

# Belle Creek Watershed District Belle Creek Township, Goodhue County, MN

2011 Watershed Management Plan Revision September 2011

Goodhue County Soil and Water Conservation District
104 E 3<sup>rd</sup> Ave
PO Box 335
Goodhue MN 55027
651-923-5286

# Belle Creek Watershed District Board Members

Les Kyllo	Chairman	14414 Cty 50 Blvd. Goodhue 55027	Term expiring 12/31/2013
James Hedeen	Treasurer	15478 Norelius Road, Welch, MN	Term expiring 12/31/2012
Brad Anderson	Secretary	10679 375 <sup>th</sup> St. Way, Cannon Falls 55009	Term expiring 12/31/2014

# Belle Creek Watershed District Board Staff

none
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# Regular Board Meeting Location

Belle Creek Township Hall	36500 County 7 Blvd Goodhue 55027
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# Watershed District Consultant:

Goodhue County Soil and Water	104 E 4rd Ave PO Box 335
Conservation District	Goodhue, MN 55027

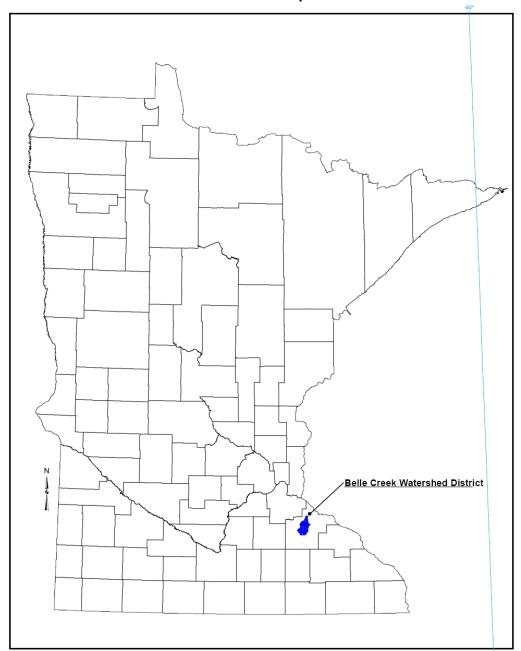
# Watershed District Plan and Project Assistance

Goodhue County Soil and Water	104 E 4rd Ave PO Box 335
Conservation District	Goodhue, MN 55027

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## State of Minnesota Watershed Locator Map



This 2011Belle Creek Watershed District Plan Revision will examine past district management activities as well as layout the goals and objectives for the watershed over the next 10 years. Due to the fact that land use, priority concerns, goals and objectives have not significantly changed since the Districts' conception, it is the intent of this plan revision to be brief and pointed. The key issues within the watershed will be expanded upon in the Ongoing Issues and Concerns section of this plan. After discussion with the BCWD Board and BCWD Citizen Advisory Committee, it is evident that future land use changes, water quality/quantity concerns and resource management programs are expected to remain fairly constant for the next 10 years. However, it is the goal of this plan to satisfy the

framework requirements of Minnesota State Statute Chapter 103D which encompasses all land within the Belle Creek Watershed boundary. The "BCWD 5 Year Activities Approach" document, located in the appendix of this plan, lays out how the District plans to implement this plan revision. This document aids in clarifying the yearly operations of the District and funding that may be associated with the levy and proposed projects.

# Watershed Background and Overall Plan

The Belle Creek Watershed District is 52,790 acres in size and covers portions of Cannon Falls, Vasa, Belle Creek, Minneola, Leon, Wanamingo, and Featherstone townships. From the upper portions of the Watershed near Hader the Belle Creek flows north to the confluence with the Cannon River just east of Welch Village. The watershed is approximately 15 miles long and averages about 5 miles wide. From the upper portions of the watershed to the mouth at the Cannon River there is an elevation change of 550'. This watershed has gentling rolling hills in the upland portions to extremely steep forested bluffs near around Vasa and north.

