PENNINGTON COUNTY

2010-2020 COMPREHENSIVE LOCAL WATER MANAGEMENT PLAN

PREPARED BY:

PENNINGTON SOIL & WATER CONSERVATION DISTRICT

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Frequently Used Abbreviations (Acronyms)

BMPs	Best Management Practices
BWSR	Board of Water and Soil Resources
CLWP	Comprehensive Local Water Plan
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWI	County Well Index
DNR	Minnesota Department of Natural Resources
DWSMA	Drinking Water Supply Management Area
EQIP	Environmental Quality Incentive Program
FEMA	Federal Emergency Management Administration
FSA	Farm Service Agency
GIS	Geographic Information System
LUG	Local Units of Government
LWMP	Local Water Management Plan
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MPCA	Minnesota Pollution Control Agency
NRCS	Natural Resources Conservation District
RIM	Re-Invest in Minnesota
RLWD	Red Lake Watershed District
SSTS	Subsurface Sewage Treatment System
STORET	MPCA Storage and Retrieval
SWAT	Soil and Water Assessment Tool
SWCD	Pennington Soil and Water Conservation District
SWP	Source Water Protection
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
TMDL	Total Maximum Daily Load
USGS	United States Geologic Survey
WCA	Wetland Conservation Act

WHIP Wildlife Habitat Incentives Program

WHP Wellhead Protection

WMA Wildlife Management Area

WRAC Water Resources Advisory Committee

Pennington County
Water Resources Advisory Committee

Charles Naplin	Pennington County Board of Commissioners
Don Barron	Member at Large
Hank Hallstrom	Resident
Ron Kalinoski	Resident
Ray Olson	Pennington Soil & Water Conservation District
Tom Wold	Township Association.
Kathy Fillmore	Natural Resources Conservation Service
Mike Flaagan	Pennington County Highway Department
Corey Hanson	Red Lake Watershed District
Garry Bennett	MN Department of Natural Resources-Waters
Bryan Malone	Pennington Soil & Water Conservation District
Howard Person	University of Minnesota Extension Service
Arlo Rude	Thief River Falls Public Utilities
Jim Courneya	Minnesota Pollution Control Agency
Chad Severts	Board of Water & Soil Resources
Rachelle Winter	Water Plan Coordinator

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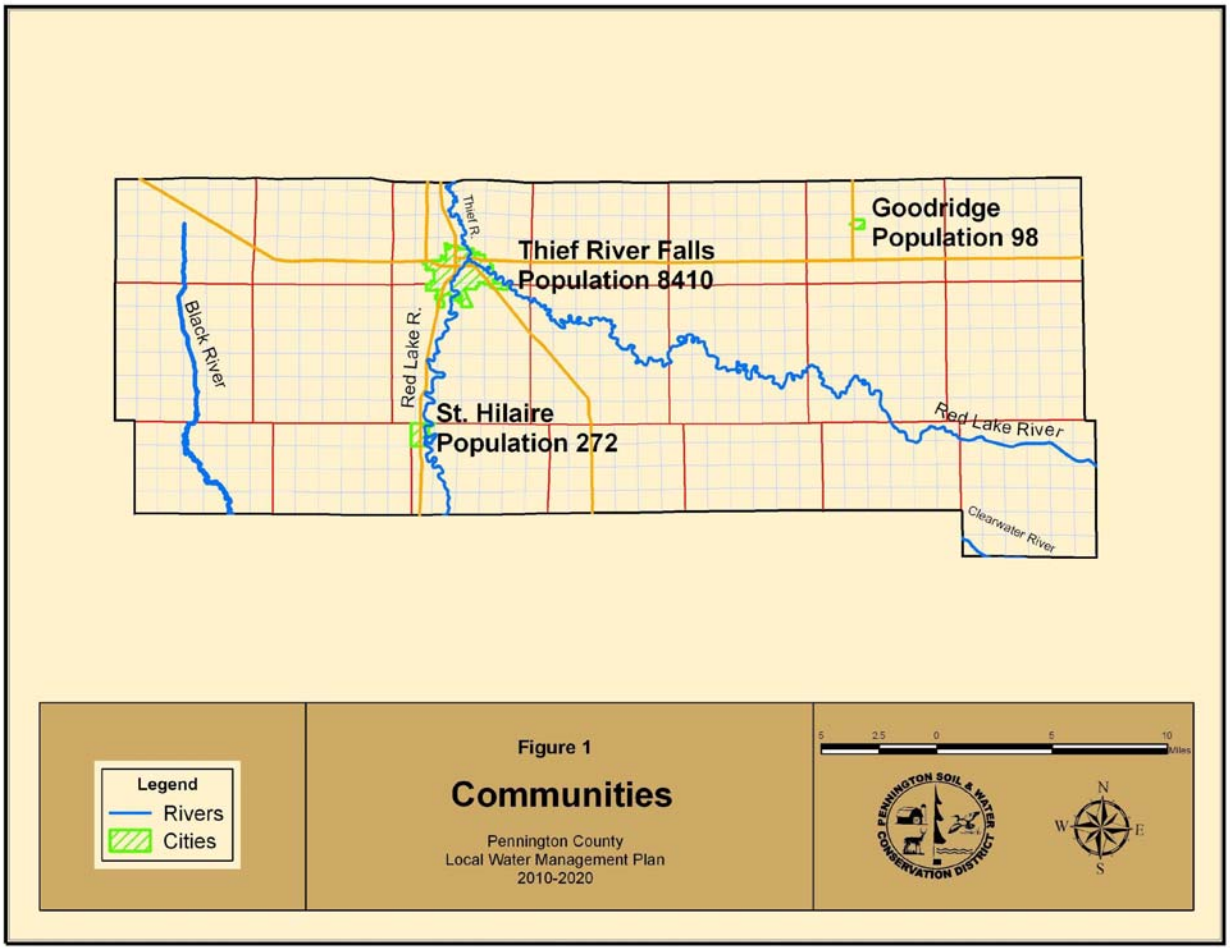
Executive Summary

