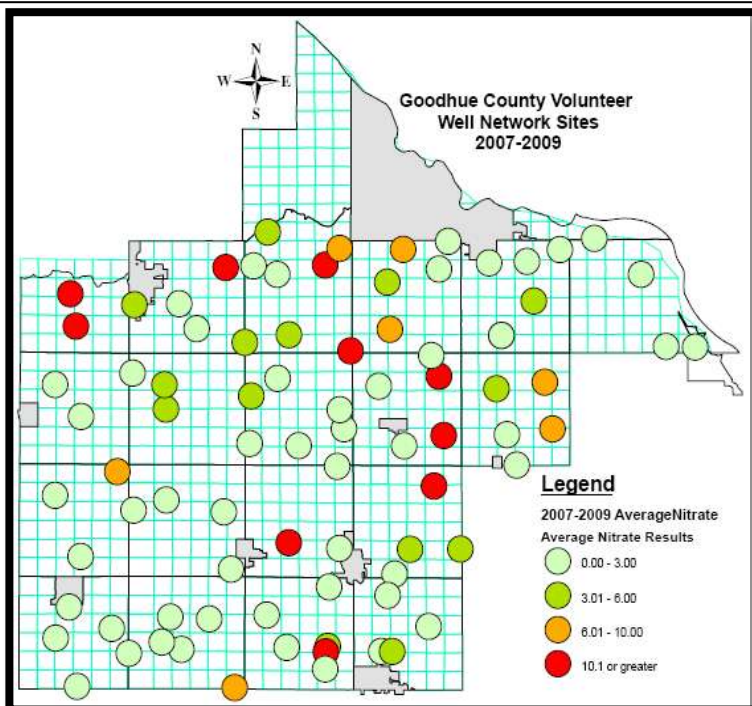
actual groundwater recharge boundary is known as the Wellhead Protection Area (WHPA). Potential hazards that could negatively affect the quality of the groundwater within the WHPA are then identified in the wellhead protection plan. Some examples of these hazards are, leaking storage tanks, industrial waste, feedlots, holding tanks above and below ground, agricultural chemical applications, non compliant floor drains, etc. It is the duty of the

public drinking water supplier to address these issues and take measures to protect the groundwater resource. It is in the best interest of any municipality to take steps to protect the WHPA. Implementing BMPs in the recharge area now can greatly reduce the risk of the water supply being contaminated in the future. A variety of BMPs can be implemented in the WHPAs such as; CRP, permanent set-a-side programs, reduced nutrient application on agricultural fields, cover crops, etc. While most of these BMPs are voluntary, some communities have gone as far as purchasing the wellhead protection area and converting the land use into a park, recreational and trail area.

In rural areas, most landowners depend on their own drinking water supply system. Typically wells are drilled into aquifers that provide a rural resident with drinking water; however there are a few landowners who receive their drinking water from springs, side-hill seeps and cold water streams in Goodhue County as well.



The above map shows the municipalities in Goodhue County with approved Wellhead Protection Plans. The Minnesota Department of Health has an ongoing list of which cities need a Wellhead Protection Plan. Red Wing along with other cities will be addressed over the next few years.

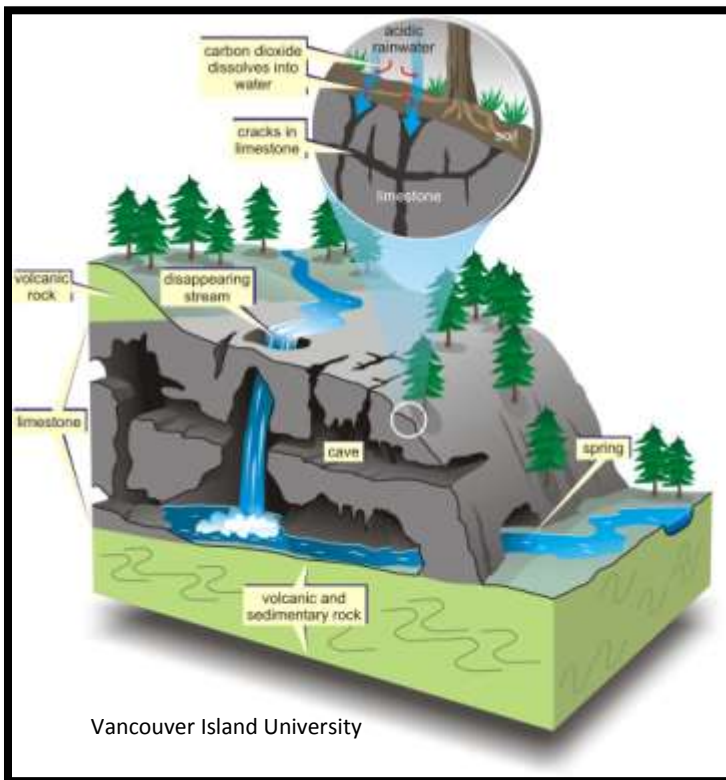


The Goodhue County SWCD has been a part of an effort in Southeast Minnesota on developing an overall baseline of what the water quality of rural drinking water is. We selected roughly 90 wells across Goodhue County to sample twice per year for nitrate levels. Over a 2 year period, we found that just 9% of the wells tested were above the Minnesota drinking water standard of 10 mg/l. This program will continue at a frequency of once per year collecting valuable nitrate data as well as expanding to other chemicals like arsenic, Acetochlor and others typically found during agricultural applications. As seen to the left, each circle represents a volunteer nitrate sampler in Goodhue County. Each circle is color-coated depicting levels of nitrates in their well sample. Well construction and age are all known on these selected wells. Knowing the depth of wells can give

us a good indication of the status of the various aquifers.

Goodhue County does have an abandoned well sealing program. When new well construction occurs the Goodhue County Environmental Health Department notifies landowners that existing wells on their property must be sealed. Sealing wells help protect our groundwater resource from contaminants.

Goodhue County is also lucky enough to be part of the SE Minnesota Driftless area; which also offers a Karst topography. A Karst landscape is one that sets atop eroding limestone and/or dolomite rock formations. Land features such as springs, seeps, sinkholes, and even caves are all prevalent in Karst settings. Karst areas have more surface water to groundwater connection than other glacial till settings. For this reason it is extremely important that sound land use practices be implemented to prevent groundwater contamination. Manure management, septic system compliance, proper chemical application rates and timing must be following closely to ensure the longevity of our groundwater resources. The below diagram is a typical cross-section of a Karst landscape not uncommon in SE MN.



Above is a map of the known Karst areas in the United States. Note: the green lobe in the Midwest is what is called the Driftless Area. (USGS)

## Rural/Agricultural Water Quality

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### Erosion and Sediment Control

Pre-settlement vegetation of Goodhue County was made up of rolling prairies and short grass bluffs, wetlands and shallow marshes in the southwestern areas and forested areas throughout river bottoms and hillsides. Then in the late 1800's agriculture started to dominate large portions of the landscape. Within a short amount of time, modern equipment paved the way to extensive row crop agricultural production. In doing so, mass amounts of perennial vegetation were lost giving way to countless erosion control problems which we are still dealing with today. Perennial vegetation has the ability to hold soil in place and absorb stormwater in rain events. Once removed, erosion and the amount of rain runoff increase immensely. This obviously affects the rate at which erosion occurs on the landscape as well as increasing the rate and flow at which rain water flows to rivers or lakes. Increasing the runoff rate causes gullies and streambank erosion. As a result more sediment enters our local streams and lakes.



Row crops can provide a canopy which helps reduce the impact that rainwater can have on a soil surface, but unfortunately the canopy is only present in July, August and September and soils are bare the remainder of the year. Soil particles can hold large amounts of phosphorous and agricultural chemicals which can impair local lakes and streams. It is important to keep rain water and soil in place.

Goodhue County's agricultural background has been and will continue to be an economic strong hold, but conservation practices will have to be implemented in order to achieve sustainable yields and water quality standards in the future. Varieties of BMP's are available to help control erosion of agriculture land and are actively being promoted at the Goodhue SWCD. BMPs for agricultural land include; contour farming, buffers, no-till farming, cover crops, grassed waterways, terraces, rotational grazing, etc. These practices help stabilize soils, prevent/reduce erosion. Cover crops can increase stabilization of the soil throughout fall, winter, and spring storm events, as well as act as a marketable 3rd crop resource.

**As seen in the picture above, gullies form easily on agricultural land if no cover crops are present. That picture was taken during a moderate spring rainfall on 2 to 6 percent slopes where little or no vegetation was present to help hold the soil in place. The runoff from fields contains nutrients, pathogens, pesticides, and salts. Like urban runoff, these items cause sedimentation in water, which reduces the amount of sunlight reaching aquatic plants and may kill many species of fish.**



Listed below are a few of the Best Management Practices that are designed and cost-shared through the SWCD office. All these practices reduce the erosion potential on working lands.



**-Terraces** These structures break long slopes into shorter ones. Terraces act as small shallow dams which slow water velocities and divert water to a tile which runs the length of the swale. Spacing of terraces in a swale is important when designing these structures. Too close together, they can be too expensive and the field may be difficult to farm. Too far apart, gullies may start to form and may blow out the next terrace downstream.

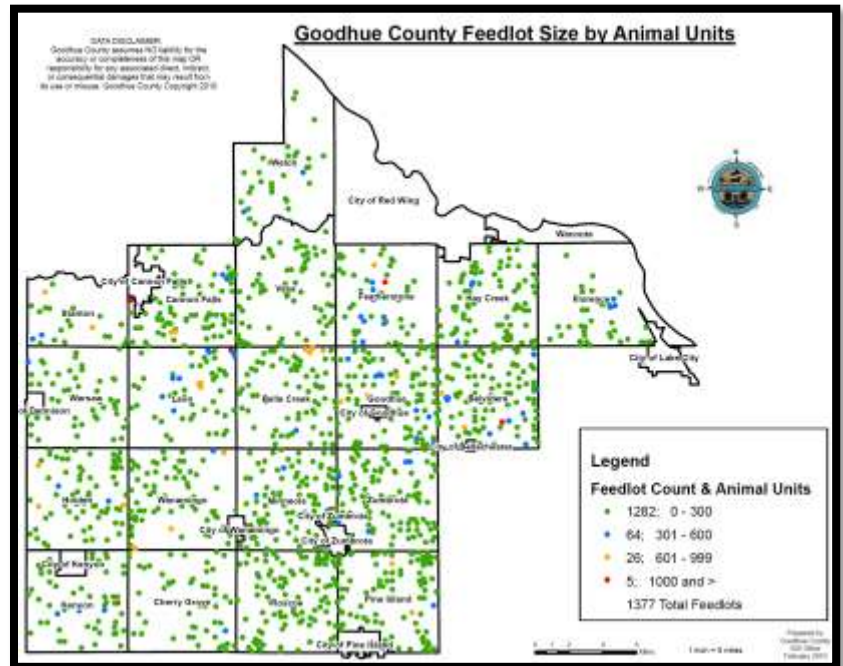
**-Grade Stabilization Structures.** These structures can be designed to be dry or wet basin and mainly to control the grade and head cut of gullies. They are typically located at the edge of a farm field and a gully where water is concentrated and erosion is present.