### Overall Plan

In the spring and fall of 1961 numerous damaging flood events took place in the Belle Creek Watershed. The Goodhue County SWCD, County Board, and local citizens took it upon themselves to investigate possible solutions to these devastating floods. The Watershed Protection and Flood Prevention Act (PL-566) was authorized in 1954 by the federal government to help protect and improve water resources and land management in watersheds below 250,000 acres in size. In 1963 the Goodhue County SWCD and the County Board of Commissioners filed a joint application for these PL-566 funds. The Belle Creek Watershed District (BCWD) was formed in 1968 following federal guidance stating that a local government unit is preferred to assist with the project. The BCWD was formed to see construction of the flood prevention structures through and be able to conduct maintenance on them in the future. In 1970 the appointed BCWD members adopted an Overall Plan which focused on the issues of flooding and water resources. The mission statement of the BCWD is "to maintain the productivity of the soil by conservancy and restoring soil fertility through the practical application of erosion control and land use practices so as to promote the general welfare and security of the families within the district." The original objectives of the watershed were:

- 1. Reduction of Floodwater Damage
- 2. Reduction of Sediment Damage

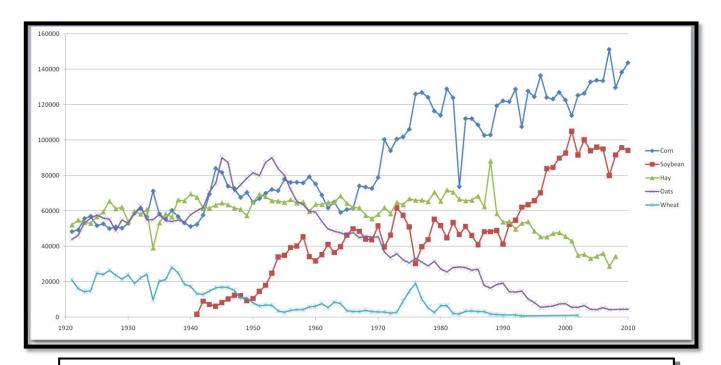
- 3. Reduction of Gully Erosion
- 4. Reduction of Streambank Erosion
- 5. Change in Land Use of Bottomland
- 6. Improvement of Habitat for Fish and Wildlife
- 7. Reforestation and Forest Management
- 8. Possibility of Recreational Development
- 9. Provide Clean Water

These overall objectives remain in place today however the main focus of the BCWD is to protect the infrastructure in place while continuing to improve the water quality and quantity within the Belle Creek Watershed District. Over the past 40+ years, 2 plan revisions have taken place. As per state statute M.S. Chapter 103D, a plan revision was last completed in 1991 by consultant Erling Weiberg

### Land use

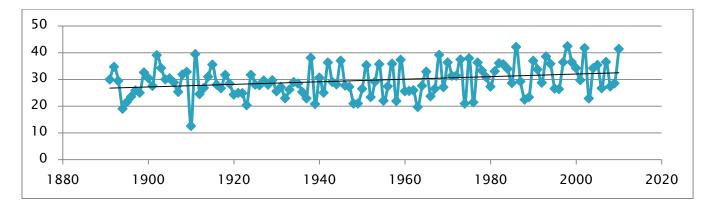
Land use within the watershed is predominately row crop agricultural making up approximately 65% of the land surface. The majority of row crop agriculture is located in the southern townships of the watershed where the slopes are moderate. Please see "Belle Creek Land Use Map" in the appendix. The soil types in the upper portion of the watershed are wind-blown in nature and consist mainly of a silt-loam matrix. Soil types near the mouth of the Belle Creek become more alluvial within the floodplain areas, loess soils on ridge tops and rock out-croppings. These soil types are conducive to producing moderate to above average yields for corn and soy bean crops. See "Belle Creek Soils Map" in the appendix for further information.

Crop trends within the Belle Creek Watershed generally mimic the trends that are seen across Goodhue County. Hay, corn and small grains made up majority of the landscape prior to the 1950's and 1960's. Major advances in planting, tillage and harvesting equipment, the loss of small scale dairy farms and high corn/soybean commodity prices, paved the way for what we see today in the watershed. We see a corn and soybean dominated landscape that has minimal hay in rotation and moderate tillage conservation practices.