Introduction

Pennington County is situated among the prairies and farmland of northwestern Minnesota. According to the 2000 Census the county has a population of approximately 13,600 with an expected increase of 0.9%. The city of Thief River Falls sits as the county seat in the northwestern portion of the county. It is the largest community in the county with a population of about 9,000. Other communities within the county include Goodridge and St. Hilaire. See Figure 1 below.



Pennington County lies within the Red River of the North Basin Watershed. It is comprised of 395,617.5 acres. The remnants of Glacial Lake Agassiz, which covered the land approximately 15,000 years ago, provide fertile soils which are ideal for agriculture. Agriculture makes up 78.5% of the land use in the county. Other land uses within the county include: 0.9% urban and industrial, 1.02% farmstead and rural residents, 5.6%, grassland, 2.3% grass-deciduous tree/shrub complex, 7.8% deciduous forest, <0.1 coniferous forest, 1.3% wetlands, and 2.5% other. Figure 3, pg 14

Watersheds in Pennington County

Pennington County is comprised of 5 watersheds. They include the Thief River, Red Lake River, Snake River, Grand Marais Creek, and Clearwater River Watersheds. Figure 4. All five watersheds are part of the larger Red River of the North Basin Watershed.

Red Lake River Watershed

This watershed covers the vast majority of the county; 72.1 % of the 844,147.8 acre watershed is within the county. The Red Lake River, which originates at the dam of the Lower Red Lake outlet, flows in a westerly direction through the Red Lake Nation, Pennington County, Red Lake County and Polk County for approximately 196 river miles until its confluence with the Red River of the North at East Grand Forks. The Red Lake River has two main tributaries, the Thief River and Clearwater River. Numerous other streams, rivers and drainages contribute to this watershed.

The Red Lake River is very important for recreation, wildlife habitat and drinking water. It is a drinking water source for the cities of Thief River Falls, East Grand Forks and Grand Forks. In Thief River Falls the municipal dam on the Red Lake River creates a reservoir of 135 acres. The reservoir is used by the city for water supply and hydropower generation.

Development in the County within this watershed is primarily within the cities of Thief River Falls and St. Hilaire. Shoreland development is rather heavy in and around these communities. Most of the land is privately owned. Figure 5. Rural land is intensively farmed for the production of soybeans and wheat. Some gravel mining is also being conducted along the Glacial Lake Agassiz beach ridge on the western portion of the county. Future developments in and around Thief River Falls will most likely take place with the continued success of Digi-Key Corporation and Arctic Cat Inc.

Recreational use of the land in this watershed is becoming more popular. Canoeing, tubing, boating, and fishing are very popular activities along the river. There are three state owned wildlife management areas (WMA); Jacksnipe, Higinbotham and Pembina which all offer activities for the outdoor enthusiasts such as birding and hiking. Figure 6. It also provides prime hunting opportunities for deer, geese, grouse and other game. Jacksnipe is located southeast of Thief River Falls and is approximately 203 acres. Higinbotham is 984 acres, located just west of St Hilaire. Pembina WMA is 4,097 acres; about half lies within western Pennington County, the other half is located in Polk County.

Thief River Watershed

The Thief River Watershed lies in the northeast and north central section of the county. The watershed has a total of 689,401 acres; 13.1 % is located in Pennington County. Most of the watershed is located within Marshall County, with some in the northern portion of Beltrami County. The Thief River begins at the outlet of Thief Lake in Marshall County where it flows south through Agassiz Pool located in the Agassiz Wildlife Refuge, and continues until it meets the Red Lake River in the city of Thief

River Falls. The quality of water on the Thief River has been listed on the 303(d) impairment list for Dissolved Oxygen and Turbidity from Agassiz Pool to its confluence with the Red Lake River.

The portion of the watershed located within Pennington County has one wildlife management area. Reiner WMA is 122 acres and is located in the north east section of the county. Land in this watershed is commonly farmed for soy beans and wheat. The population is sparse in rural areas, however in and around the city of Thief River Falls the population is heavily developed.

Clearwater Watershed

Clearwater Watershed is 887,096.2 acres; 9.5% is located in Pennington County along the southeast corner. The majority of the watershed is within Red Lake and Polk Counties. The area in the County which the watershed drains has only a few farmsteads. Land use is mostly agricultural including the production of wildrice. Oriniak is a small 312 acre wildlife management area found within this watershed.

Grand Marais Creek Watershed

Grand Marais Creek Watershed is a 383,436.1 acre watershed; only 3.2 % is within the County. This watershed lies mostly in the northwestern portion of Polk County and barely enters into the western portions of Pennington County. Land use throughout the watershed is primarily agriculture and is extensively drained.

Snake River Watersheds

Snake River Watershed is 501,919.7 acres; only 2.1% is located within the northwest corner of the County. Most of the watershed is in Marshall County; however a small section is also in Polk County. The northwest corner of the County which the watershed drains is sparsely populated with agricultural fields making up the majority of land use.

