INVENTORY
CHISAGO COUNTY
PUBLIC DITCH
SYSTEM

Inventory Chisago County
Chapter 103E Drainage Ditches
for Water Quality Degradation

Accepted by the
Chisago County
Board of
Commissioners
on November
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Introduction

The ditch system in Chisago County plays an important role in managing the drainage of surface water in many parts of the County. These ditches have been constructed and have evolved in importance and function over the many years they have been in existence.

Most of the county ditches in Chisago County were authorized and constructed in the early 1900’s during the federal government’s sod-busting incentive period. This was an effort to expand the number of tillable acres in the United States by draining wetlands. There also were many laterals established in the 1940’s to many of these ditches. Based on best data available in 2014, there are eleven (11) county ditches and four (4) judicial ditches (those that traverse more than one county boundary) established in Chisago County.

Judicial Ditch 1 has been abandoned and is now a tributary to Comfort Lake from Forest Lake. Judicial Ditch 2 has been abandoned and is now portions of the Sunrise River. Judicial Ditches 3 & 4 are also abandoned. The County Ditch Workgroup made the decision early in the process to only inventory the 11 public ditches and not the abandoned Judicial Ditches.

Ditches may have a negative effect on the water quality of the receiving waters due to erosion, movement of nutrients, pesticides, and sediments and lack of adequate vegetated buffer strips along the banks. Management and maintenance of the Chisago County public ditch system has not taken place on a regular basis, but rather has been complaint driven.

In 2014, Chisago County was awarded an $80,000 grant under the Minnesota Board of Water and Soil Resources Soil Erosion and Drainage Law Compliance Program. This grant was to help Chisago County implement two objectives identified in the September 2013-2023 Chisago County Local Water Management Plan:

(1) Develop an inventory of the County public ditch system, and significant tributaries, including record searching and field verification to confirm locations of existing public ditches. Identify, inventory, and evaluate functions, purpose, and necessity of the Chisago County ditch system. Determine legal status of ditches, rights, and responsibilities as defined in Minnesota Statutes 103E.

(2) Develop a plan for management and maintenance of the Chisago County ditch system. Establish a system and protocol for establishing best management practices within the easement right of ways of existing public ditches.
This report addresses the first objective. Completion of objective 2, the next step in the process, will be implemented based on County Board direction.

This report is intended to summarize the findings of the work completed to date to meet the expectations of the grant.
Grant Work Plan
The grant work plan, as submitted by Chisago County and approved by the Minnesota Board of Water and Soil Resources, included three primary activities. They are:

1. Develop a database for all Chapter 103E drainage ditch systems.
2. Inventory Chisago County Chapter 103E drainage ditches for water quality degradation.
3. Inventory Chisago County Chapter 103E drainage ditches that are public waters.

For each of these primary activities, the grant application included several activity indicators that the County intended to complete. They are explained in further detail below.

1. Develop a database for all Chapter 103E drainage ditch systems.
   a. Designate and assign drainage inspector for Chisago County.
   b. Complete a technology needs assessment for the project.
   c. Identify and verify, by legal description/survey, all legally established ditches and lateral, both county and judicial.
   d. Cross reference all ditch establishments and laterals by board/legal action.
   e. Identify parcels impacted by County ditch system.
   f. Identify watershed drainage areas impacted by County ditch system.

2. Inventory Chisago county Chapter 103E drainage ditches for water quality degradation.
   a. Inventory all legally established Chisago County Chapter 103E drainage ditches where erosion, sediment or nutrients contribute substantially to water quality degradation.
   b. Identify priority side inlet control and buffer strip needs for which the following authorities apply:
      i. Section 103E.021, Subd. 6, Incremental Implementation of Vegetated Ditch Buffer Strips and side inlet controls: and
      ii. Section 103E.011, Subd. 5, Use of External Funding
   c. Develop a County ditch inspection plan and database, for management and maintenance of Chapter 103E drainage ditches.
   d. Establish a system and protocol for establishing Best Management Practices within easement right-of-ways of existing public ditches.