The above graph shows the Total Acres Harvested for Corn, Soybeans, Hay, Oats and Wheat over the past 90 years in Goodhue County. There is clear evidence of a increase in a cornsoybean rotation since the late 1960's. It is estimated that the number of hay acres within the Belle Creek Watershed is slightly higher than other watersheds within the county as a percentage. The landscape within the watershed is conducive to having hay in rotation due to erosion potential of these steep loess soil slopes. Data from NASS USDA

Large commercial developments and the prospect of intense urban development are not foreseen in the near or distant future. Row crop agriculture, agro-forestry and grazing will continue to be the dominate land use management activities. Public and private drainage systems as identified under Minnesota State Statute 103E are non-existent within the BCWD. Many swales and draws contain wetland characteristics that are regulated under the Clean Water Act as well as the Wetland Conservation Act of Minnesota.



The graph above so relative precipitation data for Goodhue County over the past 100+ years. The average yearly rainfall amounts seem to be increasing from about 28" per year to 31".

# Other plans within Belle Creek Watershed

Goodhue County Water Plan lists the Belle Creek Watershed District as a partner in continued conservation practice implementation within the Belle Creek Watershed. The Goodhue County Water Plan identifies water resources concerns across the county. Many of the concerns that are listed apply to the BCWD. Below is a list of resource concerns that the citizens of Goodhue County as well as the Water Plan Advisory Committee selected as priorities for protection and restoration. The concerns were split between Urban and Agricultural settings.

# **Urban/Residential Water Quality Management**

- -Erosion and Sediment control
- -Septic System Compliance
- -Impaired Waters
- -TMDL involvement on listed waters w/in cities
- -Groundwater Protection

# Rural/Agricultural Water Quality Management

- -Erosion and Sediment Control
- -Feedlot Water Quality Improvement
- -Nutrient Management
- -Impaired Waters
- -TMDL involvement as non-point source

It is the goal of the County Water Plan and Water Plan Coordinator to implement projects/programs which help restore and protect the above listed concerns.

TMDL (Total Maximum Daily Load) The Belle Creek is currently listed under Section 303(d) Clean Water Act list of impaired waters for E.coli and Turbidity impairments. This means that often enough the level of sediment and bacteria in the water are so high that it limits the recreational use of the stream as well as the aquatic life within the Belle Creek. A TMDL Implementation Plan for the Lower Cannon River Watershed was completed in 2009 for the turbidity impairment. As per the Cannon River Watershed Summary of the Lower Lobe on the main stem of the Cannon: "The water quality goal is Total Suspended Solids (TSS) values of 44 mg/L or less. The reduction scenarios in the TMDL are based on a load duration curve from low flow to high flow. The most dramatic reductions are required during high flow conditions: 82% at the confluence reach and 49% at the Pine to Belle reach. Mid range flows require a 39% reduction at the confluence reach and an 8% reduction at the Pine to Belle reach. Under low flow conditions no reductions are needed."

The Cannon River Watershed Partnership is currently undertaking a **Cannon River Water Management Strategy**. This document is a compilation of other local and state plans, public input as well as other pertinent information regarding the overall health of the Cannon River

Watershed. The Belle Creek Watershed falls under the "Lower Cannon River Lobe Management and Monitoring" heading. http://www.crwp.net/cannon-river-strategy/

Within this document, information on past monitoring locations and water quality results has been complied. Short term goals were also set for this portion of the watershed. Here is a list of said goals;

- 1. Riparian Channel Assessment and Inventory to identify sediment source spots.
- 2. Use GIS and ground truthing to identify gullies and ravines.
- 3. Use GIS, SWAT modeling, and ground truthing to identify locations for rate and volume control BMPs.
- 4. Form groups of landowners, called Watershed Councils, 1-3.
- 5. Develop list and begin to carry out stream stabilization projects.

For further information on water quality data within the BCWD, visit the Environmental Database Access site on the MPCA home page at:

(<a href="http://www.pca.state.mn.us/data/eda/index.cfm">http://www.pca.state.mn.us/data/eda/index.cfm</a>)

# Relationship between BCWD and SWCD

The Goodhue County SWCD will assist the Belle Creek Watershed District with the BCWD plan development and administration procedures when necessary. The intent of this relationship is to utilize the Goodhue SWCD staff's knowledge in assistance with: grant writing, implementing BCWD Plan, generating reports, as well as executing conservation projects throughout the watershed. These services will be provided on a fee for service basis as agreed upon by the BCWD Board and Goodhue SWCD Board via a Memorandum of Understanding every 3 years.

