Roseau River Watershed District

March 2020 Management Plan Amendment

Appendix 14: Supplemental Amendment

1.0 Introduction - background and summary.

In June of 2004 the Roseau River Watershed District (RRWD) Board of Managers approved the District's Overall Plan. That document encapsulates the history, general information, existing conditions, goals and sub-watershed implementation plans of the District at that time. The Overall Plan has served as a guidance document as the District has worked toward achieving the outlined goals. Watershed Management Plans are intended to be updated every 10 years. On September 26, 2012 the District's Plan update deadline was extended to April of 2019. This extension was to allow synchronization with the Watershed Restoration and Protection Strategies (WRAPS) process, and a new planning program called One Watershed One Plan (1W1P). The 1W1P process is meant to bring together all management plans that lay within a watershed's geographic boundary. Due to delays in completing the WRAPS report and the demands on state agency staff with other 1W1P plans in progress, the RRWD requested and was granted a new extension until December 2023 with a required amendment to the 2004 Overall Plan to be completed by June 30, 2020.

This amendment is meant to update the current conditions, goals, strategies and action items from the 2004 Overall Plan as well as provide information on several studies, technical analysis and policies that have been developed in the past 16 years.

The RRWD Board and staff are excited to provide a snapshot of all that has been accomplished to date as well as lay out the vision and plans for the Roseau River Watershed District as we look to begin our 1W1P journey in the near future. Water Management is a contentious business, but using the tools and knowledge developed over time, we are confident in our ability to continue to make great progress in the years to come.

2.0 Mission Statement

The following Mission Statement was adopted by the Board of Managers in 2002. It was reviewed by the Board in 2019 and found to represent the mission of the District.

Mission Statement

Adopted 10/31/02

The Roseau River Watershed District (RRWD) is committed to a leadership role in protecting, improving, and managing the surface waters and affiliated groundwater resources within the District, including their relationships to the ecosystems of which they are an integral part, through regulation, capital projects, education, cooperative endeavors, and other programs based on sound science, innovative thinking, an informed and engaged constituency, and cost effective use of public funds.

3.0 Historical Effectiveness of the District

The Historical Effectiveness portion of the 2004 Overall Plan highlighted the fact that the RRWD's work on FDR had mostly focused on the ring dike program while retention projects basin wide were being held up for environmental impact evaluations. After the 2002 flood, the need to move FDR projects forward became glaringly clear. The RRWD Board of Managers renewed their commitment to move projects through the newly developed US Army Corps of Engineers (USACE) Concurrence Point process utilizing Project Teams as outlined in the 1998 Mediation Agreement. Project Teams are made up of representatives of various stakeholders including permitting agencies, local government representatives, the watershed district and landowners. The Mediation Agreement also outlines how Natural Resource Enhancements (NREs) should be considered when developing projects. These documents can be found at the following websites:
Mediation Agreement - https://www.rrwmb.org/FDRWG/FDRAGMT.pdf
Concurrence Points, Section 3C --
https://www.rrwmb.org/Project_Team_Handbook/Project_Team_Handbook.pdf

3.1 Multipurpose Water Management - Projects

The following update on the Historical Effectiveness of the RRWD categorized projects into three categories: Completed, Under Development and Proposed/Studied.

COMPLETED

West Interceptor

Initiated as a MN Statute 103D watershed project petitioned by the City of Roseau, the West Interceptor project was one of the first in the Red River Basin to utilize the USACE's Concurrent Point process for permitting and the Project Team process. The West Interceptor moved fairly quickly through the planning and design phases and construction was completed in 2008.

The City of Roseau acted as the funding agent for the project utilizing federal, state and local funding sources. The cost of the project was $4.2 million.

The FDR purpose of the project is to intercept water coming off the ridge west of the city and channel it north to the Roseau River. The West Intercept keeps overland flows out of the industrial / business portion of town and out of the City's stormwater system, thus protecting Polaris Industries manufacturing plant, Titan Machinery implement dealership, Ace hardware store as well as hotels, restaurants and other stores and dealerships.

The NRE component includes a nearly 600 acre wetland restoration site in Section 33 of Jadis Unorganized township.

Operation of the project is passive (no control structures to be operated) for the main channel. There are culverts with screw-gate style controls to allow manipulation of the water levels in the restoration area.

Despite initial reticence on the part of local landowners, the project has proved beneficial to the city of Roseau as well as adjacent landowners

Palmville Fen Restoration and Flood Damage Reduction project

The Palmville Fen Restoration and Flood Damage Reduction project (Palmville Project) was initiated as a NRE based project that had some FDR benefits. This project also followed the Project Team process to ensure the construction of the most practicable project that met the purpose and need defined at the beginning of the process. The Minnesota Department of Natural Resources (MN DNR) manages a large area of public property adjacent to a jurisdictional drainage system that artificially lowered water levels on that public land which contains a fen. This project became the first of several MN DNR and RRWD partnership projects.

The project was funded using State Flood Hazard Mitigation (FHM) bonding dollars, local watershed construction funds and Red River Watershed Management Board (RRWMB) funds. The cost of the project was approximately $428,000.

The project installed two control structures in Judicial Ditch 63 (JD 63), one mile apart, that force the water to a higher level, sending it into the state land and helping to restore hydrology in that area, including the fen, as the NRE benefit. This benefit is gained by one component of the water control structures, stop-log bays that keep the water in the ditch at a ditch-half-full level during non-flood times as written in the project's operating plan.

During high-water events, screw-gates act as a second component of the structures controlling the water that flows downstream. These gates are operated by the RRWD for FDR benefit as outlined in the operating plan for the project.
The project has been operated approximately five times for flood damage reduction since completion in 2013.

The Hay Creek Setback Levees and Norland Impoundment

The life of the Hay Creek Setback Levees and Norland Impoundment (Hay Creek / Norland) project began in the mid 1990's when land became available and the RRWD's engineer at the time felt there was potential for an impoundment on that land. The RRWD purchased most of the land needed for the impoundment area in 1997. Soon after, the District entered into an agreement with the US Army Corps of Engineers (USACE) to design a project under the Section 206 Aquatic Ecosystem Restoration program. After several years of delays and funding issues with the USACE program, the RRWD ended that agreement and moved the project forward with the Project Team process.

The final engineering, design and construction cost approximately $10M and was funded using State FHM bonding dollars, local construction and RRWMB funding.

Construction was completed in 2012 and the project was operational in 2013. As of February 2020 the project has been operated four times, including once to maximum capacity in the fall of 2019.

This is a multi-purpose project intended to accomplish the following:

- 50% reduction in the 10-yr & a 30% reduction in the 100-yr discharges from Hay Creek/Norland drainage area.
- Reducing backwater and flood durations in the City of Roseau.
- Reduce flooding to 13,300 acres of ag land, 24 miles of roads, 131 miles of ditches, and 27 culverts and bridges.
- Stream flow augmentation
- Improved dissolved oxygen levels
- Enhanced fish habitat
- Riparian buffer corridor
- Wetland restorations.
- Reduction in bank erosion on downstream ditches and the Roseau River.

The project consists of setback levees along a portion of Hay Creek (CD#7), approximately 9 miles of levees with three inlet and three outlet structures creating the Norland Impoundment, and a connection channel between Hay Creek and the Norland Impoundment. The drainage area for this project is about 124 square miles. For additional information about the project, go to the RRWD website at http://www.roseauriverwd.com/Projects_Hay_Creek_Norland.html

Roseau River Wildlife Management Area Pool 2 and Pool 3 Outlet Project

The RRWMA Pool 3 Outlet Project, as it became known, is the second multi-purpose water management project partnership between the RRWD and MN DNR. The concept of constructing a project within the Roseau River WMA had been proposed in various forms for several years. In 2006 the MN Flood Hazard Mitigation program awarded a state funded grant to assess a project that would replace failing or inadequate structures within the WMA. The project stalled for several years until a Project Team was created in 2010 to move the project forward. The Final Engineer's Report was completed in June of 2014 and is available on our website at http://www.roseauriverwd.com/Project_rrwma.html

The project is entirely within the Roseau River WMA and consisted of removal and replacement of the Pool 2 to Pool 3 control structure, Pool 3 outlet structure and conveyance channel, and a 2.5 mile outlet channel from Pool 3 to the Roseau River.

The project purposes are as follows:

- Address the need to repair or replace the failing control structure between Pools 2 & 3
- Improve water level management capabilities on the WMA for vegetation management
- Control pool bounce to improve nesting success
- Provide more efficient flood storage and improve the timing of more than 8,000 acre-feet of flood storage in the RRWMA area
- Provide flood damage reduction downstream at Caribou by decreasing peak flows at Caribou
- Manager storage and flow release in beneficial consideration of Red River peak flows
- Provide flood damage reduction in agricultural areas upstream and south of the Big Swamp along the Roseau River in Moose, Soler, Dieter and Pohlitz Townships.
- Moderate the effects of sever flooding on wildlife habitat and vegetation in the Big Swamp
- Reduce the incidence of crossover flows from the Roseau River to the Two Rivers.
- Streamflow augmentation, improved dissolved oxygen levels, enhanced fish habitat, and improved water level management.
- Reduction in riverbank erosion and bank sloughing on the Roseau River.

The majority of construction took place in 2016 with final completion in 2018. The project was operational in 2019.

The project was funded 75% by the Flood Hazard Mitigation bonding program through the MN DNR with 25% coming for the RRWMB and RRWD construction fund dollars. The cost of the project was $3.6 Million.

UNDER DEVELOPMENT

Roseau Lake Rehabilitation Project

Roseau Lake historically provided a diversity of habitats for many aquatic mammals, birds, fish, amphibians, and reptiles. In 1914 the Roseau River was channelized and a legal ditch system was created through the lake basin, draining Roseau Lake.

Discussions about a project, in one form or another, in the historic Roseau Lake area have occurred periodically between the USACE and MN DNR since the 1930s. In 2011 the MN DNR and the RRWD partnered on a series of meetings with

landowners in the area to gain insight on their problems with flooding as well as their thoughts on possible solutions.

In 2014 the RRWD, in partnership with the DNR initiated a Project Team to develop a multi-purpose project to rehabilitate Roseau Lake. The project team developed the following purpose and need statement to guide the design:

The purpose of this project is to improve habitat conditions in the Roseau Lake and the Roseau River and to manage the available storage capacity of the lake basin to reduce flood damages near and downstream of the lake basin.

The project continues to follow the Mediation agreement, Project Team process and USACE Concurrence Point process. The following goals of the project were defined by the Project Team:

PROJECT GOALS

- Improve water level management in Roseau Lake basin
- Provide more efficient flood storage and improve the timing of flooding
- Control pool bounce to improve nesting success
- Provide flood damage reduction downstream
- Manage storage and flow release in beneficial consideration of Red River flows
- Provide flood damage reduction in agricultural areas both in surrounding areas and downstream
- Stream flow augmentation
- Enhanced waterfowl, fish and wildlife habitat
- Improved water level management on WMA lands to improve vegetation
- Reduction in riverbank erosion and bank sloughing on the Roseau River
- Reduce the incidence of crossover flows from the Roseau River to the Two Rivers.

The project team spent months developing and investigating various project alternatives to determine which one would best meet the Purpose and Need as well as project goals. In May of 2018, the RRWD received acceptance of Alternative 2A' as the Preferred Alternative by the USACE. More information on the preferred alternative and the June 2019 Engineer's report can be found on our website at http://www.roseauriverwd.com/Project_Roseau_Lake_Bottom.html

The project continues to move through the planning and permitting processes. The Environmental Assessment Worksheet will be published for comment in early 2020. HDR Engineering continues to work on design and plans. The Project Team is developing the operating and maintenance plans and mitigation proposal.

This project currently has funding committed from various sources: Lessard-Sams Outdoor Heritage Council; State of Minnesota Flood Hazard Mitigation program; Red River Watershed Management Board; and local RRWD construction funds. As the project moves forward, additional funding partners will be pursued as appropriate.

Whitney Lake Project Area

The Whitney Lake project area encompasses about a 74 square drainage area that has historically struggled with frequent inundation flooding with water sitting on fields for weeks at a time. In 2016, the RRWD entered into a cooperative agreement with the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) to advance the project under the Regional Conservation Partnership Program (RCPP). This partnership allowed the RRWD to receive $500,000 in federal funds to develop a plan to address the water management issues in this area. The stated purpose of the project is as follows: *Reduce damages to agricultural lands for a 10 year 24 hour storm and reduce damages to roadways for a 25 year 24 hour storm event in the Whitney Lake watershed.*

At the beginning of the planning process it became clear that no one project alone would meet the purpose of the project and address the frequent damaging flooding landowners experience. The Project Team process was also utilized with this project to determine a Preferred Alternative. After many months of meeting and investigating alternatives, the RRWD proposed seven alternatives to be considered by the USACE for Concurrence Point 2, Alternatives Analysis. Those alternatives represent retention sites, diversions and private (legal) drainage systems. Work continues evaluating the alternatives as of the writing of this plan amendment. As more information becomes available it will be posted on our website at http://www.roseauriverwd.com/Projects_Whitney_lake.html

Funding partners for the planning have been: USDA through the NRCS; Flood Damage Reduction Work Group; and RRWD.

Roseau River Restoration

One of the components addressed in the 2004 Overall Plan was a restoration of the historic channel segments of the river that had been cut off when the river was dredged in the early 1900's. Early coordination meetings between RRWD staff and MN DNR representatives began in 2018 to discuss initiation of the restoration work. In 2019 the RRWD contracted with Houston Engineering to submit proposals to the Lessard-Sams Outdoor Heritage Council to fund this restoration work.

The project would re-establish nearly 14 miles of natural channel, reconnect hundreds of acres of floodplain, improve habitat, and improve water quality. The RRWD continues to work closely with DNR stream ecologists and local WMA managers to develop this project.

The Lessard-Sams Outdoor Heritage Council proposal to the 2019 Minnesota Legislature includes a funding allocation for the project. The RRWD is committed to moving forward with the project once funding is secured.

PROPOSED/STUDIED

Beltrami Island Project Area

Since the flood of 2002, the RRWD has spent an enormous effort studying the effects and benefits of storing water in the upper reaches of the watershed. The most recent effort utilized the RCPP process to fund the investigation and planning. Lack of a clearly defined Purpose and Need for retention in this area and modeling showing negligible benefit has prompted the RRWD Board of Managers to discontinue the study of this area for retention type projects.

A report outlining the work completed to this point and the outcomes will be available on the RRWD website in 2020.

Malung Impoundment

Immediately after the 2002 flood the Malung Impoundment Site was investigated as a potential site to benefit the City of Roseau from a 100 year flood event. A Preliminary Engineer's Report was completed for the project and after a public hearing, the RRWD Board of Managers established it as a project. Due to several factors, including landowner objection and other projects being considered to remove the City from the 100 year floodplain (West Intercept and the City of Roseau's East Diversion project), the Board of Managers decided not to pursue the project at that time.

The Preliminary Engineer's report and project information is retained by the RRWD for revival if circumstances change and it becomes necessary to revisit the project.

Lost River State Forest Peatland Restoration

Reducing discharge from the Lost River State Forest has been identified in multiple planning efforts as a public benefit. Strategies ranging from gated impoundments to culvert sizing have been proposed in the past. Of these, Norland Impoundment located on the southern limits of the forest was the only project to be constructed. The project area is 72 square miles of primarily wetlands dissected by 70 miles of legal ditch, Jurisdictional Ditch 61 (JD 61). The Peatland Restoration

Project will analyze the existing soil, vegetation and elevation characteristics to determine specific areas with the ability to be restored or re-wetted and compare that data with the infrastructure that may be impacted or benefited. The project, once complete, will provide a roadmap to installing water management strategies in the Lost River State Forest, and the methodology will replicable in similar landscapes in Northern MN.

As of the drafting of this amendment, no funding has been secured by the RRWD for the Lost River State Forest Peatland Restoration Study. When project funding has been obtained and the study moves forward, the RRWD will be working closely with MN DNR on the impacts on state forest lands.

3.2 Multipurpose Water Management - Drainage

The RRWD is the jurisdictional authority for four drainage systems within the district and historically managed those systems with minimal maintenance effort. Conditions are constantly changing for drainage. In the past decade, land use has evolved changing lands that had previously been haying or grazing ground to tilled crop land, more precision drainage is taking place on fields, drain tile is being installed, and the frequency of intense summer storms create challenges for drainage systems that are between 50 – 100+ years old. The RRWD has taken a more proactive approach to educating the public about the roles and responsibilities in drainage management. Minnesota State Statutes Chapter 103E clearly defines the process and procedures jurisdictional authorities follow in dealing with these systems. The current statute can be found here https://www.revisor.mn.gov/statutes/cite/103E

The following update on the Historical Effectiveness of the RRWD categorized our jurisdictional drainage system projects into three categories: Completed, Under Development and Proposed/Studied.

COMPLETED

County Ditch #8 Sediment Reduction Project

In 2016 the RRWD was awarded a Board of Soil and Water Resources (BWSR) Clean Water Fund Projects and Practices Grant for $147,700 to install 23 side water inlets, install two rock drop structures and stabilize over 300 feet of stream bank. The work was completed in 2019.

State Ditch #51 Sediment Reduction Project

In 2018 the RRWD was awarded a Board of Soil and Water Resources (BWSR) Clean Water Fund Multi-Purpose Drainage Management Grant for $55,600. The RRWD, in cooperation with landowners, road authorities, and the Roseau SWCD, has implemented conservation practices on five high priority sites targeted due to the

large volume of sediment they contribute to SD 51. The sites selected for this application were identified through a 2014 Soil Erosion and Drainage Law Compliance grant as a high priority concern due to extensive gully erosion and modeled high erodibility factors.

UNDER DEVELOPMENT

County Ditch #16 Improvement project

As part of the Whitney Lake Project, an improvement of the CD #16 system was part of the Preferred Alternative. In 2019 a group of landowners submitted a petition to the District to improve the system using BTSAC Technical Paper #3 (see Section 4.5)

The RRWD is following the procedures outlined in MN Statute 103E for drainage improvements and expects to complete the project by 2021.

A BWSR Multi-Purpose Drainage Management grant was also awarded to the District to complete a complimentary clean water component of the project. Twenty-seven side water inlets will be installed to reduce erosion adjacent to CD 16 and prevent sediment deposition in SD 51.

PROPOSED/STUDIED

NEW DRAINAGE SYSTEM

Another component of the Whitney Lake Project is a new drainage system adjacent to CR 115. The District anticipates landowners submitting a petition in 2020.

4.0 Reports, Studies, Technical Papers

In the 2004 Overall Plan, Section V: Overall Watershed Goals, really sets the standard the District follows in researching, developing and planning projects and programs. The work presented in this amendment section represents the District's continued commitment to reaching the goals and objectives defined in the Overall Plan. The following plans, reports, studies, and technical papers are being used by the District to not only supplement those existing goals, strategies, and action items, but explore new possibilities as well.

The RRWD continues to work with landowners, local, state, and federal agencies in all facets of project planning and development. The successful template of cooperation and consensus-based planning developed with the Citizens Advisory Committee (CAC) and Technical Advisory Committee (TAC), as well as the Mediation Agreement, has become second nature to the RRWD.

4.1 Distributed Detention Reports (U.S. & Canada) - Efforts to develop comprehensive plans for expanded distributed detention strategies are being developed throughout the United States portion of the Red River Basin. These planning efforts establish benefit to local damage centers as well as reduction in

contribution to the Red River main stem (20% peak flow reduction goal on the Red River mainstem from 1997 flood levels). This report summarizes methodology and outcomes of the Roseau River Watershed Expanded Distributed Detention Strategy, funded by the Red River Watershed Management Board (RRWMB), which assumed a goal of 35% peak flow reduction and 20% overall volume reduction for the 100 year 10 day Standardized Melt Progression Event in the Roseau River watershed. Houston Engineering, Inc. (HEI) and HDR, Inc. (HDR) were tasked with the responsibility to execute the RRWMB Expanded Distributed Detention Strategy for the Roseau River Watershed District. HEI analyzed the Upper Roseau River Watershed and Hay Creek tributary, while HDR analyzed the Lower Roseau River Watershed. The report is available on the District's website at the following link: **http://www.roseauriverwd.com/pdf/RRWD%20RRWMB%20Detention%20Report.pdf**

4.2 Minnesota Pollution Control Agency's WRAPS Summary - The MPCA employs a watershed approach to restoring and protecting Minnesota's rivers, lakes, and wetlands. Money to accelerate efforts to monitor, assess, and restore impaired waters, and to protect unimpaired waters was funded by the Minnesota's Clean Water Legacy Act.

4.2.1 Background - The Clean Water Legacy Act (CWLA) requires that Watershed Restoration and Protection Strategy (WRAPS) reports summarize priority areas for targeting actions to improve water quality, and identify point sources and nonpoint sources of pollution with sufficient specificity to prioritize and geographically locate watershed restoration and protection actions. In addition, the CWLA suggests including an implementation table of strategies and actions that are capable of cumulatively achieving needed pollution load reductions for point and nonpoint sources.

The WRAPS report provides the results of such prioritization and strategy development. Because many of the nonpoint source strategies outlined in the WRAPS report rely on voluntary implementation by landowners, land users, and residents of the watershed, it is imperative to create social capital (trust, networks, and positive relationships) with those who would be needed to voluntarily implement best management practices.

The implementation strategies, including associated scales of adoption and timelines, provided in the WRAPS report are the result of watershed modeling efforts and professional judgment based on what is known at the time of the report and, thus, should be considered approximate. Furthermore, many strategies are predicated on necessary funding being secured. As such, the proposed actions outlined are subject to adaptive management—an iterative approach of implementation, evaluation, and course correction.

4.2.2 Restoration Category - The RRW streams in the restoration category were assessed and listed as impaired for aquatic life or aquatic recreation based on the final 2018 federal 303(d) Impaired Waters listing. These reaches failed to meet a minimum threshold for fish Index of Biological Integrity (F-IBI), macroinvertebrate Index of Biological Integrity (M-IBI), and/or a specified water quality standard. Four reaches were identified as restoration candidates, as

shown in Table X (Appendix A.1). These reaches failed to meet F-IBI, M-IBI, and/or water quality criteria for *Escherichia coli* (*E. coli*) and Total Suspended Solids (TSS). Streams within the restoration category are assigned a goal for implementation to achieve their relative water quality criteria. Only one impaired stream, Hay Creek (-505), required a Total Maximum Daily Load (TMDL) study. Once finalized, the Hay Creek TMDL Study can be found at: https://www.pca.state.mn.us/water/watersheds/roseau-river

4.2.3 Protection Category - The protection category includes waterbodies currently designated as supporting aquatic life and aquatic recreation, or those waterbodies that have not been assessed. The protection category is divided into three subcategories based on past impairments, descriptive information from the Roseau River Watershed Monitoring and Assessment Report (2018a), and the Hydrologic Simulation Program - FORTRAN (HSPF) watershed model rankings. These three subcategories include: previously impaired, potential impairment risk, and high-quality waters.

Protection Category 1 includes waterbodies which were previously listed as impaired on the 2014 federal 303(d) Impaired Waters list. These waterbodies have been subject to impairment in the past, and are prioritized to prevent future impairment. These waterbodies tend to be near or occasionally exceed numeric water quality standards.

Protection Category 2 includes waterbodies which have been assessed and not deemed high-quality or previously impaired. They also include HSPF-modeled HUC12-sized watersheds determined to be in the lowest 50% of the combined water quality scores shown in Table X. Non-assessed streams were included to highlight locations that can potentially contribute to poor water quality throughout the RRW. These streams are often major tributaries to the Roseau River with the capacity to delivery high pollutant loads.

Protection Category 3 includes waterbodies which have been described in the Roseau River Watershed Monitoring and Assessment Report (2018a) as high-quality waters, or have biota indicative of high-quality waters. These waterbodies provide habitat for a range of less tolerant biological species and improved recreation opportunities.

Table X summarizes the restoration and protection categories, and Figure Y (Appendix A.2) shows the corresponding location in the RRW. Reduction goals for conventional pollutant impaired reaches are defined first by the TMDL reductions. Reaches categorized as protection likely meet water quality standards, if so implementation goals are based on state and region pollutant and flood reduction goals (e.g., Minnesota Nutrient Reduction Strategy).

4.2.4 WRAPS Report – The Strategies and Actions Tables in the WRAPS report identify specific strategies that were developed for the RRW subwatersheds to restore impaired waterbodies and to protect those waterbodies that are not impaired. Once finalized, the Roseau River WRAPS Report can be found at: https://www.pca.state.mn.us/water/watersheds/roseau-river

4.3 Prioritize, Target, and Measure Application - The Prioritize, Target, and Measure Application (PTMApp) is a vision for a state-wide desktop and web application which provides the technical bridge between the types of strategies in a local water plan and the identification of implementable on-the-ground Best Management Practices (BMPs) and Conservation Practices (CPs).

PTMApp can be used by Soil and Water Conservation Districts (SWCD), watershed districts, county local water planning, agency staff and decision-makers to interactively and in real-time, PRIORITIZE resources and the issues impacting them, TARGET specific locations to place CPs and BMPs, and MEASURE water quality improvement by tracking the expected nutrient and sediment load reductions delivered to priority resources.

In 2016 the International Water Institute was awarded LCCMR funding to run PTMApp for the Roseau River upstream of Roseau Lake. The RRWD was also awarded a BWSR Clean Water Fund grant to compliment that effort and draft a report to summarize the results. The RRWD Board, as well as Canadian partners, provided additional funding to complete the model all the way to the Red River. Houston Engineering was hired to complete a Targeted Implementation Plan (Plan) for the Roseau River basin. Included within this Plan are maps showing potential locations for implementing technically feasible Practices as well as estimates of the number and types of Practices needed to achieve regional sediment and total phosphorus reduction goals (10% load reduction for each). The estimated cost of the Plan to make progress towards goals are included to guide funding requests for implementation. This Plan divides the study area into eight management areas to assess whether the water quality goals can be achieved. The management areas for the study area are based largely on 10-digit HUC boundaries within the US and comparable watershed delineations that have been performed in Canada. The Plan can be used to guide Practice implementation decisions on both public and private lands and to coordinate these efforts among local, state, and federal governments; international organizations; non-profit governmental organizations; individual producers; and agribusiness. Nothing in this Plan should be construed as forcing landowner cooperation. This Plan is intended to guide implementation efforts and should not be considered prescriptive. The Plan is available on the RRWD website at: http://www.roseauriverwd.com/Targeted_Implementation_Plan.html

4.3.1 Beltrami Island Watershed Targeted Implementation Profile - This report describes the results of an effort to refine PTMApp data and information for the Beltrami Island Watershed, and to target the placement of specific practices. Potential practices highlighted within the implementation scenario presented in this report align with preferred BMPs within the watershed as determined by responses from a set of surveys that were conducted within the watershed. The results are intended to compliment work completed through the Beltrami Island Regional Conservation Partnership Program (RCPP) project.

The completion of this project included the updating and utilization of PTMApp data to support efforts to target specific BMPs to improve water quality within

and downstream of the Beltrami Island Watershed and make progress towards local water management goals.
The remainder of this report presents the methods used for locating feasible conservation and management BMPs within the Beltrami Island Watershed and describes the information presented in the Targeted Implementation Profile. The targeted implementation profile can be used to guide or inform the implementation of practices within the watershed.
The underlying data developed for this project will serve the Roseau River Watershed District and its partners as they continue to improve the condition of water resources through the implementation of BMPs, by providing technical support to farmers and landowners, and by performing educational and outreach activities within the watershed.
The report is available on the RRWD website at the following link:
http://www.roseauriverwd.com/pdf/Beltrami_Island_PTMApp_Final_Report.pdf

4.3.2 Hay Creek Sub-Watershed Targeted Implementation Profile – In 2019 a Total Maximum Daily Load Assessment was drafted for the Hay Creek Sub-Watershed in partnership with the MPCA as part of the WRAPS report. The RRWD took this information and asked Houston Engineering to assess the Sub-Watershed using PTMApp. Funding from the BWSR grant was used to create educational materials and hold public outreach events. The District plans to continue working to address in-channel, channel adjacent, and in field problems within this sub-watershed. As projects and programs are implemented, updates will be available on the RRWD website.