Grade stabilization structures like this one shown above act as sediment traps for agricultural runoff. Over time sediment build up can cause the structure to not function and can become a liability. Many of the structures that the NRCS/SWCD designed and installed in the mid 1970s are in need of repair or clean out. As seen above, the outlet is buried in 4' of sediment.

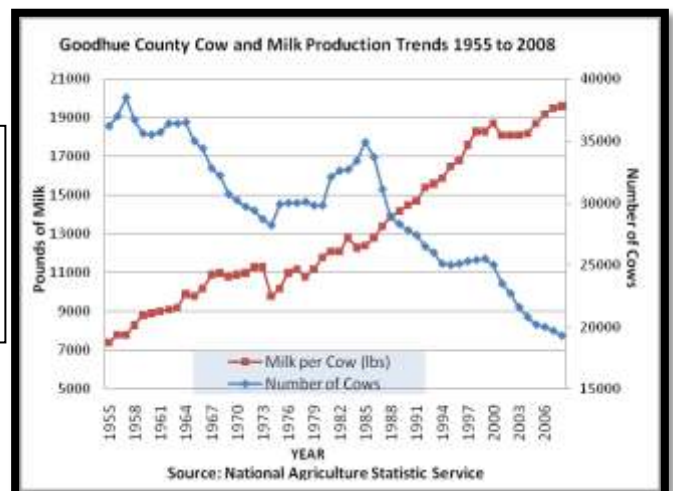
## Feedlot Water Quality Improvement

During the original water planning process in 1990 only 48 feedlots were permitted by the MPCA. As of January 1<sup>st</sup> 2010 1,074 feedlots are registered in Goodhue County. Goodhue County SWCD houses the current Feedlot Officer who administers the County Feedlot Program. The County feedlot program is a cooperative arrangement between the MPCA and county government to administer Minnesota's feedlot rule. Counties are responsible for the implementation of feedlot rules and regulations throughout Minnesota. The county Feedlot Officer is actively notifying feedlot owners of training sessions and the latest feedlot concepts in the area as well as permitting new and expanding feedlots. This has been done by conducting informational meetings, newsletters/direct mailings sent to feedlot owners and feedlot articles placed in local newspapers, all striving to achieve feedlot compliance.



FLEVAL or MinnFarm feedlot evaluation models are tools that take a “fixing” approach to achieve feedlot compliance. It can predict phosphorous runoff (as well as other pollutants) concentrations at a feedlot’s discharge point. This is done by collecting information like; size of lot, % of paved areas, areas of rooftops, number/type of livestock, surrounding vegetation, typical storm events, soil types, topography, etc. That information is then entered into the MinnFarm spreadsheet. It processes the information and presents a series of options like redirect stormwater flow, add roof gutters, limit animal units, increase actual feedlot size, create buffer strips, setbacks, fencing, proper lot management, etc. Most options are low cost and can be very effective if maintained.

**While the number of milking cows has dropped in Goodhue County over the past 50 year, the amount of milk which they produce has increased. This is due to more streamline milking systems, the introduction of various growth hormones, increased number of milkings per day and better feed technology.**





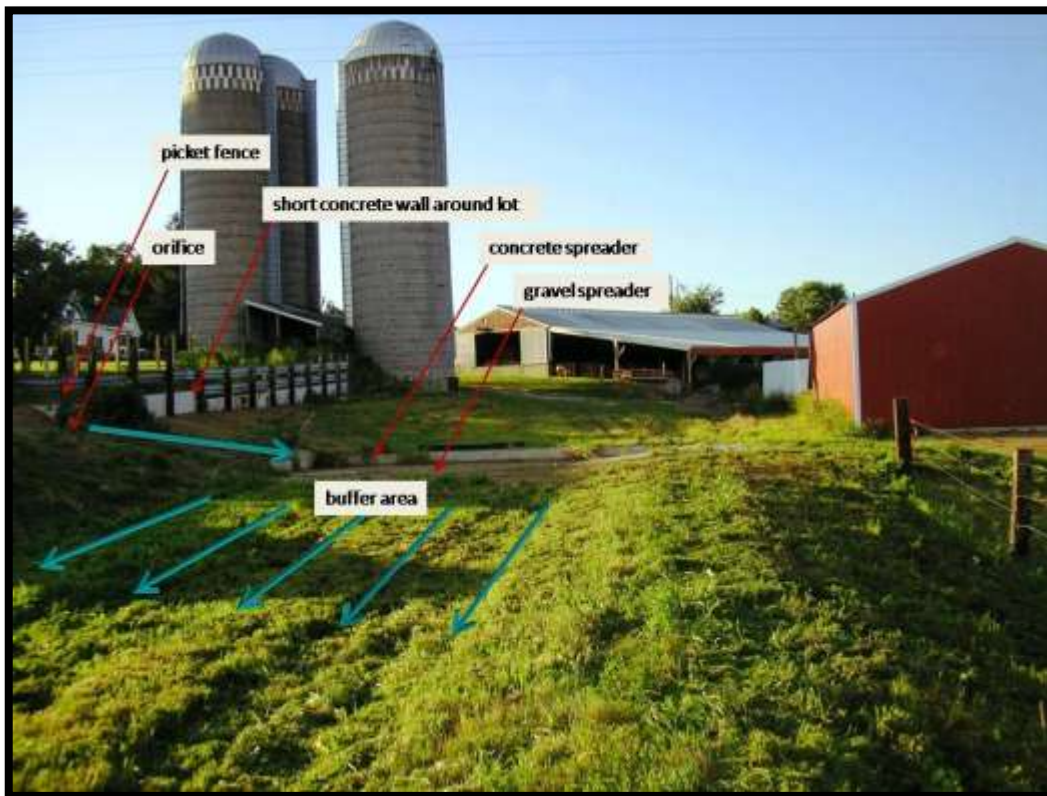
Before



After



**This fix was more expensive than the majority of FLEVAL feedlot fixes. The project above eliminated almost all animal waste runoff. This was done by installing grated cement slabs which allowed waste to seep through and be collected in underground storage tanks. Photos: Goodhue County SWCD**



The above graphic shows a typical feedlot fix that receive cost-shared through the SWCD office. The picket fence holds back manure solids while allowing effluent to flow through an orifice in the short concrete wall. Treatment is maximized by spreading the effluent in a thin layer across the entire width of the buffer area. This is accomplished with a concrete spreader initially, followed by gravel spreaders. The effluent is treated in the buffer with a combination of filtration and vegetative nutrient uptake. The size of the buffer is designed to treat all stormwater flowing off of the lot during a 25-year 24-hour storm event. If this system were not in place, the stormwater runoff from the feedlot would likely channelize and flow untreated into a surface water body during a large storm event.

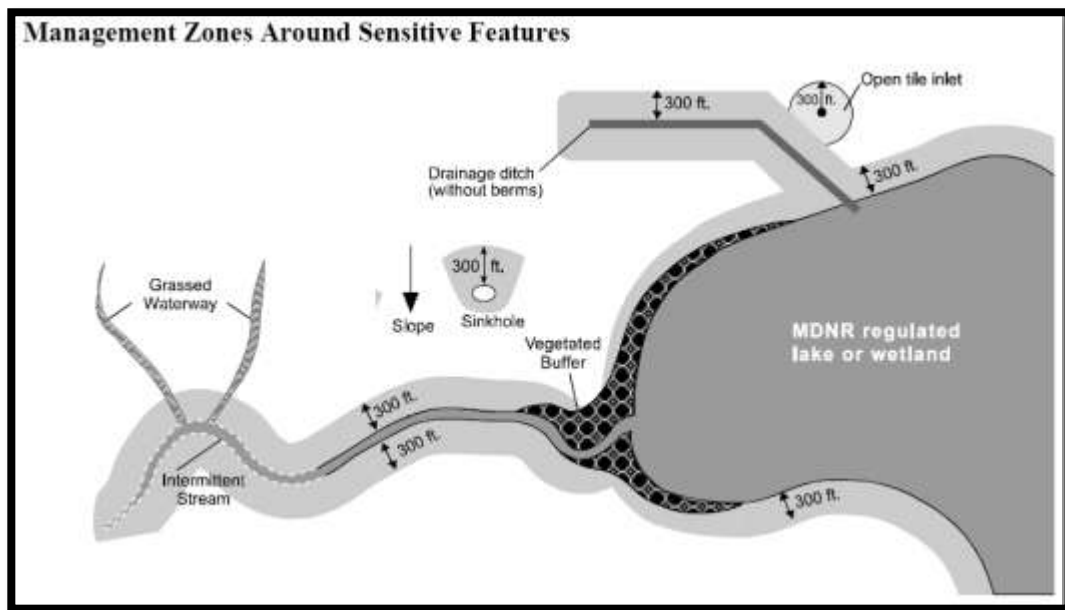
Continued education on feedlot runoff, implementing BMP's, and enforcement will be needed for feedlot owners to achieve compliance. Non-compliant open feedlots are a major concern due to the immediate

potential for surface water and groundwater degradation. For instance; high permeable soils tend to leach waste very easily, contaminating aquifers and drinking water via abandoned or unsealed wells and contamination of groundwater by surface water recharge. Surface water impacts from feedlots come from open ditches, over topping and failing earthen lagoons, open lot runoff, gullies through a feedlot, etc.

## **Nutrient Management**

Land application of waste or over application of fertilizers, pesticides, manure, etc. are potential sources of non-point source pollution to groundwater as well as surface water. Enforcing the day to day operations of application practices is difficult, thus technical assistance and education are essential components that help protect the environment. To protect water quality and meet state rules, runoff pollutants must be reduced to safe levels before entering streams, rivers and lakes. Proper manure application can not only benefit the environment, it can also save landowners money.