Administration of Local Water Management Plan

The responsibility of administrating and coordinating the implementation of the Comprehensive Local Water Plan (CLWP) is the responsibility of the Soil and Water Conservation District's Water Plan Coordinator. Guidance and direction is provided by the Water Resources Advisory Committee (WRAC). The WRAC is a group of individuals from local, state, and federal governments as well as local citizens and interest groups. The WRAC also helps to establish priority concerns, goals, and objectives of the plan, and oversees the implementation of the local plan and projects.

A summary of the accomplishments of the Pennington County Local Water Management Plan (CLWP) can be found in Appendix A.

Plan Purpose

The Pennington County Local Water Management Plan originates from a local desire to actively participate in the management of local water resources and from State legislation that identifies the County as a central figure in water resource management. The Comprehensive Local Water Management Act of 1985 (Minnesota Statutes, chapter 110B) allows counties the opportunity to work with the Minnesota Board of Water and Soil Resources (BWSR) in identifying water related problems and priorities which can be addressed through a set of locally based strategies and work plans. The County, upon approval of the Local Water Management Plan, is eligible to receive implementation funding from the state.

Pennington County completed its first CLWP in 1990. This plan established a direction which identified education, information development, ground water protection, surface water protection, solid waste control, erosion prevention, flood reduction, and improved land management as key issues. Funding from BWSR was combined with resources from Local Units of Government (LUGs), the Pennington Soil and Water Conservation District (SWCD), the Red Lake Watershed District (RLWD), and other agencies to implement a series of programs identified in the CLWP.

The implementation portion of the plan has been refined each year. The County has expanded its water resource management role since 1990 by accepting responsibility for shoreland management, feedlot program administration, Wetland Conservation Act (WCA) administration, floodplain administration and Subsurface Sewage Treatment Systems (SSTS) administration.

The CLWP has been updated twice since it was first completed; once in 1997 and again in 2002.

This is the fourth generation of local water planning in the County. We continue to actively work on past and current priority concerns and to identify future concerns so our water and related land resources are protected, managed and developed. The fourth generation plan focuses on the protection of water resources through education, the

promotion and implementation of Best Management Practices (BMPs) and coordination and cooperation with agencies. This will be accomplished through three main priority concerns for the next ten years.
The following guidelines will be met in this document:

1. The plan must cover the entire county
2. The plan must address problems in the context of watershed units and ground water systems.
3. The plan must be based upon principles of sound hydrological management of water, effective environmental protection and efficient management.
4. The plan must be consistent with local water management plans prepared by counties, watersheds districts and watershed management organizations wholly or partially within a single watershed unit or groundwater system.
5. The plan must cover a five or ten year period.

Description of Priority Concerns

Comment and public participation was requested from citizens of Pennington County. Those comments along with governmental agencies expressed their water resource concerns. The following priority concerns were developed from this process: Protection and Improvement of Surface Water Quality, Flood Damage Reduction, and Drinking Water Protection.

Priority Concern 1: **Protection and Improvement of Surface Water Quality**

Focus areas that will be addressed in this plan include the following; the reduction of sedimentation in the Thief and Red Lake River Watersheds with priority given to the minor watersheds supplying the Thief River Falls Reservoir; addressing surface water quality through the enforcement of existing regulations and programs and the establishment of new programs; and working with landowners and government entities to educate and assist landowners to install projects that improve or protect water quality.

Estimated Cost: $3,751,770.00 **Ψ**

Priority Concern 2: Flood Damage Reduction

The County is rather flat with the highest elevation being 1,186 feet above sea level and lowest elevation being 974 feet above sea level. This creates a slope that only ranges 0-2 %. Flooding is a common disaster which has the potential of causing numerous problems. It is a priority to focus on flood damage reduction by working with landowners and government entities and by maintaining adequate drainage systems.

Estimated Cost: $916,600.00 **Ψ**

Priority Concern 3: **Protect the County's Drinking Water Sources**

Focus will be given to the protection of the County's drinking water sources. Pennington County is unique in regards to our drinking water sources; utilizing both surface and ground water. The city of Thief River Falls depends on the municipal dam on the Red Lake River to provide their drinking water. Other communities in the County and rural citizens depend on private and public groundwater wells as their water source. It is a top priority to maintain a viable drinking source for public consumption. Protecting the drinking water for the majority of citizens within Pennington County is a wise and relatively inexpensive investment for the community's future.

Estimated Cost: $682,300 [Ψ]

[Ψ] The estimates for implementing these priorities can be found in the implementation schedule. The Natural Resources Block Grant (NRBG) is utilized to implement some of these programs however money is obtained from a variety of sources including state and federal cost-share, watershed funds, counties, cities, contribution agreements between government entities, grants etc. to get many of the new or expensive projects accomplished. Some of the actions in this plan will not get accomplished unless funds are found. It is important to note that these are rough estimates and are subject to change with the projects needs.