4.4 Flood Damage Reduction Work Group's Technical and Scientific Advisory Committee (TSAC) Papers – The Flood Damage Reduction Work Group relies on a Technical and Scientific Advisory Committee (TSAC) to provide technical and scientific information and analysis in support of the mediation effort. The TSAC represents a range of disciplines, including hydrology, engineering, ecology, soils science, and economics. The TSAC developed a series of working papers to address key topics associated with flood damage reduction and modeled the use of different strategies for flood damage reduction. The TSAC did its work based on consensus, and its work products reflect consensus recommendations to the FDRWG. The RRWD has used and will continue to use these technical papers in the development of projects. The work papers can be found at the following link:
https://www.rrwmb.org/FDRWG_Committees.html

4.5 International Water Institute's Basin Technical and Scientific Advisory Committee (BTSAC) Papers – The committee was tasked with determining the effects of agricultural drainage on flooding with recommendations for subsurface and surface water management in the Red River of the North Basin. The RRWD has used these papers as guidance in updating the District's Rules (Water Management Option for Subsurface Drainage: Briefing Paper #2) and as a recommendation for a landowner ditch improvement petition (Water Management Option for Surface

Drainage: Briefing Paper #3). The Briefing Papers, along with presentations, can be found at the following link:
https://iwinst.org/mesmerize/watershed-research/reports-and-past-research-archive/

4.6 Drainage Ditch Inventory & Inspection Report (SEDLCP) – In 2013 the RRWD Board of Managers renewed their commitment to the Overall Plan's Section V: Overall Watershed Goals and in 2014 the RRWD partnered with Roseau County SWCD to inventory catchment basins that drain into legal drainage systems within the Roseau River Watershed. The purpose of the investigation was to determine catchments and pourpoint locations that contributed the greatest potential sediment to a particular legal ditch. The watershed district modeled sediment loss from data generated by the international water institute, and spatial analyst tools within ArcMap. Watershed and SWCD staff conducted field truthing of priority sites and incorporated known problem locations that were not identified in the modeling. The final inventory provided a platform to pursue future funding for construction projects, specifically the CD 8 Sediment Reduction Project and the SD51 Sediment Reduction Project. These projects work to meet the NRE Water Quality Action Items identified in the Overall Plan in those subwatersheds. Information generated through the SEDCLP grant was also used in landowner outreach and individualized BMP cost-share efforts. The report attached to this amendment as Appendix A.3.

4.7 Roseau River Water Trail Masterplan – In 2018 the RRWD partnered with HDR Engineering to do some community outreach. After discussions with community members, the opportunity to improve the boat dock and add a kayak launch at the Roseau City Park was the project chosen. From there the idea of making the Roseau River a water trail developed and a Stakeholder group was formed. The University of Minnesota and Center for Urban and Regional Affairs (CURA) were utilized through grant funding to develop the implementation plan.

The Roseau River Water Trail Masterplan proposes designs for six sites that were selected along the Roseau River that are significant in terms of access and use of the Roseau River: Hayes Lake State Park, Malung Town Hall, City Park, City Center, Stoe's Bridge and Dieter Town Hall.

It is the intent of the RRWD to work with project partners to plan, implement, and promote the Roseau River as a water trail. A water trail is a stretch of river or lake that is mapped and managed for recreation.

The goal of Roseau River Water Trail (RRWT) is to promote the enjoyment and conservation of the natural, cultural, and historical resources of the Roseau River by encouraging responsible, quality, public access opportunities through partnerships and stakeholder advocacy. The RRWT aims to do the following:

1. Capitalize on the Roseau River's potential for, increased accessibility for motorized and non-motorized watercraft, fishing, camping, and birding opportunities by actively promoting the water trail.
2. Utilize the Roseau River for educational opportunities to study water quality, habitat, and responsible recreation practices.

3. Ensure the water trail plan is sustainable by utilizing low maintenance structures and working with local groups for long-term upkeep.

The Roseau River Water Trail Masterplan document has five sections. The first section, Introduction, sets the context for the project including area history, descriptions of habitat and ecology of the region, information about regional recreation, Roseau County demographic and economic data, and site selection criteria. The second section, Research and Precedents, describes some of the projects and additional research that informed the development of ideas for the RRWT. The third section, Community Engagement, documents the community participation and input given by the community members and stakeholders for the RRWT project between June and August 2018. The fourth section, Design and Recommendations, documents the design brief, design principles and recommendations, the design features, and the Masterplan for each access site along the Roseau River. The fifth section are the References for the plan.
Based on the principles and recommendations, conceptual designs were developed for all six of the chosen sites. Designs for three locations on the trail close to or in the City of Roseau were selected to develop more in-depth designs. They are Roseau City Park, Roseau City Center, and the Malung Town Hall.

The entire Masterplan can be found on the RRWD website at:
http://www.roseauriverwd.com/Roseau_River_Water_Trail.html

4.8 Current Wildlife Management Area Plans – There are eight major Wildlife Management Areas (WMAs) in Minnesota, two of which have lands within the RRWD. The Red Lake WMA is in the process of updating it's Management Plan. Updates can be found at the following link:
https://www.dnr.state.mn.us/wmas/habitat_management_report.html?pgm_prj=WMA09005
The other Major WMA is the Roseau River WMA. Updating of their management plan has not begun at this point. For a copy of their current management plan please contact the Area Wildlife office at 218-463-1130.

4.9 RRWD Comprehensive Project Model – In 2019 the RRWD Board of Managers requested HDR Engineering, working with Houston Engineering, complete a comprehensive model that would show the effects of projects, both proposed and completed, on the Roseau River. The summary of this effort is available from the RRWD upon request.

5.0 Public Outreach

As the RRWD has done the work described in the previous sections of this amendment, various public outreach materials have been created to educate the public and promote the purpose of the project or program. New material is posted on the RRWD website periodically. A sample of that material is included as Appendix A.4 to this amendment.

5.1 Launch Party flyer
5.2 RRWMA Pool 3 Outlet Project ribbon cutting invitation
5.3 RRWD Facebook account screenshot
5.4 Roseau County Fair Booth photo
5.5 Hay Creek Sub-watershed Stakeholder Meeting postcard
5.6 Roseau River Habitat Restoration information sheet
5.7 RRWD Summer 2019 Newsletter
5.8 WRAPS Open House postcard
5.9 Roseau Lake Rehabilitation Project Newsletter
5.10 BMP handouts

Appendix A.1 - Table X

Table X: Waterbody prioritization description.

HUC-12 (09020314XXXX)	AUID (09020314-XXX)	Waterbody name	Waterbody description	Strategy Level	Combined Score[3]
0303	505	Hay Creek	Headwaters to Roseau River	**Restoration** Currently Impaired	8
0507	542	Pine Creek	Unnamed creek to Roseau River		39
0105	516	Severson Creek (County Ditch 23)	Unnamed creek to Roseau River		66
0105	541	Severson Creek/County Ditch 23	Severson Creek to Unnamed creek		66
0606	501	Roseau River	Hay Creek to MN/Canada border	**Protection Level 1** Previously Impaired	45
0409	508	Sprague Creek	MN/Canada border to Roseau River		67
0503	519	Lost River	Unnamed ditch to Unnamed ditch	**Protection Level 2** Assessed Reaches/High Potential for Impairment	22
0502	502	Roseau River	S Fork Roseau River to Hay Creek		29
0205	518	Unnamed creek	Unnamed creek to S Fork Roseau River		28
0205	539	Unnamed creek	Headwaters to Unnamed creek		28
0203	540	Paulson Creek	Unnamed ditch to S Fork Roseau River		60
0605	N-1[1]	State Ditch Number Sixty nine	Whitney Lake ditch to Roseau River		8
0106	N-2[1]	Bear Creek	Headwaters to Roseau River		9
0501	N-3[1]	County Ditch Number Eight	Headwaters to Roseau River		37
0402	N-4[1]	Unnamed ditch	Headwaters to Sprague Creek		43
0104	68-0004-00[2]	Hayes Lake	Hansen Creek to S Fork Roseau River	**Protection Level 3** High quality Waters	91
0205	503	Roseau River, South Fork	Headwaters to Roseau River		28
0107	504	Roseau River	Headwaters to S Fork Roseau River		54
0301	512	County Ditch 9	T161 R37W S29, south line to Hay Creek		54
0103	517	Hansen Creek	Unnamed lake (68-0083-00) to Roseau River		96
0202	521	Unnamed ditch (Judicial Ditch 63)	Unnamed ditch to Mickinock Creek		45
0202	522	Mickinock Creek	Unnamed ditch to Unnamed creek		45

[1]Unassessed reaches included in the prioritization. These reaches have a combined water quality score of less than 50.

[2]DNR Lake ID

Appendix A.2 - Figure Y

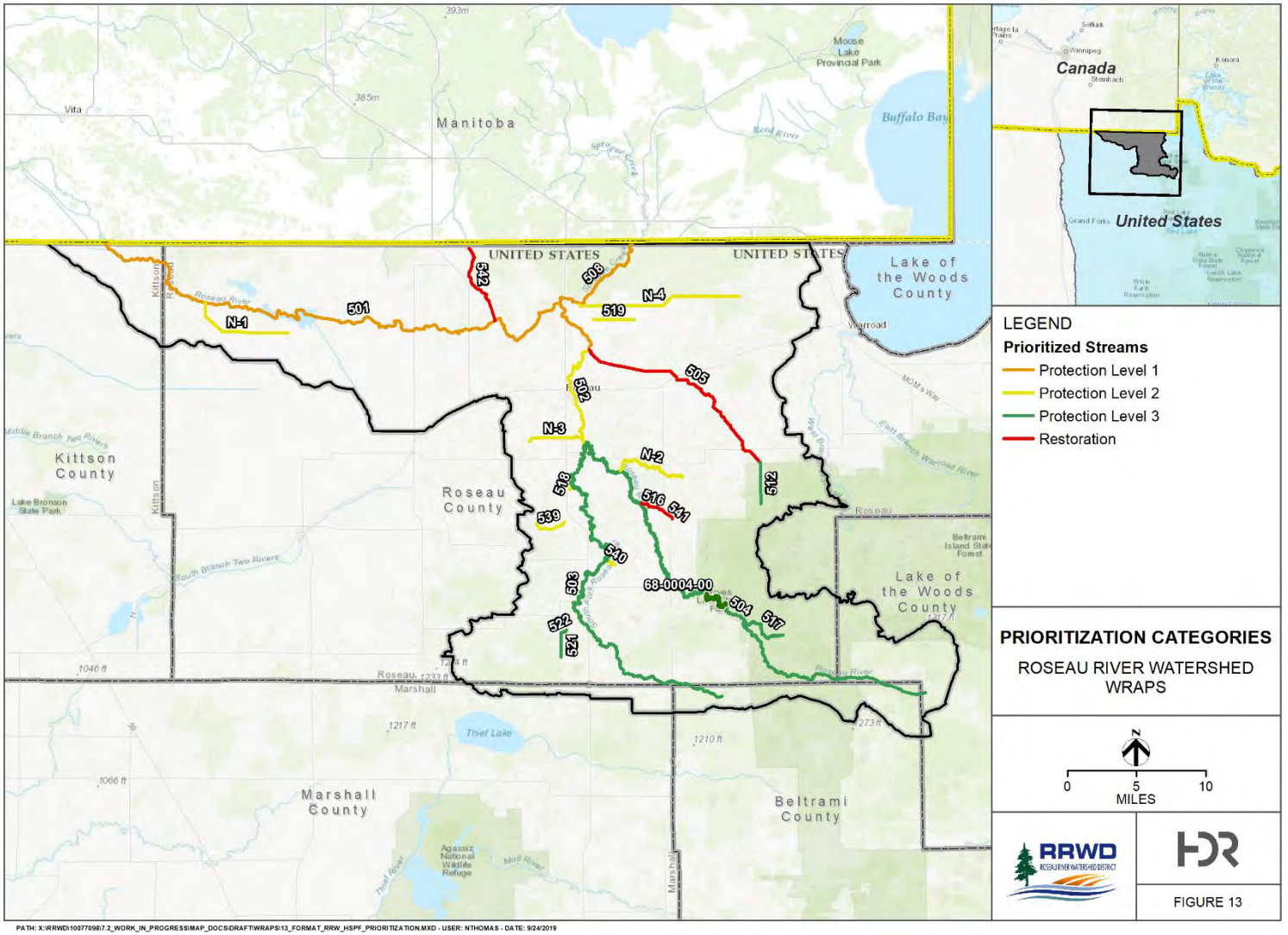


Figure Y: Roseau River Watershed waterbody prioritization categories.

Roseau River Watershed District
Drainage Ditch Inventory and Inspection (SEDLCP) 2014
Site Identification and Prioritization Project
Grant ID – C14-8525

Introduction

The Roseau River Watershed District in partnership with the Roseau County SWCD received a grant through the SEDLCP program to inventory catchment basins that drain to legal drainage systems under jurisdiction of the Roseau River Watershed. The purpose of conducting the inventory was to provide a catalogue of drainage areas that could contribute sediment to legal drains and the Roseau River. Drainage areas were combined with weighted soil loss estimates to measure potential impairments per drainage area and prioritize sites within ditch systems and the Roseau River that require conservation practices. Spatial data provided by the International Water Institute (IWI) was utilized to generate soil loss values for each drainage area.

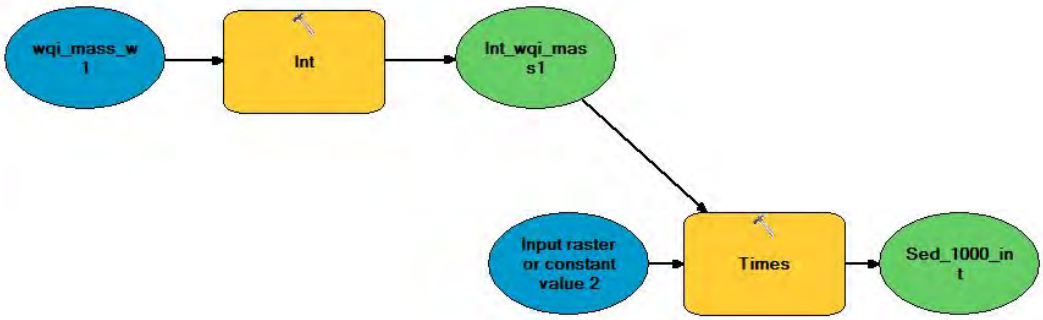
Data Provided

The International Water Institute provided the watershed district with spatial data illustrating potential soil loss, Nitrogen loss, Phosphorus loss, overland catchments, overall water quality index, flow lines and stream power. Overall catchments provided the foundation for generating sediment loss values, catchment sizes provided range in size from 6 acres – 250 acres. For catchments greater than 250 acres, the watershed exported drainage areas using the project permitting tool provided by the IWI website.

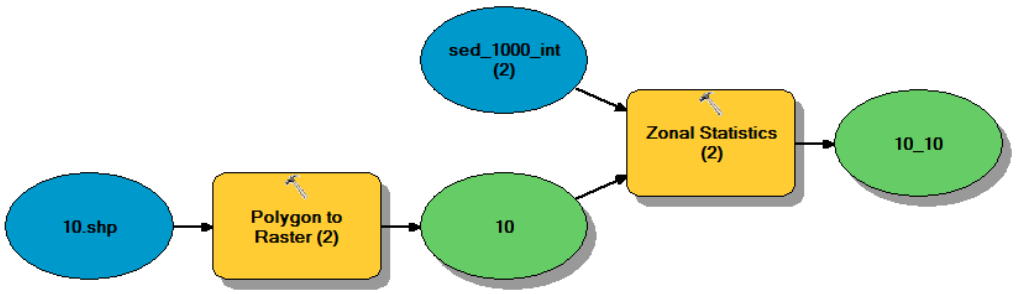
Methodology and Modeling

Water quality, nutrient loss, and sediment loss were provided as raster data. Sediment loss raster (sed_mass_w1) was selected as the target dataset for measuring and ranking catchment basins. The reason for selecting sediment loss over nutrient loss or water quality data was soil loss is easier to measure, field verify and relate through public outreach to stakeholders.

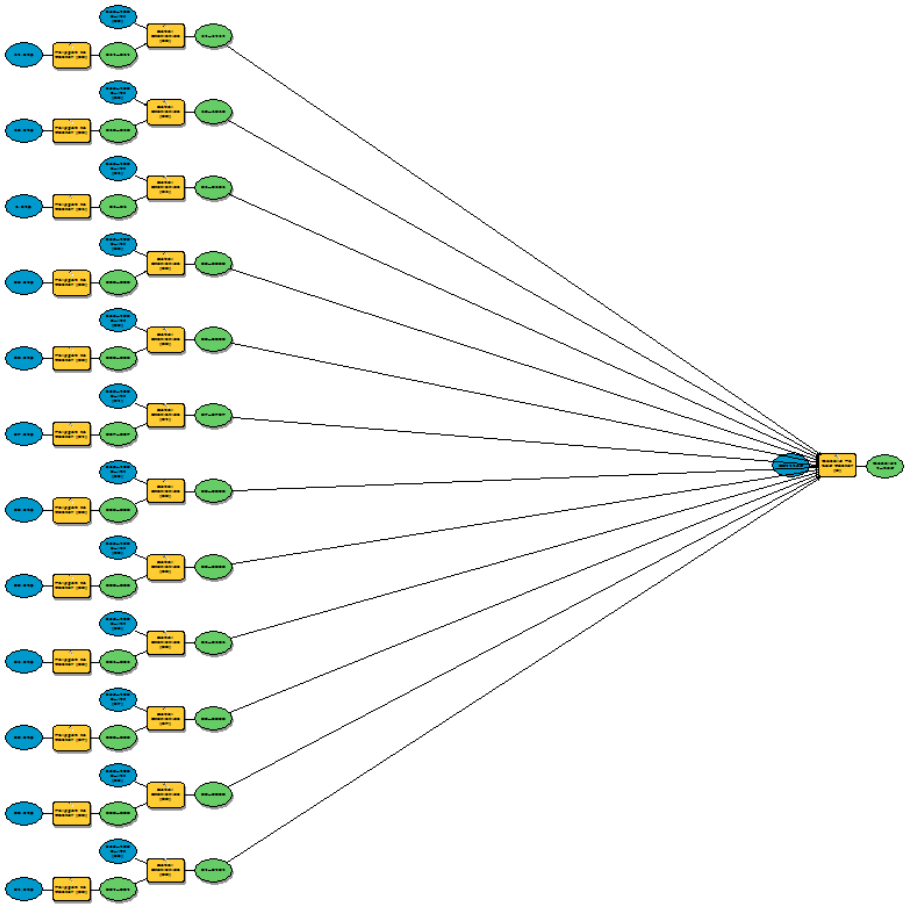
The first step in modeling sediment loss data was to convert the original dataset to an integer raster, this allowed for a value to be attached to each 3 meter by 3 meter pixel. The sediment integer raster was then multiplied by 1000, using the Times tool in the Arc Toolbox. The purpose of Times tool to multiply cells by 1000 was to rank each individual cell from 0-100 with 0 being low/no loss and 100 being highest loss.



The second step in the process was to convert individual catchment basins from vector to raster data. The converted catchment raster was input into the Zonal Statistics Tool, this tool utilized the catchments as the target boundary and inputs the sed_1000_int raster data as the sediment loss value. The data produced from the Zonal statistics tool was an individual raster of a catch basin with the sediment values clipped within its boundaries.



Once all the catchment basins have been converted to raster's and have been combined with the sediment raster through the Zonal Statistics tool, all raster catchments were combined using the Mosaic tool to create a complete mosaic of all catchments per ditch system.



The output of the mosaic was, individual catch basins with a numerical value regarding potential soil loss. The individual soil loss values per catchment were joined with the original catchment vector data, allowing the calculated soil loss per site to be included in a table format.

The attribute data from the final catchment data (polygon) was joined with the pourpoint data (point) to allow future users to select the outlet location and query all modeled data.

The completed mosaic allows a broad view of the potential sediment yield throughout a drainage system. The mosaic provides agency staff and stakeholders a tool to discuss opportunities to reduce erosion and implement BMP's on their property.

Ground Truthing

Each catchment basin has a designated pour-point that allows for inspection of a geographically known outlet. These pour-points put targets on the land for technical staff to assess if there is existing BMP's at catchment outlets. Each ditch system was inspected to verify modeled data, comment on specific site features or determine if BMP's were already in place or needed. Information collected in the field was input in the attribute data for each ditch system pour point,

target locations were determined based on the following criteria; there is no existing form or erosion control or BMP, there is visible evidence of active erosion or sedimentation and the weighted sediment score (w_sed) is greater than 50.0.

Existing erosion control measures and BMP's were experienced throughout the ditch systems in varying forms, most commonly by rocked outlets and sidewater inlets. Grassed waterways, Buffer strips and grade control structures were also encountered during field truthing, open vegetated ditch bottoms that outlet into the ditch system were noted as non priority as long as there was no erosion/sedimentation encountered at the pour point.

Visible erosion at pour points were noted as; active soil aggradation or degradation resulting from surface water at each site. Most common forms of erosion encountered were small gullies accompanied by sediment delta formation in the legal drainage system. Large gullies, rill erosion, excessive sedimentation (ie ditch plugging) and headcutting were also noted in the field.

Using a weighted sediment score of greater than 50.0 as a natural break in targeting pour points was choosen to generate a comprehensive list of sites to pursue remediation through conservation drainage. Addressing sites that score greater than 50.0 as a priority will ensure that sites with the greatest impact to water quality are actively pursued in future.

Watershed Ditch #3

28 pour points out of the 99 modeled, were identified as a priority location to implement some form of BMP. There were 33 pour points that had some existing form of erosion control, with 1 of these sites needing further stabilization due to scouring. Ten sites were identified as contributing sediment into the legal drainage system but did not meet criteria to be targeted, these sites will be included as needing conservation practices as well. See table below.

FID	Shape *	Name	target	FID	Drain_ID	SedVal	Area	w_sed	D_ran	FID	Name	Ex_BMP	Vis_Imp	Com
0	Point		no	0		4038429	45850	88.079149	0	0	<Null>	none	none	CRP
1	Point		no	1		15745807	179200	87.867227	0	1	<Null>	none	none	CRP
2	Point		no	2		2610503	30275	86.226358	0	2	<Null>	none	none	CRP
3	Point		no	3		2879955	46600	61.801609	0	3	<Null>	410 SWI	none	<Null>
4	Point		yes	4		4258316	46625	91.331174	0	4	<Null>	none	minor sediment	could use rock or SWI with riser
5	Point		no	5		1112629	40975	27.15385	0	5	<Null>	none	none	low priority
6	Point		no	6		4597401	84925	54.134837	0	6	<Null>	none	none	grassed road ditch
7	Point		no	7		5565489	126425	44.022061	0	7	<Null>	none	minor scour	somewhat grassed outlet
8	Point		yes	8		6057801	91950	65.881468	0	8	<Null>	none	minor sediment delta	could use rock or SWI with riser
9	Point		yes	9		9867122	150375	65.616771	0	9	<Null>	none	minor sediment delta and scour	could use rock or SWI with riser
10	Point		yes	10		3387768	58600	57.811741	0	10	<Null>	none	sediment delta	could use rock outlet
11	Point		yes	11		5325522	101550	52.442363	0	11	<Null>	none	minor sediment delta	could use SWI with riser
12	Point		no	12		1565592	115825	13.516875	0	12	<Null>	none	minor sediment delta	could use SWI with riser
13	Point		yes	13		5122613	59250	86.457603	0	13	<Null>	none	minor sediment delta	could use rock outlet
14	Point		no	14		7880238	94175	83.676538	0	14	<Null>	410 SWI	none	<Null>
15	Point		yes	15		9548999	110250	86.612236	0	15	<Null>	none	gully formation and sediment delta	could use an SWI
16	Point		yes	16		1565850	27525	56.888283	0	16	<Null>	none	sediment delta	could use SWI or rock outlet
17	Point		no	17		2669883	52375	50.976286	0	17	<Null>	410 SWI	none	<Null>
18	Point		no	18		4775125	87675	54.463929	0	18	<Null>	410 SWI	none	<Null>
19	Point		no	19		930410	130850	7.110508	0	19	<Null>	410 SWI	scour on outlet	could use rock on outlet
20	Point		yes	20		7185123	135875	52.88039	0	20	<Null>	none	sediment delta	ditch plugged by delta at base flow
21	Point		no	21		2243819	47125	47.614196	0	21	<Null>	none	none	grassed outlet
22	Point		yes	22		2026425	37575	53.93014	0	22	<Null>	none	sediment delta and scour	high priority
23	Point		yes	23		11125488	155225	71.6733	0	23	<Null>	none	sediment delta	perenial vegetation
24	Point		no	24		3794209	43400	87.424171	0	24	<Null>	410 SWI	minor delta	needs to be cleaned
25	Point		no	25		4196266	80575	52.079007	0	25	<Null>	none	none	WMA land perenial vegetation
26	Point		yes	26		4989453	56100	88.938556	0	26	<Null>	Grassed Buffer	scour and delta	could use rock or SWI with riser
27	Point		no	27		2946601	31600	93.246867	0	27	<Null>	Grassed Buffer	minor delta	buffer is good
28	Point		no	28		1936949	27450	70.562805	0	28	<Null>	none	none	grassed
29	Point		no	29		8474157	97900	86.559316	0	29	<Null>	410 SWI	minor sediment	minor sediment from 2014 construction
30	Point		no	30		7310066	103875	70.37368	0	30	<Null>	410 SWI	minor sediment	sediment from 2014 construction
31	Point		no	31		1637230	69200	23.659393	0	31	<Null>	none	minor sediment delta	could use rock or SWI with riser
32	Point		yes	32		3514339	43650	80.511775	0	32	<Null>	none	minor sediment delta	uplands in CRP
33	Point		no	33		5774390	69200	83.444942	0	33	<Null>	410 SWI	none	constructed in 2014
34	Point		no	34		2711318	113500	23.888264	0	34	<Null>	none	scour and sediment delta	constructed in 2014
35	Point		no	35		823175	59600	13.811661	0	35	<Null>	none	scour and sediment delta	constructed in 2014
36	Point		no	36		2673589	108325	24.681182	0	36	<Null>	none	headcutting minor sedimentation	could use rock outlet
37	Point		no	37		573670	37350	15.359304	0	37	<Null>	none	scour and sediment delta	could use SWI
38	Point		no	38		1994551	150500	13.252831	0	38	<Null>	none	scour and sediment delta	could use SWI
39	Point		no	39		6182203	74475	83.010446	0	39	<Null>	410 SWI	scouring	scouring occuring at trap
40	Point		no	40		11266073	138750	81.196923	0	40	<Null>	410 SWI	none	cleaned out fall of 2014
41	Point		yes	41		2708371	32975	82.134071	0	41	<Null>	none	channelization	perenial vegetation
42	Point		yes	42		2295867	43800	52.417055	0	42	<Null>	none	channelization	perenial vegetation
43	Point		no	43		3948309	58675	67.291163	0	43	<Null>	none	none	CRP
44	Point		no	44		1891893	30450	62.131133	0	44	<Null>	none	none	CRP
45	Point		no	45		5489243	93675	58.598804	0	45	<Null>	none	none	CRP
46	Point		yes	46		8503435	147525	57.640637	0	46	<Null>	none	minor rill	CRP
47	Point		no	47		5049779	66325	76.136887	0	47	<Null>	none	none	CRP
48	Point		no	48	WD 3 L 1	37354264	1318825	28.323897	52	48	<Null>	none	none	low priority
49	Point		no	49	WD 3 L 1	10139921	246500	41.135582	45	49	<Null>	none	minor sediment and channelization	could use rock outlet or SWI