3. Inventory Chisago County Chapter 103E drainage ditches that are public waters.
   a. Determine the status of compliance with the section 103E.021 buffer strip requirements and the 50 foot shoreland buffer rule (6120.3300, Subpart 7) requirement for all Chisago County drainage authority’s jurisdiction that are public waters.
   b. Develop a plan to enforce the applicable requirements.
   c. Document the functional relationship of ditches to their associated drainage systems.

Inventoried Ditches

Inventories were conducted on the 11 ditches in the map below.
Background

General Background
Minnesota’s first comprehensive drainage law was passed in 1887. It established a petition process for landowners, monitoring by county commissioners and a system of viewers to survey, locate and prepare a report on a proposed drainage ditch. This 119-year-old law established a process that is similar to the approaches still used in state drainage law. See Minnesota Statutes Chapter 103E.

The object of the general drainage acts was to reclaim agricultural lands and to dispose of waters. Most of the county ditches in Chisago County were authorized and constructed in the early 1900’s during the federal government’s sod-busting incentive period in an effort to expand the number of tillable acres in the United States by draining wetlands. There were also were many laterals established in the 1940’s to many of these ditches. Based on best data available, there are presently eleven (11) county ditches and four (4) abandoned judicial ditches (those that traverse more than one county boundary) established in Chisago County.

Under current statutes, the Chisago County Board, acting as the drainage authority, may:

1. Construct and maintain drainage systems;
2. Deepen, widen, straighten, or change the channel or bed of a natural waterway that is part of the drainage system or is located at the outlet of a drainage system;
3. Extend a drainage system into or through a municipality for a suitable outlet; and
4. Construct necessary dikes, dams, and control structures and power appliances, pumps, and pumping machinery as provided by law.

See Minn. Stat. Sec. 103E.011, subd. 1
Grant Work Plan Actions

Drainage Ditch Inspector

The following action accomplished “Designate and assign drainage inspector for Chisago County” in the ditch grant work plan.

Minnesota Statutes Chapter 103E places a duty on the county board to keep in repair and free from obstruction all state, county, or judicial drainage systems lying within such county. See In re Judicial Ditch No 2, 17 N.W.2d 499 (Minn. 1945). Pursuant to Minnesota Statutes 103E.065, the drainage authority is required to appoint a competent person as drainage inspector to examine the drainage systems designated by the drainage authority specifying the appointment period and compensation. The inspector may be the county highway engineer, but does not have to be.

On August 6, 2014, as a result of recommendations from the County Ditch Workgroup, the Chisago County Board of Commissioners appointed the Chisago County Wetland Specialist as the official Ditch Inspector. Ditch responsibilities will fall within the Wetland Specialist day to day duties concerning state wetlands/waters regulations and water related programs, issues and associated regulations. The Chisago County Environmental Services Department will share ditch responsibilities in so much as inspection duties are required. Maintenance, care and affiliated reporting concerning all state, county or judicial drainage systems within the county will remain the responsibility of the Public Works Department. Wetland Specialist ditch permitting and evaluation assistance may be sought at the direction of the County Engineer in coordination with the Environmental Services Director.

Pursuant to Minnesota Statute Chapter 103E.705, the drainage authority is required to have the drainage system inspected on a regular basis (i.e. more than once every 5 years). Additionally, the drainage authority having jurisdiction must also inspect the drainage system for violations of section 103E.021 regarding maintenance of permanent strips of perennial vegetation and issue a written compliance notice to the property owner. For each drainage system, the drainage inspector shall make a drainage inspection report in writing to the board after examining a drainage system, designating portions that need repair or maintenance of the permanent strips of perennial vegetation and the location and nature of the repair or maintenance. See Minnesota Statute Chapter 103E.705, subd. 3.
**Technology Needs Assessment**
*
The following action accomplished “Complete a technology needs assessment for the project”.

Technology needs for this grant were discussed as several County Ditch Workgroup meetings. Collectively, using the combined wisdom of the group, it was decided that overall sufficient technical capacity exists within the County to complete the project with the exception that a high quality GPS unit was needed to collect field data. Based on recommendations of workgroup members, the decision was made for the county to purchase a Trimble GEO 7X and associated software. The group did not record in meeting minutes the discussions, rather the ultimate group decision. The unit was purchased using Chisago County match funds from the Chisago County Highway Department.