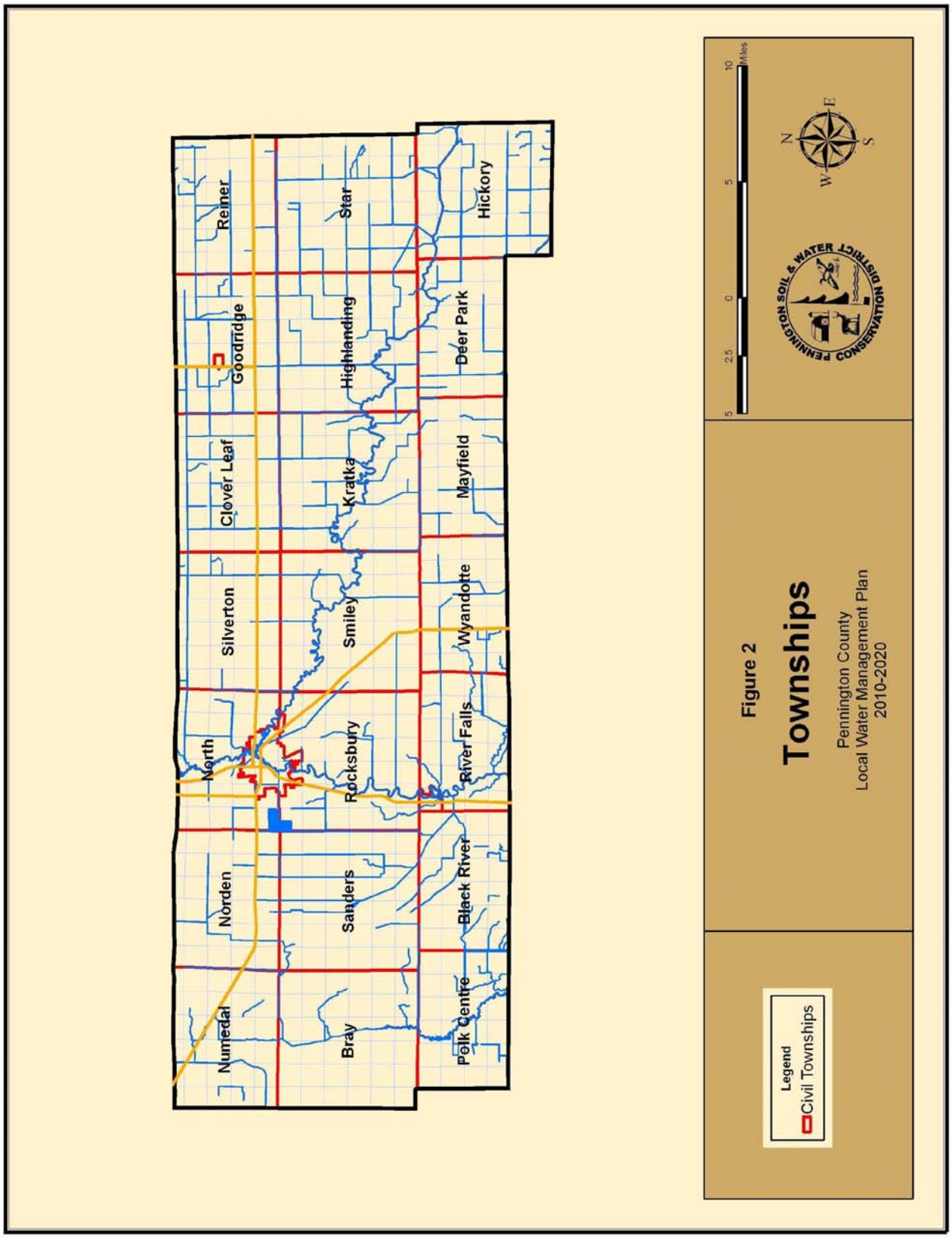
Consistency with other Plans

During the updating process many water management plans were reviewed. They included watershed districts plans, surrounding county water plans, Resource Conservation and Development (RC &D) plan, The Red River Basin Natural Resources Framework Plan, and miscellaneous regional, state, and national plans.

Plans were reviewed to ensure this plan would be consistent with other plans and projects, to avoid duplication of actions, regulations and permitting and to better coordinate with monitoring, data collection, and education. At this time, Pennington County's Local Water Plan is consistent with local, regional and state plans.

Recommended Amendments to Other Plans and Official Controls

There are no amendment recommendations to other plans and official controls at this time.


Reiner
Star
Hickory
Goodridge
Highlanding
Deer Park
Clover Leaf
Kratka
Mayfield
Silverton
Smiley
Wyandotte
North
Rocksbury
River Falls
Norden
Sanders
Black River
Numedal
Bray
Polk Centre
Legend
Civil Townships
Figure 2
Townships
Pennington County
Local Water Management Plan
2010-2020
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PENNINGTON SOIL & WATER CONSERVATION DISTRICT