Elements such as nitrogen, phosphorous and potassium are generally the main ingredients of fertilizers. Nitrogen is water soluble and is able to move through the water table freely and phosphorous is able to attach to soil particles. When they are applied in excess of plant needs, nutrients can wash into aquatic ecosystems where they can cause excessive plant growth, which reduces swimming and boating opportunities, creates a foul taste and odor in drinking water, and kills fish. In drinking water, high concentrations of nitrate can cause methemoglobinemia, a potentially fatal disease in infants also known as blue baby syndrome.



Shown here is a graphic produced by the MPCA for minimum manure application setbacks. More information on setbacks can be found in the web link section of the appendix.



In agricultural settings the MPCA regulates the application and setbacks for a variety of land-applied nutrients. These setbacks (above) provide a buffer between areas that are more susceptible to contaminants than others. If these setbacks are practiced, farmers have the opportunity to land apply nutrients to their fields with limited negative effects on surrounding water quality sensitive features. Over applying fertilizers to crop land has been an ongoing issue in the agriculture community over the past 40 years. Knowing what nutrients are available in the soil and the amount of nutrients crops need to produce high-quality yields is important information to obtain prior to application. Most local co-ops have a soil testing service available.

Cost sharing is often available for implementing nutrient management plans. The basics of a plan are determining the inputs and outputs of a given cropped field. Nutrient management plans are an ongoing tool which helps minimize nutrient inputs while still attaining desirable yields. Nutrient management plans utilize information like soil type, crop rotation, crop residue, commercial fertilizer and manure nutrient content. These inputs allow farmers to maximize their production while minimizing their

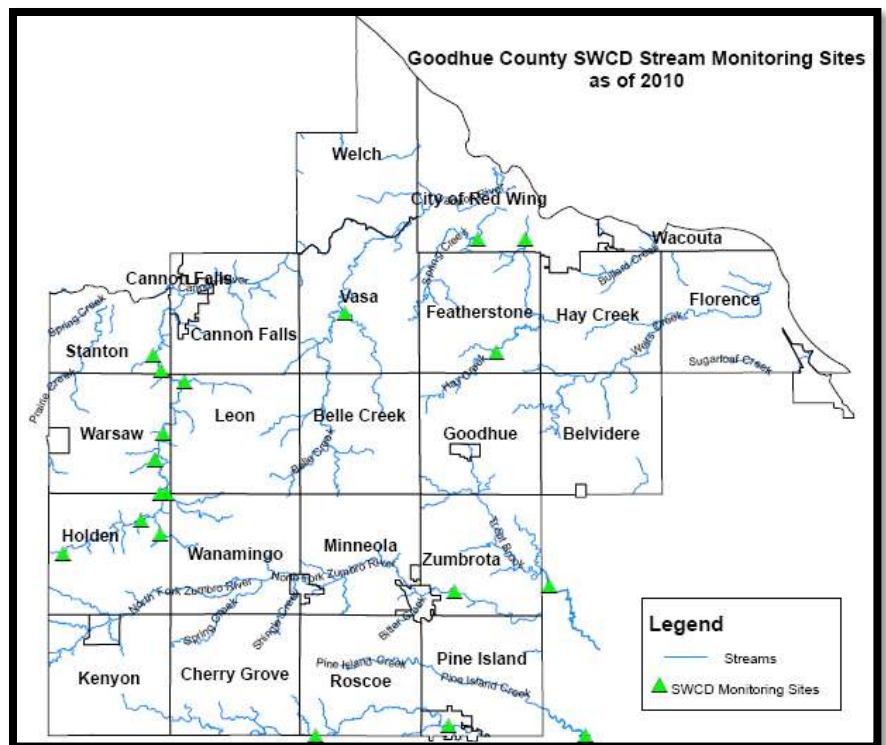
commercial input costs. Also, keeping an up to date nutrient management plan will better a landowners chances of being enrolled in the Conservation Stewardship Program (CSP) as it becomes available. CSP is a program that rewards farmers who are practicing sound conservation agricultural practices.



Recent technologic advances in farm practices can prove to be a conservation method in itself. Technology such as GPS and real-time yield monitors on harvesters allow farmers to get a better understanding of the limits of their fields. Data such as yields, moisture content, soil characteristics, etc. is downloaded into a GPS which then can control a variety of devices, such as; planters, sprayers, harvesters and even tillage equipment. Knowing this information can reduce farmers overall cost of inputs by limiting herbicide/pesticide application, nutrient application and planting rates just for starters.

## Impaired Waters

Soil and Water Conservation Districts are set up perfectly to implement agricultural BMPs to help with the plan. The Goodhue County SWCD has taken an active role in assessing Goodhue County's streams. Stream assessments need to be completed prior to a stream being listed as impaired. A stream assessment consists of collecting field data and water samples for lab analysis over the course of a few years. Lab analysis includes parameters such as Nitrates, Ammonia, Total Phosphorous, Chloride, Total Suspended Solids, Turbidity, *E.coli*, etc. After the stream data is collected and submitted to the MPCA for review, a stream may or may not be listed as impaired for one or more parameters. Continuing to expand the stream sampling network in Goodhue County is a priority. Testing for additional parameters will be a focus in the future.



Agricultural chemicals like Atrazine and Acetochlor can leech into our surface and drinking water. Testing these chemicals and locating potential sources of pollutant can help local government agencies when addressing land use practices.

Up until recently, many of the streams in Goodhue County have had no to little data collected on them. Watershed partnerships, MDA, MPCA, DNR and the SWCD have been collecting samples and conducting stream assessments over the past 8 years. The MPCA Environmental Data Access website hosts most of the stream and lake data collected within the state of Minnesota. All the data that the SWCD collects on streams within Goodhue County is submitted to this program each fall. This user-friendly website gives staff and the general public the ability to research the data collected on a given stream or lake.

Fecal Coliform (*E.coli*), another water quality impairment, is also abundant in some of the streams in Goodhue County. Sources of *E.coli* come from the lower intestinal track of human and other animals. *E.coli* can be easily tested in a collected water sample from a stream. If high levels of *e.coli* are found in a sample, some sort of human or animal activity is contributing to the problem. Failing septic systems and polluting open feedlots are the two main causes of increased fecal counts in streams the SWCD has tested thus far. The Goodhue SWCD applied and received a Clean Water Legacy Grant in 2007 to conduct an *E.coli* assessment in the Little Cannon River Watershed. We assessed every feedlot within the watershed and gave them each an individual FleVAL score. We also identified each septic system in the watershed and gave them scores based on age and location to a stream. We then broke down the entire Little Cannon River Watershed into 10 different sub-watersheds. We set up sample locations at the downstream end of each sub-watershed in order to collect actual *E.coli* data. From this data we were able to verify the feedlot and septic assessments that were conducted with real data over 2 years of sampling. A few minor sub-watersheds have shown to be a cause for concern in regards to *e.coli* levels. Feedlot and septic system fixes will now be targeted in these watersheds.

Turbidity, the most common impairment in southeast Minnesota is prevalent in the streams of Goodhue County. The Little Cannon River, Belle Creek, Spring Creek, Hay Creek, Mississippi and Cannon Rivers, and Prairie Creek all have listed impairments for turbidity. The watersheds which host turbidity impaired streams in Goodhue County are

dominated by row crop agricultural. The source of turbidity in these streams comes from agricultural runoff; directly and/or indirectly. Most fields have no winter cover crop thus leaving the ground unstable for 6 months of the year. Erosion can be a major issue during these periods. Storm runoff from a field can directly contribute to the sediment load in a local stream. Another source of sedimentation in an agricultural setting is streambank erosion. Streambank erosion is a natural erosive process, but when watershed landscapes are altered, the rate at which streambanks erode can increase. The loss of perennial vegetation is the main factor in stormwater flow rate increases in a streambed. Holding stormwater higher in the landscape, where the rain falls is an overall goal of the conservation practices which are implemented in the Goodhue SWCD office. Many of these practices were described in the previous section: Erosion and Sediment Control.

# Implementation Plan

## Urban/Residential Water Quality Management Implementation Plan

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**Erosion and Sediment Control** The goal of this concern is to limit and reduce erosion and control sediment from land use practices associated with urban development.

Objective 1: Provide leadership, education and staff time to assist cities, townships, developers and landowners in developing and implementing environmentally sound stormwater management practices.

Action Item 1a: Provide information on stormwater and erosion rules and regulations to 25 landowners, 1 township, 5 city staff and 5 contractors each year.

**Partners:** SWCD, City Staff, TWP, MPCA      **Time Line:** 2010 to 2020      **Cost:** \$1,200/year

Action Item 1b: Offer 5 remediation techniques on erosion and sediment control issues in urban areas.

**Partners:** SWCD, City Staff, MPCA      **Time Line:** 2010 to 2020      **Cost:** \$500/year

Action Item 1c: Assist Goodhue County Public Works Department with Public Waters permits compliance on all bridges and culverts effecting stream crossing. Assist County planning staff with proper stream alignment and debris issues as they arise.

**Partners:** SWCD, County Public Works, DNR      **Time Line:** 2010 to 2020      **Cost:** \$1,000/year

Action Item 1d: Cooperate with municipalities in Goodhue County who administer SWPPP and offer assistance in writing and implementing plans when applicable.

**Partners:** SWCD, City of Red Wing other City Staff, MPCA      **Time Line:** 2010 to 2020      **Cost:** \$1,500/year

Action Item 1e: Develop 1 urban stormwater BMP demonstration site to display the water quality benefits of practices that reduce volume and rate of stormwater runoff.

**Partners:** SWCD, City Staff, CRWP, ZWP, MNDOT, MPCA      **Time Line:** 2012 to 2014      **Cost:** \$65,000

Objective 2: Encourage maintenance on 10% of existing stormwater basins.

Action Item 2a: Assist City of Red Wing with inventory and inspections on 20 stormwater basins.

**Partners:** SWCD, City of Red Wing      **Time Line:** 2011 and 2016      **Cost:** \$1,000

Action Item 2b: Assist Goodhue County Public Works Department as well as all municipalities with stormwater detention pond maintenance needs

**Partners:** SWCD, County Public Works Staff      **Time Line:** 2015      **Cost:** \$2,500

Objective 3: Provide and seek financial incentives for implementing stormwater BMPs.

Action Item 3a: Encourage 2 developments to incorporate Low Impact Development strategies and proper platting techniques which compliment natural resource features.