Technology based capital equipment typically has 3-5 years of useful life. The useful life for the Trimble GEO 7X is assumed to be 4 years. 75% of the useful life will be used up by the end of the grant period. Purchase price $9,439 X 75% = $7,079. This is the amount claimed as a grant match amount.

The Trimble unit was purchased by the county on or about June 24, 2015. The unit was used to complete the field assessment work.

**Legal Description/survey & County Board Legal Action**
*
The following action accomplished “Identify and verify, by legal description/survey, all legally established ditches and lateral, both county and judicial” and “Cross reference all ditch establishments and laterals by board/legal action”.

A review of the files located in the Office of the County Auditor for county ditches was conducted by the County Surveyor and County Attorney’s Office. The Auditor’s file included copies of the petitions and included the legal description for each ditch. A review of past minutes of the County Board was also completed by the County Attorney’s Office as well as a review of county ditch files transferred to the Minnesota Historical Society.

Additionally, drawings of many of the ditches were found in the office of the County Highway Engineer. GIS maps were created showing the location of the ditches based on the legal descriptions contained in the petitions. Unfortunately, there was a minimal amount of information found for the Judicial ditches.

Information gathered through this process is included in the appendix to this document.
GIS Review/Watershed Delineation

The following activity accomplished “Identify parcels impacted by County ditch system”, and “Identify watershed drainage areas impacted by County ditch system” in the Ditch grant work plan.

In 2014, Chisago Soil and Water Conservation District staff completed a GIS review and Watershed Delineation. LiDAR digital elevation models were used to create hill shade, clipped digital elevation models and depth grid.

Known culverts were added to create a detailed “stream network” or a path where water flows.
The Natural Resources Conservation Service Watershed Delineation Tool was used to delineate the watershed drainage area and also areas to check for additional culverts that might change the watershed.
The following 11 county ditches were inventoried using this process.
Upon completion of the desktop review of the county ditches and their watersheds, SWCD staff completed a field review of the watershed boundaries to determine the location of existing culverts and ditches and their impact on the watershed of each county ditch. Once this was completed SWCD staff input this data into the model to develop a more accurate watershed boundary for each county ditch.
County Ditch 1 Watershed
County Ditch 3 Watershed
County Ditch 4 Watershed
County Ditch 7 Watershed
County Ditch 9 Watershed
Field Findings - Inventory of Chisago County Ditches

The following activity accomplished “Inventory all legally established Chisago County Chapter 103E drainage ditches where erosion, sediment or nutrients contribute substantially to water quality degradation” and “Identify priority side inlet control and buffer strip needs for which the following authorities apply;

1. Section 103E.021, Subd. 6, Incremental Implementation of Vegetated Ditch Buffer Strips and side inlet controls; and

2. Section 103E.011, Subd. 5, use of external funding.

Jeff Fertig (County Ditch Inspector) and Craig Mell (SWCD Administrator) conducted the inventory of the Chisago County Ditch system in February – May 2016. They completed this work by using desk-top GIS data, reviewing historical records about the ditches and doing field inventories (where possible) of the public ditches. The following is a summary of their findings.
County Ditch 1 Field Findings

Approximate Length: 13,320 feet
Insufficient buffer (at least one side): 1,536 feet
Number of laterals present: 6
Number of side inlets needed: 2
Other notes:
Chisago County has no documentation that County Ditch 1 has been officially abandoned. It is currently considered to be a County Ditch.
Predominate land use in the watershed is row crop agriculture.
Approximately 3900’ of this ditch has been buried underground via a 24” pipe. The buried portions of the ditch are from Hwy 95 west to the woodlot and then from the NW corner of the woodlot to the wetland area.
Severe bank erosion is occurring along portions of the wooded area near the midpoint of the ditch.
The actual location of the ditch and legal County Ditch location are very close except for changes made by the landowner in the last 10 years.