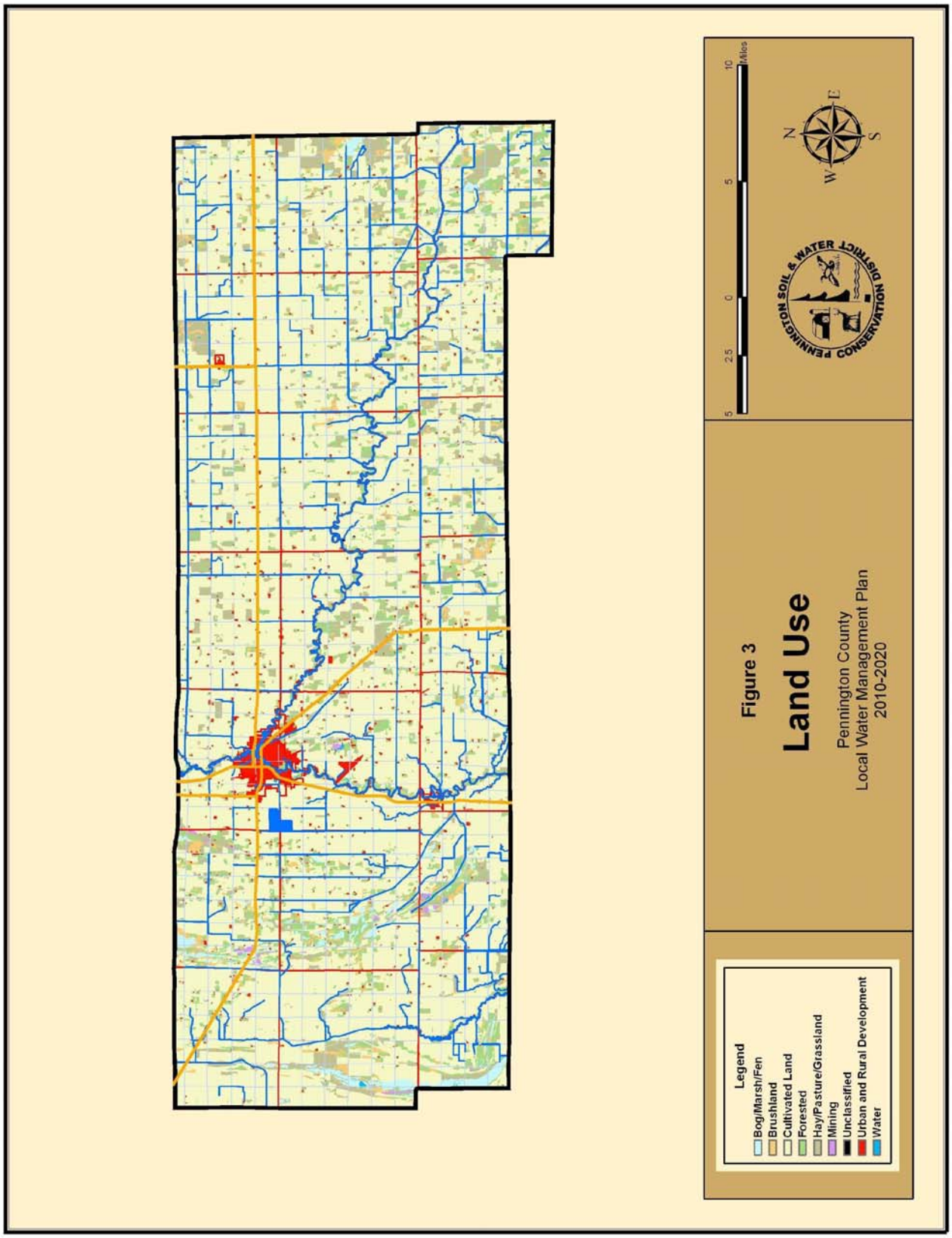
Figure 3
Land Use
Pennington County
Local Water Management Plan
2010-2020
Legend
Bog/Marsh/Fen
Brushland
Cultivated Land
Forested
Hay/Pasture/Grassland
Mining
Unclassified
Urban and Rural Development
Water
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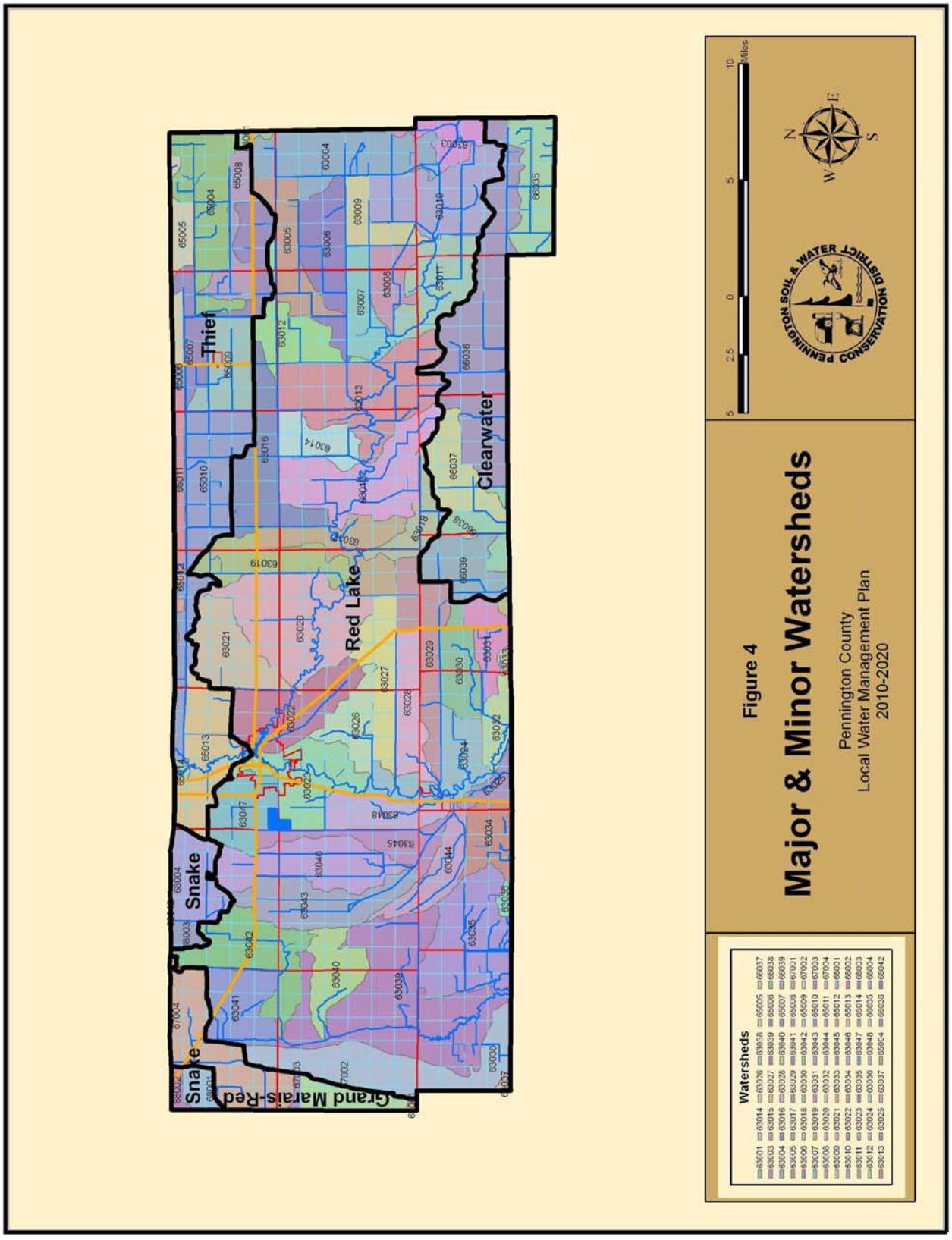
PENNINGTON SOIL & WATER CONSERVATION DISTRICT