### Relationship between BCWD and Goodhue County

The Goodhue County Board of Commissioners appoints the BCWD Board members. Currently Richard Samuelson (or his District 2 successor) selects 3 board members to

manage BCWD duties and coordinate receiving and spending of the local levy. BCWD local levy is typically around \$9,000.00 from the tax payers within the watershed. To the right is a summary breakdown of the past 5 years of income and expenditures.

		Depos	sits	Expenditures	
Ye	ar	<b>County Levy</b>	State Aid	Insurance	<b>Other Bills</b>
20	)10	\$9,459	\$1,135	\$7,621	\$5,703
20	009	\$9,250	\$384	\$7,434	\$1,994
20	800	\$9,018	\$381	\$7,398	\$1,680
20	007	\$9,170	\$0	\$7,851	\$852
20	006	\$10,661	\$0	\$6,981	\$5,336

In the past, Board duties have included; receiving hosting regular board meetings, paying insurance on structures, conducting limited maintenance on structures, providing financials to Goodhue County Auditor. These appointed commissions are 3 year terms. Below is the list of 2012 BCWD Board members. Once a term expires, the Commissioner from the 2<sup>nd</sup> District will appoint the position at the last County board meeting in December of each year. The selected Board member must live within the BCWD.

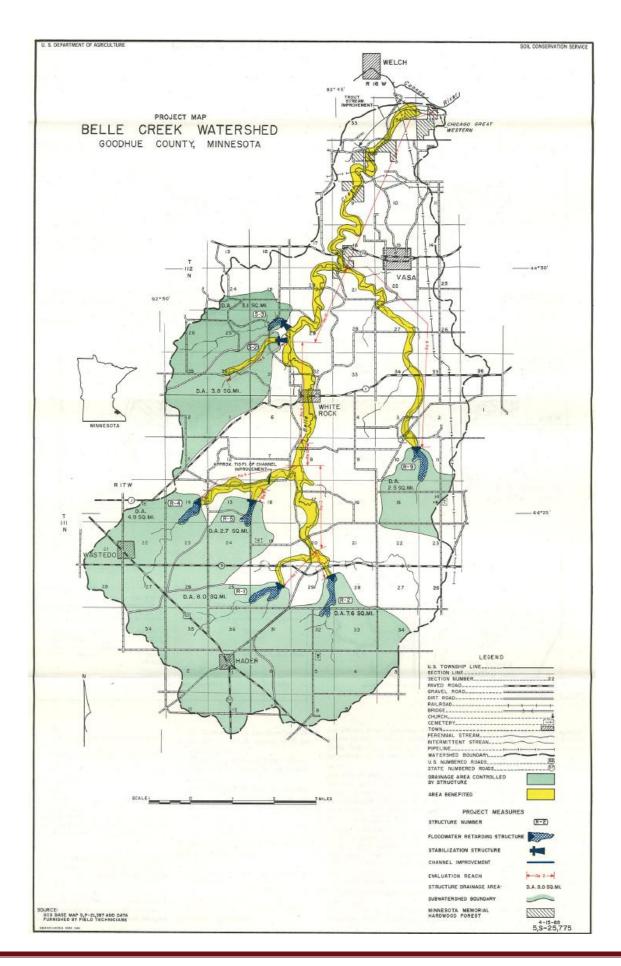
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### **Public Access to Belle Creek Watershed Structures**

Public access to the BCWD structures has always been prohibited to the general public. The BCWD does have maintenance easements designated for appropriate Local/State/Federal agencies for access to the Belle Creek Watershed District property for inspections and repairs only. Public access is granted ONLY at the will of the landowners surround the impoundments.

# **Ongoing Issues and Concerns**

This section of the plan revision is intended to give additional background information on the structures the BCWD helped install and currently maintains. The BCWD main goal is to protect and to preserve the past investments made to help reduce the flooding impacts of the Belle Creek. The BWCD has and will continue to conduct efforts to maintain and improve this hydrologic system within the watershed. Each structure has its own ID and is labeled on the 'Belle Creek Watershed' project map on the following pages of this plan.