50	Point		no	50	WD 3 L 1	26833424	601575	44.605284	40	50	<Null>	none	minor sediment delta	could use SWI with riser
51	Point		no	51	WD 3 L 1	30669498	510325	60.097973	22	51	<Null>	none	none	<Null>
52	Point		yes	52	WD 3 L 1	13862257	207800	66.70961	16	52	<Null>	none	minor sediment delta	could use SWI with riser
53	Point		yes	53	WD 3 L 1	18159452	276625	65.64646	18	53	<Null>	none	sediment delta	could use SWI with riser
54	Point		no	54	WD 3 L 1	8444545	357800	23.6013	53	54	<Null>	none	sediment delta and scour	could use SWI with riser
55	Point		yes	55	WD 3 L 1	644774784	10758475	59.931801	24	55	<Null>	none	channelization	could use rock outlet
56	Point		no	56	WD 3 L 1	3521577	180825	19.475056	58	56	<Null>	none	minor scour and sediment	open road ditch
57	Point		no	57	WD 3 L 1	4794642	461225	10.395451	59	57	<Null>	none	sediment delta	50 percent plugged could use rock
58	Point		no	58	WD 3 L 1	7988091	231574.999999	34.494617	48	58	<Null>	none	sediment delta	60 percent plugged could use rock
59	Point		yes	59	WD 3 L 1	22793184	293250	77.726118	9	59	<Null>	none	ditch sedimented in at base flow	CRP needs and SWI
60	Point		yes	60	WD 3 L 1	16073525	185800	86.509822	4	60	<Null>	none	minor sediment and scour	CRP needs and SWI
61	Point		no	61	WD 3 L 1	20796012	982150	21.173967	57	61	<Null>	none	none	road ditch grassed
62	Point		no	62	WD 3 L 1	36085744	422300	85.450495	6	62	<Null>	410 SWI	none	field crossing
63	Point		no	63	WD 3 L 1	7744112	183825	42.127632	44	63	<Null>	410 SWI	minor scour	<Null>
64	Point		no	64	WD 3 L 1	40833140	680650	59.991391	23	64	<Null>	410 SWI	minor sediment delta	sediment accumulation in ditch despite armor
65	Point		no	65	WD 3 L 1	70096784	852525.000002	82.222555	8	65	<Null>	410 SWI	none	constructed in 2014
66	Point		no	66	WD 3 L 1	11464372	534900	21.432739	56	66	<Null>	410 SWI	sediment deposition on outlet	24" SWI is likely too large for drainage area
67	Point		no	67	WD 3 L 3	39498580	889025	44.429099	41	67	<Null>	none	sediment delta	could use a WASCAB or SWI with riser
68	Point		no	68	WD 3 L 3	13571550	295833.584643	45.875623	30	68	<Null>	none	minor sediment delta	grassed rd ditch
69	Point		no	69	WD 3 L 3	33198908	871000	38.115853	47	69	<Null>	none	none	CRP
70	Point		yes	70	WD 3 L 3	34290812	377875	90.746443	1	70	<Null>	none	minor scour	CRP
71	Point		no	71	WD 3 L 3	46602840	516400	90.245624	2	71	<Null>	410 SWI	none	<Null>
72	Point		no	72	WD 3 L 3	55593512	732500	75.89558	12	72	<Null>	410 SWI	minor sediment	<Null>
73	Point		no	73	WD 3 L 3	25060896	375175	66.797884	15	73	<Null>	410 SWI	none	<Null>
74	Point		yes	74	WD 3 L 3	100284816	1306025	76.786291	10	74	<Null>	none	minor sedimentation	perenial vegetation
75	Point		no	75	WD 3 L 3	6848952	1388225	4.933604	60	75	<Null>	none	minor sediment	could use cattle exclusion at pour point
76	Point		no	76	WD 3 L 3	8997244	207025	43.459698	43	76	<Null>	410 SWI	minor sediment	neede to establish vegetation
77	Point		yes	77	WD 3 L 3	32324792	514725	62.80012	21	77	<Null>	none	scouring sediment deposition	could use rock outlet
78	Point		no	78	WD 3 L 3	20625408	375875	54.873051	25	78	<Null>	none	none	grassed outlet
79	Point		no	79	WD 3 L 2	14459211	423750	34.122032	49	79	<Null>	none	sediment delta	could use rock outlet or SWI
80	Point		no	80	WD 3 L 2	48437716	1091150	44.391437	42	80	<Null>	none	sediment delta	could use SWI with riser
81	Point		no	81	WD 3 L 2	11495836	180750	63.600752	20	81	<Null>	410 SWI	none	field crossing with perenial vegetation
82	Point		yes	82	WD 3 L 2	46116824	850750	54.207257	27	82	<Null>	none	minor sedimentation	farmed into the ditch
83	Point		yes	83	WD 3 L 2	36961992	687300	53.778542	28	83	<Null>	none	scour and sediment delta	nearly plugged at base flow
84	Point		no	84	WD 3 L 2	441157504	10910349.9991	40.434771	46	84	<Null>	none	minor sediment deposition	grassed road ditch
85	Point		no	85	WD 3 L 2	31105686	469800	66.210485	17	85	<Null>	410 SWI	minor sediment delta	needs an outlet cleanout
86	Point		no	86	WD 3 L 2	31338352	577899.999999	54.227984	26	86	<Null>	Grassed Buffer	minor scour and delta	<Null>
87	Point		yes	87	WD 3 L 2	52617680	824949.999999	63.782872	19	87	<Null>	none	minor delta	perenial vegetation
88	Point		no	88	WD 3 L 2	12903912	414500	31.131271	51	88	<Null>	none	none	grassed road ditch
89	Point		no	89	WD 3 L 2	14659228	166425	88.083088	3	89	<Null>	410 SWI	none	constructed in 2014
90	Point		yes	90	WD 3 L 2	49015788	568925	86.155096	5	90	<Null>	none	minor delta	could use SWI with riser
91	Point		no	91	WD 3 L 2	29386008	385750	76.178893	11	91	<Null>	410 SWI	minor rill erosion	constructed in 2014
92	Point		no	92	WD 3 L 2	154568928	3221625	47.97856	29	92	<Null>	410 SWI	none	constructed in 2014
93	Point		no	93	WD 3 L 2	17814412	254050	70.121677	14	93	<Null>	410 SWI	minor channel	constructed in 2014
94	Point		no	94	WD 3 L 2	28430352	1242525	22.881111	55	94	<Null>	410 SWI	none	constructed in 2014
95	Point		no	95	WD 3 L 2	66648964	2019925	32.995762	50	95	<Null>	410 SWI	minor delta	constructed in 2014
96	Point		no	96	WD 3 L 2	5108516	222150	22.995796	54	96	<Null>	410 SWI	minor delta	constructed in 2014 needs to be seeded and rocked
97	Point		no	97	WD 3 L 2	16189439	193375	83.720434	7	97	<Null>	410 SWI	none	constructed in 2014 needs to be seeded and rocked
98	Point		no	98	WD 3 L 2	32637128	455800	71.604054	13	98	<Null>	none	none	grassed hard crossing no outlet

County Ditch #16

3 pour points were identified as priority sites out of 47 potential sites. There were 5 pour points that had existing BMP's in place, 8 sites were identified as non-priority but needing conservation practices.

FID	Shape *	Name	target	FID_1	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	FID_	Name_1	Ex_BMP	Vis_Im	Com
0	Point		no	0	0	0		408997	31475	12.994345	0		none	none	low priority
1	Point		no	1	0	0		2616888	41075	63.709994	1		none	none	low priority
2	Point		no	2	0	0		3760518	53600	70.158918	2		none	none	low priority
3	Point		no	3	0	0		3464797	127825	27.105785	3		none	none	low priority
4	Point		no	4	0	0		583746	62200	9.384984	4		none	none	low priority
5	Point		no	5	0	0		492072	57525	8.554055	5		none	none	low priority
6	Point		no	6	0	0		204285	26700	7.651124	6		none	none	low priority
7	Point		no	7	0	0		4516955	104900	43.059628	7		none	none	low priority
8	Point		no	8	0	0		4019130	95625	42.030118	8		none	none	low priority
9	Point		no	9	0	0		5887527	157800	37.310057	9		none	none	low priority
10	Point		no	10	0	0		2713133	70925	38.25355	10		none	none	could use rock or SWI
11	Point		no	11	0	0		263692	32250	8.176496	11		none	minor scour	grassed outlet
12	Point		no	12	0	0		835292	114200	7.314291	12		none	none	grassed outlet
13	Point		no	13	0	0		657789	32100	20.491869	13		none	none	grassed outlet
14	Point		no	14	0	0		1669889	28925	57.731685	14		none	none	no distinct outlet
15	Point		no	15	0	0		1639144	38900	42.137378	15		none	sedimented in	farmed into the ditch bottom
16	Point		no	16	0	0		645871	40475	15.957282	16		none	none	low priority
17	Point		no	17	0	0		322963	27200	11.87364	17		none	none	low priority
18	Point		no	18	0	0		875377	63850	13.709898	18		none	none	low priority
19	Point		yes	19	0	0		49753580	552550	90.04358	19		none	none	scour to south of PP will need addressing
20	Point		no	20	0	0		797629	37775	21.115261	20		none	minor sediment	could use rock outlet
21	Point		no	21	0	0		819853	66400	12.347184	21		none	none	low priority
22	Point		no	22	0	0		6162601	155325	39.675526	22		SWI 410	none	working well
23	Point		no	23	0	0	CD 16	37985100	1058300	35.892564	23		none	none	grassed outlet
24	Point		yes	24	0	0	CD 16	49753580	356700	100	24		none	none	scour to south of PP will need addressing
25	Point		no	25	0	0	CD 16	5935495	234175	25.346408	25		none	minor sediment	could use rocked outlet
26	Point		no	26	0	0	CD 16	63691360	1925975	33.069671	26		none	none	no outlet - solid crossing
27	Point		no	27	0	0	CD 16	16330168	390875	41.778492	27		none	none	low priority
28	Point		no	28	0	0	CD 16	402639936	5105175	78.868978	28		none	none	low priority
29	Point		no	29	0	0	CD 16	13758360	242775	56.671239	29		none	none	low priority
30	Point		no	30	0	0	CD 16	17456312	526875	33.13179	30		none	none	low priority
31	Point		no	31	0	0	CD 16	1735685	175225	9.905464	31		none	none	low priority
32	Point		no	32	0	0	CD 16	14343083	332325	43.159807	32		SWI 410	none	looks like it was recently replaced
33	Point		no	33	0	0	CD 16	32211682	604025	53.328392	33		none	none	low priority
34	Point		no	34	0	0	CD 16	8028199	198449.999999	40.454518	34		none	none	low priority
35	Point		no	35	0	0	CD 16	3700869	261050	14.176859	35		SWI 410	some scouring	
36	Point		no	36	0	0	CD 16	1527280	162150.000001	9.418933	36		none	none	grassed outlet
37	Point		no	37	0	0	CD 16	9974852	164225.000001	60.738937	37		none	noen	grassed outlet
38	Point		no	38	0	0	CD 16	28444214	615375	46.22257	38		none	ditch sedimented in at pour point	farmed into the ditch bottom
39	Point		no	39	0	0	CD 16	3002531	213150	14.08647	39		none	minor sediment	could use rock
40	Point		no	40	0	0	CD 16	4028102	244600	16.468119	40		none	minor sediment	could use rock
41	Point		no	41	0	0	CD 16	13464170	610625	22.049818	41		none	minor sediment	could use SWI with riser
42	Point		yes	42	0	0	CD 16	55345696	654675	84.539193	42		none	minor sediment	could use SWI
43	Point		no	43	0	0	CD 16	10577409	254225	41.606486	43		SWI 410	none	pipe angled upstream with trap
44	Point		no	44	0	0	CD 16	4772919	351075	13.595155	44		none	none	looks stable
45	Point		no	45	0	0	CD 16	43667024	1025275	42.590548	45		none	none	grassed rd ditch
46	Point		no	46	0	0	CD 16	96363664	1937950	49.724536	46		SWI 410	minor sediment	75 percent of section outlets through 24 inch SWI

County Ditch #8

23 sites were identified as prioritized locations for conservation practices out of 66 pourpoints draining into the legal ditch. There were 11 sites identified that have existing BMP's to reduce erosion/sediment transport. There were 10 sites that were identified as needing conservation practices but did not meet criteria to be considered priority.

FID	Shape *	Com	target	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	FID_	Name	Ex_BMP	Vis_Imp	Com
0	Point		no	0	0	0	CD 8	345866045	6109700	57.100356	0		none	none	road ditch
1	Point		no	1	0	0	CD 8	17323426	375250	46.185026	1		none	none	road crossing
2	Point		no	2	0	0	CD 8	48873040	1526025	31.89531	2		SWI 410	none	trapped SWI
3	Point		no	3	0	0	CD 8	2559966	224975	11.424893	3		none	minor scour	rocked outlet
4	Point		no	4	0	0	CD 8	174271216	2788950	62.499073	4		none	none	road ditch
5	Point		no	5	0	0	CD 8	79645690	1622925	49.087196	5		none	sediment delta and scour	good place for SWI
6	Point		no	6	0	0	CD 8	23675588	459300.000336	51.55562	6		none	none	<Null>
7	Point		no	7	0	0	CD 8	22371068	747750	29.918634	7		SWI 410	none	crossing with culvert acts as an SWI
8	Point		no	8	0	0	CD 8	54386496	1229850	44.250841	8		none	none	grassed bottom ditch
9	Point		no	9	0	0	CD 8	62620296	743475	84.237256	9		none	none	outlets via wetland complex
10	Point		yes	10	0	0	CD 8	24147916	410950	58.761207	10		none	none	could use 410 with riser
11	Point		yes	11	0	0	CD 8	18641649	238775	78.408106	11		none	minor scour and sediment fan	could use 410 either rock or SWI
12	Point		yes	12	0	0	CD 8	134379265	3327125	40.39752	12		none	minor scour	natural upland
13	Point		yes	13	0	0	CD 8	18963204	176487.5	99.115612	13		none	minor sedimentation	could use SWI with riser
14	Point		yes	14	0	0	CD 8	15939302	198325	79.662924	14		none	none	could use SWI or rock
15	Point		yes	15	0	0	CD 8	51469636	603975	85.218488	15		none	minor sedimentation	could use SWI or rock
16	Point		no	16	0	0	CD 8	36661530	394131.524343	93.536126	16		SWI 410	minor sedimentation	maintance is proposed summer 2015
17	Point		no	17	0	0	CD 8	19222800	207950	92.436096	17		SWI 410	minor sedimentation	maintance is proposed summer 2015
18	Point		no	18	0	0	CD 8	231422096	3345850	69.186907	18		none	none	RCP under highway
19	Point		no	19	0	0	CD 8	34613992	438674.999999	78.707156	19		none	none	grassed ditch
20	Point		no	20	0	0	CD 8	83664328	1131625	74.109638	20		none	minor sedimentation	Dual 30" CMPs
21	Point		yes	21	0	0	CD 8	12482788	218175	57.214566	21		none	sediment delta	<Null>
22	Point		no	22	0	0	CD 8	8763787	281450	31.687465	22		none	sediment delta	<Null>
23	Point		no	23	0	0	CD 8	49211880	1296225	37.99708	23		none	none	<Null>
24	Point		yes	24	0	0	CD 8	19967180	287625	69.291831	24		none	minor sedimentation	could use SWI with riser
25	Point		yes	25	0	0	CD 8	116341216	1778100	65.430675	25		none	none	recently cleaned good spot for SWI
26	Point		no	26	0	0	CD 8	50706124	853900	59.384146	26		SWI 410	none	field crossing with CMP
27	Point		no	27	0	0	CD 8	8357961	633425	13.194665	27		SWI 410	minor erosion	30" CMP with trap
28	Point		no	28	0	0	CD 8	5788944	300075	19.285191	28		SWI 410	none	<Null>
29	Point		no	29	0	0	CD 8	48675804	1466300	33.83237	29		none	none	<Null>
30	Point		yes	30	0	0	CD 8	28266140	586525	51.748385	30		none	scourbol	old crossing and trap
31	Point		no	31	0	0	CD 8	13756696	347075.668031	39.487304	31		none	bank sloughing	no outlet to the ditch
32	Point		no	32	0	0	CD 8	1904587	142775	13.335434	32		410 Grade Stabilization	none	<Null>

FID	Shape *	Com	target	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	FID_	Name	Ex_BMP	Vis_Imp	Com
33	Point		no	33	0	0	CD 0	25843050	590225	42.431022	33		none	minor headcutting	low priority
34	Point		no	34	0	0	CD 0	36932046	1226956	31.736753	34		none	channelization	headcutting in field uplands treated by grassed waterway
35	Point		no	35	0	0	CD 0	7711362	181075	42.586564	35		none	channelization	gully formation - uplands treated by small basin
36	Point		no	36	0	0		2588548	64325	32.426708	36		none	none	buffer may be needed here
37	Point		yes	37	0	0		2772276	56668	71.358458	37		none	minor scour and sediment fan	could use SWI or rock outlet
38	Point		yes	38	0	0		2884778	31225	91.428037	38		none	minor sedimentation and gully formation	<Null>
39	Point		no	39	0	0		2111529	127700	16.581998	39		SWI 410	none	<Null>
40	Point		no	40	0	0		1638256	135975	12.354977	40		SWI 410	washout on outlet	could use rock outlet
41	Point		no	41	0	0		740446	37000	19.506519	41		SWI 410	washout on outlet	could use rock outlet
42	Point		no	42	0	0		1424845	166425	8.561609	42		none	none	recently cleaned
43	Point		no	43	0	0		388946	41050	9.474933	43		none	none	recently cleaned
44	Point		no	44	0	0		1048888	84600	12.41	44		none	none	recently cleaned - could use an SWI
45	Point		no	45	0	0		593679	64700	9.180371	45		none	none	recently cleaned
46	Point		no	46	0	0		586487	66400	8.968526	46		none	none	recently cleaned
47	Point		yes	47	0	0		1534818	26425	57.720884	47	<Null>	none	none	recently cleaned - could use an SWI
48	Point		yes	48	0	0		1724758	26425	65.26962	48	<Null>	none	sedimentation	could use SWI with riser
49	Point		yes	49	0	0		8189247	115375	70.980256	49	<Null>	none	sedimentation and headcutting	could use SWI with riser
50	Point		no	50	0	0		11456766	134450	85.620239	50	<Null>	none	rill erosion at the outlet to ditch	grassed - CRP
51	Point		yes	51	0	0		3980664	55525	71.695344	51	<Null>	none	rill erosion at the outlet to ditch	grassed - CRP
52	Point		no	52	0	0		944723	113625	7.434196	52	<Null>	none	minor scour	could use rock outlet
53	Point		no	53	0	0		933631	68725	13.995216	53	<Null>	none	minor scour	could use rock outlet
54	Point		no	54	0	0		502196	39750	12.632352	54	<Null>	none	minor scour	could use rock outlet
55	Point		no	55	0	0		564569	30525	18.456747	55	<Null>	none	minor scour	could use rock outlet
56	Point		no	56	0	0		8437571	172150	37.405981	56	<Null>	none	sediment delta in ditch	could use SWI with riser
57	Point		no	57	0	0		1117046	28200	39.611525	57	<Null>	none	sediment delta in ditch	could use SWI
58	Point		yes	58	0	0		5249227	101950	51.488249	58	<Null>	none	scour and sediment delta in ditch	could use rock outlet or SWI
59	Point		yes	59	0	0		2646210	40500	65.338519	59	<Null>	none	sediment delta	open road ditch
60	Point		yes	60	0	0		10940000	119850	91.335903	60	<Null>	none	sediment delta	could use SWI
61	Point		no	61	0	0		5537568	60950	90.854274	61	<Null>	none	none	plugged outlet CRP
62	Point		no	62	0	0		12378516	134675	91.913086	62	<Null>	none	none	plugged outlet CRP
63	Point		no	63	0	0		6570258	71575	91.795431	63	<Null>	none	none	plugged outlet CRP
64	Point		yes	64	0	0		3083404	31000	99.498012	64	<Null>	none	none	could use SWI with riser
65	Point		yes	65	0	0		7712387	85100	91.08776	65	<Null>	none	minor sedimentation	could use SWI with riser

County Ditch #11

There were 32 sites out of 94 inventoried that were identified as priority, needing conservation practices. 22 sites were identified as contributing impairments but not meeting priority criteria and 22 sites had existing conservation practices in place.

FID	Shape *	Name	target	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	FID_	Name	Ex_BMP	Vis_Imp	Com
0	Point		yes	0	0	0	CD11L1B1	22677136	359275	63.119159	0	<Null>	none	sediment delta and scour	Needs BMP
1	Point		yes	1	0	0	CD11L1B1	27020512	369550	73.117337	1	<Null>	none	scour	Needs BMP
2	Point		no	2	0	0	CD11L1B1	14814754	192000	77.160177	2	<Null>	none	none	Grassed road ditch
3	Point		yes	3	0	0	CD11L1B1	32172940	374425	85.92626	3	<Null>	none	none	Recently cleaned
4	Point		yes	4	0	0	CD11L1B1	24699016	363600	67.929087	4	<Null>	none	sediment delta	Recently cleaned could use SWI
5	Point		yes	5	0	0	CD11L1B1	27343840	406100	67.332775	5	<Null>	none	sediment delta	Needs SWI
6	Point		yes	6	0	0	CD11L1B1	26389556	357750	73.765356	6	<Null>	none	sediment delta	Could use Rock
7	Point		no	7	0	0	CD11B1B2	24973728	656500	38.040713	7	<Null>	410 SWI	none	<Null>
8	Point		no	8	0	0	CD11B1B2	41650960	650275	64.051301	8	<Null>	none	none	Grassed ditch
9	Point		no	9	0	0	CD11L1	34647920	663725	52.202222	9	<Null>	410 SWI	none	<Null>
10	Point		yes	10	0	0	CD11L1	37782216	480350	78.655597	10	<Null>	none	sediment delta	Needs SWI
11	Point		yes	11	0	0	CD11L1	83081728	1149425	72.281121	11	<Null>	none	sediment delta	Could use Rock
12	Point		no	12	0	0	CD11L1	115861856	2160425	53.601424	12	<Null>	none	none	recently cleaned culvert 50 ft upstream
13	Point		yes	13	0	0	CD11L1	17753808	190750	93.073688	13	<Null>	none	sediment delta	Needs SWI
14	Point		no	14	0	0	CD11L1	38162332	420500	90.754654	14	<Null>	410 SWI	none	<Null>
15	Point		yes	15	0	0	CD11L1	35709456	384950	92.763881	15	<Null>	none	sediment delta	could use SWI or Rock
16	Point		yes	16	0	0	CD11L1	70545568	802375	87.920945	16	<Null>	none	sediment delta	could use rock
17	Point		no	17	0	0	CD11L1	49027564	814150	60.219326	17	<Null>	none	none	perenial vegetation
18	Point		no	18	0	0	CD11	859283776	15576410.39	55.165712	18	<Null>	none	none	vegetated open ditch
19	Point		no	19	0	0	CD11	120872944	1573350	76.82521	19	<Null>	410 SWI	minor delta	pipe may be oversized 24 inch currently
20	Point		yes	20	0	0	CD11	45098592	509000	88.602342	20	<Null>	410 Rock	none	<Null>
21	Point		yes	21	0	0	CD11	42053412	508675	82.672457	21	<Null>	none	minor sedimentation	could use rock
22	Point		yes	22	0	0	CD11	20020576	236700	84.58207	22	<Null>	none	minor sedimentation	could use rock
23	Point		no	23	0	0	CD11	248789488	4069450	61.1359	23	<Null>	none	none	open ditch vegetated
24	Point		no	24	0	0	CD11	22104472	242000	91.340793	24	<Null>	none	none	open ditch vegetated
25	Point		no	25	0	0	CD11	264577600	4216400	62.719894	25	<Null>	none	none	outlets via old stream channel
26	Point		no	26	0	0	CD11	31834468	354750	89.737753	26	<Null>	none	none	outlets via old stream channel
27	Point		no	27	0	0	CD11L2	17018988	260875	65.238095	27	<Null>	410 SWI	none	<Null>
28	Point		no	28	0	0	CD11L2	6741067	162625	41.451603	28	<Null>	none	sediment delta	could use SWI
29	Point		yes	29	0	0	CD11L2	36957536	440675	83.865742	29	<Null>	none	sediment delta	could use SWI
30	Point		yes	30	0	0	CD11L2	47619468	702300	67.805023	30	<Null>	none	minor sedimentation	low priority
31	Point		no	31	0	0	CD11L2	53154268	727500	73.064286	31	<Null>	410 SWI	none	<Null>
32	Point		no	32	0	0	CD11L2	21213052	484400	43.792428	32	<Null>	none	minor sedimentation	open ditch could use SWI
33	Point		no	33	0	0	CD11L3	18884580	463225	40.767618	33	<Null>	none	sediment delta	could use SWI
34	Point		no	34	0	0	CD11L3	41688744	984525	42.344018	34	<Null>	none	sediment delta	could use SWI
35	Point		no	35	0	0	CD11L3	6177844	473800	13.038928	35	<Null>	none	sediment delta	could use rock
36	Point		no	36	0	0	CD11L3	3359129	422250	7.955308	36	<Null>	none	sediment delta	could use Rock or SWI
37	Point		no	37	0	0	CD11L3	3765353	278675	13.511628	37	<Null>	410 SWI	none	<Null>
38	Point		no	38	0	0	CD11B1B1	27133312	813425	33.35687	38	<Null>	none	sediment delta	could use SWI
39	Point		no	39	0	0	CD11B1B1	18411480	487925	37.734242	39	<Null>	410 Rock	sediment delta	needs cleanout
40	Point		no	40	0	0	CD11B1B1	6828972	271650	25.138863	40	<Null>	410 Rock	sediment delta	needs cleanout
41	Point		no	41	0	0	CD11B1B1	40697808	609025	66.824528	41	<Null>	410 SWI	none	<Null>
42	Point		no	42	0	0	CD11B1B1	511959008	8000949.998	63.987278	42	<Null>	none	none	vegetated road ditch
43	Point		yes	43	0	0		4667549	90875	51.3623	43	<Null>	none	minor delta	low priority
44	Point		no	44	0	0		3462270	146425	23.645347	44	<Null>	none	sediment delta	low priority
45	Point		no	45	0	0		1635783	34800	47.005259	45	<Null>	none	scour and sediment delta	needs a BMP
46	Point		no	46	0	0		3964592	88950	44.571017	46	<Null>	none	scour and sediment delta	needs a BMP
47	Point		no	47	0	0		350705	48325	7.257217	47	<Null>	none	sediment delta	needs rock
48	Point		no	48	0	0		442592	33350	13.271124	48	<Null>	none	sediment delta	needs rock or an SWI
49	Point		no	49	0	0		855620	30525	28.030139	49	<Null>	none	none	grassed
50	Point		no	50	0	0		6260330	64400	97.210093	50	<Null>	none	none	outlets via grassed draw

FID	Shape *	Name	target	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	FID_	Name	Ex_BMP	Vis_Imp	Com
51	Point		yes	51	0	0		4760219	52125	91.323146	51	<Null>	none	minor sedimentation	could use rock
52	Point		no	52	0	0		4919874	76775	64.081719	52	<Null>	none	none	open ditch
53	Point		no	53	0	0		1488877	30500	48.815639	53	<Null>	410 Rock	none	<Null>
54	Point		no	54	0	0		2514443	31450	79.950493	54	<Null>	410 SWI	none	<Null>
55	Point		no	55	0	0		2472762	27600	89.592826	55	<Null>	410 Rock	none	<Null>
56	Point		no	56	0	0		2832732	34425	82.287059	56	<Null>	410 Rock	none	<Null>
57	Point		no	57	0	0		4654061	50250	92.618129	57	<Null>	none	none	CRP plugged
58	Point		no	58	0	0		9086485	97950	92.766565	58	<Null>	410 SWI	none	<Null>
59	Point		no	59	0	0		4376295	46125	94.879024	59	<Null>	none	none	CRP may be plugged
60	Point		no	60	0	0		1926418	109750	17.552784	60	<Null>	none	none	grassed outlet
61	Point		no	61	0	0		10632652	115400	92.137366	61	<Null>	410 SWI	none	<Null>
62	Point		no	62	0	0		4040609	42525	95.01726	62	<Null>	none	none	grassed drainageway
63	Point		yes	63	0	0		10377318	115550	89.808031	63	<Null>	none	minor scour	could use rock
64	Point		yes	64	0	0		13946777	156375	89.188022	64	<Null>	none	sediment delta	could use SWI
65	Point		yes	65	0	0		4596861	50125	91.70795	65	<Null>	none	sediment delta	could use SWI
66	Point		yes	66	0	0		3771557	43600	86.503601	66	<Null>	none	sediment delta	could use Rock or SWI
67	Point		yes	67	0	0		6550890	66650	98.287922	67	<Null>	none	none	recently cleaned will need rock
68	Point		no	68	0	0		20078694	285375	70.35898	68	<Null>	none	none	diffuse pour point no ident channel
69	Point		yes	69	0	0		3655873	40725	89.769748	69	<Null>	none	sediment delta	could use riser
70	Point		no	70	0	0		1114505	28925	38.530856	70	<Null>	none	sediment delta	could use rock
71	Point		no	71	0	0		6822455	180275	37.844709	71	<Null>	none	none	grassed outlet
72	Point		no	72	0	0		2709436	47850	56.623532	72	<Null>	none	none	approach with culvert at outlet
73	Point		no	73	0	0		477028	40200	11.866368	73	<Null>	none	sediment delta	could use rock
74	Point		no	74	0	0		999174	99975	9.994239	74	<Null>	none	sediment delta	could use rock
75	Point		no	75	0	0		834010	78950	10.563775	75	<Null>	none	none	low priority
76	Point		no	76	0	0		1855931	127675	14.53637	76	<Null>	none	sediment delta	needs a BMP
77	Point		no	77	0	0		1011402	71150	14.215067	77	<Null>	410 SWI	sediment delta	needs a cleanout
78	Point		no	78	0	0		1663539	67700	24.572216	78	<Null>	410 Rock	sediment delta	needs a cleanout
79	Point		no	79	0	0		3149200	101600	30.996063	79	<Null>	410 Rock	sediment delta	needs a cleanout
80	Point		yes	80	0	0		2004212	31225	64.186133	80	<Null>	none	sediment delta	could use rock
81	Point		yes	81	0	0		6114029	100125	61.06396	81	<Null>	none	sediment delta and scour	needs an SWI
82	Point		no	82	0	0		2830843	40125	70.550604	82	<Null>	none	none	rocked outlet
83	Point		yes	83	0	0		1649361	31425	52.485632	83	<Null>	none	none	could use rock
84	Point		yes	84	0	0		1506864	26850	56.121564	84	<Null>	none	sediment delta	could use rock
85	Point		no	85	0	0		370134	45425	8.148244	85	<Null>	none	minor sedimentation	needs a BMP
86	Point		yes	86	0	0		7707322	116750	66.015606	86	<Null>	none	sediment delta and scour	needs a BMP
87	Point		no	87	0	0		1725073	36550	47.19762	87	<Null>	none	sediment delta and scour	needs a BMP
88	Point		yes	88	0	0		5029954	71125	70.719916	88	<Null>	none	sediment delta and scour	needs a BMP
89	Point		yes	89	0	0		1834426	29275	62.661862	89	<Null>	none	sediment delta and scour	needs a BMP
90	Point		no	90	0	0		4476736	106575	42.005498	90	<Null>	none	sediment delta and scour	needs a BMP
91	Point		yes	91	0	0		2298472	34725	66.190698	91	<Null>	none	minor sedimentation	needs a BMP
92	Point		no	92	0	0		5951379	98500	60.420091	92	<Null>	none	none	vegetated road ditch
93	Point		no	93	0	0		4364659	44300	98.525034	93	<Null>	none	none	outlets via a river oxbow

County Ditch #7

There were 64 sites identified as a priority locations for conservation practices out of 126 pourpoints contributing to the ditch system. There was 1 site that was identified requiring conservation practices but not meeting priority criteria, 8 existing BMP's were identified along the ditch. The upper portions of the ditch system were not field verified due to access and time constraints, all prioritized locations not field verified are assumed as priority/contributing sediment.