**Partners:** SWCD, County Staff, City staff, Developers      **Time Line:** 2014-2020      **Cost:** \$1,500/yr

Action Item 3b: Seek and provide funding for 5 rain garden and infiltration basin retrofits within municipalities in Goodhue County to help achieve stormwater volume and rate reduction.

**Partners:** SWCD, City staff, Developers, Landowners      **Time Line:** 2012-2020      **Cost:** \$20,000/yr

Action Item 3c: Provide funding sources for 5 streambank restoration and stabilization within municipalities in Goodhue County.

**Partners:** SWCD, County Staff, City Staff, Landowners **Time Line:** 2011-2020 **Cost:** \$15,000/yr

**Septic System Compliance** The goal of this priority concern is to improve the groundwater and surface water resource in Goodhue County by using the tools available to increase septic system compliance.

Objective 1: Seek incentives from funding sources available which address septic system compliance in Goodhue County.

Action Item 1a: Continue to seek funding for and administer the AgBMP Loan program in the Goodhue SWCD office at least once per year.

**Partners:** SWCD, County Staff, Landowners **Time Line:** 2010-2020 **Cost:** \$25,000/yr

Action Item 1b: Apply for funding opportunities, like the Clean Water Fund, for financial assistance for fixing 5 ITPH systems and failing septic systems within Shoreland Districts each year.

**Partners:** SWCD, County Staff, BWSR, MPCA, Landowners **Time Line:** 2010-2020 **Cost:** \$50,000/yr

Objective 2: Support septic system compliance efforts in Goodhue County and SE Minnesota.

Action Item 2a: Offer support and assistance to Goodhue County Land Use Department when adopting a septic system Point-of-Sale Ordinance.

**Partners:** SWCD, County Staff, MPCA, SE MN Water Resources Bd. **Time Line:** 2010-2012 **Cost:** \$1,000/yr

Action Item 2b: Continue to support efforts made by Southeast Minnesota Wastewater Initiative staff and the Southeast Minnesota Water Resources Board in seeking additional funding and facilitating 1 cooperative meeting each year.

**Partners:** SWCD, Co. Staff, MPCA, SE MN Water Resources Bd., Wastewater Initiative **Time Line:** 2010-2020 **Cost:** \$2,000/yr

Action Item 2c: Assist Goodhue County Land Use Department with SSTS 2010 Rule Revision.

**Partners:** SWCD, County Staff, MPCA **Time Line:** 2010-2011 **Cost:** \$500/yr

Action Item 2d: Seek funding and provide education for 30 individual and 3 cluster septic system upgrades.

**Partners:** SWCD, County Staff, BWSR, MPCA, Landowners, SE Wastewater Initiative, **Time Line:** 2010-2020 **Cost:** \$25,000/yr

**Groundwater Protection** The goal of this priority concern s to protect the groundwater resource of Goodhue County by implementing the actions listed below.

Objective 1 Help support and educate source water protection efforts across Goodhue County

Action Item 1a: Assist participating municipality staff on Wellhead Protection Plan writing and implementation efforts.

**Partners:** SWCD, City Staff, MDA, MDH **Time Line:** 2010-2020 **Cost:** \$2,000/yr

Action Item 1b: Promote well sealing programs within WHP areas in one town each year.

**Partners:** SWCD, MDA, County Staff, MPCA, Landowners **Time Line:** 2010-2020 **Cost:** \$1,000/yr

Action Item 1c: Inspect all feedlots within DWSMAs in rotation every 4 years.

**Partners:** SWCD, MPCA **Time Line:** 2010-2020 **Cost:** \$1,500/yr

Action Item 1d: Identify all SSTS systems within DWSMAs and seek funding for non-compliant systems.  
**Partners:** SWCD, County Staff, MPCA, BWSR, Landowners      **Time Line:** 2012-2020      **Cost:** \$40,000/yr

Action Item 1e: Promote existing conservation programs to one town each year and offer source water protection ideas to city council and water supply staff.  
**Partners:** SWCD, City Staff, Elected Officials, MDH, MDA      **Time Line:** 2010-2015      **Cost:** \$10,000/yr

Action Item 1f: Encourage and assist 1city each year to work with landowners and map nutrient applications in DWSMAs.  
**Partners:** SWCD, County Staff, MPCA, NRCS, Landowners      **Time Line:** 2010-2020      **Cost:** \$1,000/yr

Action Item 1g: Identify and seek funding for fixing five leaking underground storage tanks within DWSMAs.  
**Partners:** SWCD, County Staff, City Staff, MPCA      **Time Line:** 2013-2014      **Cost:** \$4,000

Objective 2: Continue to develop a baseline of nitrate concentration in groundwater.

Action 2a: Administer and maintain the network of citizen volunteer nitrate monitors in Goodhue County.  
**Partners:** SWCD, County Staff, Volunteers Network, SE MN H2O Bd.      **Time Line:** 2010-2020      **Cost:** \$1,000/yr

Action 2b: Collect at least 1 nitrate sample and 1 Atrazine sample from each volunteer each year to maintain baseline data.  
**Partners:** SWCD, SE MN H2O Bd.      **Time Line:** 2010-2020      **Cost:** \$3,500/yr

Action Item 2c: Share data sets with other local and state agencies involved with well data each year  
**Partners:** SWCD, County Staff, MPCA, CRWP, ZWP, SE MN H2O Bd.      **Time Line:** 2010-2020      **Cost:** \$500/yr

Action Item 2b: Educate 75 landowners on overall groundwater quality in Goodhue County each year.  
**Partners:** SWCD, County Staff, MDH      **Time Line:** 2010-2020      **Cost:** \$500/yr

**Impaired Waters** The goal of this objective is to continue to assess water bodies for impairments and take steps to repair impaired waters and watersheds.

Objective 1: Educate urban residents on water quality impairments in Goodhue County

Action Item 1a: Provide 1 brochure and 1 news releases on yard waste rules and pick up days each year.  
**Partners:** SWCD, County Staff, City Staff, CRWP, ZWP      **Time Line:** 2010-2020      **Cost:** \$1,500/yr

Action Item 1b: Promote composting efforts in Red Wing every other year with 1 newspaper bulletin.  
**Partners:** SWCD, Red Wing Staff, MPCA      **Time Line:** 2011-2020      **Cost:** \$500/yr

Action Item 1c: Conduct 1 stormwater intake stamping day within municipalities in Goodhue County.  
**Partners:** SWCD, City Staff, MPCA      **Time Line:** 2012-2020      **Cost:** \$2,500/yr

Objective 2: Promote new and existing rules, ordinances and BMPs within cities which contribute to impaired waters.

Action Item: 2a: Perform a Phosphorous workshop for landowners and commercial applicators on the 'No Phosphorous' state law in Minnesota and survey compliance in each city over 5 years  
**Partners:** SWCD, County Staff, City Staff, MPCA, Extension      **Time Line:** 2011-2015      **Cost:** \$1,500/yr



Action Item 2b: Inventory each municipality's street sweeping programs and seek funding for improved maintenance programs.

**Partners:** SWCD, City Staff, MECA, MPCA      **Time Line:** 2011-2015      **Cost:** \$1,000/yr

Action Item 2c: Routinely assist municipalities with construction site inspections for erosion and sediment control.

**Partners:** SWCD, City Staff, MPCA      **Time Line:** 2010-2020      **Cost:** \$2,500/yr

Action Item 2d: Seek funding for 1 erosion and sediment inspector to follow up on MPCA issued Stormwater NPDES permits. **Partners:** SWCD, MPCA      **Time Line:** 2010-2020      **Cost:** \$35,000/yr

## **Rural/Agricultural Water Quality Management Implementation Plan**

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**Erosion and Sediment Control** The goal of this concern is to limit and reduce erosion and control sediment from land use practices associated with agricultural practices.

Objective 1: Establish and maintain stream and field vegetated buffers in accordance with Goodhue County Zoning Ordinance.

Action Item 1a: Continue to educate all township supervisors, County staff and landowners on the Shoreland Ordinance and the importance of buffers.

**Partners:** SWCD, TWP, County Staff, Elected Officials      **Time Line:** 2010-2020      **Cost:** \$2,000/yr

Action Item 1b: Utilize GIS land use buffer layer developed by Cannon River Watershed Partnership to identify location needs of buffers on 400 acres across Goodhue County.

**Partners:** SWCD, CRWP, County Staff, Landowners      **Time Line:** 2010-2020      **Cost:** \$3,000/yr

Action Item 1c: Provide the Goodhue County Land Use Department with proper technical support when addressing buffer all related issues.

**Partners:** SWCD, County Staff      **Time Line:** 2010-2020      **Cost:** \$5,000/yr

Action Item 1d: Continue to provide and seek funding for financial incentives for 100 acres of buffer installations.

**Partners:** SWCD, County Staff, Landowners      **Time Line:** 2010-2020      **Cost:** \$20,000/yr

Action Item 1e: Promote 50 acres of harvestable buffers to landowners who can utilize those perennial crops in buffer settings.

**Partners:** SWCD, CRWP, ZWP, County Staff, Landowners      **Time Line:** 2010-2020      **Cost:** \$1,500/yr

Objective 2: Increase and maintain perennial vegetation on the landscape in Goodhue County

Action Item 2a: Promote and establish 5 acres of cover crop practices on canning crops and silage fields each year

**Partners:** SWCD, CRWP, ZWP, NRCS, SE MN H2O Bd      **Time Line:** 2011-2020      **Cost:** \$3,500/yr

Action Item 2b: Increase the amount of managed wood land on marginal row crop acres by 5 acres each year

**Partners:** SWCD, CRWP, ZWP, DNR, NRCS      **Time Line:** 2010-2020      **Cost:** \$1,500/yr

Action Item 2c: Partner with Pheasants Forever and other non-profit organizations to establish and maintain native grasses on interested landowners' property yearly.

**Partners:** SWCD, CRWP, ZWP, PF, NRCS, FSA      **Time Line:** 2010-2020      **Cost:** \$2,500/yr

Objective 3: Preserve, enhance and increase wetland resources in the Zumbro River and Cannon River watersheds.

Action Item 3a: Promote and market 20 acres of wetland preservation and restoration programs such as CRP, WRP, RIM and BWSR Wetland Banks each year.

**Partners:** SWCD, NRCS, FSA, BWSR, Landowners **Time Line:** 2010-2020 **Cost:** \$1,000/yr

Action Item 3b: Yearly provide and promote preservation programs to 5 wetland landowners such as Wetland Preserve Area Program and the Rural Preserve Property Tax Program in an attempt to alleviate tax burdens.