People in Goodhue County and the Belle Creek Watershed are working together to protect their property and improve their environment. They're making plans, through the Belle Creek Watershed project, to prevent the flooding which destroys crops, damages farmland and causes tons of topsoil to wash into Belle Creek every

This soil erosion leaves gulleys in the uplands, damages the banks of the creek and brings pollution in the form of sediment to Belle Creek as well as the Cannon River, the Mississippi and Lake Pepin downstream.

#### **Project Sponsors**

Goodhue Soil and Water Conservation

Goodhue County Board of Commissioners

Belle Creek Watershed Board of Man-

#### Technical Assistance

Soil Conservation Service, U.S. Department of Agriculture

Forest Service, U.S. Department of Minnesota Department of Natural Resources

#### The Flooding Problem

- · Rainfall and snowmelt cause flooding annually on 830 acres of farmland and could potentially damage 2,000 acres and 90 farms.
- 22 roads and 12 bridges are potential targets of large floods. Five of the roads and two bridges are damaged annually.
- Belle Creek transports 44,000 tons of sediment to its outlet at the Cannon River each year.
- Soil erosion in the uplands, along the streambank and in the floodplain re-

duces the quality of the farmland and is the source of the sediment Belle Creek carries.

#### Structural Improvement Measures

- Five dams planned for the areas most severely damaged will control runoff from 25 square miles of the watershed. The holding capacity of these dams is equal to 4,000 acres of water one foot deep. At these five locations, water will flow into the creek at less than 20 percent of its present rate.
- Two structures will stop gulley formation by controlling runoff water. With these structures in place the gulleys will not spread further into cropland and will no longer be sources of sedi-
- Two miles at the lower end of Belle Creek will be improved as a trout stream through measures including stabilizing and seeding the banks and con-

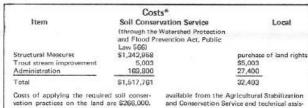
struction of shelters and fences.

#### Soil Conservation on the Land

Many of the 400 farmers in the Belle Creek Watershed already have begun work on this project. With help from the Goodhue Soil and Water Conservation District, they have accelerated the application of soil conservation practices on their land.

These practices include terraces, contouring, grass waterways, minimum tillage, pasture and hayland management, woodland improvement and wildlife habitat. Two-thirds of the land upstream from the planned structure sites now is adequately treated with soil and water conservation practices.

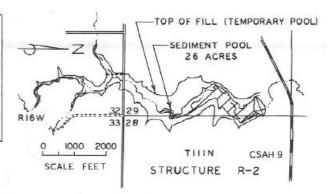
These practices are just as essential to the project as the structures, because adequate soil conservation practices on land above the dams and other struc-tures will help assure their effectiveness.

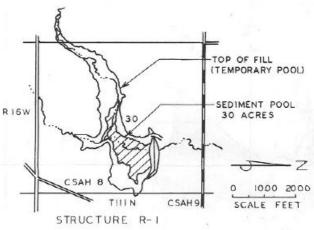


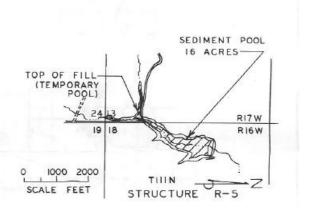
Costs of applying the required soil conser-vation practices on the land are \$266,000. These costs are the responsibility of the landowners, with financial assistance when

available from the Agricultural Stabilization and Conservation Service and technical assis-tance from the Soil Conservation Service.

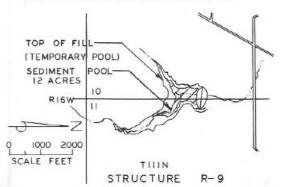
\*Construction costs updated, 1975

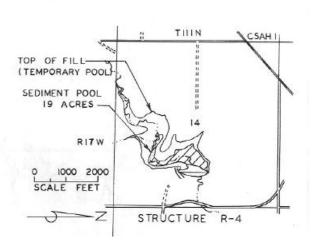






Engineers drawings of dams planned for the watershed. On the map, they are labeled as floodwater retarding structures. The green areas on the map indicate the land that these structures will protect.





### **Erosion Control**

### **Erosion and Sediment Control**

Pre-settlement vegetation Belle Creek Watershed was made up of rolling prairies and short grass bluffs, some wetlands located in wet draws 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 during rain events. Once removed, erosion



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.