FID	Shape *	Name	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	D_rank	Haycreek_PP.Ex_BMP	Haycreek_PP.Vis_Imp	Haycreek_PP.Com	target
0	Point		0	0	0		2678212	49025	54.629516	0				yes
1	Point		1	0	0		4685348	77275	60.632132	0				yes
2	Point		2	0	0		8786901	94850	92.639968	0				yes
3	Point		3	0	0		10437132	110675	94.304333	0				yes
4	Point		4	0	0		6420074	68000	94.412853	0				yes
5	Point		5	0	0		1799434	39400	45.670914	0				no
6	Point		6	0	0		609749	35050	17.396548	0				no
7	Point		7	0	0		2095753	49225	42.574972	0				no
8	Point		8	0	0		243143	36225	6.712022	0				no
9	Point		9	0	0		7369288	96350	76.484567	0				yes
10	Point		10	0	0		6197489	111400	55.632756	0				yes
11	Point		11	0	0		2778704	32675	85.040673	0				no
12	Point		12	0	0		2651954	56275	47.124904	0				no
13	Point		13	0	0		5553911	62125	89.39897	0				yes
14	Point		14	0	0		3335893	42225	79.002795	0				yes
15	Point		15	0	0		12372901	246275	50.240183	0				yes
16	Point		16	0	0		1365669	70400	19.398707	0				no
17	Point		17	0	0		538166	26650	20.193846	0				no
18	Point		18	0	0		7436271	83625	88.924018	0	none	none	30" CMP crossing	no
19	Point		19	0	0		2529051	52350	48.31043	0				no
20	Point		20	0	0		3329256	74125	44.914078	0				no
21	Point		21	0	0		6416094	111900	57.337748	0				yes
22	Point		22	0	0		572453	49100	11.658921	0	none	none	open ditch no erosion	no
23	Point		23	0	0		2267464	25925	87.462449	0				yes
24	Point		24	0	0		2495237	29325	85.089071	0				yes
25	Point		25	0	0		2338653	26250	89.091543	0				yes
26	Point		26	0	0		9029179	101400	89.045158	0				yes
27	Point		27	0	0		5612432	59525	94.286972	0				yes
28	Point		28	0	0		1889326	108125	17.473535	0				no
29	Point		29	0	0		1102866	80525	13.695945	0				no
30	Point		30	0	0		2048452	46350	44.195297	0				no
31	Point		31	0	0		3344174	133925	24.970498	0				no
32	Point		32	0	0		9708770	104275	93.10736	0				yes
33	Point		33	0	0		649462	45650	14.226968	0				no
34	Point		34	0	0		4378827	64450	67.941458	0	none	none	open ditch no erosion	yes
35	Point		35	0	0		4101637	46925	87.408354	0				yes
36	Point		36	0	0		8778865	103950	84.452766	0				yes
37	Point		37	0	0		4433962	48075	92.230099	0				yes
38	Point		38	0	0		3380076	41600	81.251827	0				yes
39	Point		39	0	0		17707214	243450	72.7345	0				yes
40	Point		40	0	0		4331965	68425	63.309682	0				yes
41	Point		41	0	0		9065606	140300	64.615866	0				yes
42	Point		42	0	0		5236193	118175	44.308805	0				no
43	Point		43	0	0		5645663	77675	72.683141	0				yes
44	Point		44	0	0		510983	32575	15.686355	0	none	none	open ditch	no
45	Point		45	0	0		6687187	86500	77.30852	0				yes
46	Point		46	0	0		4354688	76225	57.129393	0				yes
47	Point		47	0	0		2512603	157925	15.910103	0				no
48	Point		48	0	0		3130966	167225	18.723074	0				no
49	Point		49	0	0		5053460	126900	39.82238	0				no
50	Point		50	0	0		3194010	33375	95.700674	0				yes
51	Point		51	0	0		3063342	35900	85.329861	0				yes
52	Point		52	0	0		7831181	100500	77.922199	0				yes

FID	Shape *	Name	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	D_rank	Haycreek_PP.Ex_BMP	Haycreek_PP.Vis_Imp	Haycreek_PP.Com	target
53	Point		53	0	0		7568229	115700	65.412524	0				yes
54	Point		54	0	0		13830642	189100	72.08166	0				yes
55	Point		55	0	0		9787121	103500	94.561556	0	SWI 410	sediment delta	needs cleanout	no
56	Point		56	0	0		2431025	29225	83.183062	0				yes
57	Point		57	0	0		8559279	108500	78.887364	0				yes
58	Point		58	0	0		3727242	41450	89.921399	0				yes
59	Point		59	0	0		1587256	33300	47.665345	0				no
60	Point		60	0	0		4342942	45025	96.456235	0				yes
61	Point		61	0	0		2742144	93125	29.445842	0				no
62	Point		62	0	0		5294082	113200	46.767509	0				no
63	Point		63	0	0		14244940	153900	92.559714	0				yes
64	Point		64	0	0		2885782	30300	95.24033	0				yes
65	Point		65	0	0		20176240	392050	51.463436	0				no
66	Point		66	0	0		4893163	85925	56.946907	0	none	none	apears stable	no
67	Point		67	0	0		4014647	105275	38.134856	0	Rock 410	none	stable	no
68	Point		68	0	0		2930807	29900	98.020301	0	none	none	open grass ditch	no
69	Point		69	0	0		5463592	59425	91.940968	0	none	none	open grass ditch	no
70	Point		70	0	0		9229086	104050	88.698568	0	none	none	no defineable channel	no
71	Point		71	0	0		5344868	128325	41.651027	0	none	sediment delta	needs a conservation practice	no
72	Point		72	0	0		6514761	119100	54.699924	0	SWI 410	none	none	yes
73	Point		73	0	0		14734115	501800	29.362525	0				no
74	Point		74	0	0		7946938	97375	81.611687	0				yes
75	Point		75	0	0		6492814	109225	59.444395	0				yes
76	Point		76	0	0		3104101	56600	54.842774	0				yes
77	Point		77	0	0		11498991	144750	79.440352	0	none	none	open grass ditch	no
78	Point		78	0	0	Hay Creek	25815222	415650	62.108077	10				yes
79	Point		79	0	0	Hay Creek	526277408	10056225	52.333496	19				yes
80	Point		80	0	0	Hay Creek	44075392	527275	83.5909	3				yes
81	Point		81	0	0	Hay Creek	527727744	10673399.9521	49.443265	22				no
82	Point		82	0	0	Hay Creek	25688612	1169800	21.959832	30				no
83	Point		83	0	0	Hay Creek	3104678144	49075788.7333	63.262929	9				yes
84	Point		84	0	0	Hay Creek	15984849	289675	55.182011	15				yes
85	Point		85	0	0	Hay Creek	8867114	204200	43.423673	25				no
86	Point		86	0	0	Hay Creek	426587584	7224200	59.049803	12				yes
87	Point		87	0	0	Hay Creek	1548610048	27253675.0963	56.822063	14				yes
88	Point		88	0	0	Hay Creek	15804372	272400	58.018987	13				yes
89	Point		89	0	0	Hay Creek	1125007488	17164496.1269	65.542704	7				yes
90	Point		90	0	0	Hay Creek	60046592	2418225	24.830854	29				no
91	Point		91	0	0	Hay Creek	8493086	185650	45.747837	24				no
92	Point		92	0	0	Hay Creek	56580552	1048500	53.96333	16				yes
93	Point		93	0	0	Hay Creek	462050720	8703525.01577	53.087768	18	none	none	72" CMP	no
94	Point		94	0	0	Hay Creek	110457896	2061475	53.581972	17				yes
95	Point		95	0	0	Hay Creek	90824176	1330825	68.246521	5				yes
96	Point		96	0	0	Hay Creek	1702378624	32571413.7157	52.266034	20	none	none	60" CMP	no
97	Point		97	0	0	Hay Creek	8640772	210725	41.004969	27				no
98	Point		98	0	0	Hay Creek	183197872	2870650	63.817558	8	none	none	48" CMP at outlet	no
99	Point		99	0	0	Hay Creek	15028816	446125	33.687455	28				no
100	Point		100	0	0	Hay Creek	37612096	406500	92.526681	2				yes
101	Point		101	0	0	Hay Creek	865859328	14011399.9972	61.796775	11				yes
102	Point		102	0	0	Hay Creek	215364496	3214650	66.994695	6	none	none	48" CMP	no
103	Point		103	0	0	Hay Creek	32312698	340000	95.037347	1				yes
104	Point		104	0	0	Hay Creek	15361157	308975	49.716505	21				no
105	Point		105	0	0	Hay Creek	94111048	1276025	73.753295	4				yes

106	Point		106	0	0	Hay Creek	12583212	306300	41.081332	26				no
107	Point		107	0	0	Hay Creek	59345872	1222050	48.562556	23				no
108	Point		108	0	0	CD 7 Lat9	37159564	410750	90.467593	0	SWI 410	sediment delta	needs cleanout	no
109	Point		109	0	0	CD 7 Lat8	13273070	262600	50.544821	0				yes
110	Point		110	0	0	CD 7 Lat8	53310696	1167200	45.674003	0				no
111	Point		111	0	0	CD 7 Lat8	27107432	469600	57.724514	0				yes
112	Point		112	0	0	CD 7 Lat6	75704704	1199400	63.118813	0	none	sediment delta	could use rock or swi	yes
113	Point		113	0	0	CD 7 Lat6	60079496	998225	60.186327	0	SWI 410	sediment delta	needs cleaning	no
114	Point		114	0	0	CD 7 Lat6	8096298	211325	38.312069	0	none	sediment delta	farmed through	yes
115	Point		115	0	0	CD 7 Lat6	15335591	632250	24.255581	0	none	sediment delta	farmed through	yes
116	Point		116	0	0	CD 7 Lat5	67131792	907575	73.968313	0	none	none	stable vegetated	no
117	Point		117	0	0	CD 7 Lat5	68611848	2102575	32.632295	0	Rock 410	none	stable	no
118	Point		118	0	0	CD 7 Lat3	9718657	432800	22.455307	0	none	none	open vegetated ditch	no
119	Point		119	0	0	CD 7 Lat3	2264865	215475	10.511034	0	Rock 410	none	stable	no
120	Point		120	0	0	CD 7 Lat3	4612552	163525	28.207014	0	none	headcutting	needs rock and fabric	yes
121	Point		121	0	0	CD 7 Lat4	60994056	1471300	41.455893	0	n/a	n/a	not field truthed	no
122	Point		122	0	0	CD 7 Lat9	271485280	6200950.05917	43.78124	0	SWI 410	none	appears stable	no
123	Point		123	0	0	CD 7 Lat9	37159564	425925	87.244383	0	SWI 410	sediment delta	needs cleanout	no
124	Point		124	0	0	CD 7 Lat9	81422272	1196550	68.04753	0	none	none	vegetated ditch	no
125	Point		125	0	0	CD 7 Lat9	68265120	778500	87.688015	0	none	none	appears stable	no

County Ditch #69

53 sites were identified as priority needing conservation practices out of 69 potential locations. The was no field investigation conducted on the ditch system due to time and access constraints. Future planning efforts for the ditch system will require field verification to determine feasibility and specific practices that would best reduce sediment deposition into the ditch.

FID	Shape *	Name	FID	ID	ORIG_FID	Drain_ID	SedVal	Area	w_sed	69_PP.Ex_BM	69_PP.Vis_Imp	69_PP.Com	69_PP.target
0	Point		0	0	0		222436688	6184250.04137	35.968256	n/a	n/a	Not Field Truthed	no
1	Point		1	0	0		9761833	171100	57.053378	n/a	n/a	Not Field Truthed	yes
2	Point		2	0	0		4380624	44625	98.165244	n/a	n/a	Not Field Truthed	yes
3	Point		3	0	0		6336595	72750	87.100962	n/a	n/a	Not Field Truthed	yes
4	Point		4	0	0		2262779	28375	79.745515	n/a	n/a	Not Field Truthed	yes
5	Point		5	0	0		1197986	27575	43.444642	n/a	n/a	Not Field Truthed	no
6	Point		6	0	0		7566292	287200	26.345028	n/a	n/a	Not Field Truthed	no
7	Point		7	0	0		14046109	342500	41.010537	n/a	n/a	Not Field Truthed	no
8	Point		8	0	0		6281817	198100	31.710333	n/a	n/a	Not Field Truthed	no
9	Point		9	0	0		15723636	428500	36.6946	n/a	n/a	Not Field Truthed	no
10	Point		10	0	0		5485039	193225	28.386798	n/a	n/a	Not Field Truthed	no
11	Point		11	0	0		746600	40750	18.321472	n/a	n/a	Not Field Truthed	no
12	Point		12	0	0		9498121	120475	78.838938	n/a	n/a	Not Field Truthed	yes
13	Point		13	0	0		2897041	35900	80.697521	n/a	n/a	Not Field Truthed	yes
14	Point		14	0	0		4640778	148225	31.30901	n/a	n/a	Not Field Truthed	no
15	Point		15	0	0		4245349	47575	89.234871	n/a	n/a	Not Field Truthed	yes
16	Point		16	0	0		25278112	313575	80.612651	n/a	n/a	Not Field Truthed	yes
17	Point		17	0	0		20261422	292950	69.163414	n/a	n/a	Not Field Truthed	yes
18	Point		18	0	0		22844512	296675	77.00181	n/a	n/a	Not Field Truthed	yes
19	Point		19	0	0		3770797	54975	68.591123	n/a	n/a	Not Field Truthed	yes
20	Point		20	0	0		16242576	184250	88.155094	n/a	n/a	Not Field Truthed	yes
21	Point		21	0	0		3051592	31900	95.661191	n/a	n/a	Not Field Truthed	yes
22	Point		22	0	0		11486050	128650	89.281384	n/a	n/a	Not Field Truthed	yes
23	Point		23	0	0		20997308	259125	81.031579	n/a	n/a	Not Field Truthed	yes
24	Point		24	0	0		23322344	273450	85.289245	n/a	n/a	Not Field Truthed	yes
25	Point		25	0	0		2860408	37075	77.151935	n/a	n/a	Not Field Truthed	yes
26	Point		26	0	0		21496116	407750	52.718862	n/a	n/a	Not Field Truthed	yes
27	Point		27	0	0		17641688	262575	67.187234	n/a	n/a	Not Field Truthed	yes
28	Point		28	0	0		2697749	39475	68.340697	n/a	n/a	Not Field Truthed	yes
29	Point		29	0	0		6060479	84800	71.467913	n/a	n/a	Not Field Truthed	yes
30	Point		30	0	0		3334258	37675	88.500544	n/a	n/a	Not Field Truthed	yes
31	Point		31	0	0		4982725	61200	81.417075	n/a	n/a	Not Field Truthed	yes
32	Point		32	0	0		10203637	141450	72.135999	n/a	n/a	Not Field Truthed	yes
33	Point		33	0	0		15922458	218425	72.896683	n/a	n/a	Not Field Truthed	yes
34	Point		34	0	0		10482075	204525	51.250825	n/a	n/a	Not Field Truthed	yes
35	Point		35	0	0		3702611	59525	62.202621	n/a	n/a	Not Field Truthed	yes
36	Point		36	0	0		35071824	484900	72.327952	n/a	n/a	Not Field Truthed	yes
37	Point		37	0	0		7740422	88625	87.339035	n/a	n/a	Not Field Truthed	yes
38	Point		38	0	0		17903996	253900	70.515935	n/a	n/a	Not Field Truthed	yes
39	Point		39	0	0		506995232	8923625	56.814941	n/a	n/a	Not Field Truthed	yes
40	Point		40	0	0		269047328	5496125	48.952185	n/a	n/a	Not Field Truthed	no
41	Point		41	0	0		349451296	6236725.06579	56.031217	n/a	n/a	Not Field Truthed	yes
42	Point		42	0	0		110543504	2083725	53.050908	n/a	n/a	Not Field Truthed	yes
43	Point		43	0	0		368501984	5529825	66.638996	n/a	n/a	Not Field Truthed	yes
44	Point		44	0	0		120290928	1384500	86.884022	n/a	n/a	Not Field Truthed	yes
45	Point		45	0	0		135556800	1625025	83.418286	n/a	n/a	Not Field Truthed	yes
46	Point		46	0	0		55033272	681775	80.720578	n/a	n/a	Not Field Truthed	yes
47	Point		47	0	0		61972028	964125	64.278001	n/a	n/a	Not Field Truthed	yes
48	Point		48	0	0		67785216	842250	80.481111	n/a	n/a	Not Field Truthed	yes
49	Point		49	0	0		23499312	257725	91.179792	n/a	n/a	Not Field Truthed	yes
50	Point		50	0	0		159814704	2177550	73.391979	n/a	n/a	Not Field Truthed	yes
51	Point		51	0	0		134114960	2107125	63.648317	n/a	n/a	Not Field Truthed	yes
52	Point		52	0	0		189633888	2330750	81.361745	n/a	n/a	Not Field Truthed	yes
53	Point		53	0	0		108738984	1507975	72.109275	n/a	n/a	Not Field Truthed	yes
54	Point		54	0	0		180622800	2424750	74.491308	n/a	n/a	Not Field Truthed	yes
55	Point		55	0	0		112108088	2155700	52.005422	n/a	n/a	Not Field Truthed	yes
56	Point		56	0	0		4489593	50975	88.074409	n/a	n/a	Not Field Truthed	yes
57	Point		57	0	0		20704788	228225	90.720946	n/a	n/a	Not Field Truthed	yes
58	Point		58	0	0		750504	44100	17.018231	n/a	n/a	Not Field Truthed	no
59	Point		59	0	0		165848	26250	6.318019	n/a	n/a	Not Field Truthed	no
60	Point		60	0	0		12788975	209100	61.162004	n/a	n/a	Not Field Truthed	yes
61	Point		61	0	0		792444	35075	22.592844	n/a	n/a	Not Field Truthed	no
62	Point		62	0	0		112108088	2155700	52.005422	n/a	n/a	Not Field Truthed	yes
63	Point		63	0	0		115135888	2379325	48.390148	n/a	n/a	Not Field Truthed	no
64	Point		64	0	0		26497084	959625	27.611915	n/a	n/a	Not Field Truthed	no
65	Point		65	0	0		54922848	1868975	29.386615	n/a	n/a	Not Field Truthed	no
66	Point		66	0	0		4585219	54625	83.939936	n/a	n/a	Not Field Truthed	yes
67	Point		67	0	0		7677528	88625	86.629371	n/a	n/a	Not Field Truthed	yes
68	Point		68	0	0		11650447	140150	83.128412	n/a	n/a	Not Field Truthed	yes

State Ditch #51

There were 23 sites that were identified as a priority out of 243 sites contributing surface water into the legal drain. There were 2 sites that identified sediment delivery potential but did not meet priority criteria, there were 14 sites with existing BMP's. State Ditch #51 is also the lower

reach of the Roseau River, many of the inventoried pour points are located in river oxbows or in large wetland complexes, this resulted in many of the pourpoints being stable due to a natural or near natural drainage regime.

FID	Shape *	Name	FID	ID	ORIG_	Drain_ID	SedVal	Area	w_sed	D_rank	SD51_PP.Ex_BMP	SD51_PP.Vis_Imp	SD51_PP.Com	SD51_PP.targe
0	Point		0	0	0		6833027	73275	93.251818	0	none	none	grassed stable	no
1	Point		1	0	0	SD 51	22728652	313775	72.436147	32	trapped culvert	minor sediment delta	low priority	yes
2	Point		2	0	0	SD 51	193898224	4117000	47.09697	70	sidewater inlet	none	stable	no
3	Point		3	0	0	SD 51	15137568	232775	65.030901	44	none	none	shares outlet with pp 5 an	no
4	Point		4	0	0	SD 51	262520256	4898225	53.594977	57	none	none	shares outlet with pp 130	no
5	Point		5	0	0	SD 51	48849992	673250	72.558473	31	none	none	screw gate on outlet	no
6	Point		6	0	0	SD 51	51712604	741425	69.747586	40	none	none	screw gate on outlet	no
7	Point		7	0	0	SD 51	937768576	18970190.179	49.433799	64	none	none	trapped dual culvert	no
8	Point		8	0	0	SD 51	1649437824	36594817.64	45.072989	74	yes	none	dual box culvert with drop	no
9	Point		9	0	0	SD 51	984045696	13945275	70.564811	37	none	none	grassed outlet culvert	no
10	Point		10	0	0	SD 51	662760704	17538250.6505	37.789442	92	none	none	proposed inlet for lake bot	no
11	Point		11	0	0	SD 51	37939700	1104550	34.348558	103	none	channelized	could use rock	yes
12	Point		12	0	0	SD 51	174357232	5796675	30.078835	110	none	deep channel	cut channel near trailor	no
13	Point		13	0	0	SD 51	164448576	1872829.85757	87.807536	9	none	none	vegetated bank	no
14	Point		14	0	0	SD 51	16878410	175750	96.036472	1	none	none	vegetated bank	no
15	Point		15	0	0	SD 51	35128036	805550	43.607518	78	none	none	vegetated bank	no
16	Point		16	0	0	SD 51	9694543872	228238117.034	42.475569	81	none	none	sprague creek confluenc	no
17	Point		17	0	0	SD 51	15574019	199275	78.153401	23	none	none	vegetated bank	no
18	Point		18	0	0	SD 51	1170998144	36517522.7675	32.066746	106	none	none	open ditch	no
19	Point		19	0	0	SD 51	15993572	169500	94.357357	2	SWI 410	none	field crossing acting as si	no
20	Point		20	0	0	SD 51	4088096000	85183647.761	47.991558	68	none	none	outlets via natural channel	no
21	Point		21	0	0	SD 51	2451515904	42134874.487	58.182585	50	none	none	oped ditch outlet	no
22	Point		22	0	0	SD 51	11952423	523900	22.814321	118	none	none	diffuse outlet marsh	no
23	Point		23	0	0	SD 51	13783849	519575	26.529084	115	none	none	diffuse outlet marsh	no
24	Point		24	0	0	SD 51	7234863	297525	24.316824	117	none	none	diffuse outlet marsh	no
25	Point		25	0	0	SD 51	10669542	412875	25.842064	116	none	none	diffuse outlet marsh	no
26	Point		26	0	0	SD 51	120604432	3130225	38.528998	89	none	none	open ditch marsh	no
27	Point		27	0	0	SD 51	2342256384	52269710.7027	44.810969	76	none	none	outlets via oxbow	no
28	Point		28	0	0	SD 51	4528507392	78468071.612	57.711465	51	none	none	outlets via ditch	no
29	Point		29	0	0	SD 51	176253232	2193975	80.335114	19	SWI 410	none	gated culvert acts as SWI	no
30	Point		30	0	0	SD 51	11527841	191275	60.268415	48	none	none	outlets via oxbow	no
31	Point		31	0	0	SD 51	320038208	6846975	46.741548	71	none	none	outlets via oxbow	no
32	Point		32	0	0	SD 51	364605984	11225675	32.479649	105	none	minor scour sediment delta	needs rock	yes
33	Point		33	0	0	SD 51	59595048	734250	81.164519	18	none	none	outlets via oxbow	no
34	Point		34	0	0	SD 51	32959072	442850	74.424911	29	none	none	outlets via oxbow	no
35	Point		35	0	0	SD 51	18326364	242875	75.455951	28	none	none	diffuse outlet	no
36	Point		36	0	0	SD 51	1661346688	31682144.2185	52.43795	60	none	none	outlets via oxbow	no
37	Point		37	0	0	SD 51	29921596	414950	72.108919	33	none	none	outlets via oxbow	no
38	Point		38	0	0	SD 51	15336220	215725	71.091529	35	none	none	open ditch	no
39	Point		39	0	0	SD 51	383001312	6884425	55.633014	53	none	none	outlets via oxbow	no
40	Point		40	0	0	SD 51	484856416	10051875	48.23542	66	none	sediment delta	sed delta possibly a form	no
41	Point		41	0	0	SD 51	19182164	694300	27.628063	113	Rock 410	gully formation sed delta	needs a geotextile base u	no
42	Point		42	0	0	SD 51	878416960	20767450	42.297777	82	Rock 410	none	stable	no
43	Point		43	0	0	SD 51	380634592	7259050	52.435869	61	Rock 410	none	stable	no
44	Point		44	0	0	SD 51	44808536	1223400	36.626235	97	none	gully/ravine formation	needs rock or drop struct	yes
45	Point		45	0	0	SD 51	1129955584	20554625	54.973301	55	none	minor sediment delta	appears stable	yes
46	Point		46	0	0	SD 51	9045222	172450	52.451273	59	none	none	outlets via oxbow	no
47	Point		47	0	0	SD 51	6626868	203775	32.520515	104	none	gully formation	could use rock or drop str	yes
48	Point		48	0	0	SD 51	9139021	163275	55.97318	52	none	none	grassed open ditch	no
49	Point		49	0	0	SD 51	143309712	4821475	29.72321	111	none	large scour	could use rock or drop str	no
50	Point		50	0	0	SD 51	144372352	3212725	44.937663	75	none	large scour	could use rock	yes
51	Point		51	0	0	SD 51	14013786	386900	36.220693	98	none	none	diffuse outlet	no
52	Point		52	0	0	SD 51	21317596	396175	53.808534	56	none	none	diffuse outlet	no