**Partners:** SWCD, BWSR, County Staff, Landowners **Time Line:** 2010-2020 **Cost:** \$4,500/yr

Action Item 3c: Educate all staff, 5 contractors and 50 landowners on the values of wetland functions and the Wetland Conservation Act of Minnesota each year.

**Partners:** SWCD, Contractors, NRCS, City/County Staff **Time Line:** 2010-2020 **Cost:** \$500/yr

Objective 4: Provide technical and financial assistance to Goodhue County landowners interested in reducing erosion and sediment by implementing BMPs in an effort to improve water quality

Action Item 4a: Actively market local/state/federal conservation programs which provide incentives to 30 landowners interested in reducing flooding and erosion each year.

**Partners:** SWCD, BWSR, NRCS, FSA, Landowners **Time Line:** 2010-2020 **Cost:** \$1,500/yr

Action Item 4b: Assist 5 landowners with establishing and demonstrating conservation tillage and rotational grazing methods that have proven to be cost effective and benefit water quality. Using the tillage transect data each year, target areas of the County that have the lowest residue amounts.

**Partners:** SWCD, CRWP, ZWP, NRCS, U of M, MDA, and SE MN H2O Bd. **Time Line:** 2011-2020 **Cost:** \$2,500/yr

Action Item 4c: Provide leadership and staff time to market, implement and maintain long-term conservation programs such as CREPII, WRP and RIM on 200 acres of conservation land.

**Partners:** SWCD, BWSR, NRCS **Time Line:** 2010-2020 **Cost:** \$2,000/yr

Action Item 4d: Seek increased cost-share rates (above 75%) on conservation practices that will have a public benefit by reducing sedimentation and flooding potential.

**Partners:** SWCD, CRWP, ZWP, NRCS, BWSR, SE MN H2O Bd. **Time Line:** 2010-2020 **Cost:** \$1,500/yr

### **Feedlot Water Quality Improvement** The goal of this concern is to improve water quality by feedlot T/A and financial assistance on feedlot fixes.

Objective 1: Provide feedlot owners and operators with proper education on feedlot compliance

Action 1a: Educate at least 30 landowners per year on MN 7020 Feedlot rules along with Goodhue County Feedlot Ordinance.

**Partners:** SWCD, Landowners, County Staff, TWP Staff, MPCA **Time Line:** 2010-2020 **Cost:** \$2,500/yr

Action 1b: Develop and maintain a web page illustrating available feedlot cost-share programs on the Goodhue County SWCD website.

**Partners:** SWCD, County Staff, MPCA, Web Consultant **Time Line:** 2010-2020 **Cost:** \$1,000/yr

Action 1c: Provide an opportunity for 20 feedlot owner or operators to tour the latest feedlot BMPs implemented in Goodhue and surrounding Counties every other year.



**Partners:** SWCD, County Staff, MPCA, Landowners, Elected Officials      **Time Line:** 2010-2020      **Cost:** \$1,500/yr

Objective 2: Provide financial and technical assistance to feedlot owner and operators to achieve feedlot compliance.

Action Item 2a: Continue to solicit funding for 10 low-cost feedlot improvements on feedlots with 300 AU or less yearly.

**Partners:** SWCD, MPCA, SE MN H2O Bd.      **Time Line:** 2010-2020      **Cost:** \$10,000/yr

Action Item 2b: Sign letters of intent with at least 2 feedlot owners interested in large feedlot fixes by August of each year for CWF submittal in the fall.

**Partners:** SWCD, MPCA, CRWP, ZWP      **Time Line:** 2010-2020      **Cost:** \$1,000/yr

Action Item 2c: Design and offer solutions to 15 feedlot owner/operators with pollution problems on open lots yearly.

**Partners:** SWCD, MPCA, Landowners      **Time Line:** 2010-2020      **Cost:** \$35,000/yr

Action Item 2d: Design and seek funding for a feedlot fix located at the 4-H Barn at the Goodhue County Fairgrounds in Zumbrota.

**Partners:** SWCD, Fairgrounds Bd, MPCA,      **Time Line:** 2011-2012      **Cost:** \$30,000/yr

Objective 3: Provide financial and technical assistance to feedlot owner and operators to achieve feedlot compliance

Action 3a: Appoint 1 fulltime position per 500 feedlots in Goodhue County as recommended by MPCA to provide assistance in feedlot registration, permits and construction.

**Partners:** SWCD, County Staff, MPCA,      **Time Line:** 2010-2020      **Cost:** \$50,000/yr

**Nutrient Management The goal of this concern is to provide the resources available to County staff to landowners to help implement sound BMP s.**

Objective 1: Assist rural landowners in adopting and following comprehensive nutrient management practices.

Action Item 1a: Conduct fertilizer application assessments on 1 golf course and park within Shoreland District in Goodhue County each year.

**Partners:** SWCD, Park and Golf Course Operators, MPCA, County Staff      **Time Line:** 2011-2015      **Cost:** \$3,000/yr

Action Item 1b: Promote and market cost-share programs that assist in nutrient management plan writing and practice installation for 5 landowners each year.

**Partners:** SWCD, NRCS, MPCA, U of M Ext.      **Time Line:** 2010-2020      **Cost:** \$2,000/yr

Action Item 1c: Educate 10 feedlot owner/operators on the value of manure and the importance of record keeping.

**Partners:** SWCD, Feedlot Operators, MPCA,      **Time Line:** 2010-2020      **Cost:** \$1,000/yr

Objective 2: Identify sensitive features for nutrient applicators and decision makers in various GIS formats.

Action Item 2a: Provide farm scale aerial maps depicting where and where not to apply nutrients and the location of sensitive features for 15 landowners each year.

**Partners:** SWCD, County Staff, CRWP, ZWP, Landowners      **Time Line:** 2010-2020      **Cost:** \$5,000/yr

Action Item 2b: In GIS format, map all WWTF sludge application sites in Goodhue County.

**Partners:** SWCD, County Staff, City Staff, Applicators, MPCA      **Time Line:** 2011-2020      **Cost:** \$5,000/yr

Objective 3: Educate private and commercial land applicators on the regulations and benefits of fertilizers.

Action Item 3a: Host a chemical/fertilizer applicators meeting each year with the 15 local cooperatives

**Partners:** SWCD, Local Cooperatives, MPCA, County Staff, Elected Officials      **Time Line:** 2011-2020      **Cost:** \$2,000/yr

**Impaired Waters** The goal of this objective is to continue to assess water bodies for impairments and take steps to repair impaired waters and watersheds.

Objective 1: Assess surface waters in Goodhue County for their designated uses.

Action Item 1a: Continue to development a stream monitoring network in Goodhue County. Focus efforts on streams with little or no baseline water quality data and on parameters which we have little data for.

**Partners:** SWCD, BWSR, DNR, MDA, MPCA, ZWP, CRWP, Volunteers      **Time Line:** 2010-2020      **Cost:** \$15,000/yr

Action Item 1b: Seek funding sources for 2 initial stream assessments and 1 long term monitoring site.

**Partners:** SWCD, DNR, MDA, MPCA, ZWP, CRWP, Volunteers      **Time Line:** 2010-2020      **Cost:** \$12,000/yr

Action Item 1c: Submit all water quality data collected on streams and lakes in Goodhue County into the STORET data base yearly.

**Partners:** SWCD, MPCA,      **Time Line:** 2010-2020      **Cost:** \$1,000/yr

Action Item 1d: Assist with ongoing monitoring efforts in place by MPCA, CRWP, ZWP, etc. in an attempt to further understand the water resource.

**Partners:** SWCD, BWSR, DNR, MDA, MPCA, ZWP, CRWP, Volunteers      **Time Line:** 2010-2020      **Cost:** \$2,000/yr

Objective 2: Address impaired waters in watersheds which host an impairment listing.

Action Item 2a: Partner with local/regional/state agencies on developing TMDL studies and Implementation plans each year.

**Partners:** SWCD, BWSR, DNR, MDA, MPCA, ZWP, CRWP      **Time Line:** 2010-2020      **Cost:** \$7,500/yr

Action Item 2b: Educate 10 landowners and 5 staff on TMDL Implementation Plan and the objectives needed to achieve load reduction goals yearly.

**Partners:** SWCD, MPCA, ZWP, CRWP, County/City Staff, General Public      **Time Line:** 2010-2020      **Cost:** \$1,000/yr

Action Item 2c: Address water quality impairments by designing and installing 5 conservation practices in targeted watersheds yearly.

**Partners:** SWCD, BWSR, MPCA, Landowners, SE MN H2O Bd.      **Time Line:** 2010-2020      **Cost:** \$75,000/yr

Action Item 2d: Provide a summary of monitoring data in Goodhue County to give the general public a better understanding of the quality surface water each year. Make this information available on the Goodhue County SWCD Website.

**Partners:** SWCD, MPCA, County Staff, Web Consultant      **Time Line:** 2010-2020      **Cost:** \$2,500/yr

## Ongoing Programs

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The Priority Concern Scoping Document contains information of concerns that were not directly addressed in this update of the plan. This section contains programs which are currently being implemented to help address those concerns. Thus, as a committee, we decided that including those concerns would be repetitive. This ongoing programs section will inform the reader of current activities which relate to water resources in Goodhue County.

### **USDA Wetland Regulations (Swampbusters)**

This wetland provision of the Farm Bill requires agricultural producers to protect and maintain wetlands on their property in order to be eligible for USDA Farm Program benefits.

### **WCA**

The Wetland Conservation Act of 1991 states that a “no net loss” of drained, filled or excavated wetlands shall occur without a replaced/restored wetland to replace them. The replaced/restored wetland should be of equal or greater size and quality. Wetlands administration falls upon the Local Government Unit (Goodhue County SWCD) and the DNR. The Local Government Unit (LGU) issues exemptions, no-loss or replacement plan determinations for drainage excavation or filling activities in wetlands.

### **DNR Waters Permits**

The DNR can also administer WCA in certain instances. DNR does have public waters permits that cover a wide range of activities in when working with lakes, stream, and wetlands. During their permit process, the SWCD is often asked to review and comment on specific projects for WCA and erosion issues.