Thief
Clearwater
Red Lake
Snake
Snake
Grand Marais-Red
Watersheds
Figure 4
Major & Minor Watersheds
Pennington County
Local Water Management Plan
2010-2020
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
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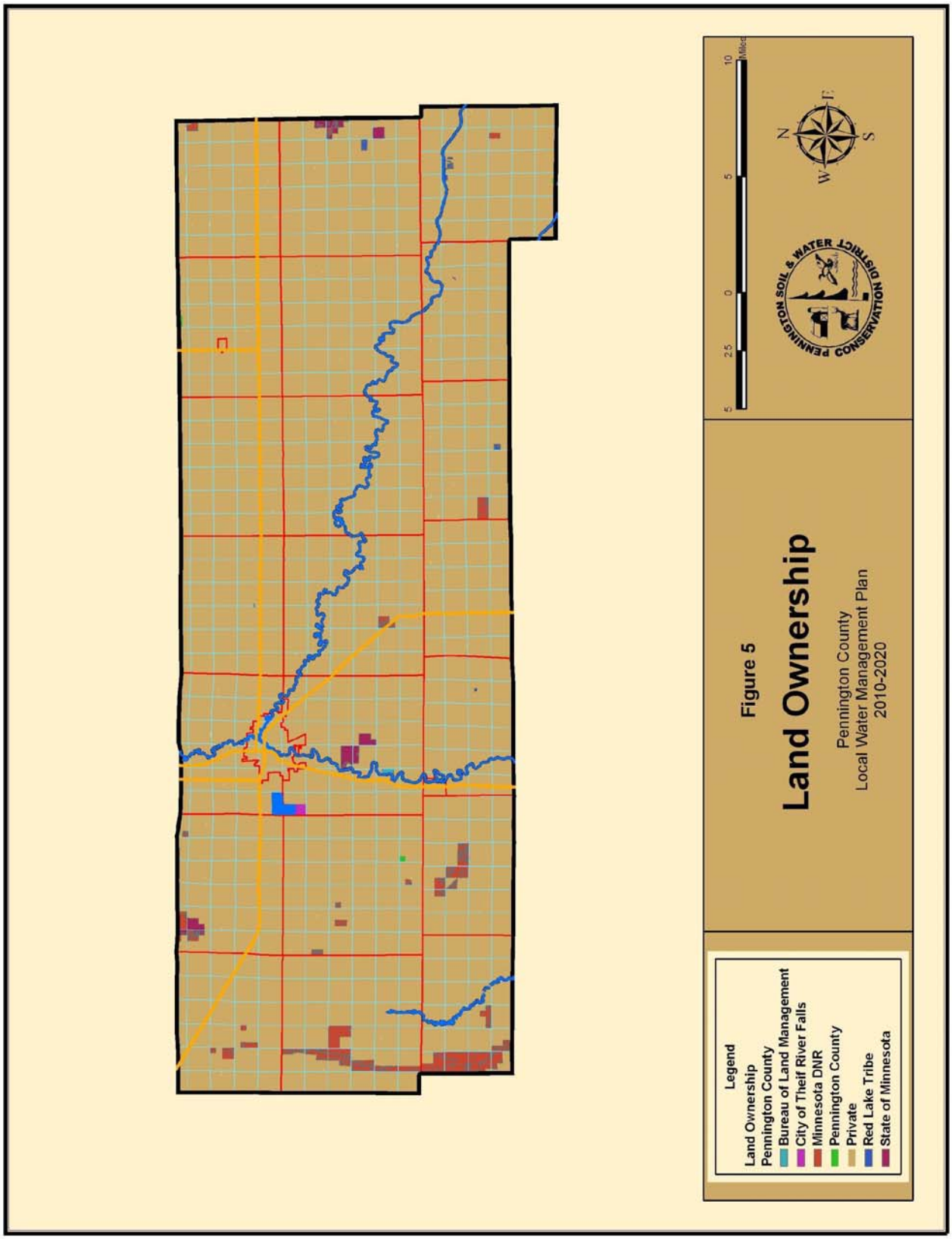
Legend
Land Ownership
Pennington County
Bureau of Land Management
City of Theif River Falls
Minnesota DNR
Pennington County
Private
Red Lake Tribe
State of Minnesota
Figure 5
Land Ownership
Pennington County