FID	Shape *	Name	FID	ID	ORIG_	Drain_ID	SedVal	Area	w_sed	D_rank	SD51_PP.Ex_BMP	SD51_PP.Vis_Imp	SD51_PP.Com	SD51_PP.targe
53	Point		53	0	0	SD 51	685525696	14864000	46.119867	72	none	minor scour	could use rock	yes
54	Point		54	0	0	SD 51	137510960	3565225	38.570065	88	none	minor scour	could use rock	yes
55	Point		55	0	0	SD 51	4653067	282975	16.443385	119	none	head cutting scour	could use rock	yes
56	Point		56	0	0	SD 51	7888553	205000	38.480746	90	none	large scour	could use rock	yes
57	Point		57	0	0	SD 51	117143752	2196200	53.339292	58	none	scour	could use rock	yes
58	Point		58	0	0	SD 51	29913876	799025	37.437973	94	none	scour	could use rock	yes
59	Point		59	0	0	SD 51	1023713280	15145975	67.589791	41	none	outer bank erosion	could use armoring	yes
60	Point		60	0	0	SD 51	144838176	2041850	70.934778	36	none	none	grassed open ditch	no
61	Point		61	0	0	SD 51	278713696	5797300	48.076466	67	none	none	open channel stable	no
62	Point		62	0	0	SD 51	29457104	421500	69.886368	39	SWI 410	none	appears stable	no
63	Point		63	0	0	SD 51	23543612	362775	64.898662	45	none	none	outlets via backwater ch	no
64	Point		64	0	0	SD 51	10945025	180475	60.645657	47	none	none	outlets via backwater cha	no
65	Point		65	0	0	SD 51	1104853248	24155325.9357	45.73953	73	none	none	stable creek confluence	no
66	Point		66	0	0	51	0	1622300	0	123	none	none	grassed open ditch	no
67	Point		67	0	0	51	0	289775	0	124	none	none	outlets via marsh	no
68	Point		68	0	0	51	15081	1656557.78675	0.009104	121	none	none	diffuse outlet	no
69	Point		69	0	0	51	31742	324200	0.097909	120	none	none	diffuse outlet	no
70	Point		70	0	0	51	148986	18500925	0.008053	122	none	none	rocked open ditch	no
71	Point		71	0	0	51	107976376	1377980	78.358449	22	none	none	diffuse outlet	no
72	Point		72	0	0	51	265183440	3505756.68165	75.642283	27	rock 410	headcutting	needs repair/replacement	yes
73	Point		73	0	0	51	44455312	490450	90.641884	6	none	none	grassed outlet	no
74	Point		74	0	0	51	17256580	206600	83.526525	14	none	none	outlets via oxbow	no
75	Point		75	0	0	51	43604364	509375	85.603659	11	none	none	diffuse outlet	no
76	Point		76	0	0	51	71106776	856575	83.012901	15	none	none	diffuse outlet	no
77	Point		77	0	0	51	115575904	1481225	78.027244	24	none	none	outlets via ditch	no
78	Point		78	0	0	51	41422272	521325	79.455756	21	none	none	outlets via backchannel	no
79	Point		79	0	0	51	236468400	3082325	76.717543	25	SWI 410	none	stable trapped	no
80	Point		80	0	0	51	22376692	280475	79.781414	20	none	none	diffuse outlet marsh	no
81	Point		81	0	0	51	245930832	4222750	58.239496	49	none	none	diffuse outlet	no
82	Point		82	0	0	51	16699350	197250	84.660837	13	none	none	diffuse outlet	no
83	Point		83	0	0	51	39812900	567300	70.179623	38	none	none	diffuse outlet	no
84	Point		84	0	0	51	65529156	855025	76.640047	26	none	none	outlets via back channel	no
85	Point		85	0	0	51	18201768	254800	71.43551	34	none	none	outlets via back channel	no
86	Point		86	0	0	51	53065952	1224750	43.327987	79	none	none	diffuse outlet marsh	no
87	Point		87	0	0	51	81396304	1697800	47.942222	69	none	none	outlets via oxbow	no
88	Point		88	0	0	51	68368552	797475	85.731279	10	none	none	diffuse outlet	no
89	Point		89	0	0	51	36224992	394000	91.941604	5	none	none	diffuse outlet	no
90	Point		90	0	0	51	407972096	5554200	73.4529	30	none	none	open ditch stable	no
91	Point		91	0	0	51	21224666	228850	92.744881	4	none	none	open ditch stable	no
92	Point		92	0	0	51	11858648	213825	55.459595	54	none	none	open grassed ditch	no
93	Point		93	0	0	51	25723376	303050	84.881623	12	none	none	open grassed ditch	no
94	Point		94	0	0	51	12680861	295175	42.960484	80	none	none	stable culvert approx 50ft	no
95	Point		95	0	0	51	422025792	6288975	67.105656	42	none	none	open ditch	no
96	Point		96	0	0	51	27191472	406262.5	66.930795	43	none	none	stable	no
97	Point		97	0	0	51	1003921856	12351625	81.278525	17	none	none	large concrete culvert roc	no
98	Point		98	0	0	51	377695712	4202825	89.867104	7	none	minor gully	could use SWI	yes
99	Point		99	0	0	51	554093120	12512200	44.284228	77	none	none	outlets via oxbow	no
100	Point		100	0	0	51	64733816	692725	93.448072	3	none	none	riparian corridor	no
101	Point		101	0	0	51	47462652	1322625	35.885192	101	none	none	diffuse outlet	no
102	Point		102	0	0	51	24188580	270075	89.562455	8	none	none	diffuse outlet	no
103	Point		103	0	0	51	63028152	772125	81.629467	16	none	none	diffuse outlet	no
104	Point		104	0	0	51	505999072	7965600	63.523033	46	none	none	open ditch	no
105	Point		105	0	0	51	46578616	889750	52.350229	62	none	none	diffuse outlet	no

FID	Shape *	Name	FID	ID	ORIG_	Drain_ID	SedVal	Area	w_sed	D_rank	SD51_PP.Ex_BMP	SD51_PP.Vis_Imp	SD51_PP.Com	SD51_PP.targe
106	Point		106	0	0	51	71433672	1858625	38.433612	91	none	none	outlets via oxbow	no
107	Point		107	0	0	51	849297600	17523913.2145	48.465065	65	none	none	open ditch	no
108	Point		108	0	0	51	30810394	1015550	30.338628	109	none	none	outlets via oxbow	no
109	Point		109	0	0	51	10834240	307300	35.256232	102	none	none	outlets via backchannel	no
110	Point		110	0	0	51	11584362	291700	39.713274	86	none	none	diffuse outlet marsh	no
111	Point		111	0	0	51	273034880	6602150	41.355449	83	none	none	diffuse outlet marsh	no
112	Point		112	0	0	51	13570771	364275	37.254193	95	none	none	diffuse outlet marsh	no
113	Point		113	0	0	51	6890415	172275	39.996604	85	none	none	open ditch	no
114	Point		114	0	0	51	18297720	484675	37.752556	93	none	none	open ditch	no
115	Point		115	0	0	51	38667104	1070225	36.129883	99	none	none	outlets via backchannel	no
116	Point		116	0	0	51	11886173	425825	27.913281	112	none	none	diffuse outlet marsh	no
117	Point		117	0	0	51	4194003712	131083907.31	31.994802	107	none	none	outlets via oxbow	no
118	Point		118	0	0	51	155496368	3932150	39.544872	87	none	none	open ditch in marsh	no
119	Point		119	0	0	51	69986352	2236875	31.287556	108	none	none	outlets via marsh	no
120	Point		120	0	0	51	11796219	317325	37.173935	96	none	none	outlets via backchannel	no
121	Point		121	0	0	51	94517944	2295100	41.182495	84	none	none	outlets via backchannel	no
122	Point		122	0	0	51	155504144	5778350	26.911513	114	none	none	outlets via oxbow	no
123	Point		123	0	0	51	88862976	2468575	35.997681	100	SWI 410	none	stable	no
124	Point		124	0	0	51	2141015808	43242947.2476	49.511329	63	none	none	open ditch	no
125	Point		125	0	0		3082202	32250	95.572155	0	none	none	outlets via backchannel	no
126	Point		126	0	0		3377951	36650	92.167831	0	none	none	diffuse outlet	no
127	Point		127	0	0		5399199	76325	70.739587	0	none	none	outlets via marsh	no
128	Point		128	0	0		6846390	108575	63.056781	0	none	none	no definable outlet	no
129	Point		129	0	0		4731634	69400	68.179164	0	none	none	no definable outlet	no
130	Point		130	0	0		10376519	141750	73.202956	0	SWI 410	none	trapped	no
131	Point		131	0	0		3034093	52750	57.518351	0	none	none	no definable outlet	no
132	Point		132	0	0		1843246	30550	60.335385	0	none	none	no definable outlet	no
133	Point		133	0	0		1840871	27925	65.92197	0	410 SWI	none	large screw gates	no
134	Point		134	0	0		4094757	66525	61.552153	0	none	none	outlets via exterior ditch	no
135	Point		135	0	0		3103513	45700	67.910569	0	none	none	outlets via parallel field dit	no
136	Point		136	0	0		3116001	33400	93.293443	0	none	none	diffuse outlet	no
137	Point		137	0	0		2033955	28450	71.492267	0	none	none	outlets via parallel field dit	no
138	Point		138	0	0		11531861	159775	72.175628	0	none	none	grassed rock outlet	no
139	Point		139	0	0		2673114	28425	94.04095	0	none	none	grassed river bank	no
140	Point		140	0	0		5080484	52750	96.312493	0	none	none	grassed river bank	no
141	Point		141	0	0		9769795	109075	89.569516	0	none	none	grassed river bank	no
142	Point		142	0	0		2371431	26225	90.426349	0	none	none	grassed river bank	no
143	Point		143	0	0		4645662	55425	83.81889	0	none	none	open vegetated ditch	no
144	Point		144	0	0		3902136	44275	88.134071	0	none	none	open vegetated ditch	no
145	Point		145	0	0		2975220	31200	95.359615	0	none	none	outlets via backchannel	no
146	Point		146	0	0		12140222	130600	92.957289	0	none	none	outlets via open ditch	no
147	Point		147	0	0		13996612	152025	92.067831	0	none	none	diffuse outlet	no
148	Point		148	0	0		2688910	29000	92.721034	0	none	none	grassed outlet	no
149	Point		149	0	0		2782119	29300	94.952867	0	none	none	diffuse outlet	no
150	Point		150	0	0		6538420	74800	87.412032	0	none	none	outlets via backchannel	no
151	Point		151	0	0		13329447	155225	85.87178	0	none	none	outlets via oxbow	no
152	Point		152	0	0		10170395	111825	90.949206	0	none	none	outlets via oxbow	no
153	Point		153	0	0		4138848	60650	68.241517	0	none	none	outlets via oxbow	no
154	Point		154	0	0		3769124	42400	88.894434	0	none	none	outlets via oxbow	no
155	Point		155	0	0		4258759	46850	90.902006	0	none	none	grassed channel	no
156	Point		156	0	0		5174915	57650	89.764354	0	none	none	diffuse outlet	no
157	Point		157	0	0		4507888	50175	89.843308	0	none	none	diffuse outlet	no
158	Point		158	0	0		13145157	200575	65.537365	0	none	none	diffuse outlet	no

FID	Shape *	Name	FID	ID	ORIG_	Drain_ID	SedVal	Area	w_sed	D_rank	SD51_PP.Ex_BMP	SD51_PP.Vis_Imp	SD51_PP.Com	SD51_PP.targe
159	Point		159	0	0		7284725	77600	93.875322	0	none	none	diffuse outlet	no
160	Point		160	0	0		2540694	28350	89.618836	0	none	none	diffuse outlet	no
161	Point		161	0	0		16818728	169425	99.269458	0	none	none	riparian corridor	no
162	Point		162	0	0		7237662	85425	84.725338	0	none	none	grassed waterway	no
163	Point		163	0	0		2104075	38500	54.651299	0	none	none	open grassed ditch	no
164	Point		164	0	0		2340561	69525	33.665027	0	none	none	outlets via grassed ditch	no
165	Point		165	0	0		18109620	360900	50.179052	0	none	none	grassed open ditch	no
166	Point		166	0	0		7462729	86425	86.349193	0	none	none	grassed open ditch	no
167	Point		167	0	0		3199711	45950	69.634625	0	none	none	grassed open ditch	no
168	Point		168	0	0		4636897	52525	88.27981	0	none	none	grassed open ditch	no
169	Point		169	0	0		12263226	137800	88.992932	0	none	none	grassed open ditch	no
170	Point		170	0	0		11566683	126925	91.130061	0	none	none	grassed open ditch	no
171	Point		171	0	0		2540694	28350	89.618836	0	none	none	outlets via oxbow	no
172	Point		172	0	0		8803551	103000	85.471369	0	none	none	diffuse outlet	no
173	Point		173	0	0		5333603	80075	66.607593	0	none	none	outlets via oxbow	no
174	Point		174	0	0		7223497	115475	62.55464	0	none	none	outlets via open ditch	no
175	Point		175	0	0		1901855	52225	36.416563	0	none	none	outlets via backchannel	no
176	Point		176	0	0		2305530	61950	37.215981	0	none	none	outlets via backchannel	no
177	Point		177	0	0		5914686	63750	92.779388	0	none	none	diffuse outlet marsh	no
178	Point		178	0	0		2048938	57525	35.618218	0	none	none	outlets via backchannel	no
179	Point		179	0	0		1036594	27275	38.00528	0	none	none	outlets via backchannel	no
180	Point		180	0	0		3171535	98750	32.11681	0	none	none	outlets via backchannel	no
181	Point		181	0	0		1672335	47825	34.967799	0	none	none	diffuse outlet marsh	no
182	Point		182	0	0		4012001	120300	33.349967	0	none	none	diffuse outlet marsh	no
183	Point		183	0	0		3454342	132775	26.016509	0	none	none	diffuse outlet marsh	no
184	Point		184	0	0		564206	27025	20.877188	0	none	none	diffuse outlet marsh	no
185	Point		185	0	0		1770614	66850	26.486372	0	none	none	diffuse outlet marsh	no
186	Point		186	0	0		2893533	89900	32.186129	0	none	none	diffuse outlet marsh	no
187	Point		187	0	0		1450166	51875	27.955007	0	none	none	diffuse outlet marsh	no
188	Point		188	0	0		10351276	123300	83.951955	0	none	none	vegetated open ditch	no
189	Point		189	0	0		1933386	59100	32.713807	0	none	none	diffuse outlet marsh	no
190	Point		190	0	0		3952688	94175	41.971733	0	none	none	diffuse outlet marsh	no
191	Point		191	0	0		1516253	54025	28.065766	0	none	none	outlet via oxbow	no
192	Point		192	0	0		1263469	55850	22.622543	0	none	none	outlet via oxbow	no
193	Point		193	0	0		3204461	105850	30.273604	0	none	none	diffuse outlet marsh	no
194	Point		194	0	0		3139886	123150	25.496435	0	none	none	diffuse outlet marsh	no
195	Point		195	0	0		1111250	38750	28.677419	0	none	none	diffuse outlet marsh	no
196	Point		196	0	0		880376	38650	22.778163	0	none	none	outlets via backchannel	no
197	Point		197	0	0		1194172	50125	23.82388	0	none	none	outlets via marsh	no
198	Point		198	0	0		1678986	65700	25.555342	0	none	none	diffuse outlet marsh	no
199	Point		199	0	0		5919924	65575	90.277148	0	none	none	outlets via oxbow	no
200	Point		200	0	0		1013511	34975	28.978156	0	none	none	diffuse outlet marsh	no
201	Point		201	0	0		2122250	98475	21.551155	0	none	none	diffuse outlet marsh	no
202	Point		202	0	0		9833548	122150	80.503872	0	none	none	outlets via oxbow	no
203	Point		203	0	0		3033053	34425	88.106115	0	none	none	outlets via oxbow	no
204	Point		204	0	0		4225031	50050	84.416204	0	none	none	outlets via oxbow	no
205	Point		205	0	0		4153918	59125	70.256541	0	none	none	outlets via oxbow	no
206	Point		206	0	0		2641916	38725	68.222492	0	none	none	outlets via oxbow	no
207	Point		207	0	0		4441590	54150	82.023823	0	none	none	outlets via oxbow	no
208	Point		208	0	0		4510638	61700	73.105964	0	none	none	outlets via oxbow	no
209	Point		209	0	0		11855343	156350	75.825667	0	none	none	outlets via oxbow	no
210	Point		210	0	0		6775949	81775	82.860887	0	none	none	diffuse outlet	no
211	Point		211	0	0		6425108	82975	77.434263	0	none	none	outlets via oxbow	no
212	Point		212	0	0		3086823	33525	92.075257	0	none	none	open ditch	no
213	Point		213	0	0		2652467	29900	88.711271	0	none	none	small open channel	no
214	Point		214	0	0		6814264	95050	71.691362	0	none	none	small open channel	no
215	Point		215	0	0		6682300	83900	79.646007	0	none	none	outlets via oxbow	no
216	Point		216	0	0		7015435	92875	75.536312	0	none	none	outlets via oxbow	no
217	Point		217	0	0		5059096	62000	81.598323	0	none	none	outlets via oxbow	no
218	Point		218	0	0		8751562	108175	80.90189	0	none	none	outlets via oxbow	no
219	Point		219	0	0		3771403	45100	83.623126	0	none	minor sedimentation	due to cattle	yes
220	Point		220	0	0		4147363	44600	92.990202	0	none	none	outlets via oxbow	no
221	Point		221	0	0		16797434	182150	92.21759	0	SWI 410	none	installed 2014 with rock	no
222	Point		222	0	0		3675164	31575	116.394743	0	none	none	outlets via oxbow	no
223	Point		223	0	0		3189964	35050	91.011812	0	none	none	outlets via oxbow	no
224	Point		224	0	0		3879992	43500	89.195218	0	none	none	outlets via oxbow	no
225	Point		225	0	0		6574272	77225	85.131395	0	none	none	vegetated stable	no
226	Point		226	0	0		2711627	66025	41.069701	0	none	none	outlets via oxbow	no
227	Point		227	0	0		7011326	88125	79.561146	0	none	none	outlets via oxbow	no
228	Point		228	0	0		6639577	80450	82.530479	0	none	none	diffuse outlet	no
229	Point		229	0	0		2449704	34000	72.050118	0	none	none	appears stable	no
230	Point		230	0	0		6367606	75300	84.563161	0	none	none	outlets via oxbow	no
231	Point		231	0	0		4672827	70800	66.000381	0	none	none	no defined channel	no
232	Point		232	0	0		15925825	174275	91.383302	0	410 rock	none	stable	no
233	Point		233	0	0		3434455	60100	57.145674	0	none	head cut scour	could use rock	yes
234	Point		234	0	0		8757980	96025	91.205207	0	none	head cut scour	could use rock	yes
235	Point		235	0	0		3725197	38775	96.072134	0	none	channelization	could use rock	yes
236	Point		236	0	0		4275321	149550	28.587904	0	none	none	outlets via oxbow	no
237	Point		237	0	0		3570878	71400	50.012297	0	none	none	grassed open ditch	no
238	Point		238	0	0		2890164	61275	47.167099	0	none	head cut scour	could use rock	yes
239	Point		239	0	0		8885609	161975	54.857904	0	none	head cut scour	could use rock	yes
240	Point		240	0	0		1972872	35125	56.167174	0	none	minor scour	opposite bank has large s	yes
241	Point		241	0	0		9071287	139775	64.899209	0	none	none	diffuse outlet	no
242	Point		242	0	0		3336803	53950	61.849917	0	none	none	diffuse outlet	no

Summary

Seven jurisdictional ditch systems were investigated within the Roseau River Watershed District to identify priority locations to install best management practices to reduce sediment and nutrient transport. A total of 744 pour point locations (sites) were identified as outlets to drainage areas contributing surface water and potential impairments into the 7 ditch systems. There were 226 sites (30% of all sites) identified as "priority" requiring some form of conservation practice, and 54 sites (7%) designated as secondary sites needing to be addressed. There were 94 sites (12.5%) that had previously adopted best management practices, identified during field investigations. Data collected from the inventory will be utilized by the watershed, local SWCD's and county in future conservation drainage projects. The watershed district will maintain a spatial dataset that will be updated annually to track conservation practice implementation within the jurisdictional boundaries of the district.

Watershed Ditch 3

Pour Points Target

- yes
- no

Drainage Area Weighted Sed

- 4.933604 - 13.764930
- 13.764931 - 22.596256
- 22.596257 - 31.427583
- 31.427584 - 40.258909
- 40.258910 - 49.090235
- 49.090236 - 57.921562
- 57.921563 - 66.752888
- 66.752889 - 75.584214
- 75.584215 - 84.415541
- 84.415542 - 93.246867

2013 Aerial Photograph

1 inch = 3,000 feet

County Rd 112
County Hwy 3
County Rd 139
Unknown or No Streetname
County Rd 115
County Rd 142
County Hwy 142
County Rd 142
County Hwy 16
County Hwy 27
State Hwy 11
County Hwy 26
Unknown or No Streetname
County Rd 114