### **NPDES**

The National Pollution Discharge Elimination System is a national program which is designed to reduce sediment and pollution that enters surface and groundwater during and after construction projects. Construction activities which disturb one or more acres of land, a NPDES permit is required. This permit requires proper erosion control practices to be installed. This is the same program which regulates amounts of pollution that wastewater treatment facility, large feedlot operations and other industries can release into the atmosphere and water.

### **Feedlots**

MN Rules 7020 were revised and adopted by the state in 2000. Goodhue County became a delegated county in the MPCA’s feedlot program January 1, 2001. The delegation agreement between the County and MPCA provides Goodhue County with the authority to register all feedlot and manure storage areas within the county, distribute and review feedlot or manure storage permit applications, issue construction short form or interim permits, inspect all feedlot and manure storage areas, and review and process complaints. Goodhue County has over 1000 feedlot registered as of January 1<sup>st</sup>, 2010

### **MEPA**

The Minnesota Environmental Policy Act is a state law passed in 1973 which aims to prevent and eliminate damage to the environment as a whole. Environmental Impact Statements (EIS) and Environmental Assessment Worksheets (EWA) may be requested by a petition from an interested group under this act.

### **RUSLE**

The Revised Universal Soil Loss Equation is a tool developed by the USDA which is used as an estimate for soil loss. Variables such as cover and soil types are a function of its equation. Goodhue County currently has a soil loss ordinance being practiced.

## **CRP**

Goodhue County as of February 2009, there were approximately 9,400 acres enrolled in the Conservation Reserve Program, Continuous CRP and CREP. New enrollment and resigning of this conservation program continue in Goodhue County.

## **State Cost Share Program**

This program is administrated at the state level by the Board of Water and Soil Resources and locally by the SWCD. This program provides funding for landowners to implement conservation practices on their land. Conservation practices that reduce flooding, erosion and improve water quality are the most popular in the Goodhue SWCD office. See the BWSR State-Cost Share Manual link in the appendix for further information on eligible BMPS.

## **EQIP**

Environmental Quality Incentive Program is a USDA administered program intended to provide incentives to USDA qualified farm program operators in implementing BMPs on the land. The Natural Resource Conservation Service (NRCS) in Goodhue County funnel about \$250,000 to \$300,000 worth of incentives to landowners annually. Cost-share practices include grassed waterways, terraces, grade stabilization structures, sediment basins, reduce/no-tilling practices, grazing systems, etc. The Wildlife Habitat Incentive Program (WHIP) is another program that provides technical assistance and cost-share opportunities to landowners interested in restoring and enhancing wildlife habitat and fish habitat.

## **Public/Private Wells**

As a goal of the 1997 revised water plan, water test kits are currently being provided for pregnant women and newborns for a reduced rate. These test kits are sent to a certified lab to measure levels of nitrates and coliform bacteria in drinking water sources. These kits are available at Goodhue County Public Health Department and the SWCD office. Hospitals and Women with Infant Children (WIC) should direct pregnant women to either of these offices to purchase the kits at a reduced rate. Every year for the past 7 years a free nitrate testing station was held at the Goodhue County Fair. County citizens are able to bring samples of their drinking water in to get tested at the fair free of charge. The sample location is recorded along with the nitrate level. Samples can either come from private wells or community wells, which are generally regulated by a community provider.

## **Wellhead Protection**

Communities that provide safe drinking water to the public should have some sort of wellhead protection plan established. Basically a wellhead protection area is an area surrounding a well where water is captured and recharges the drinking water supply. This area should be delineated and boundaries clearly labeled. The process of developing a wellhead protection plan needs to be a coordinated effort between; the community where the plan is located, local unit of government, Goodhue County Public Health and the Minnesota Department of Health. Managing land use in this area can have a major influence on a communities drinking water supply in the future. Currently Cannon Falls, Pine Island and Goodhue have a plan or are currently going through the process of developing one.

## **TMDL**

The Minnesota Pollution Control Agency (MPCA), through the Clean Water Act, is the lead agency for conducting the Total Maximum Daily Load (TMDL) studies in the state of Minnesota. TMDL studies can show the source of a particular pollutant and how much (load) of a pollutant a water body can support and steps that can be taken to reduce the pollutant source (Implementation Plan). Lake Pepin TMDL study is currently underway, along with many other water bodies across SE Minnesota. A list of completed, current and future TMDL studies can be found on the MPCA website which is included in the appendix.

## **Sewage and Wastewater Treatment Plants**



Goodhue County supports the Southeast Minnesota Wastewater Initiative (SEMNWI) in a regional effort to achieve septic tank compliance. SEMNWI received a 319 grant of \$530,000 to educate local officials and the public about health and water quality effects of untreated sewage and septic systems. The Cannon River Watershed Partnership houses the SEMNWI staff which promotes upkeep and replacement of failing septic systems that pose a health risk. The Goodhue County Public Health Department has numerous brochures, pamphlets and folders on the operations and maintenance of septic systems. Once a year, the SWCD and the Public Health office will run a column in a newspaper and host a contractor's workshop to remind septic owners/operators to check/maintain/pump their systems.

### **Solid Waste Management**

The Goodhue County Solid Waste Management Department is taking actions to protect the surface and ground water resources of the County. This department is the driving force of the County's recycling efforts. Household Hazardous Waste Collection days are typically held in the spring and summer months throughout the County. On these collection days, people can bring their old, unused or unwanted paints, pesticides and anything from their homes with a hazard warning label. The Department also coordinates a series of Clean-up days where people can bring their old appliances, batteries, furniture, computers etc. in for proper disposal. The Solid Waste Department also regulates all waste management facilities in Goodhue County as well as licensing waste haulers, underground tanks conditions, and landfills. These restrictions help the overall quality of surface water and groundwater by managing soil contamination.

### **Floodplain and Shoreland Management**

Floodplain and Shoreland Management is a program through the DNR and administered by the LGU which is the Planning and Zoning Department. The overall goal of the program is to preserve and enhance the quality of surface waters, preserve the economic values of shoreland properties and ensure the sustainable use of water and related resources. Under this program restrictions and management guides are followed when a development is in the vicinity of surface water. These guidelines focus on the realization on the value of shoreland areas, and applying best management practices when construction work is needed.

# Appendix

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## Helpful Web Links

### Board of Water and Soil Resources (BWSR) Links

Wetlands

<http://www.bwsr.state.mn.us/wetlands/index.html>

State Cost-Share Manual

<http://www.bwsr.state.mn.us/cs/index.html>

Water Plan Information

<http://www.bwsr.state.mn.us/planning/CLWM/index.html>

### Erosion Control Links

Erosion Control Technology Council

<http://www.ectc.org/index.asp>

Minnesota Erosion Control Association

<http://www.mnerosion.org/>

MPCA Stormwater Manual

<http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>

### Goodhue County Links

Goodhue County SWCD

<http://www.goodhueswcd.org/>

Zoning Ordinance

<http://www.co.goodhue.mn.us/departments/landuse/zoning/index.aspx>

Comprehensive Plan

<http://www.co.goodhue.mn.us/departments/landuse/planning/2009CompPlanUpdate.aspx>

GIS/Online Mapping

<http://www.co.goodhue.mn.us/departments/landuse/gis/OnlineGISMapping.aspx>

School Districts, Commissioner Districts, House and Senate Districts, Natural Resource Inventory,

Groundwater Sensitivity to Pollution

<http://www.co.goodhue.mn.us/departments/landuse/gis/generalmaps.aspx>

Geologic Atlas Plates

[http://www.dnr.state.mn.us/waters/programs/gw\\_section/mapping/platesum/goodcga.html](http://www.dnr.state.mn.us/waters/programs/gw_section/mapping/platesum/goodcga.html)

### Minnesota Department of Agriculture (MDA)

General

<http://www.mda.state.mn.us/>

Phosphorous Free Law Information

<http://www.mda.state.mn.us/protecting/waterprotection/phoslaw.aspx>

### Minnesota Department of Health (MDH) Source Water Assessment Site (Wellhead Protection)

<http://www.health.state.mn.us/divs/eh/water/swp/index.htm>

### Minnesota Department of Natural Resources (DNR)

Waters <http://www.dnr.state.mn.us/waters/index.html>

## Minnesota Pollution Control Agency (MPCA)

Manure Application setback Information

<http://www.pca.state.mn.us/publications/wq-f8-11.pdf>

TMDL Link

<http://www.pca.state.mn.us/water/tmdl/>

Clean Water Act Section 319

<http://www.pca.state.mn.us/water/319.html>

Surface Water Assessment (Water Quality Data)

<http://www.pca.state.mn.us/data/eda/index.cfm>

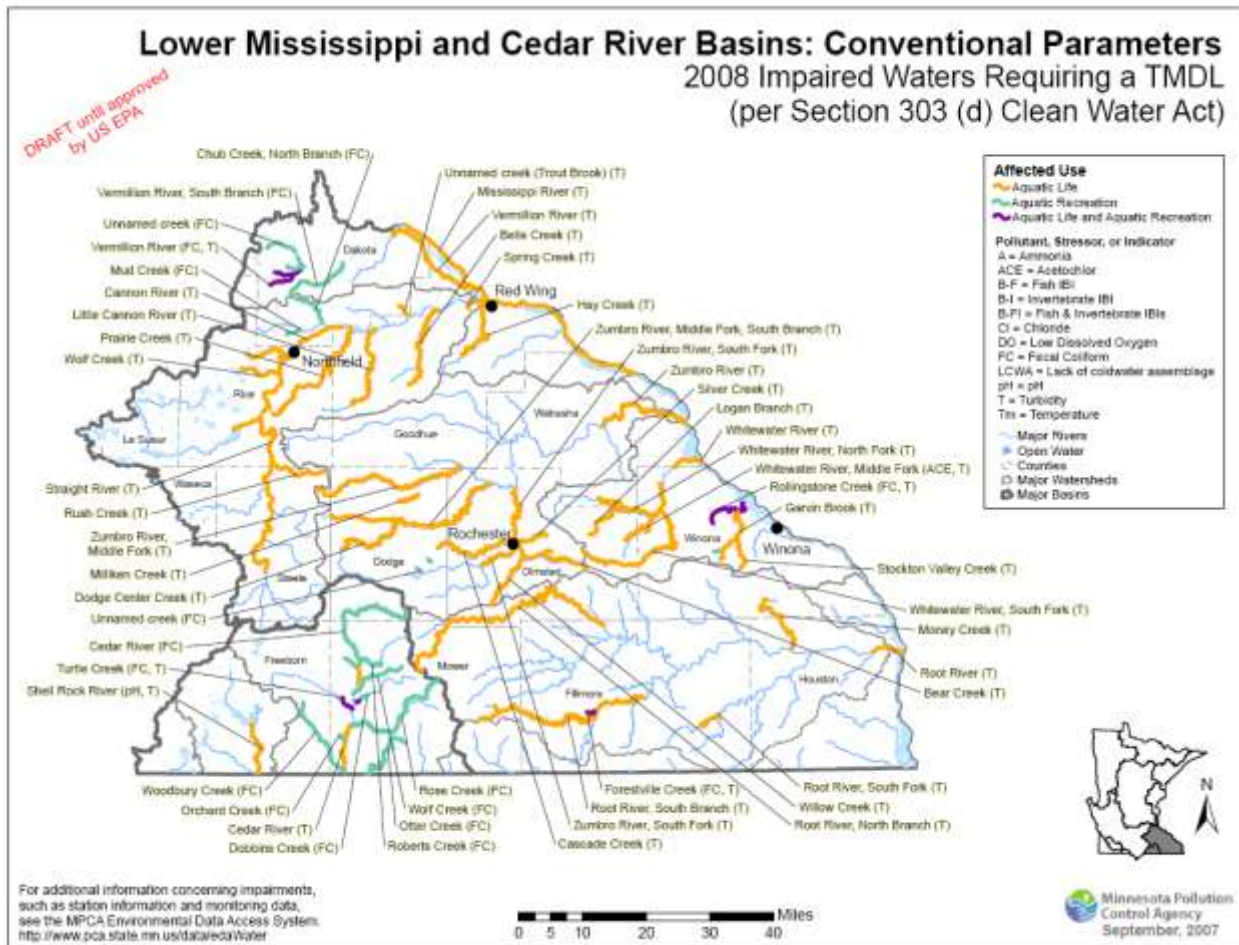
## United State Department of Agriculture (USDA) Links