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.

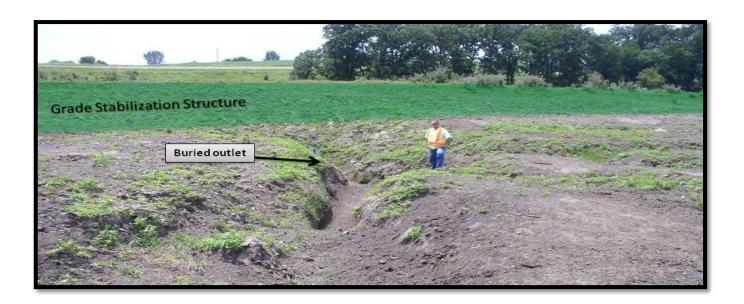
Row crops can provide a canopy which helps reduce the impact that rainwater can have on a soil surface, but unfortunately the canopy is only effectively present in June, July, August and September and soils are bare the remainder of the year. Soil particles can hold large amounts of phosphorous and agricultural 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 within BWCD include; contour farming, buffers, no-till farming, cover crops, grassed waterways, terraces, rotational grazing, etc. These practices help stabilize soils, prevent and reduce erosion and improve water quality and wildlife habitat. 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.

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.



-Sediment Basins These structures break long slopes into shorter ones. These basins act as small shallow dams which slow water velocities and divert water to a tile which runs the length of the swale. Spacing 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 downstream structure. (Shown in the photo are a similar practice; farmable terraces)



-Grade Stabilization Structures. These structures can be designed to control the grade and head cut of gullies as well as detain stormwater during rain events. They are typically located at the edge of a farm field and a gully where water is concentrated and erosion is present.





-Grassed Waterways. These waterways are designed to accommodate flow from storm events for a given watershed and prevent washing and scouring. Waterways are a cheap and effective method of soil conservation on agricultural land. Proper maintenance and tillage patterns around these waterways can extend their lifespan tremendously.

-Grade Stabilization Structures (continued) This structure is designed to retain water throughout the year. This practice can still retain stormwater during rain events as well as provide a wildlife aspect to soil and water conservation

# **Accomplishments**

Septic/sewage assistance in the town of White Rock –In 1992 the BCWD hired CMS, a consulting firm, to develop and design a community septic system in the Town of White Rock. The system serves 4 homes and total project cost was estimated at \$17,000. The BCWD assisted with the financials of the project as well as donating the property where drainfield is now located. The drainfield has 5–200' lines and 4 tanks; 2–1,500gals, 1–1,000gals and 1–1,500gals pumping tank.

Structure maintenance—The BCWD enlisted the help of the Sentence to Serve crew to help with brush and debris removal for their structures. These crews cut down intrusive trees and shrubs from the dam and spillway. Other methods of debris removal have also been hired out to local contractors in an effort to keep the trees off the structures. The maintenance topic will continue to be the key objective of the District.

Waterway cleanout-Sediment and debris was removed from S2 drop structure.

**Education**-Each year the BCWD allows 6<sup>th</sup> Grade Field Day to take place on Structure R-2. The field day is geared toward teaching students about conservation, land use, wildlife and water quality. Many surrounding schools attend this field day each September.

**Permits:** No permits were reviewed or issued during since the past plan revision. BCWD does not choose to have permit authority on land use changes in the watershed.

# Implementation of the Plan

# 1) Continue to Control Flood Waters

- **1. A)** Maintaining Existing Structures The goal of this objective is to implement various land use practices that will help extend the life and function of the structures that Belle Creek Watershed District maintain.
  - 1. Restore existing water and sediment control structures (638/410) and other impoundment structures that are failing and/or sediment laden to assist with volume control.
  - 2. Provide Cost Share incentives to landowners involved in implementing and improving rate control conservation practices.
  - 3. Assess the amount of sediment in BC structures and seek funding for removal when/if needed.
    - (a) Funding sources such as the Clean Water Fund, NRCS and/or federal special funding opportunities, Watershed Management Organization funding possibilities and levy possibilities.
  - 4. Yearly review and act on BCWD infrastructure improvement recommendations as documented by NRCS, MNDNR and the SWCD reports.
- **1. B)** Grazing Management on/adjacent/above BCWD structures.
  - 1 Implement managed rotational grazing plans on impoundment structures that have adjacent pasture land.
  - 2 Utilize grazing to control woody vegetation on structures and emergency spillways.
  - 3 Provide incentive payment for landowners interested in conducting rotational grazing on/near structures.
  - 4 Implement routine inspection of grazing sites to assure a healthy and sustainable stand of vegetation.
- 1. C) Mechanical and Chemical removal of woody vegetation