County Ditch 8

Pour Points Target

yes

no

County Ditch 8

Drainage Area Weighted Sed

7.434306 - 16.302436

16.302437 - 25.170567

25.170568 - 34.038698

34.038699 - 42.906828

42.906829 - 51.774959

51.774960 - 60.643089

60.643090 - 69.511220

69.511221 - 78.379350

78.379351 - 87.247481

87.247482 - 96.115612

2013 Aerial Photograph

1 inch = 3,000 feet

N

County Rd 123

State Hwy 11

Unknown or No Streetname

County Rd 114

State Hwy 89

County Hwy 15

County Hwy 2

County Hwy 2

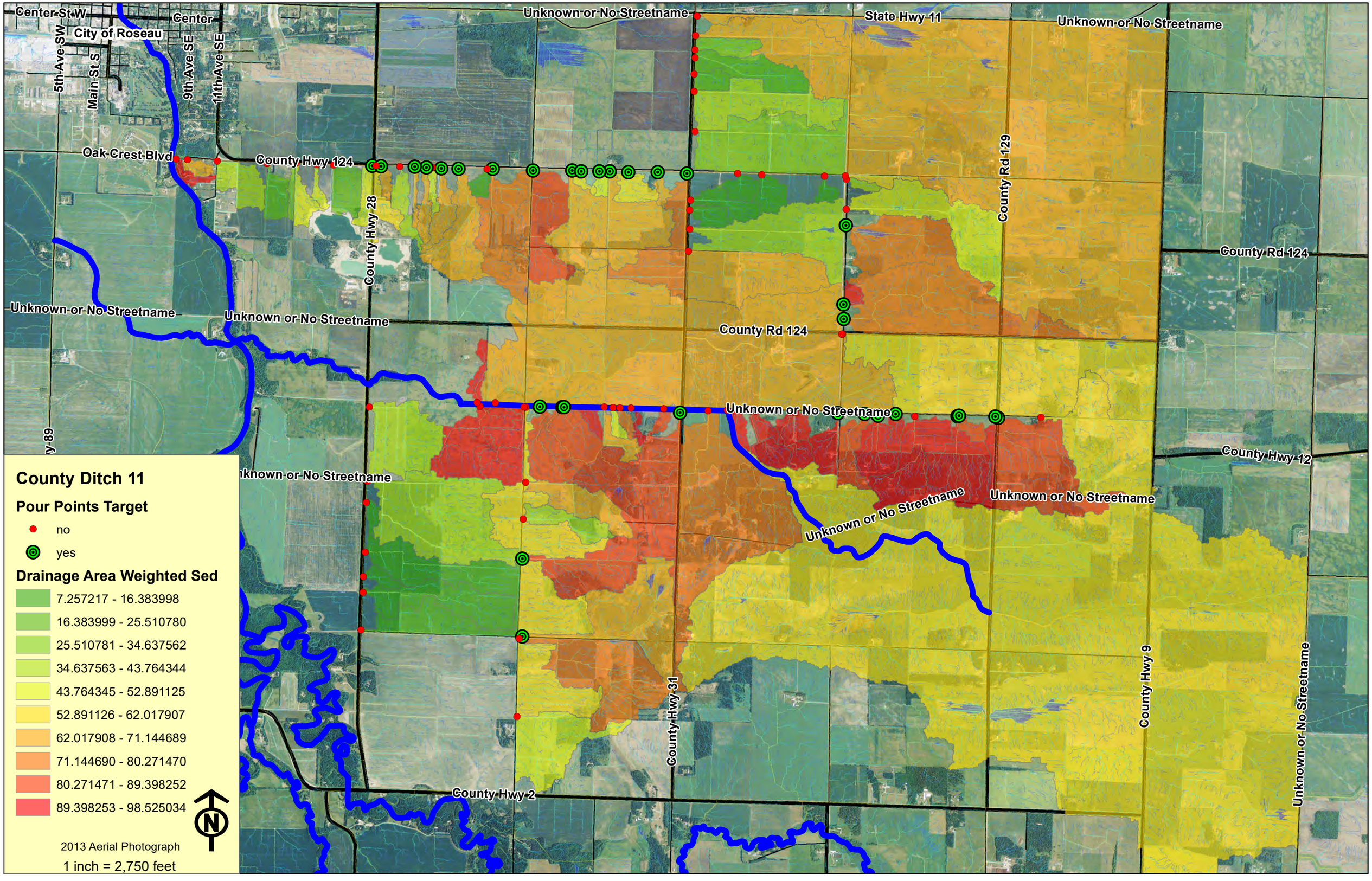
County Hwy 15

County Rd 121

County Hwy 14

County Rd 126

Unknown or No Streetname


Center St W
City of Roseau
Center
5th Ave SW
Main St S
9th Ave SE
11th Ave SE
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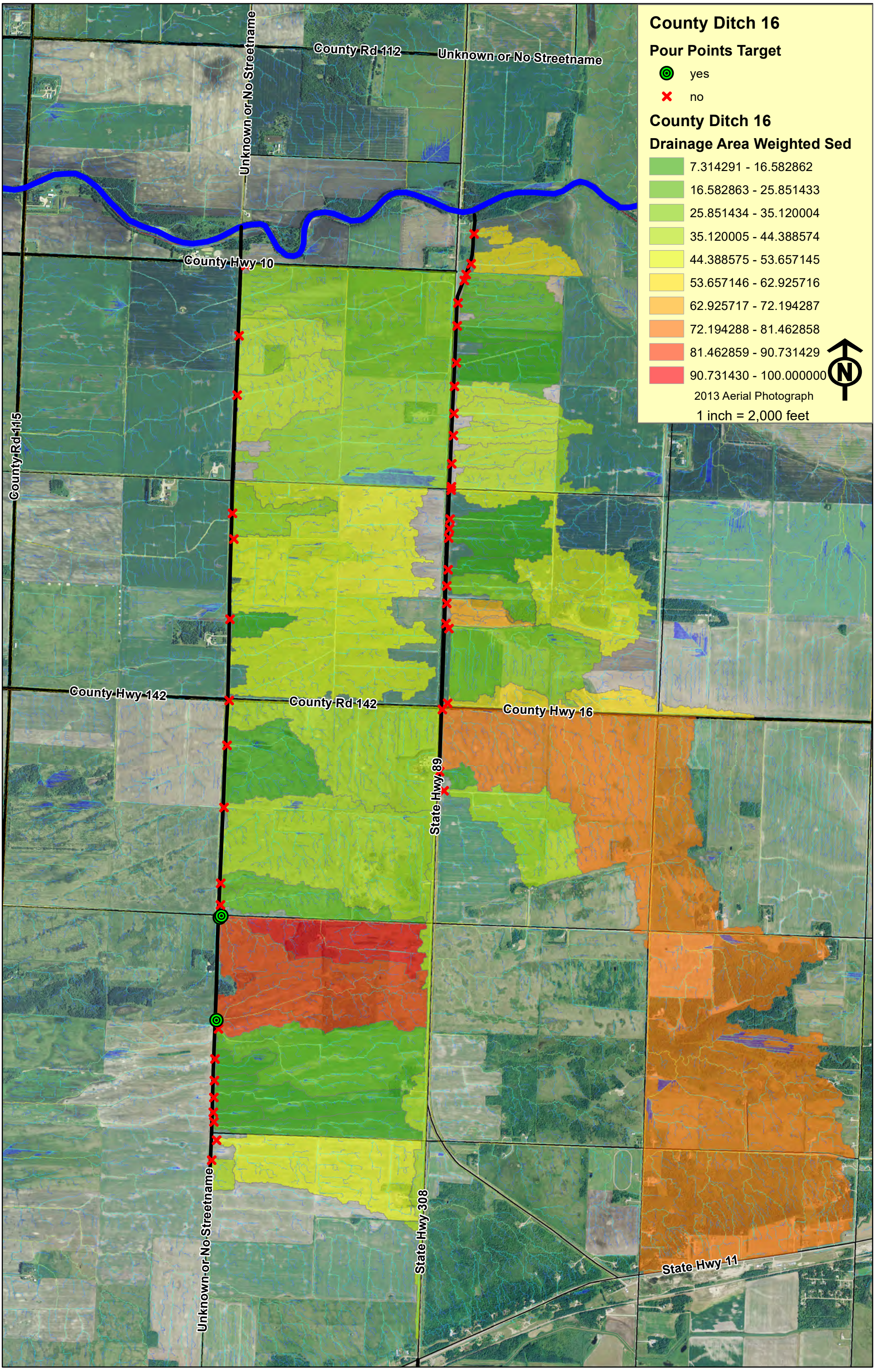
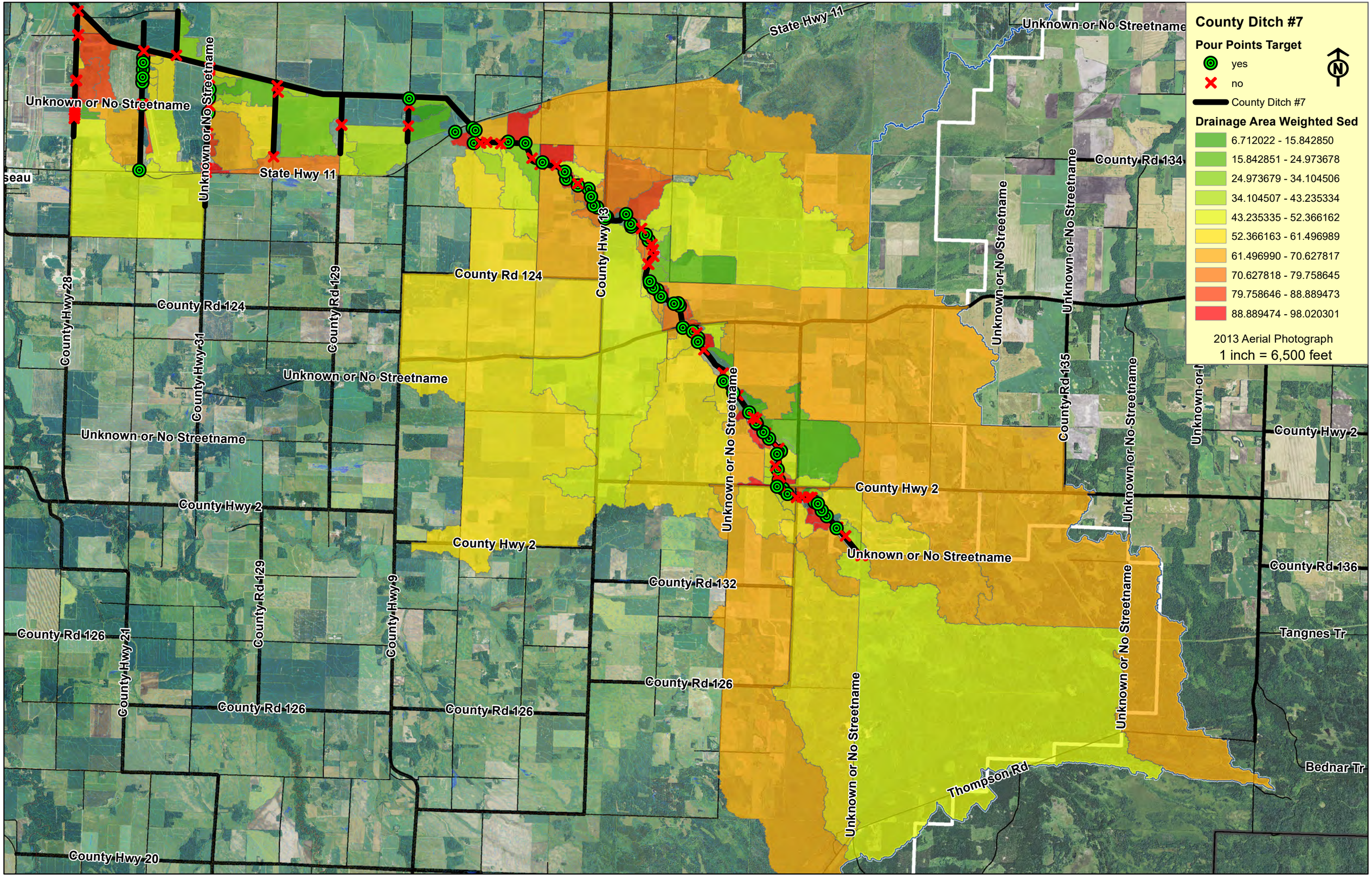
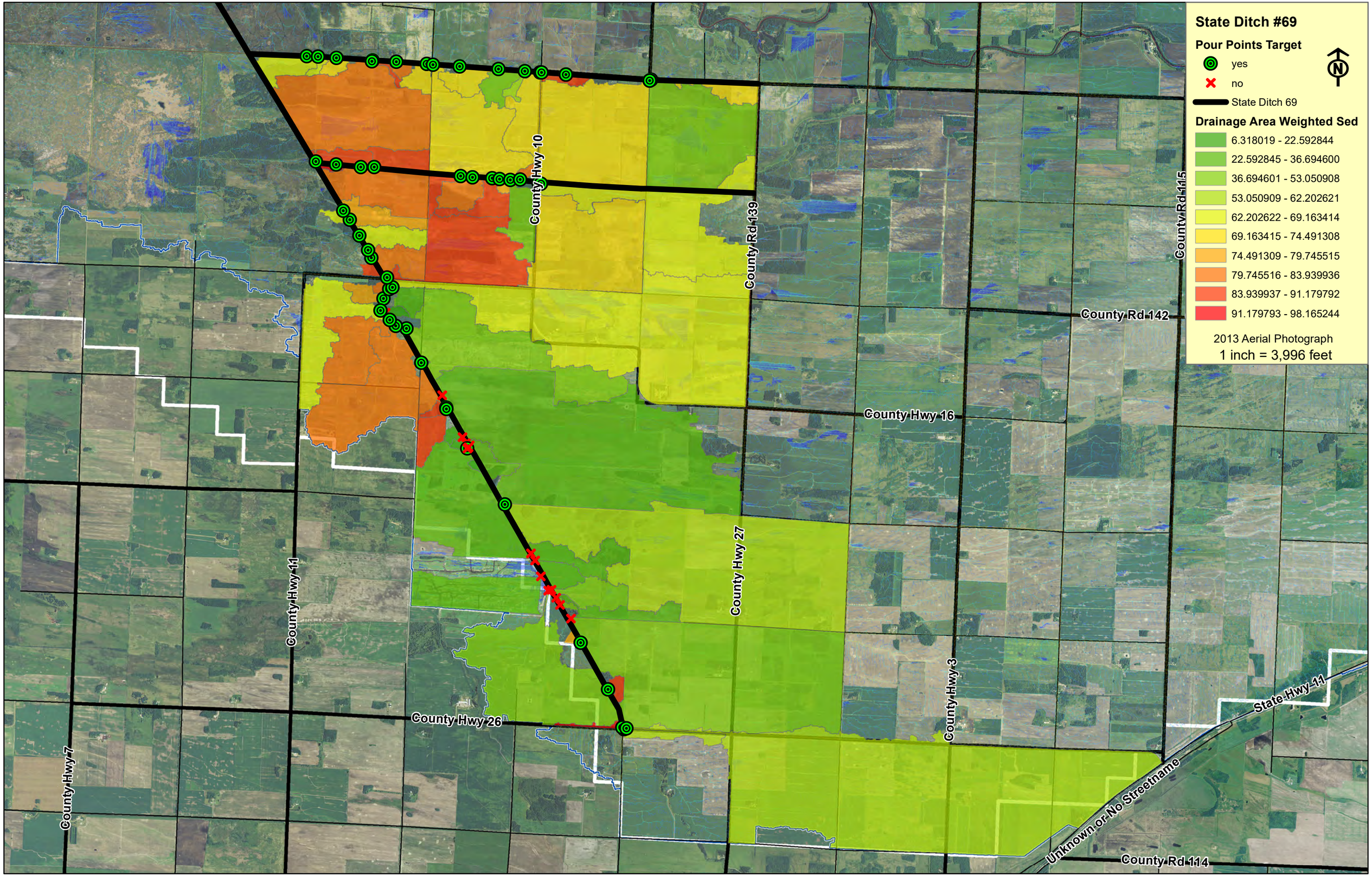
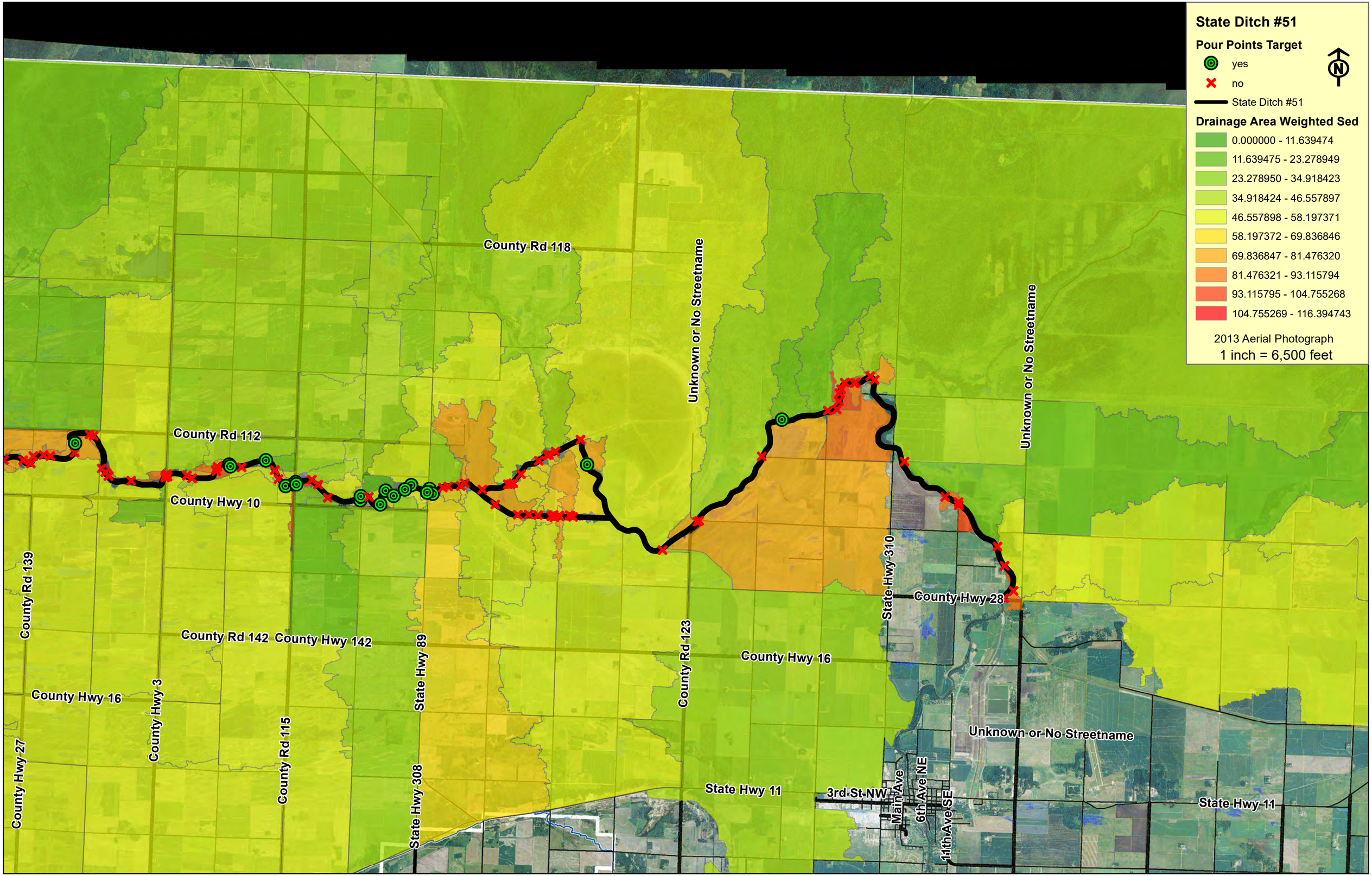
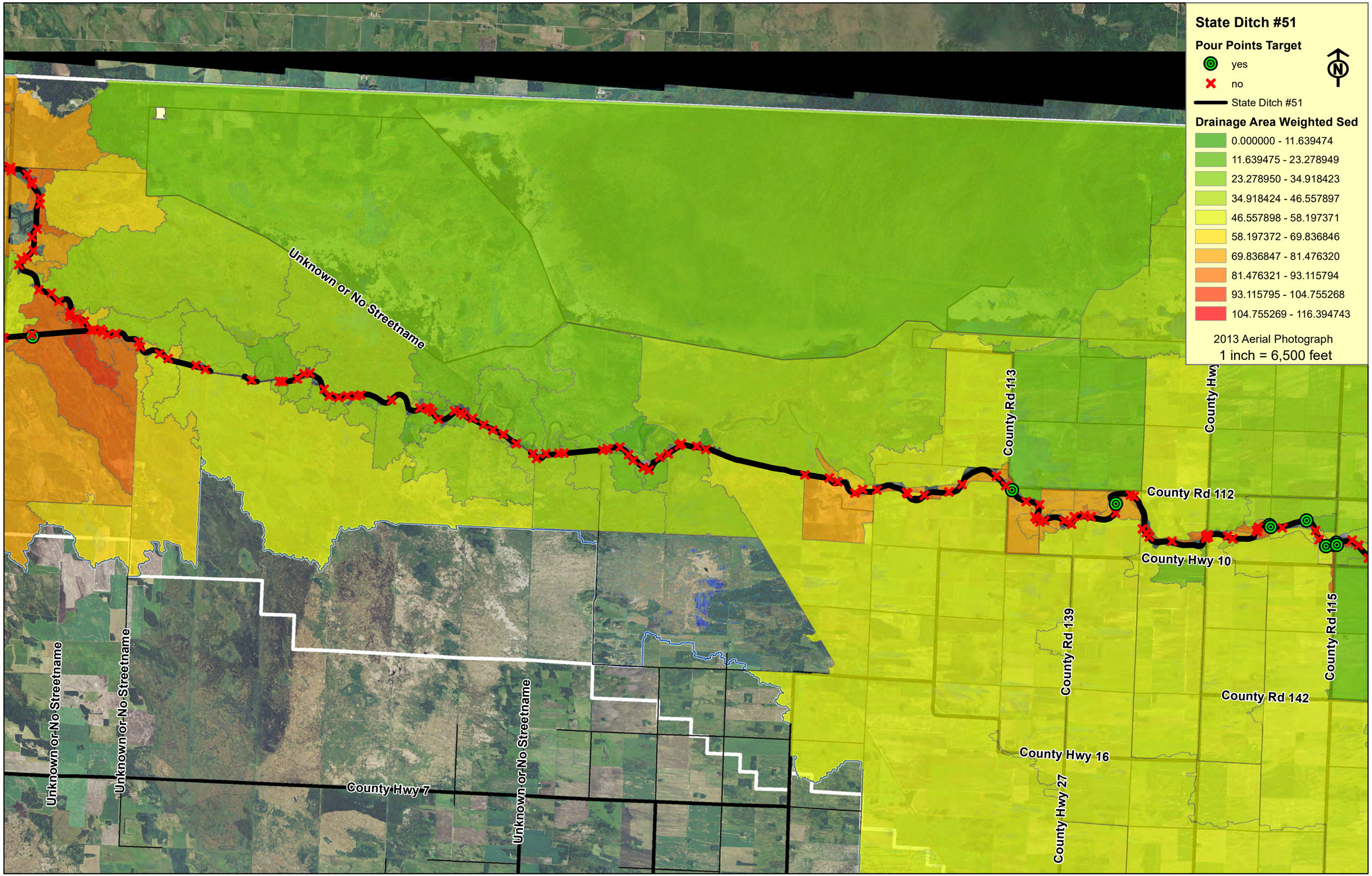
State Hwy 11
Unknown or No Streetname
Oak Crest Blvd
County Hwy 124
County Hwy 28
County Rd 129
County Rd 124
Unknown or No Streetname
Unknown or No Streetname
County Rd 124
Unknown or No Streetname
County Hwy 12
Unknown or No Streetname
Unknown or No Streetname
Unknown or No Streetname
County Hwy 31
County Hwy 9
Unknown or No Streetname
County Hwy 2
County Ditch 11
Pour Points Target
no
yes
Drainage Area Weighted Sed
7.257217 - 16.383998
16.383999 - 25.510780
25.510781 - 34.637562
34.637563 - 43.764344
43.764345 - 52.891125
52.891126 - 62.017907
62.017908 - 71.144689
71.144690 - 80.271470
80.271471 - 89.398252
89.398253 - 98.525034
N
2013 Aerial Photograph
1 inch = 2,750 feet

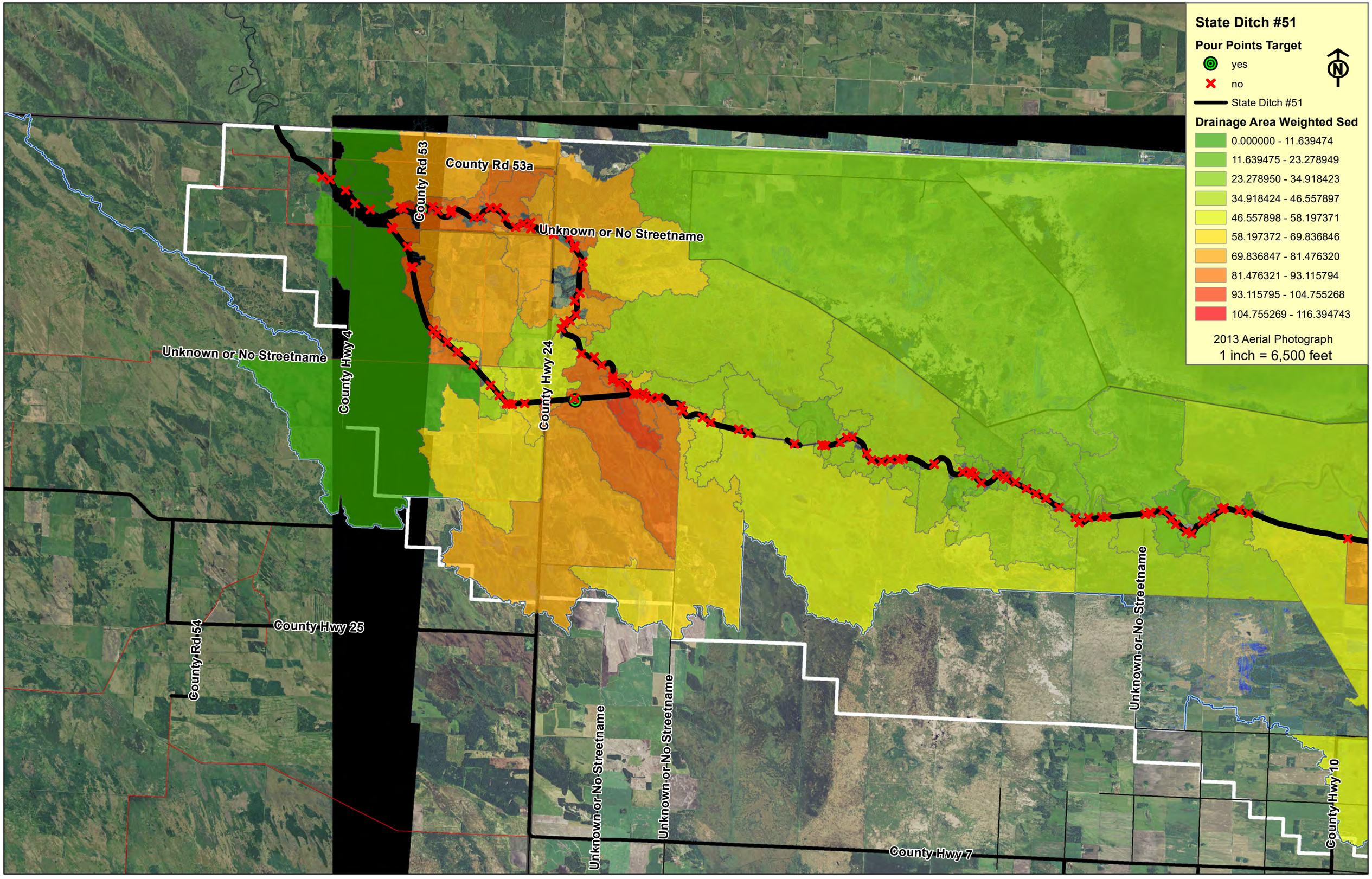

County Ditch 16
Pour Points Target
yes
no
County Ditch 16
Drainage Area Weighted Sed
7.314291 - 16.582862
16.582863 - 25.851433
25.851434 - 35.120004
35.120005 - 44.388574
44.388575 - 53.657145
53.657146 - 62.925716
62.925717 - 72.194287
72.194288 - 81.462858
81.462859 - 90.731429
90.731430 - 100.000000
2013 Aerial Photograph
1 inch = 2,000 feet
N
Unknown or No Streetname
County Rd 112
Unknown or No Streetname
County Hwy 10
County Rd 115
County Hwy 142
County Rd 142
State Hwy 89
County Hwy 16
Unknown or No Streetname
State Hwy 308
State Hwy 11


County Ditch #7
Pour Points Target
yes
no
County Ditch #7
Drainage Area Weighted Sed
6.712022 - 15.842850
15.842851 - 24.973678
24.973679 - 34.104506
34.104507 - 43.235334
43.235335 - 52.366162
52.366163 - 61.496989
61.496990 - 70.627817
70.627818 - 79.758645
79.758646 - 88.889473
88.889474 - 98.020301
2013 Aerial Photograph
1 inch = 6,500 feet
N
Unknown or No Streetname
State Hwy 11
County Rd 124
County Hwy 13
County Rd 134
County Hwy 28
County Hwy 31
County Rd 129
County Hwy 2
County Rd 135
County Rd 132
County Hwy 9
County Hwy 21
County Rd 126
County Hwy 20
Thompson Rd
Tangnes Tr
Bednar Tr
County Rd 136


State Ditch #69
Pour Points Target
yes
no
State Ditch 69
Drainage Area Weighted Sed
6.318019 - 22.592844
22.592845 - 36.694600
36.694601 - 53.050908
53.050909 - 62.202621
62.202622 - 69.163414
69.163415 - 74.491308
74.491309 - 79.745515
79.745516 - 83.939936
83.939937 - 91.179792
91.179793 - 98.165244
2013 Aerial Photograph
1 inch = 3,996 feet
N
County Hwy 10
County Rd 139
County Rd 115
County Rd 142
County Hwy 16
County Hwy 27
County Hwy 11
County Hwy 26
County Hwy 7
County Hwy 3
State Hwy 11
Unknown or No Streetname
County Rd 114


State Ditch #51
Pour Points Target
yes
no
State Ditch #51
Drainage Area Weighted Sed
0.000000 - 11.639474
11.639475 - 23.278949
23.278950 - 34.918423
34.918424 - 46.557897
46.557898 - 58.197371
58.197372 - 69.836846
69.836847 - 81.476320
81.476321 - 93.115794
93.115795 - 104.755268
104.755269 - 116.394743
2013 Aerial Photograph
1 inch = 6,500 feet
N
County Rd 118
Unknown or No Streetname
Unknown or No Streetname
County Rd 112
County Hwy 10
County Rd 139
State Hwy 310
County Hwy 28
County Rd 142
County Hwy 142
State Hwy 89
County Rd 123
County Hwy 16
County Hwy 16
County Hwy 3
County Rd 115
Unknown or No Streetname
County Hwy 27
State Hwy 308
State Hwy 11
3rd St NW
Main Ave
6th Ave NE
11th Ave SE
State Hwy 11


State Ditch #51
Pour Points Target
yes
no
State Ditch #51
Drainage Area Weighted Sed
0.000000 - 11.639474
11.639475 - 23.278949
23.278950 - 34.918423
34.918424 - 46.557897
46.557898 - 58.197371
58.197372 - 69.836846
69.836847 - 81.476320
81.476321 - 93.115794
93.115795 - 104.755268
104.755269 - 116.394743
2013 Aerial Photograph
1 inch = 6,500 feet
N
Unknown or No Streetname
County Rd 113
County Hwy
County Rd 112
County Hwy 10
County Rd 115
County Rd 139
County Rd 142
County Hwy 16
County Hwy 27
County Hwy 7
Unknown or No Streetname
Unknown or No Streetname
Unknown or No Streetname


State Ditch #51
Pour Points Target
yes
no
State Ditch #51
Drainage Area Weighted Sed
0.000000 - 11.639474
11.639475 - 23.278949
23.278950 - 34.918423
34.918424 - 46.557897
46.557898 - 58.197371
58.197372 - 69.836846
69.836847 - 81.476320
81.476321 - 93.115794
93.115795 - 104.755268
104.755269 - 116.394743
2013 Aerial Photograph
1 inch = 6,500 feet
N
County Rd 53
County Rd 53a
Unknown or No Streetname
Unknown or No Streetname
County Hwy 4
County Hwy 24
County Hwy 25
County Rd 54
Unknown or No Streetname
Unknown or No Streetname
Unknown or No Streetname
County Hwy 7
County Hwy 10

Come and see what the Roseau River and City Park have to offer at the

"Launch Party"

River Trail Kickoff/Kayak Launch Dedication

Tuesday, June 26th, 2018 - from 4-7:00 pm

Roseau City Park Boat Launch & Fishing Dock area

Kayak Launch Dedication @ 5:00pm

- **Free hotdog, chips and pop** sponsored by Watershed District
- **Root Beer Floats ($1.00)** by First United Lutheran Church Youth Group
- **Kayak/Paddle Boards available to try out** by H2O Fitness & Paddling
- **Color Run** sponsored by Team Epic will follow the dedication at 5:30
  *No advanced registration needed
- **Makin' Noise Mobile DJ** on-site during the event
- **Free Face Painting**
- **Streiff Sporting Goods**
  *kayaks, canoes, paddleboards, life jackets, paddles and clothing for sale on-site
- **Educational and Informational Booths**
  -Life Care Medical Center
  -DNR
  - International Water Institute's River Watch Program
  - Coast Guard Auxiliary
  *Boat Safety *Free Vessel Safety Checks *Life Jacket Fitting

In the event of inclement weather, we will put an announcement on Wild 102 Radio if party is cancelled

Sponsored by: HDR Engineering, RRWD, Evans Foundation, A+ Concrete and Landscaping


PLEASE JOIN US!!
Roseau River Wildlife Management Area
Pool 3 Outlet Project
RIBBON CUTTING
June 25, 2019
1:00 p.m. — 400th St & Dike Rd — Caribou
GUEST SPEAKERS - LUNCH PROVIDED
PROJECT PARTNERS:
RRWD
ROSEAU RIVER WATERSHED DISTRICT
Red River Watershed Management Board
DEPARTMENT OF NATURAL RESOURCES

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Roseau River Watershed District

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Community

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Send Message

Create Live Event Offer Job

Create Post

Write a post...

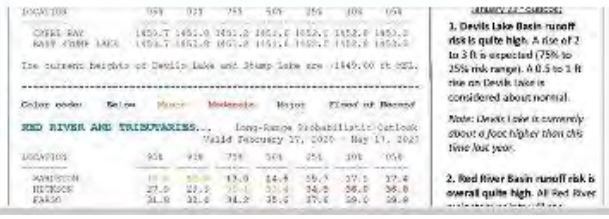
Photo/Video Get Messages Check in ...

1 Scheduled Post
Scheduled for tomorrow at 4:00 PM. See post.

Boost an Instagram Post

Reach more people and get more reactions, comments and shares

Photos



1. Devils Lake Basin runoff risk is quite high. A rise of 2 to 3 ft is expected (75% to 25% risk range). A 0.5 to 1 ft rise on Devils Lake is considered about normal.

Note: Devils Lake is currently about a foot higher than this time last year.

2. Red River Basin runoff risk is overall quite high. All Red River

RRWD

The Roseau River Watershed District (RRWD), part of the Red River Basin, is located in Northwestern ...

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492 followers

9 were here 0 this week

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Posts from Pages you've liked as your Page


Roseau River Watershed District
WRAPS Process Overview
Watershed Restoration and Protection Strategy
What is WRAPS?
Roseau River Watershed Facts:
1,147 sq. miles
Soil

Hay Creek Subwatershed Stakeholder Meeting

Watershed Priorities and Management

Thursday, February 13th, 2020
Roseau City Center
3 pm to 5 pm (meal to follow)
Open house with presentation at 3:15 pm
Guest speaker Warren Formo (MAWRC)

This is about what matters to you!