CRP, EQIP, WHIP and Other Related Programs

<http://www.mn.nrcs.usda.gov/programs/>

Web Soil Survey

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>



# Follow Minnesota's Phosphorus Lawn Fertilizer Law

**\*Starting January 1, 2005, fertilizers containing phosphorus cannot be used on lawns in Minnesota.**

## Identify the fertilizer

There are three identifying numbers on a bag of fertilizer. Find the phosphorus content by looking for the middle number.



It must be **0**.

\*These restrictions do not apply to fertilizers used for agricultural crops, flowers and vegetable gardening, or on golf courses by trained staff.

\*Exemptions - Fertilizers containing phosphorus may be used on lawns if a soil test indicates that it is needed or if you are establishing a new lawn.



For more information go to the Minnesota Department of Agriculture website: [www.mda.state.mn.us](http://www.mda.state.mn.us)



In accordance with the Americans With Disabilities Act, an alternative form of communication is available upon request. TTY: 1-800-651-627-2529  
The Minnesota Department of Agriculture is an Equal Opportunity Employer

## Acreeage and Proportiona te Extent of the Soils

Goodhue County, Minnesota

Map symbol	Map unit name	Acres	Percent
1003	Udorthents, loamy (cut and fill land)	195	*
1007	Udorthents, shallow (sanitary landfill)	38	*
1010	Pits, quarry	269	*
1027A	Coland-Spillville complex, 0 to 2 percent slopes, flooded	3,072	0.6
1033A	Spillville loam, 0 to 2 percent slopes, occasionally flooded	140	*
1036A	Udipsamments, 0 to 2 percent slopes, frequently flooded	59	*
1038	Udorthents, earthen dam	37	*
1051C	Udorthents, loamy (abandoned clay pits), 2 to 45 percent slopes	226	*
GP	Pits, gravel-Udipsamments complex	686	0.1
L171A	Merton silt loam, 1 to 3 percent slopes	184	*
L177B	Moland silt loam, 2 to 6 percent slopes	6	*
L180A	Maxcreek silty clay loam, 0 to 2 percent slopes	702	0.1
M505A	Klinger silt loam, 1 to 3 percent slopes	17,392	3.5
M506B	Kasson silt loam, 1 to 6 percent slopes	19,855	4.0
M507A	Marquis silt loam, 1 to 3 percent slopes	1,171	0.2
M507B	Marquis silt loam, 2 to 6 percent slopes	22,772	4.6
M508A	Oran silt loam, 1 to 3 percent slopes	347	*
M509A	Mantorville loam, 0 to 2 percent slopes	199	*
M509B	Mantorville loam, 2 to 6 percent slopes	374	*
M509C2	Mantorville loam, 6 to 12 percent slopes, moderately eroded	104	*
M510A	Maxfield silty clay loam, 0 to 2 percent slopes	18,459	3.7
M511A	Readlyn silt loam, 1 to 3 percent slopes	1,006	0.2
M516C2	Wangs-Wagen Prairie complex, 6 to 12 percent slopes, moderately eroded	631	0.1
M516D2	Wangs-Wagen Prairie complex, 12 to 18 percent slopes, moderately eroded	417	*
M516E	Wangs-Wagen Prairie complex, 18 to 35 percent slopes	404	*
M518B	Clyde-Floyd complex, 1 to 4 percent slopes	15	*
M520B	Rasset sandy loam, 0 to 6 percent slopes	1,883	0.4
M520C2	Rasset sandy loam, 6 to 12 percent slopes, moderately eroded	247	*
M521C2	Kenyon silt loam, 6 to 12 percent slopes, moderately eroded	972	0.2
M522D2	Bassett-Racine complex, 12 to 18 percent slopes, moderately eroded	4,021	0.8
M522E	Bassett-Racine complex, 18 to 25 percent slopes	1,144	0.2
M523C2	Bassett-Kasson complex, 6 to 12 percent slopes, moderately eroded	10,270	2.1
M525A	Dakota silt loam, 0 to 3 percent slopes	1,127	0.2
M526B	Winneshiek silt loam, 2 to 6 percent slopes	760	0.2

M526C2	Winneshiek silt loam, 6 to 12 percent slopes, moderately eroded	466	*
M527D2	Nasset-Winneshiek complex, 12 to 18 percent slopes, moderately eroded	68	*
M532A	Maxfield silty clay loam, 0 to 2 percent slopes, occasionally flooded	5,263	1.1
M534B	Estherville-Ridgeport complex, 0 to 6 percent slopes	2,093	0.4
M535B	Wagen Prairie silt loam, 2 to 6 percent slopes	405	*
M536C2	Meridian, till substratum-Bassett complex, 6 to 12 percent slopes, moderately eroded	411	*
M536D2	Meridian, till substratum-Bassett complex, 12 to 18 percent slopes, moderately eroded	337	*
M537E	Meridian-Bassett complex, 18 to 35 percent slopes	138	*
M538A	Waukegan silt loam, 0 to 2 percent slopes	5,139	1.0
M539F	Bellechester loamy sand, 18 to 45 percent slopes	524	0.1
M540F	Frontenac-Bellechester complex, 18 to 45 percent slopes	2,230	0.4
M541C2	Copaston loam, 6 to 12 percent slopes, moderately eroded	224	*
M541D	Copaston loam, 12 to 18 percent slopes	142	*
M-W	Water, miscellaneous	28	*
N501B	Downs silt loam, 2 to 6 percent slopes	106	*
N501C2	Downs silt loam, 6 to 12 percent slopes, moderately eroded	91	*
N501D2	Downs silt loam, 12 to 18 percent slopes, moderately eroded	105	*
N507B	Timula-Mt. Carroll complex, 2 to 6 percent slopes	12,203	2.4
N507C2	Timula-Mt. Carroll complex, 6 to 12 percent slopes, moderately eroded	17,180	3.4
N507D2	Timula-Mt. Carroll complex, 12 to 18 percent slopes, moderately eroded	12,117	2.4
N507E	Timula-Mt. Carroll complex, 18 to 25 percent slopes	2,506	0.5
N508E	Seaton silt loam, 18 to 25 percent slopes	1,296	0.3
N514B	Joy-Ossian, occasionally flooded, complex, 1 to 5 percent slopes	8,897	1.8
N517A	Oak Center-Mt. Carroll complex, 0 to 2 percent slopes	668	0.1
N518B	Lindstrom silt loam, 2 to 6 percent slopes	1,004	0.2
N518C2	Lindstrom silt loam, 6 to 12 percent slopes, moderately eroded	1,171	0.2
N518D2	Lindstrom silt loam, 12 to 18 percent slopes, moderately eroded	1,162	0.2
N519B	Vasa silt loam, 1 to 4 percent slopes	2,558	0.5
N521B	Mt. Carroll silt loam, 2 to 6 percent slopes	2,209	0.4
N521C2	Mt. Carroll silt loam, 6 to 12 percent slopes, moderately eroded	3,091	0.6