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County Ditch 2 Field Findings

Approximate Length: 38,400 feet
Insufficient buffer (at least one side): 9,932 feet
Number of laterals present: 8
Number of side inlets needed: 0
Other notes:
Predominate land use in the watershed is row crop, turf grass, and vegetable agriculture. Severe bank erosion is occurring throughout the ditch system.
The actual location of the ditch and legal County Ditch location are extremely different. Per the 1938 aerial photo portions of the County Ditch were not installed per the legally defined boundary. Since 1938 portions of the County Ditch have been manipulated by the landowners.
Outlets into Goose Creek.
County Ditch 3 Field Findings

Approximate Length: 49,800 feet
Insufficient buffer (at least one side): 13,650 feet
Number of laterals present: 17 (there are numerous other laterals throughout the watershed, but the original northeast portion of the County Ditch is no longer in existence)
Number of side inlets needed: 0
Other notes:
Predominate land use in the watershed is row crop and turf grass agriculture.
Severe bank erosion is occurring throughout the ditch system.
The actual location of the ditch and legal County Ditch location are extremely different.
Per the 1938 aerial photo a majority of the County Ditch was installed per the legally defined boundary. Since 1938, all of the NE portion of the County Ditch has been manipulated by the landowners.
Outlets into Hay Creek.
County Ditch 4 Field Findings

Approximate Length: 15,200 feet
Insufficient buffer (at least one side): 390 feet
Number of laterals present: 0
Number of side inlets needed: 1 (north of Hwy 8)
Other notes:
Predominate land use in the watershed is row crop agriculture.
The County Ditch is in the same location as installed and legally defined by the County.
There is severe bank erosion through the wooded area just downstream of Hwy 8.
A large beaver dam was present at the very east end of the County Ditch.
County Ditch 5 Field Findings

Approximate Length: 36,850 feet
Insufficient buffer (at least one side): 2,460 feet
Number of laterals present: 27
Number of side inlets needed: 0
Other notes:
Predominate land use in the watershed is row crop agriculture west of Interstate 35 and rural residential east of Interstate 35.
The actual location of the ditch and legal County Ditch location are fairly close except for slight changes west of Interstate 35 and a section east of Grand Ave.
County Ditch 6 Field Findings

Approximate Length: 17,850 feet
Insufficient buffer (at least one side): 10,000 feet
Number of laterals present: 29
Number of side inlets needed: 7
Other notes:
Predominate land use in the watershed is row crop agriculture.
The County Ditch is in the same location as installed and legally defined by the County.
Outlets to Rush Creek.
County Ditch 7 Field Findings

Approximate Length: 23,000 feet
Insufficient buffer (at least one side): 1,725 feet
Number of laterals present: 9
Number of side inlets needed: 0
Other notes:
Predominate land use in the watershed is rural residential and the City of North Branch. Very little row crop production is present.
The County Ditch is in the same location as installed and legally defined by the County. Outlets into the North Branch of the Sunrise River.
County Ditch 8 Field Findings

Approximate Length: 18,400 feet
Insufficient buffer (at least one side): 2,030 feet
Number of laterals present: 3
Number of side inlets needed: 0
Other notes:
Predominate land use in the watershed is row crop agriculture. There is also a large dairy operation present.
The County Ditch is in the same location as installed and legally defined by the County. Outlets to Rush Creek.
Approximate Length: 20,950 feet
Insufficient buffer (at least one side): 1,520 feet
Number of laterals present: 3 (there are numerous other laterals that drain into the actual
ditch location, but not the legal County Ditch)
Number of side inlets needed: 0
Other notes:
Predominate land use in the watershed is row crop agriculture and a grass feed beef
operation.
Severe bank erosion has occurred on the Johnson and Bedell property north of 460th Street.
As a result the main ditch channel has been blocked and the water drains to the northeast.
The actual location of the ditch and legal County Ditch location are extremely different
Per the 1938 aerial photo portions of the County Ditch were not installed per the legally
defined boundary, but a majority of the lower half of the ditch was not installed as legally
defined.
Outlets to Goose Creek
County Ditch 10 Field Findings

Approximate Length: 30,650 feet
Insufficient buffer (at least one side): 1,000 feet
Number of laterals present: 6
Number of side inlets needed: 1
Other notes:
Predominate land use in the watershed is rural residential.
The County Ditch is in the same location as installed and legally defined by the County.
There is severe bank erosion between Hemingway Ave and Lent Trail.
Outlets to the Sunrise River North Pool.
County Ditch 14 Field Findings