This meeting is about getting your thoughts and feedback and to support you in being a steward of the land in a manner that works for you! You are the expert on your land and no one cares about it more than you do. Your combined knowledge is a powerful thing, let's use it together!

For those unable to attend the meeting, the survey will be made available, along with presentation material from the meeting, at the RRWD website following the public meeting.

Please RSVP by emailing rrwd@mncable.net or calling (218) 463-0313

Agenda Outline

- ✓ Information on monitoring efforts
- ✓ Background on drainage system study
- ✓ Forward planning
- ✓ Attendee survey

roseauriverwd.com

714 6th St. SW
Roseau, MN 56751

Hay Creek Subwatershed Stakeholder Meeting



Roseau River Habitat Restoration

Project Background & Scope

The Roseau River is currently classified as Minnesota State Ditch 51 starting at the Canadian border and continuing 45 miles upstream to County Road 28. This reach of the river was channelized in the early 1900s which caused habitat degradation of the river and its riparian corridor. The increased slope of the river has led to entrenchment, disconnected oxbows, high bank erosion, reduced access to floodplain and loss of critical habitat. Altered hydrology impacts turbidity and water temperature leading to reduced biodiversity and vulnerability to climate change. The Roseau River Watershed District (RRWD) in partnership with the MN Department of Natural Resources (MN DNR) is leading implementation of a plan to restore this reach of the Roseau River. **The project will restore degraded habitat, increase the resilience of the ecosystem surrounding the river, reestablish natural levels of connectivity between the river and its riparian corridor, strengthen biodiversity, and restore overall watershed hydrology to the area.**

The project reconnects 13.6 miles of historic oxbows on the Roseau River for a total restoration of 22.5 miles of river and associated floodplain and riparian habitat located almost entirely within the Roseau River Wildlife Management Area (RRWMA).

Restoration will include rehabilitation of natural river habitat, and enhancement of wetland and prairie plant communities in both form and function. The stream rehabilitation will be based on the principles of natural channel design with an understanding of the hydrology and fluvial geomorphology at the site. Reconnecting the historic oxbows will reestablish a natural meandering pattern and riffle-pool-run sequence which is essential to an ecologically functional and productive river system. The restored river and associated riparian wetlands and prairie will improve habitat for several species of greatest conservation need (SGCN) and game fish such as Lake sturgeon, walleye, Northern pike and Channel catfish.

The restoration is located within the MN DNR's Aspen Parklands Conservation Focus Area (CFA) identified in the Minnesota Wildlife Action Plan 2015 – 2025 (WAP) as well as the Kittson-Roseau Aspen Parkland Prairie Core Area identified in the Minnesota Prairie Conservation Plan. The Roseau river and its riparian corridor is considered a key habitat for SGCN and received a high score (high priority for restoration) in the Wildlife Action Network.

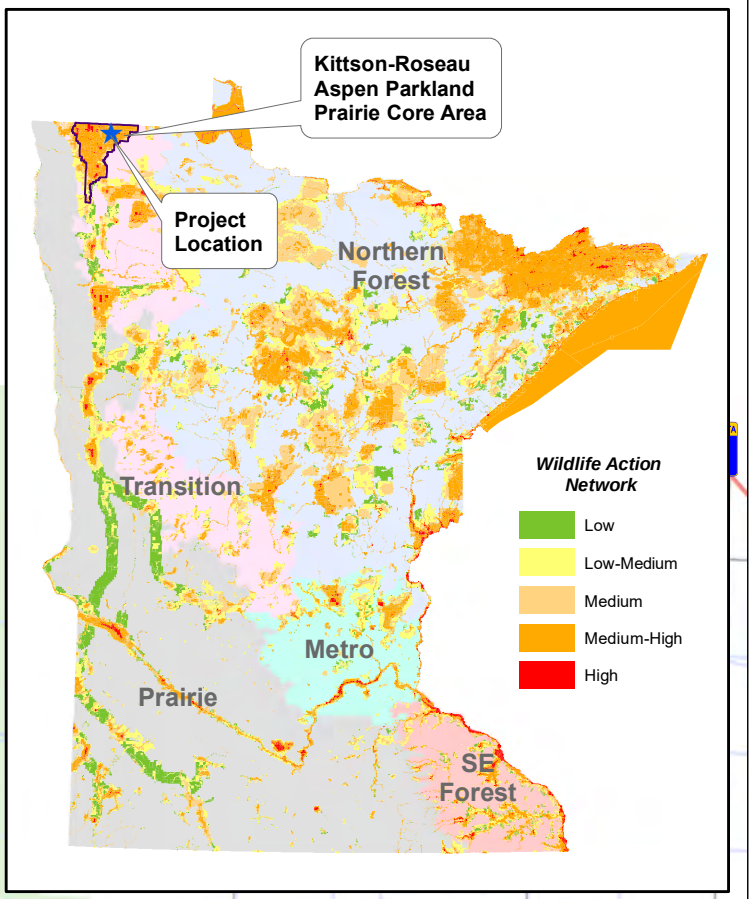
Outdoor recreation within the WMA already includes hunting, fishing and birding. The MN DNR constructed three large waterfowl pools located approximately 1 mile north of the project area. These pools are a rich source of wildlife habitat and are part of the Pine to Prairie Birding Trail. Outdoor recreation will benefit from the restoration by expanding opportunities to enjoy wildlife through improved kayaking and canoeing along the river.

With appropriate funding, this project is ready for implementation as it is located almost entirely on protected land within the RRWMA. Eliminating the need for major land acquisition bypasses one of most difficult steps in conservation projects. This project will be a showcase example of the positive impact that river restoration can have on fish and wildlife habitat as well as provide a unique opportunity to observe the enhancement of adjacent wetland and upland habitats responding to restored natural hydrology.

Timeline

Outcomes/Benefits

- Reconnect 13.6 miles of historic oxbows to reestablish natural meanders
- 366 acres of restored aquatic habitat
- Restored hydrology for riparian wetlands and uplands
- Increased ecosystem resilience
- Expanded opportunities for outdoor recreation, fishing and wildlife viewing



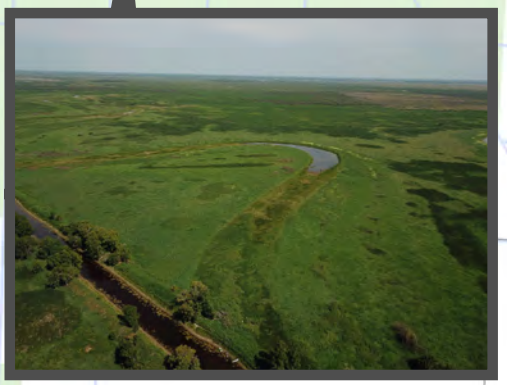
Roseau River WMA

Reconnected River Habitat - 13.6 Miles
366 Acres of In-stream Habitat

Roseau River

MN State Ditch 51

Channelized Roseau River



Disconnected Oxbow

COUNTY 0 ROAD
COUNTY 4 ROAD
COUNTY 24 ROAD
COUNTY 25 ROAD
COUNTY 7 ROAD
COUNTY 103 ROAD
COUNTY 11 ROAD
COUNTY 10 ROAD
COUNTY 112 ROAD
COUNTY 3 ROAD
COUNTY 115 ROAD

Roseau River Watershed District
DEPARTMENT OF NATURAL RESOURCES
The Nature Conservancy
Red River Watershed Management Board

RRWD
ROSEAU RIVER WATERSHED DISTRICT

SUMMER 2019

rrwd@mncable.net 714 6th St SW, Roseau, MN 56751 218.463.0313 roseauriverwd.com

RRWMA RIBBON CUTTING EVENT

June 25th started out as a rainy day, but by the time the ribbon cutting event for the Roseau River Wildlife Management Area (RRWMA) Pool 2 and Pool 3 Outlet Project started, the clouds had cleared, the sun came out and the bugs cooperated by staying away. Representatives from the project partners, the Red River Water Management Board (RRWMB), the Minnesota Department of Natural Resources (MNDNR), and the Roseau River Watershed District (RRWD) along with project engineers from HDR Engineering Inc., landowner Butch Schmalz, MN Representative Dan Fabian, and former MN Senator LeRoy Stumpf attended.

The concept for this project was discussed for several years. In 2011, the RRWD applied for and received a grant from the MNDNR Flood Hazard Mitigation program to re-establish the project. The purpose of the project is to improve water management capability on the RRWMA by replacing a failing structure between Pool 2 and Pool 3, improving the conveyance on the west end of Pool 3 and constructing a new Pool 3 outlet structure and channel west to the Roseau River. The RRWMA covers more than 74,000 acres in upland and wetland habitat. Approximately 10,600 of those acres are shallow pools that are managed for waterfowl and shorebirds. The RRWMA is traversed by a twenty-seven mile long dike road and offers hunting, boat launching, and primitive camping opportunities. New outlet structures and channels allow for consistent management of these habitats along with providing flood damage reduction benefits by controlling the timing of storage and discharge.

RRWMA primarily receives water from the Pine Creek Diversion and the Sundown Bog in Manitoba flowing directly into Pool 1 West and Pool 2, respectively. Pool 1 East is fed by its own drainage area discharging into County Ditch 17. Pools 1, 2, and 3 have a combined drainage area of just over 200 square miles. Control structures on the RRWMA allow movement of water downstream in preparation to receive and store water coming from the eastern portion of the watershed district, reducing impacts on privately owned land.

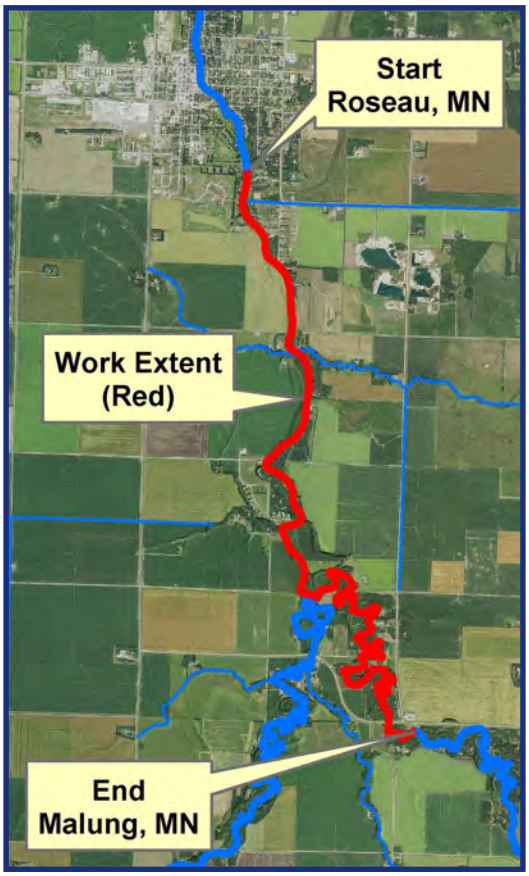
Construction on the Pool 2 and Pool 3 Outlet Project began in 2016 under less than ideal conditions. RJ Zavoral & Sons were able to complete the majority of heavy equipment work during the extremely wet 2016 season.

ALL THINGS ROSEAU RIVER.....

conservation corps MINNESOTA & IOWA

Information on youth and young adult opportunities:

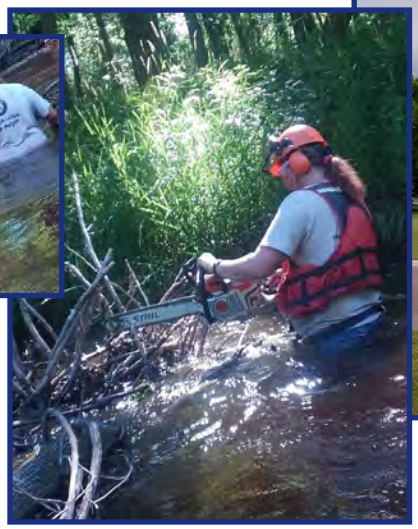
www.conservationcorps.org



The Conservation Corps began back in the 1930s providing natural resource jobs to unemployed young men so they could work to support their families during the Great Depression. Later in the 1970s the federal government launched the summer Youth Conservation Corps and the year-round Adult Conservation Corps. In 1981, federal funding was discontinued and the Minnesota Legislature created the Minnesota Conservation Corps through the MNDNR offering both youth and young adult programs which provide hands-on environmental stewardship and service-learning opportunities.

The Conservation Corps offers youth and young adults ways to be engaged in conservation, natural resource management, and emergency response work.

The RRWD has utilized Conservation Crews in the past to assist with habitat restoration within the Norland Impoundment. Early in 2019 the RRWD applied for, and received Clean Water Funding to utilize the Conservation Corps Minnesota crews for the first round of removing woody obstructions between the City of Roseau and the community of Malung. Their work will improve navigability and provide erosion control measures on the Roseau River. The Conservation Corps crew will be on the Roseau River from July 8-11, 2019 and July 22-26, 2019.



Follow the RRWD
Send us your pics!

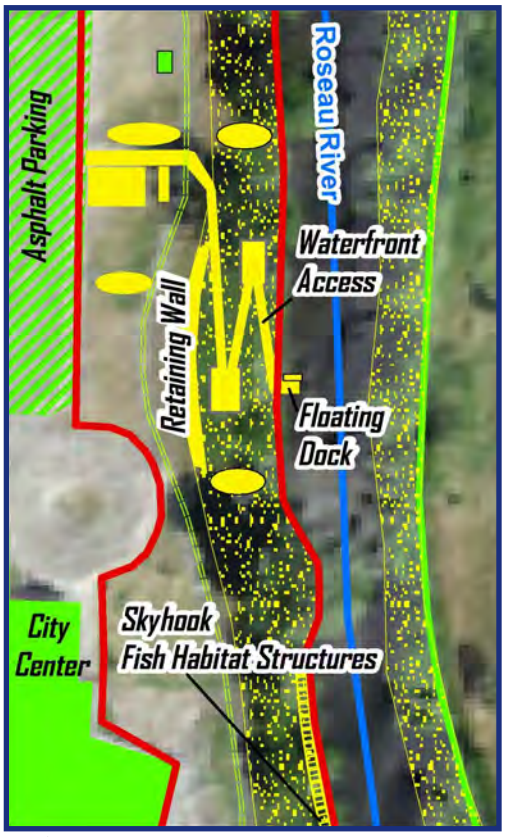
ALL THINGS ROSEAU RIVER cont.

The Roseau River Trail Stakeholder group met on February 7, 2019 to discuss plans for the 2019 construction season. The group held extensive discussion on next steps for the trail project and talked about recent outreach to the communities of Malung and Wannaska. Out of that discussion came the design concept for the Roseau City Center and ideas for future launch sites in Malung, Wannaska, and at the Dieter Town Hall.

In March, the RRWD submitted a grant application on behalf of the City of Roseau to the MNDNR's Outdoor Recreation Grant Program. The purpose of the program is to increase and enhance outdoor recreation facilities in local and community parks throughout the state. The grant provides matching funds to local units of government for up to 50% of development.

In early June, the City of Roseau was awarded a matching funds grant in the amount of $32,900. The city and the RRWD will split the required matching funds for installation of the Roseau City Center access. Plans for the access include an accessible switchback ramp, accessible kayak launch, and skyhook fish habitat structures. A retaining wall, spillways, and rain gardens are also proposed as erosion control measures. The Skyhook fish habitat structures will provide riverbank fishing opportunities and will also serve as erosion control measures. The riparian corridor will be seeded with native seed following necessary brushing and prescribed burning to further stabilize the corridor.

Engineering and permitting will begin once the grant agreement is executed with construction beginning in 2020.



… IN OTHER RIVER NEWS:

SD51 Sediment Reduction— Phase I Completion Summer '19

Roseau River Restoration Project— Application submitted to the LSOHC for grant funding.

2nd Annual Summer Festival in the Park

On June 26th, the Roseau City Park hosted the 2nd Annual Summer Festival in the Park. With the success of last year's Launch Party, the river trail stakeholder group was game for another party! There were multiple activities, booths, and of course, food! Thank you to all who attended and all who made it possible!

Roseau Lake Project

Complete project information available:

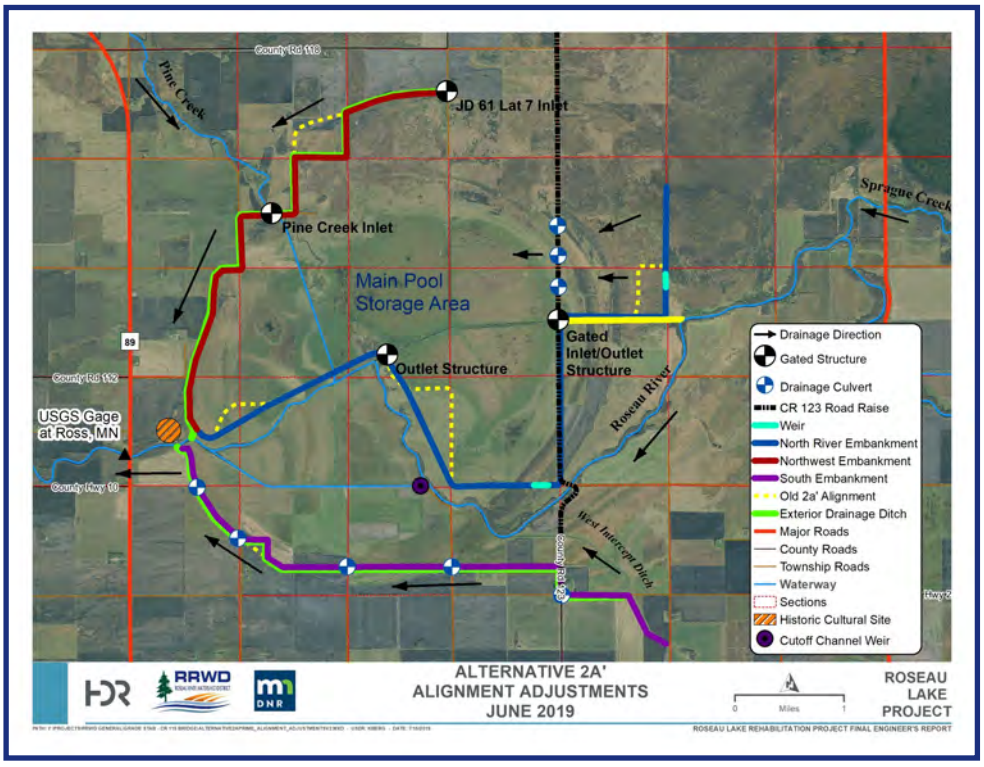
www.roseauriverwd.com

PROJECT GOALS

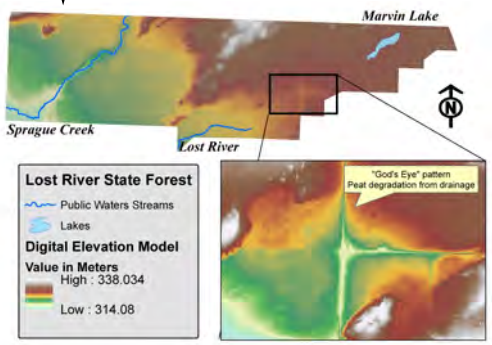
- Improve water level management in Roseau Lake basin
- Provide more efficient flood storage and improve the timing of flooding
- Control pool bounce to improve nesting success
- Provide flood damage reduction on ag lands both surrounding and downstream
- Enhanced waterfowl, fish and wildlife habitat
- Reduction in riverbank erosion and bank sloughing on the Roseau River

PROJECT STATUS

- Final Engineer's Report Complete
- Operation & Maintenance Plan being developed
- COE Concurrence Points (CP) 1 & 2 have been approved. CP 3 has been submitted.
- Environmental Assessment Worksheet is being completed.



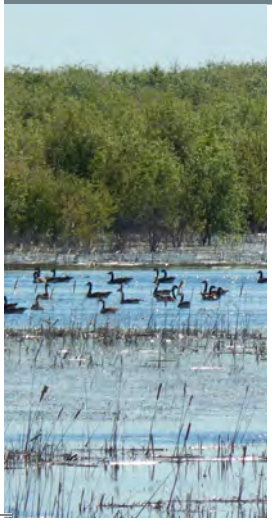
LOST RIVER STATE FOREST



On June 17, 2019, Specialist McCormack presented 244-FH Peatland Restoration Lost River State Forest project to the LCCMR Committee for grant funding. The purpose of this project is to develop a comprehensive plan for restoration of peatlands. The plan will outline ways to ease impacts on infrastructure and land downstream.

Watershed Restoration and Protection Strategy (WRAPS)

Roseau River Watershed District



Watershed Open House!

When: Thursday, Feb. 25
Come any time:
3:30pm - 5:30pm

Where: Roseau Civic Center
121 Center St E
Roseau, MN 56751

Overview: The Roseau River Watershed District (RRWD) and Minnesota Pollution Control Agency are hosting an open house to present the Watershed Restoration and Protection Strategy (WRAPS) project for the RRWD. We hope to gather your input to help us evaluate what's best for the watershed and how best to communicate the WRAPS project over the next few years.

c/o HDR
701 Xenia Ave S
Suite 600
Minneapolis, MN 55416

Watershed Open House Announcement!

Roseau Lake Rehabilitation Project

The Roseau Lake Rehabilitation project is a Natural Resource Enhancement (NRE) / Flood Damage Reduction (FDR) water management project located about 6 miles northwest of the City of Roseau. This is a joint project of the Roseau River Watershed District (RRWD) and Minnesota Department of Natural Resources (MN DNR) with the purpose of improving habitat conditions in the Roseau Lake and the Roseau River and to manage the available storage capacity of the lake basin to reduce flood damages near and downstream of the lake basin.

In 2011 the RRWD and the MN DNR hosted three meetings with landowners in the Roseau Lake area, or the Lake Bottom, as it is locally known. The purpose of these meetings was to gather information on landowner problems and concerns and get their input on possible solutions. The RRWD and DNR gained a lot of insight into the need for the project from these meetings.

The RRWD Board of Managers initiated a Project Team in 2014 which met on a regular basis for over 4 years. A Project Team is a group of landowners, regulatory agency staff, local government officials, and other interested parties that develop a Purpose and Need Statement for the project, various alternative to meet the criteria of the Purpose and Need Statement, and choose a preferred alternative. The project team is also involved in the drafting of the Operation and Maintenance Plan for the project. Basing the direction of the project on the information received in 2011 the Project Team recommended, and the RRWD Board concurred with, choosing the alternative known as Alternative 2A'.

This newsletter provides the current status of the project, what the Alternative 2A' looks like and hopefully provides answers to some questions that we've been asked about the project.

Frequently Asked Questions

How much water will be stored in the lake for wildlife management? The operating plan for the project hasn't been developed yet. However, the DNR has recommended that the state should manage water levels during spring and summer up to the 1028.0 elevation to manage for shallow marsh habitat for ducks and other waterbirds. At 1028.0 elevation, 1655 acre-feet or 8% of the project's gated storage north of the river would be used. In the fall, the desired elevation is somewhat higher (1030-1031 elevation) to provide for a bigger area to hold and hunt waterfowl. At 1031.0 elevation, 10,020 acre-feet of storage, or 47% of the project's gated storage north of the river would be used.

How much of the spring flood storage of the basin north of the river would be available? All of it. Water will be metered out of the basin in late fall each year to provide for spring flood storage. At 1034.0 elevation (the proposed managed level of gated storage), the basin will hold 21,090 acre-feet of water.

How will the project be operated? Under the preferred alternative for the project (designated 2A'), the stage of river in a given flood event will be raised such that more of the river's water is forced downstream than currently is the case. Then, once a "trigger" elevation of flooding is attained at the Ross gauge, water would be allowed to flood the basin to reduce the downstream flood peak. Water will be held in the basin to allow water from adjacent lands to more efficiently drain. Once the river has receded, water will be metered out of the basin back into the river in preparation for the next event. All project operating procedures will be outlined in an operations plan.

Why do this project? Isn't the flooding problem caused by sources upstream of Roseau? Why not spend the money for a project there? This project will not solve all of the flooding problems in the watershed. But it has the potential to significantly reduce the impact of flooding near and downstream of Roseau Lake for the smaller, more frequent floods. The RRWD and other project partners are seeking additional opportunities in the Roseau River watershed to reduce downstream flooding.

What else is being done to reduce flood damages on the Roseau River? There are a number of projects that are operational, under construction, or in the planning stages. They are: (1) Palmville WMA (operational): This project acts to slow the rate of discharge of waters from the fen and enhance the natural functions of the fen. (2) Norland/Hay Creek (operational): This project moderates flood water contributions to the Roseau River via temporary storage in impoundments. (3) Whitney Lake (planning): The goal of the project will be to moderate flooding in the western reaches of the Roseau River via improved timing of storage in impoundments and other measures. (4) Roseau River WMA—Pool 3 Outlet (operational): (a) Drawdown management in 2 pools provides spring flood storage and (b) improve timing of discharges from the pools to reduce flood peaks on the western reaches of the river.

How will the project reduce flooding downstream of the basin? The peak of flooding on the river and the duration of time that water is on the land will be reduced by the project for more frequent (<10 year) events. This will be accomplished by forcing water past the lake basin early in a flood event followed by storing water in the basin once the river downstream of the lake is predicted to go above a specified level (i.e. a "trigger" elevation). Once the flood peak has passed downstream of the lake, the water stored in the lake will be metered out at a rate that will not cause flooding downstream. Basin water levels will be returned to pre-flood levels in anticipation of the next event.

How will the project reduce flooding between Highways 89 and 310? Early in a given flood event, additional water (as compared to the present condition) will be forced downstream. Once a "trigger" elevation is attained at the Ross gauge, flow will be directed into the lake north of the river. After the flood peak passes downstream and water has receded from private lands located near the river that lie between Highways 89 and 310, releases of water out of the basin will commence. As flood waters recede, the operating plan will give priority to drainage off of private lands (as opposed to the public lands north of the river) to make storage available for the next flood event. Efficiency of drainage by exterior dikes and of lands contained within the floodway will be given attention in project planning.

Will this project be effective in reducing the effects of the big (>25-year event) floods? For the larger floods, the project will not make conditions worse than they are now, but damage from such floods will not be decreased by the project. The amount of land and infrastructure needed to reduce damages for the larger floods would be cost-prohibitive. The footprint of the project would take in a lot of private land, which would likely be unacceptable. The project work team has several farmers as members. They indicated that if the project helped farmers manage their lands better for the more frequent floods (i.e. < 10 years), this would be helpful.

continued on next page

Frequently Asked Questions (continued)

What will the fishing be like on the river after the project is built? The project will restore low-to-moderate flows to the oxbow, which starts at the Mikkelson Bridge and re-enters the channelized river near the outlet of the old lakebed. This will improve fish habitat along that stretch as well as moderate velocities downstream of the project under low-to-moderate river flows, thus improving conditions for fish along that stretch of river. In addition, opportunities for additional access both for boats and for river bank fishing will be explored in the vicinity of Roseau Lake.