### Acreage and Proportionate Extent of the Soils *continued*

Goodhue County, Minnesota

Map symbol	Map unit name	Acres	Percent
N521D2	Mt. Carroll silt loam, 12 to 18 percent slopes, moderately eroded	2,123	0.4
N522A	Otter silt loam, channeled upland, 0 to 2 percent slopes, frequently flooded	3,282	0.7
N526B	Gale-Oak Center complex, 1 to 6 percent slopes	314	*
N526F	Gale-Oak Center complex, 18 to 45 percent slopes	97	*
N534E	Downs-Nasset complex, 18 to 25 percent slopes	179	*
N535B	Hesch-Rasset complex, 1 to 6 percent slopes	1,647	0.3
N537E2	Fayette-Hersey, bedrock substratum, complex, 18 to 25 percent slopes, moderately eroded	205	*
N538C2	Waubek and Massbach soils, 6 to 12 percent slopes, moderately eroded	105	*
N552B	Schapville-Winneshiek complex, 2 to 6 percent slopes	2	*
N553B	Frankville-Nasset-Mt. Carroll complex, 2 to 6 percent slopes	45	*
N553C2	Frankville-Nasset-Mt. Carroll complex, 6 to 12 percent slopes, moderately eroded	305	*
N553D2	Frankville-Nasset-Mt. Carroll complex, 12 to 18 percent slopes, moderately eroded	1,100	0.2
N553E	Frankville-Nasset-Mt. Carroll complex, 18 to 35 percent slopes	3,472	0.7
N555B	Tama-Dinsmore complex, 2 to 6 percent slopes	54	*
N572B	Downs-Hersey, bedrock substratum, complex, 2 to 6 percent slopes	411	*
N572C2	Downs-Hersey, bedrock substratum, complex, 6 to 12 percent slopes, moderately eroded	762	0.2
N572D2	Downs-Hersey, bedrock substratum, complex, 12 to 18 percent slopes, moderately eroded	1,053	0.2
N574B	Downs-Hersey complex, 2 to 6 percent slopes	10,519	2.1
N574C2	Downs-Hersey complex, 6 to 12 percent slopes, moderately eroded	7,130	1.4
N574D2	Downs-Hersey complex, 12 to 18 percent slopes, moderately eroded	952	0.2
N576B	Rasset fine sandy loam, 0 to 6 percent slopes	784	0.2
N577A	Shandep-Cylinder complex, 0 to 2 percent slopes	1,078	0.2
N578B	Barremills silt loam, drainageway, 1 to 5 percent slopes, occasionally flooded	9,417	1.9
N579A	Dakota silt loam, 0 to 3 percent slopes	6,317	1.3
N580G	Brodale, very flaggy-Bellechester-Rock outcrop complex, 45 to 90 percent slopes	339	*
N581B	Rockton-Atkinson complex, strath terrace, 0 to 6 percent slopes	776	0.2
N581C2	Rockton-Atkinson complex, strath terrace, 6 to 12 percent slopes, moderately eroded	74	*
N582B	Newhouse-Valton complex, 2 to 6 percent slopes	153	*
N582C2	Newhouse-Valton complex, 6 to 12 percent slopes, moderately eroded	572	0.1
N582D2	Newhouse-Valton complex, 12 to 18 percent slopes, moderately eroded	2,223	0.4
N584E	Downs silt loam, valleys, 18 to 25 percent slopes	2,236	0.4
N585B	Mt. Carroll-Hersey complex, 2 to 6 percent slopes	53,756	10.8
N585C2	Mt. Carroll-Hersey complex, 6 to 12 percent slopes, moderately eroded	30,496	6.1
N585D2	Mt. Carroll-Hersey complex, 12 to 18 percent slopes, moderately eroded	5,837	1.2
N586C2	Ridgeton, sandy substratum-Eden Prairie complex, 6 to 12 percent slopes, moderately	1,146	0.2



N586D2	Ridgeton, sandy substratum-Eden Prairie complex, 12 to 20 percent slopes, moderately	1,423	0.3
N590C2	Tama silt loam, valleys, 6 to 12 percent slopes, moderately eroded	839	0.2
N590D2	Tama silt loam, valleys, 12 to 18 percent slopes, moderately eroded	2,022	0.4
N591A	Port Byron silt loam, 0 to 2 percent slopes	915	0.2
N591B	Port Byron silt loam, 2 to 6 percent slopes	8,733	1.7
N591C2	Port Byron silt loam, 6 to 12 percent slopes, moderately eroded	1,091	0.2
N592B	Crescent-Eden Prairie complex, 2 to 6 percent slopes	546	0.1
N593B	Sparta loamy sand, 0 to 6 percent slopes	4,542	0.9
N593C	Sparta loamy sand, 6 to 12 percent slopes	383	*
N594B	Chelsea loamy sand, 2 to 6 percent slopes	1,304	0.3
N594C	Chelsea loamy sand, 6 to 12 percent slopes	1,023	0.2
N594E	Chelsea loamy sand, 12 to 35 percent slopes	2,020	0.4
N596B	Eleva sandy loam, 2 to 6 percent slopes	314	*
N596C2	Eleva sandy loam, 6 to 12 percent slopes, moderately eroded	386	*
N596D2	Eleva sandy loam, 12 to 18 percent slopes, moderately eroded	454	*
N597C2	Waucoma-Winneshiek complex, 6 to 12 percent slopes, moderately eroded	1,302	0.3
N598D2	Winneshiek-Waucoma complex, 12 to 18 percent slopes, moderately eroded	2,240	0.4
N598E	Winneshiek-Waucoma complex, 18 to 35 percent slopes	2,362	0.5
N599B	Winneshiek loam, sinkhole karst, 2 to 6 percent slopes	247	*
N599C2	Winneshiek loam, sinkhole karst, 6 to 12 percent slopes, moderately eroded	92	*
N600C2	Eleva-Alvin complex, 6 to 12 percent slopes, moderately eroded	515	0.1
N601C2	Oak Center-Hersey complex, 6 to 12 percent slopes, moderately eroded	1,629	0.3
N601D2	Oak Center-Hersey complex, 12 to 18 percent slopes, moderately eroded	978	0.2
N602A	Joy silt loam, 1 to 3 percent slopes	10,112	2.0
N603C2	Lilah-Billett complex, 6 to 12 percent slopes, moderately eroded	130	*
N603D2	Lilah-Billett complex, 12 to 18 percent slopes, moderately eroded	287	*
N604B	Billett sandy loam, 2 to 6 percent slopes	472	*
N604C2	Billett sandy loam, 6 to 12 percent slopes, moderately eroded	276	*
N605B	Rasset sandy loam, strath terrace, 2 to 6 percent slopes	855	0.2
N605C2	Rasset sandy loam, strath terrace, 6 to 12 percent slopes, moderately eroded	514	0.1

### Acreage and Proportionate Extent of the Soils *continued*

Goodhue County, Minnesota

Map symbol	Map unit name	Acres	Percent
N606A	Tama silt loam, sandy substratum, 0 to 3 percent slopes	2,173	0.4
N607A	Meridian silt loam, 0 to 3 percent slopes	1,954	0.4
N607C2	Meridian silt loam, 6 to 12 percent slopes, moderately eroded	444	*
N607D2	Meridian silt loam, 12 to 18 percent slopes, moderately eroded	242	*
N608A	Malardi loam, 0 to 3 percent slopes	1,340	0.3
N608C2	Malardi loam, 6 to 12 percent slopes, moderately eroded	784	0.2
N609D	Hawick sandy loam, 12 to 18 percent slopes	641	0.1
N609E	Hawick sandy loam, 18 to 45 percent slopes	4,014	0.8
N610B	Waucoma loam, 2 to 6 percent slopes	715	0.1
N611A	Calco silt loam, ponded, 0 to 1 percent slopes, frequently flooded	3,166	0.6
N612A	Calco silt loam, 0 to 2 percent slopes, frequently flooded	5,596	1.1
N613A	Calco-Udfluvents, loamy complex, 0 to 18 percent slopes, frequently flooded	1,012	0.2
N614A	Kalmarville-Radford complex, 0 to 3 percent slopes, frequently flooded	5,660	1.1
N615A	Otter silt loam, 0 to 2 percent slopes, occasionally flooded	1,174	0.2
N616A	Littleton silt loam, 0 to 2 percent slopes, occasionally flooded	1,572	0.3
N617A	Kennebec silt loam, 0 to 2 percent slopes, occasionally flooded	3,612	0.7
N618A	McPaul silt loam, 0 to 3 percent slopes, frequently flooded	1,345	0.3
N619A	Kennebec-Lawson, channeled, complex, 0 to 3 percent slopes, flooded	2,968	0.6
N620B	Chaseburg silt loam, 2 to 12 percent slopes, frequently flooded	3,991	0.8
N621B	Udfluvents, loamy, 2 to 12 percent slopes, frequently flooded	1,477	0.3
N622A	Ankeny-Zumbro complex, 0 to 3 percent slopes, occasionally flooded	1,913	0.4
N623B	Burkhardt sandy loam, 0 to 6 percent slopes	523	0.1
N624B	Lilah sandy loam, 0 to 6 percent slopes	434	*
N624C2	Lilah sandy loam, 6 to 12 percent slopes, moderately eroded	104	*
N625B	Coloma loamy sand, 0 to 6 percent slopes	402	*
N626C	Plainfield loamy sand, 6 to 12 percent slopes	283	*
N626D	Plainfield loamy sand, 12 to 18 percent slopes	144	*
N627A	Billett fine sandy loam, 0 to 4 percent slopes	419	*
N628A	Burkhardt sandy loam, very gravelly substratum, 0 to 3 percent slopes	1,531	0.3
N629F	Mt. Carroll and Timula soils, 20 to 40 percent slopes	2,974	0.6
N630B	Schapville-Shullsburg complex, 2 to 6 percent slopes	172	*
N630C2	Schapville-Shullsburg complex, 6 to 12 percent slopes, moderately eroded	979	0.2
N631D2	Schapville silt loam, 12 to 18 percent slopes, moderately eroded	1,193	0.2
N631E	Schapville silt loam, 18 to 35 percent slopes	1,865	0.4
N632G	Brodale, flaggy-Schapville complex, 18 to 80 percent slopes	2,976	0.6

N633C2	Massbach silt loam, 6 to 12 percent slopes, moderately eroded	296	*
N633D2	Massbach silt loam, 12 to 18 percent slopes, moderately eroded	457	*
N634E	Massbach-Schapville complex, 18 to 35 percent slopes	1,102	0.2
N635B	Frankville-Nasset-Downs complex, 2 to 6 percent slopes	9	*
N635C2	Frankville-Nasset-Downs complex, 6 to 12 percent slopes, moderately eroded	30	*
N635D2	Frankville-Nasset-Downs complex, 12 to 18 percent slopes, moderately eroded	111	*
N635E	Frankville-Nasset-Downs complex, 18 to 35 percent slopes	195	*
N636A	Houghton muck, ponded, 0 to 1 percent slopes	758	0.2
N637B	Klossner muck, seepy, 1 to 8 percent slopes	193	*
N638G	Brodale, flaggy-Bellechester complex, 30 to 70 percent slopes	3,139	0.6
N639F	Frontenac-Lacrescent complex, 20 to 45 percent slopes	4,042	0.8
N639G	Frontenac-Lacrescent complex, 30 to 70 percent slopes	16,303	3.3
N640G	Lacrescent, flaggy-Frontenac-Rock outcrop complex, 45 to 90 percent slopes	777	0.2
N641F	Brodale channery loam, 20 to 45 percent slopes, flaggy	357	*
N642E	Frankville-Nasset complex, Oneota formation, 18 to 35 percent slopes	2,346	0.5
N643B	Port Byron-Dinsmore complex, 2 to 6 percent slopes	4,156	0.8
N643C2	Port Byron-Dinsmore complex, 6 to 12 percent slopes, moderately eroded	465	*
N644A	Abscota loamy sand, 0 to 3 percent slopes, occasionally flooded	155	*
W	Water	15,034	3.0
Total		499,700	100.0

\* Less than 0.1 percent

Source: USDA NRCS