Approximate Length: 30,450 feet
Insufficient buffer (at least one side): 15,230 feet
Number of laterals present: 18
Number of side inlets needed: 3
Other notes:
Predominate land use in the watershed is row crop agriculture.
The County Ditch is in the same location as installed and legally defined by the County except for a couple hundred feet in the very north section (Leibel property)
The City of Rush City sanitary sewer ponds discharge into the County Ditch.
There is severe bank erosion in the wooded section southeast of the City of Rush City sanitary sewer ponds.
Outlets to Rush Creek
Ditch Inspection Plan

The following activity accomplished “Develop a County ditch inspection plan and database, for management and maintenance of Chapter 103E drainage ditches” in the Ditch grant work plan.

For existing county drainage systems, it is the responsibility of the drainage authority to maintain the drainage system that is located in its jurisdiction, including the permanent strips of perennial vegetation under section 103E.012, and provide the repairs necessary to make the drainage system efficient.

As such, Chisago County’s drainage inspector will inspect all open drainage ditches at a minimum of every five years when no violation of section 103E.012 is found and annually when a violation of section 103E.012 is found, until one year after the violation is corrected.

Inspections of the county ditch system will occur on a 5 year rotating basis. Each year 20% of the ditches will be inspected, with all ditches being inspected each 5-year cycle. Ditches will be inspected for general condition, function and maintenance needs.

The inspections will consist of and not be limited to:

1. Designating portions of the drainage system that need repair or maintenance of the permanent strips of perennial vegetation.
2. Designating the locations and nature of the repairs or maintenance.
3. Designating the locations of excessive broadleaf weeds and suggested control plans.
4. Designating the locations of trees and brush and suggested removal plans.
5. Finding and documenting areas where sediment deposits and/or debris or slowing or blocking water flow.
6. Locating culverts, inlets and drain tile that needs repair or replacement.
Best Management Practices Establishment

The following activity accomplished “Establish a system and protocol for establishing Best Management Practices within easement right-of-ways of existing public ditches” in the Ditch grant work plan.

Minnesota Statutes 103F.48 requires that all public drainage systems established under chapter 103E must have a 16.5-foot minimum width continuous buffer of perennially rooted vegetation which must be in place on or before November 1, 2017.

Excerpts from the statute are listed below.

Subdivision 3: Water resources riparian protection requirements on public waters and public drainage systems.

(a) Except as provided in paragraph (b), landowners owning property adjacent to a water body identified and mapped on a buffer protection map must maintain a buffer to protect the state's water resources as follows:

(1) for all public waters, the more restrictive of:

(i) a 50-foot average width, 30-foot minimum width, continuous buffer of perennially rooted vegetation; or

(ii) the state shoreland standards and criteria adopted by the commissioner under section 103F.211; and

(2) for public drainage systems established under chapter 103E, a 16.5-foot minimum width continuous buffer of perennially rooted vegetation on ditches within the benefited area of public drainage systems.
Inventory Chisago County 103E drainage ditches that are public waters

According to the 1996 Chisago County Protected Waters and Wetlands map, all public ditches are public waters. “Heavy dashed lines on the original Public Waters maps are BOTH public ditch and a protected watercourse. If the ditch would be abandoned by the drainage authority, it would become a protected watercourse. Current example of that would be Goose Creek which used to be a County ditch.”

Public ditches having no specific DNR shoreland classification were given a 16.5-foot buffer width. All other public waters on the Buffer Protection Map have a 50-foot buffer requirement, including public ditches where a specific shoreland classification was assigned.
If the ditch line is where the Public Water line is (and where it actually is out in the field), and there is no specific shoreland classification, then the buffer would be 16.5 feet.

Any natural or altered waterway (including ditches) that drained more than two square miles of land that had a definable bed and bank at the time of Public Water Inventory (PWI) designation was considered a public water.