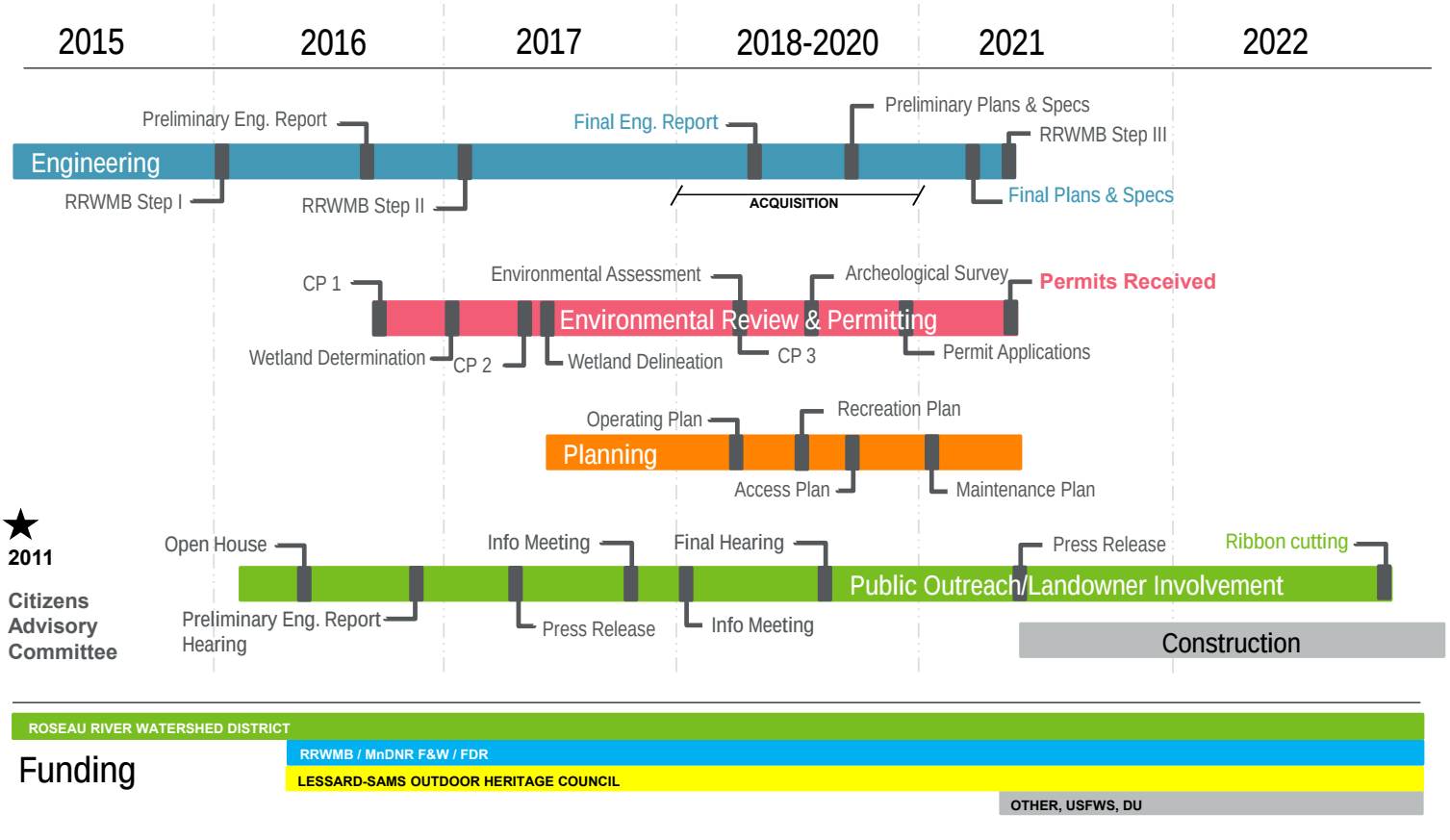
Who is in charge of building and operating this project? How much will it cost to build the project? The Roseau River Watershed District and Minnesota DNR will share responsibility for constructing and operating the project. The cost of building the project is approximately $15million for the alternative chosen.

What will happen to the lake bottom road? The road will have a lift placed on it such that the top of the road will be the same elevation as the top of the dikes (i.e., 1036.0 feet). Part of the road (just north of the Stoe Bridge) will actually be part of the dike system. Concrete culverts of sufficient size will be placed to allow water to pass under the road rather than have to flow over the road when the lake floods.

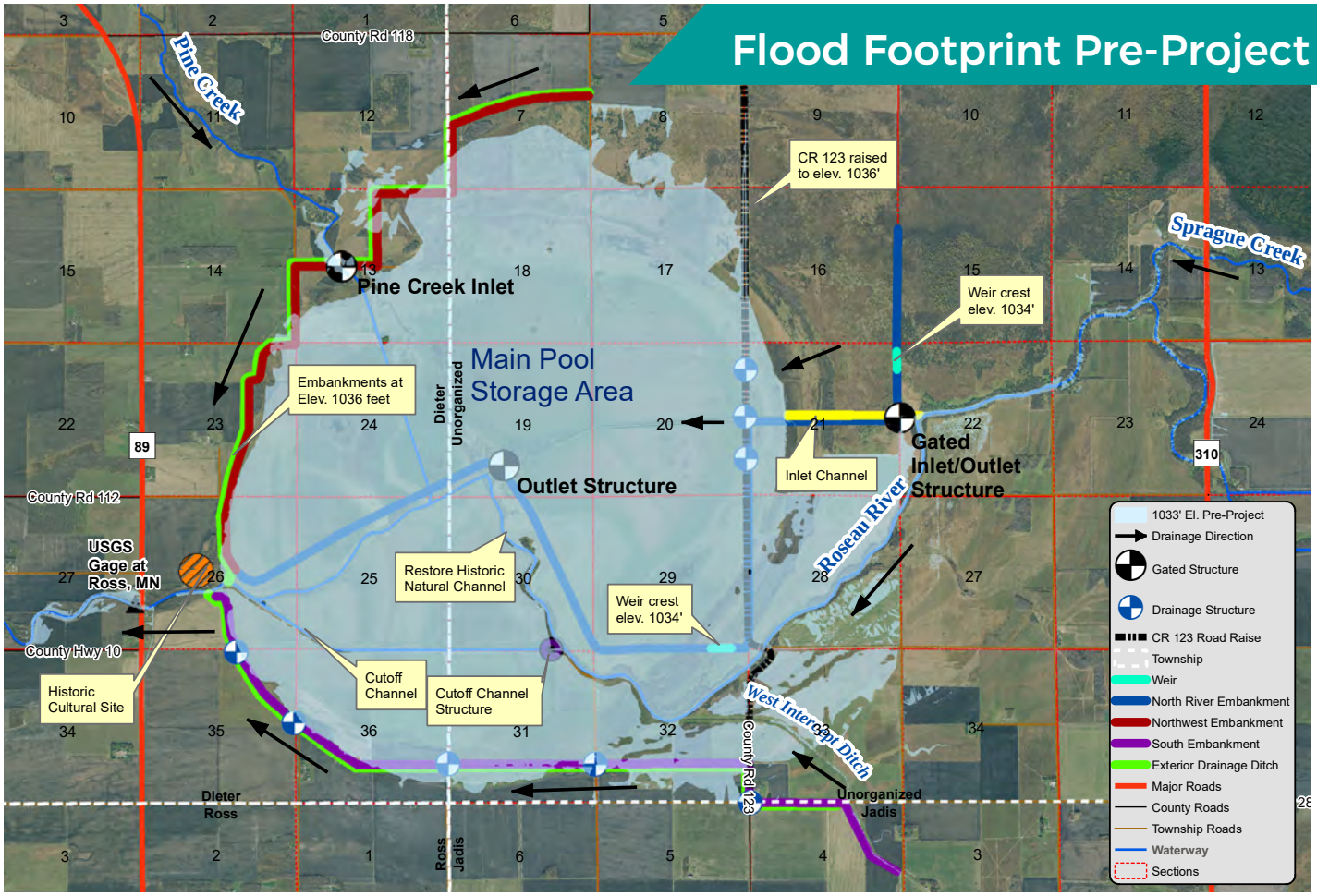
Will my property taxes go up to pay for this project? No. This project will be funded using State bonding (Flood Hazard Mitigation Bond), regional (Red River Watershed Management Board), State Legacy Amendment funds (Lessards Sams Outdoor Heritage Council), and local constructions which are currently included in the Roseau River Watershed District levies. The project partners will also pursue other funding as the project progresses and opportunities become available.

Why isn't the project building the dikes higher to store more water? The proposed dike elevations (top = 1036' and weir = 1034') balance natural resource enhancements (NRE) and flood damage reduction (FDR) against cost. Building dikes above the heights proposed brings no added value for NRE or FDR. Roseau Lake's existing condition provides storage, and storage volume will not be increased by the project. The project changes the timing of when Roseau Lake floods by restricting early flood water from entering Roseau Lake, thus allowing for storage later on in a flood. This restriction of flow into Roseau Lake delays the storage for frequent flow events (e.g., 2- 5-, or 10 year events), thereby increasing downstream water levels during the early stages of a flood. The change in storage timing will result in reduced overall downstream water levels and flood durations later on in a flood. The project will be most effective for the more frequent floods. A higher dike would force even more water downstream early in a flood, but a higher dike would not increase flood storage in the basin and would come at a much higher cost.

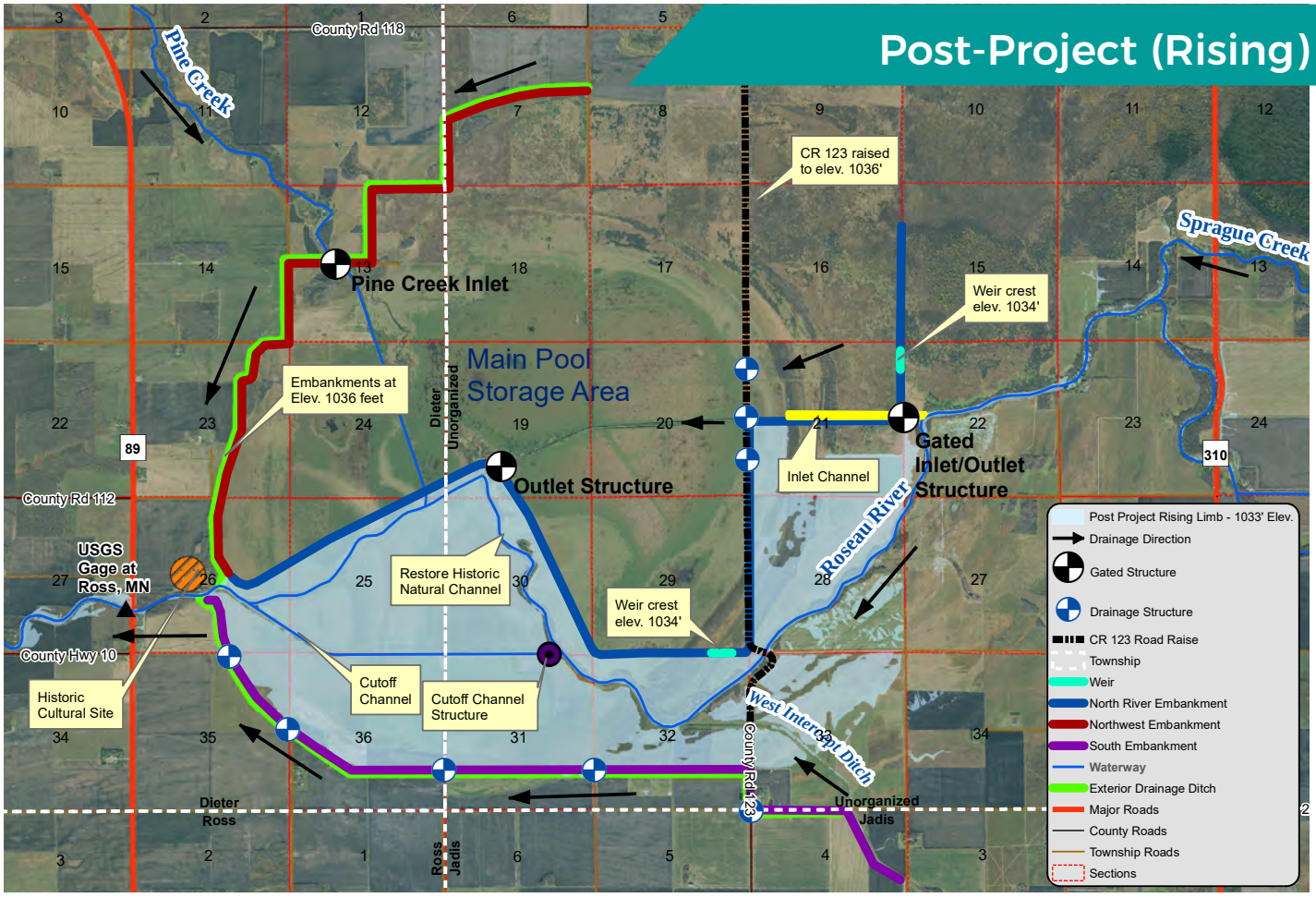
Timeline



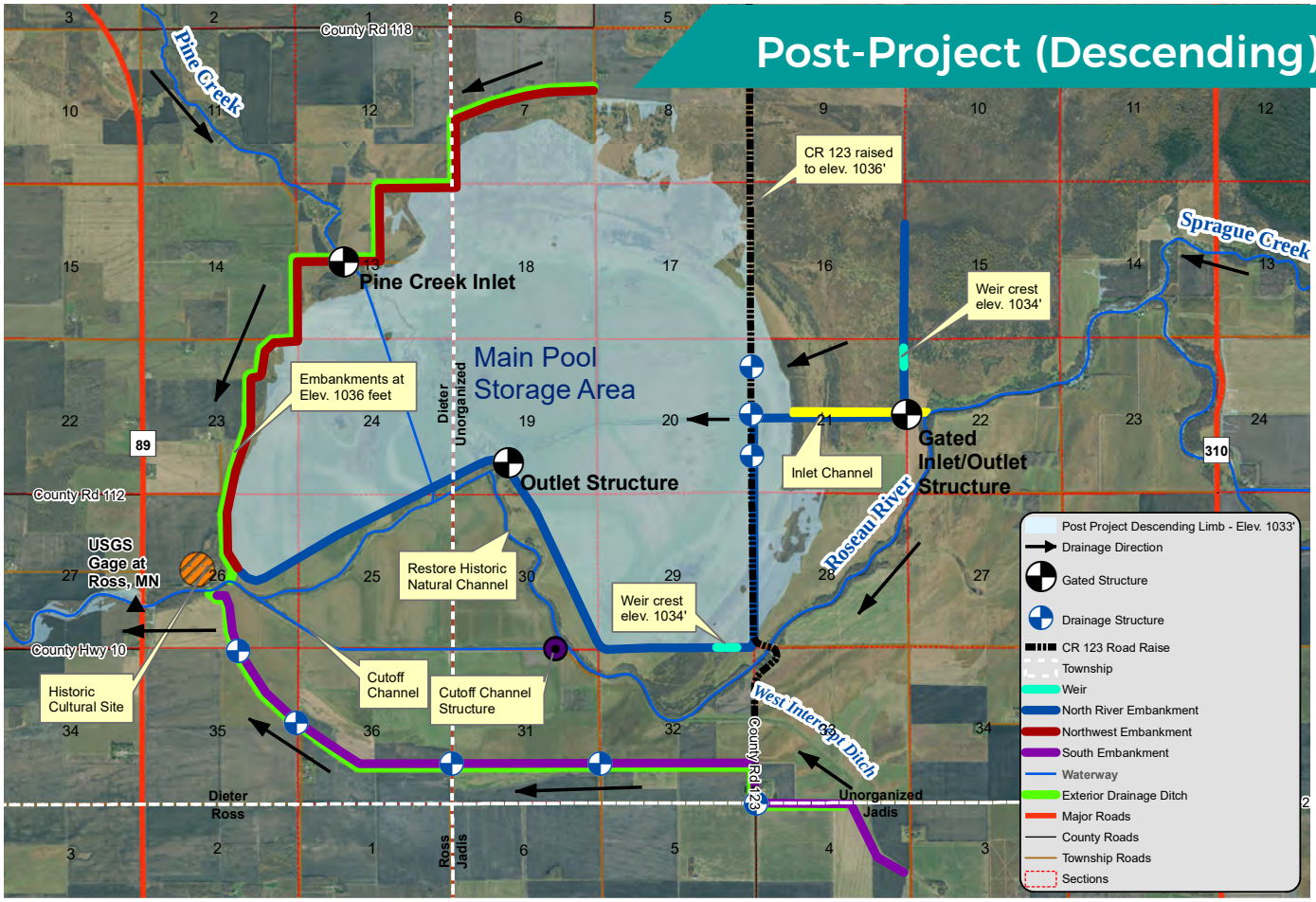
Flood Footprint Pre-Project



Post-Project (Rising)

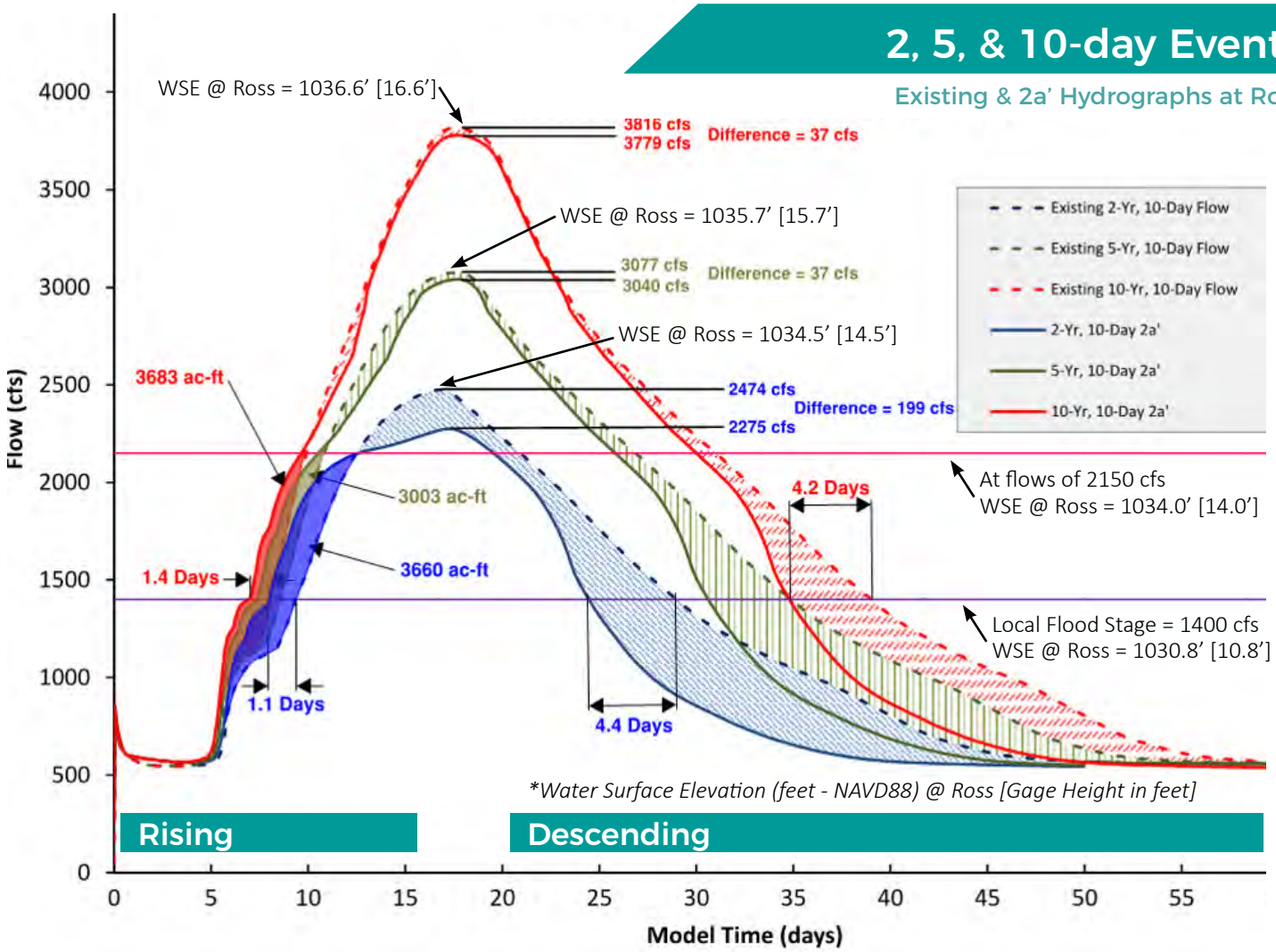


Post-Project (Descending)



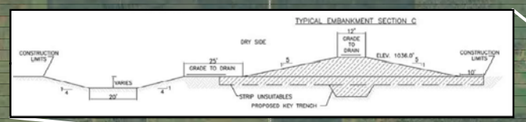
2, 5, & 10-day Events

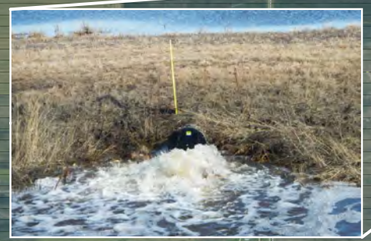
Existing & 2a' Hydrographs at Ross

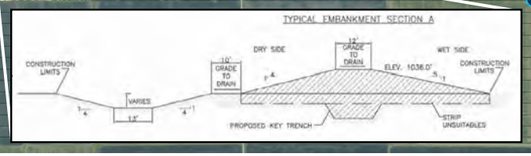


**Water Surface Elevation (feet - NAVD88) @ Ross [Gage Height in feet]*

Roseau Lake Rehabilitation Project







Embankments at Elev. 1036 feet

Pine Creek Inlet Structure

Pine Creek Restoration

Main Pool Storage Area

Dieter Unorganized

Outlet Structure

Weir crest elev. 1034'

Inlet Channel

Gated Inlet/Outlet Structure

Historic Cultural Site

USGS Gage at Ross, MN

Restore Historic Natural Channel

Roseau River

CR 123 raised to elev. 1036'

Cutoff Channel

Drainage Structures

Cutoff Channel Structure

Weir crest elev. 1034'

West Interceptor Ditch

Dieter Ross

Ross Jadis

Unorganized Jadis

Legend

- Gated Structure
- Drainage Structure
- Township
- Weir
- Inlet Channel
- North River Embankment
- Northwest Embankment
- South Embankment
- Northwest Embankment Drainage
- South Embankment Drainage
- USGS Gage Station
- Historic Channel Restoration
- Waterway
- Sections

We want to hear from you!

1.) Complete this form

2.) Take a picture of the form and text it to: 218-242-1737

**standard text message rates may apply*

QUESTIONS OR COMMENTS?

RoseauRiverWD.com

RRWD@mncable.net

(218) 463-0313

☐ I **would like more info about** the Roseau Lake Project

Name: _____

Email: _____

Phone: _____

RRWD
ROSEAU RIVER WATERSHED DISTRICT

Roseau River WD
108 3rd Ave SW
Roseau, MN 56751

WHAT'S INSIDE?

(218) 463-0313

RRWD@mncable.net

RoseauRiverWD.com

Contact us if you'd like to be added or removed from our mailing list.

Cover Crops

Cover Crops

Cover crops are herbaceous plants grown alongside annual cash crops to provide seasonal soil cover on cropland when the soil would otherwise be bare.

Cover crops can provide multiple benefits depending on their intended use. A cover crop can be used to provide soil cover during the non-growing season, uptake nutrients after a cash crop has been harvested, outcompete common weeds, or increase soil fertility by increasing soil organic matter and available nitrogen.

A wide variety of grasses (millet, oats, rye, wheat, etc.), broadleaf plants (buckwheat, flax), brassicas (mustards, canola, turnips, etc.), and legumes (clover, peas, alfalfa, etc.) can be used as beneficial cover crops.

References
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/climatechange/?cid=stelprdb1077238

https://bbe.umn.edu/sites/bbe.umn.edu/files/agricultural-best-management-practices-handbook-for-minnesota-second-edition.pdf

https://extension.umn.edu/cover-crops-minnesota/cover-crop-options

http://mccc.msu.edu/

Benefits of Cover Crops

- Reduced erosion due to protective cover of the soil surface.
- Improved physical and biological soil health from increased soil organic matter and nutrient additions (from certain cover crops).
- Reduced numbers of weeds and certain crop pests.

Installation Considerations

- Additional expense (seed) and labor (planting) may be incurred when using a cover crop; however, expenses can be offset as a result of increased productivity and decreased use of herbicides and fertilizers.
- Planting times for cover crops vary depending on the chosen crop.
- Mixtures of two or more cover crop species will provide more benefit than a single species.
- The short growing season in Minnesota—paired with the use of full season corn and soybean—creates obstacles for adequately establishing certain cover crops.
- There have been isolated reports of corn yield reductions with certain cover crops. Consult your local watershed district for cover crop recommendations.
- If the cover crop is grazed or harvested for grain or seed, it may be considered a double crop for insurance purposes.

Maintenance

Depending on the reason for use of a cover crop, the crop may need to be terminated before the cash crop is planted.

CLEAN WATER LAND & LEGACY AMENDMENT

For More Information Please Contact

Roseau River Watershed District
714 6th Street Southwest
Roseau, MN 56751

(218) 463-0313

www.roseauriverwd.com

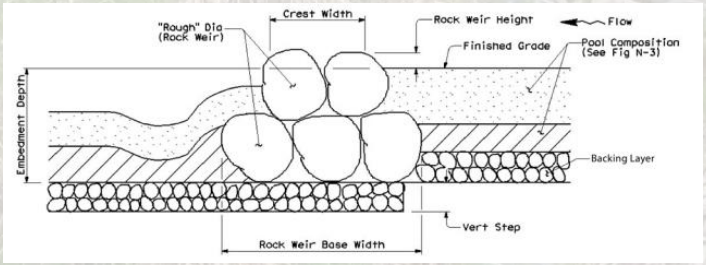
RRWD ROSEAU RIVER WATERSHED DISTRICT

Grade Control Structure

Grade Control Structure

A Grade Control Structure is built within a natural or man-made channel, stream, grassed waterway, or gully to reduce channel bed erosion. Grade control structures are used at sites where the flow velocity or the concentration of water in a channel requires a structure to stabilize the grade or to prevent headwater cutting (erosion) from continuing upstream. These structures control stream flow passage through a sudden drop in elevation from one stable grade to another.

There are a wide variety of Grade Control Structures with high variability in designs and expense. Consult your local watershed district personnel for design/engineering support.



References
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_044354

Benefits of Installing a Grade Control Structure

- Increased grade stability and erosion control within natural or artificial channels.
- Decreased channel headwater cutting and bed erosion by lowering channel elevation in a controlled manner.
- Managed water flow for non-erosion benefits including fish passage, water table control, and reduced turbidity.
- Improved water quality by reducing the amount of sediment delivered downstream.

Installation Considerations

- Endangered Species Act considerations or special permits/easements may be required.
- Adequate conservation practices should be installed above the structure to prevent sedimentation.

Maintenance

- Maintain good vegetative cover on all slopes and water courses near and upstream of the grade control structure
- Remove debris accumulation at the structure and immediately upstream or downstream.
- Keep burrowing animals off earthen grade control structures.

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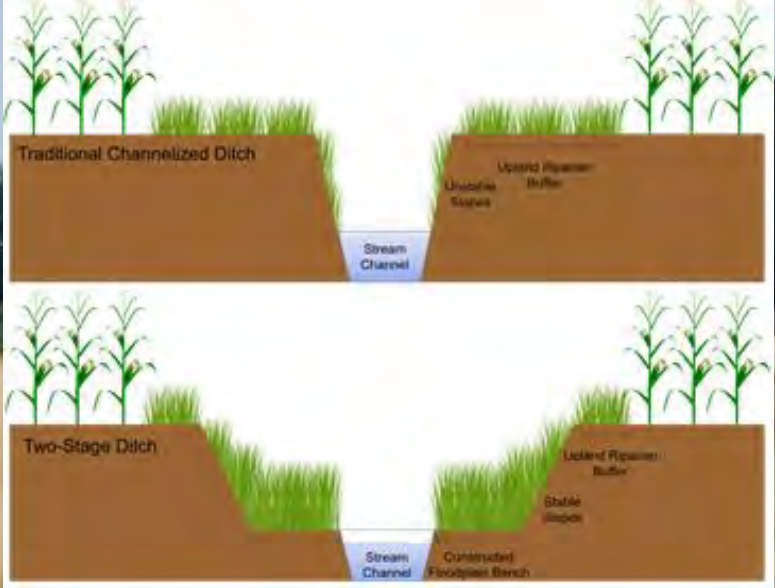
Two-Stage Ditch



Two-Stage Ditch

A two-stage ditch is a design modification to a conventional channelized ditch where one or more benches are established within the ditch. A two-stage ditch provides a low-flow inner channel and a vegetated bench that only floods during higher flows. The vegetation slows water flow, providing an opportunity for sediments and other heavier material to settle.

References

https://agbmps.osu.edu/bmp/open-channeltwo-stage-ditch-nrcs-582

Benefits of Installing a Two-Stage Ditch

- Reduced wetness in fields with subsurface drainage, where outlets are frequently under water.
- Increased bank stability and reduced maintenance cost over conventional ditches.
- Reduced downstream export of nutrients and sediment.
- Improved plant-soil-water interactions in ditches, increasing nutrient cycling.

Installation Considerations

- Two-stage ditches are best suited to ditches with a grade of less than 2%, and fields that are fairly flat (less than 0.5% slope) with subsurface drainage installed. They can be implemented on fields with greater slope, but grade-control structures might be required.
- Existing ditches that experience bank erosion or are currently undersized would benefit from conversion to a two-stage design.
- They are appropriate for sites where good aquatic habitat is already present or desired.
- Two-stage ditches may impact existing grass buffer contract(s). Consult your local watershed district prior to construction.

Maintenance

Once constructed, a two-stage ditch is relatively self-sustaining. Periodic mowing or removal of woody vegetation might be required.

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