Local Water Management Plan
2010-2020
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
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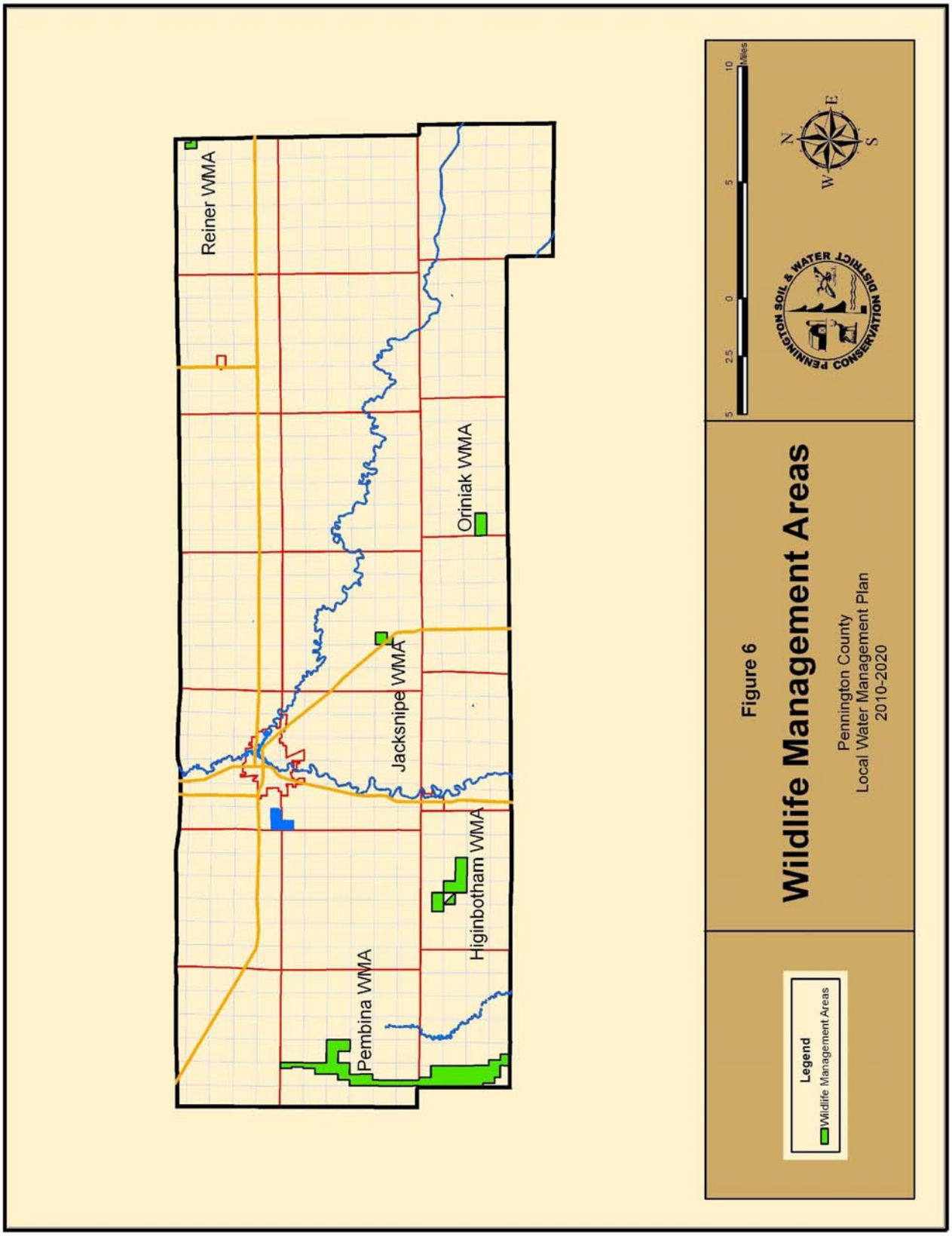
Reiner WMA
Oriniak WMA
Jacksnipe WMA
Higinbotham WMA
Pembina WMA
Legend
Wildlife Management Areas
Figure 6
Wildlife Management Areas
Pennington County
Local Water Management Plan
2010-2020
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
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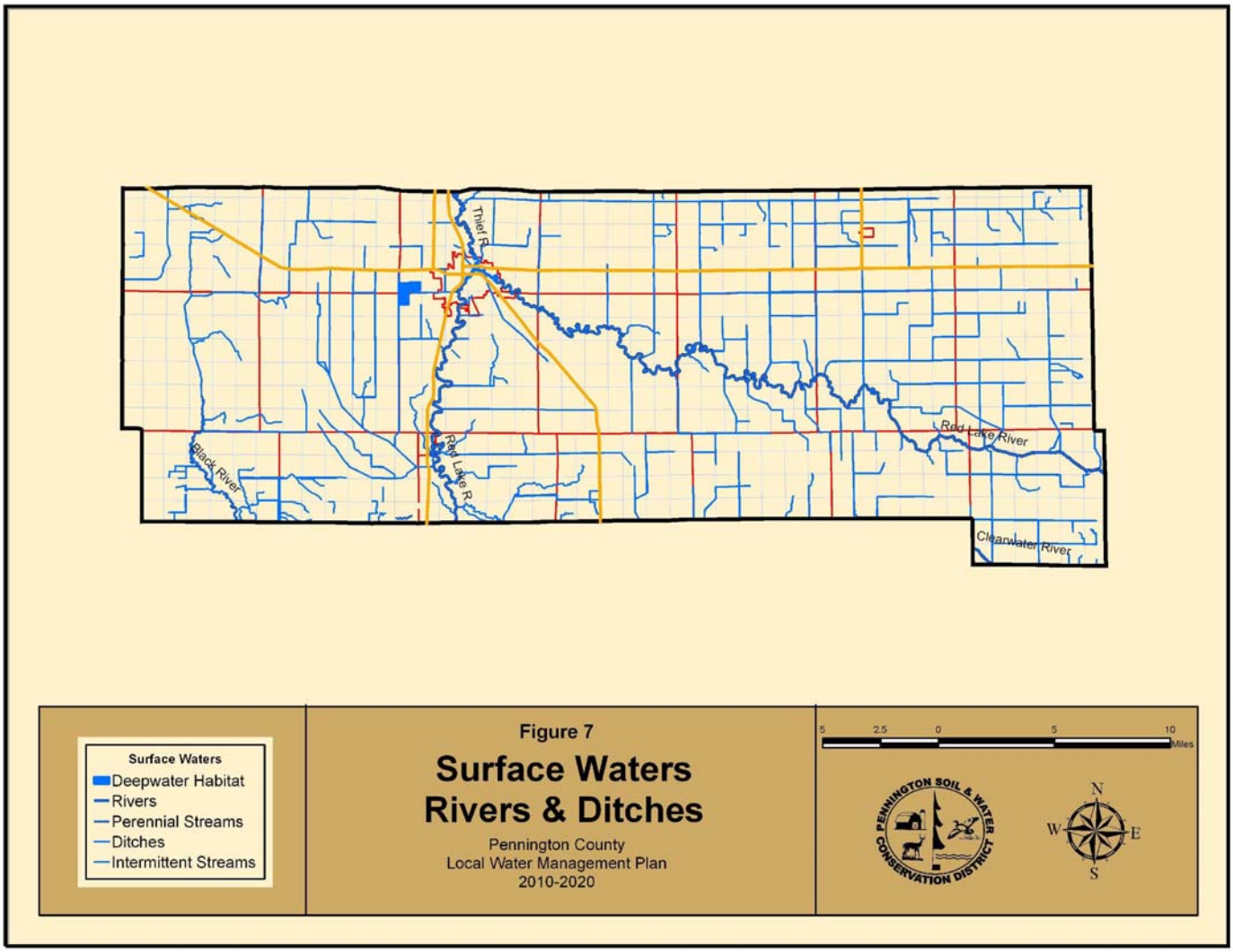
Miles