All Public Waters will be mapped by the DNR as requiring a 50-foot buffer, with two exceptions:

Public Water Watercourses that are also a Public Ditch and do not have a DNR assigned shoreland classification (will be mapped as requiring a 16.5-foot buffer).

Public Water Wetlands that do not have a DNR assigned shoreland classification (will not be mapped).

Public Waters are all lakes, wetlands and watercourses that meet the criteria set forth in Minnesota Statutes 103G.005, subd. 15 and are designated on public waters inventory maps. (See legend on Public Waters maps).

However, over the past century, several of the ditches were altered and portions of these ditches no longer follow the route originally established in the early 1900’s. The new route may now be considered to be a public water ditch. Public water ditches require a one rod buffer whereas public waters require a 50 foot buffer.

The County Ditch Workgroup will look to the County Board as to what steps to take or not take to rectify the situation.
Enforcement

The following information provides guidance for "Develop a plan to enforce applicable requirements" in the Ditch grant work plan.

Per Minnesota Statutes 103F.48 landowners are required to establish a 16.5 foot minimum width continuous buffer of perennially rooted vegetation on all public drainage systems established under chapter 103E on or before November 1, 2018.

A few highlights from MN Statutes pertaining to the Buffer Law include: https://www.revisor.mn.gov/statutes/?id=103F.48

SWCDs

- May issue a validation of compliance when requested by a landowner. (Subd. 3(d))

- Must issue landowners with implementation of the water resource riparian protection requirements including: planning, technical assistance, implementation of approved alternative practices, and tracking progress towards compliance with the requirements provided in Minnesota Statutes 103F.48, Subd. 3. (Subd. 6)

- Must notify the county or watershed district with jurisdiction when it determines a landowner is not in compliance. (Subd. 7)

- Must grant a conditional waiver to a landowner: (a) who has applied for and maintained eligibility for financial assistance within one year of the compliance dates in Minnesota Statutes 103F.48, subd. 3(e); or (b) are subject to a drainage proceeding. (Laws of Minnesota 2015, 1st Special Session, Chapter 4, Article 4, Section 146).

Counties and Watershed Districts

- If electing jurisdiction to enforce the buffer requirement as identified on the Buffer Protection Map, must provide the landowner with a list of corrective actions needed to come into compliance and a practical timeline to meet the riparian protection requirements when notified by the SWCD that a landowner is not in compliance. A copy of the corrective action must be provided to BWSR. (Subd. 7(a))

- Elect to accept jurisdiction* and identify the ordinance, rule, or other official controls to carry out the compliance provisions of section 103F.48 and section 103B.101, subdivision 12a, by notice to the board prior to March 31, 2017 (Subd. 7(b)). May adopt an administrative penalty order plan. (Subd. 7(b))

* If a county or watershed district with jurisdiction over the noncompliant site has not adopted a plan, rule, ordinance, or official control under this paragraph, the Board of Water
and Soil Resources must enforce this section under the authority granted in section 103B.101, subdivision 12a.
**Summary of Ditch Findings**

There are about 56 miles of public drainage ditches in Chisago County. Of these, there are many miles of the ditches that are not in the locations as described in the legal documents that were originally adopted for the creation of the ditches.

Because there are ditches not in the locations described in their recorded documents, the County will need to decide if in fact those ditches are public. If so, then the County should prepare new legal descriptions for them and then have those new descriptions approved by the affected landowners and the County. This process will include a “redetermination of benefits”. This is a proceeding that establishes whose land benefits or is impacted from the ditch, and how costs and compensation should be apportioned among landowners. If they are not public ditches, then it is the responsibility of the adjacent property owner(s) to maintain them and to create the required buffer strips along each side of the ditch.

The new Minnesota Buffer Law will affect much of the frontage along the ditches. There are areas along the public ditches that will be required to have a 16.5-foot-wide vegetative (uncultivated) buffer strip and there are many stretches of the private ditches that will be required to have a 50-foot-wide vegetative (uncultivated) buffer.

Determining which ditches and which sections of each ditch meet or do not meet the buffer requirements will require additional field work.
Appendix

Minnesota Statutes 103E
Historical Ditch Inventory

Public Works Inventory of Paper Ditch File July 23, 2014
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