- 1 Utilize mechanical and chemical methods of woody vegetation removal when necessary.
- **1.D)** Install and implement additional flood reduction practices within the Belle Creek Watershed The goal of this objective is to create additional upland storage by doing such things as increasing perennial vegetation and installing conservation practices along field edges, head cuts, eroded gullies, and sizing of culverts.
  - 1 Utilize relevant elevation data and mapping software to assist with locating conservation sites
  - 2 Promote the perennial vegetation throughout the watershed to encourage infiltration.
    - a. Seek out marginal cropland on steep slopes and adjacent to streams for hay and/or grazing promotion.
    - b. Market CRP and other set-a-side programs on marginal agricultural lands.

### 2. Erosion Control

- **2.A)** Reduce erosion rates on agricultural fields by implementing conservation practices and reducing surface runoff volume.
  - 1 Promote with education efforts & incentives 2<sup>nd</sup> and 3<sup>rd</sup> crop practices that leave fields green over winter.
  - 2 Market contour buffer strips on slopes 6– 12%
  - 3 Promote existing and new conservation tillage practices
    - a. Eliminate fall tillage of soybeans
    - b. Market farming on the contour.
    - c. Increase residue to 30% or greater on agriculture grounds within the watershed.
    - d. Promote conservation practices that reduce erosion and sedimentation
    - e. Maintain existing terraces/sed basins/dams by providing incentives for cleanouts and structural fixes on failing practices.
    - f. Provide incentives for landowners within the watershed that implement conservation practices that help control runoff and reduce overland flow.
- **2.B)** Managing streambank erosion on the Belle Creek and tributaries.
  - 1 Controlled grazing within stream riparian corridor.

- a. Supply landowners with the technical assistance needed to effectively carryout managed grazing plans in, and adjacent to, riparian areas.
- 2 Continue to remove sediment and debris from drainage system as needed
- 3 Implement grassed buffer strips adjacent to the Belle Creek and its tributaries.
- 4 Seek funding sources and provide local technical assistance to restore eroding streambanks
- 5 Utilize rip rap where necessary, but focus on bioengineering practices to help reduce erosion rates on cutbanks and eroding bluffs

# 3. Water Quality Improvement

- **3.A)** Improve the quality of surface and ground water within the Belle Creek Watershed by informing and educating BCWD residence on the proper disposal of sanitary waste.
  - 1 Cooperate with state and local government agencies to help achieve septic compliance throughout the watershed.
  - 2 Provide cost-share programs and low interest loan opportunities to landowners who strive for septic system compliance.
  - 3 Improve water quality within the BCWD through oversight of land applied chemicals
    - Partner with local and state agencies to help promote the proper use of herbicides and pesticides from agricultural activities.
    - b. Promote and market <u>no fall</u> application of anhydrous ammonia (without Nitrogen Stabilizer) in an effort to reduce the amount of nitrogen within the Belle Creek Watershed hydrologic system.

### 4. Outreach

- **4.A)** Provide the general public with pertinent information related to the history and workings of the Belle Creek Watershed District
  - 1 Partner with the Goodhue SWCD and Goodhue County, and other state/federal agencies, to generate educational materials for Belle Creek Watershed landowners
  - 2 Partner with the Goodhue SWCD for posting information related to the BCWD on the Goodhue SWCD website. <a href="www.goodhueswcd.org">www.goodhueswcd.org</a>
  - 3 With assistance from Goodhue SWCD generate a yearly newsletter to all landowners within the BCWD.

# **APPENDIX**

# Belle Creek Watershed District Five Year Activity Approach

**BCWD Land Use Map** 

**BCWD Sub-Watershed Map** 

**BCWD** Hillshade Map

**BCWD Slope Map** 

Belle Creek TMDL Listing

Goodhue County Watershed Organizations