Assessment of Priority Concerns

Priority Concern 1: Protection and Improvement of Surface Water Quality

Pennington County's water resources may not be abundant; it is one of the few counties in the state with no lakes. However the rivers, ditches and wetlands that comprise the County's surface water are vital to the success of the area and it is a top priority for their protection and improvement. Uses of the County's surface waters include public water supply, irrigation, livestock, industrial, recreation and drainage. Rivers in the County include the Thief, Black, Red Lake and Clearwater. Figure 7, below. These rivers have reaches that have been channelized, are relatively "young" rivers and range in depth from 5-20 feet. The Thief, Black and Clearwater Rivers are all tributaries of the Red Lake River. There are also numerous miles of drainage ditches and wetlands that contribute to the county's surface water. Figure 8.



Red Lake River

The Red Lake River originates at the Lower Red Lake dam. The Corps of Engineers operates a dam located at the outlet of Lower Red Lake to control lake levels. It flows in a westerly direction through the Red Lake Nation, then Pennington, Red Lake and Polk Counties for approximately 196 river miles until its confluence with the Red River of the North at East Grand Forks.

The river begins as a slow, low gradient stream which flows through wetlands, bogs and agriculture land. The gradient of the channel and the riffles decrease as it moves west. Trees are sparse and small on the low grassy banks. Near Highlanding, the trees become larger and the river meanders through farmland. Stands of willow, elm and cottonwood are interspersed with open fields. Residential development is extensive along the banks as it enters and leaves Thief River Falls and St. Hilaire.

The Red Lake River is very important for recreation, wildlife habitat and drinking water. The municipal dam on the Red Lake River creates a reservoir of 135 acres. The reservoir is used by the city of Thief River Falls for a water supply and hydropower generation.

The quality of water on the Red Lake River has been listed on the 303(d) impairment list for mercury, low dissolved oxygen and high turbidity (>25 NTUs). Total Maximum Daily Load (TMDL) studies for the Red Lake River are planned to place during the lifespan of this plan, most likely by 2015. We plan to assist in the development implementation of these TMDL plans.

Thief River

The Thief River begins at the outlet of Thief Lake in the Thief Lake Wildlife Management Area, which is owned and operated by the Department of Natural Resources (DNR). It flows south through Agassiz Pool located in the USFWS Agassiz Wildlife Refuge, and continues until it meets the Red Lake River in the city of Thief River Falls; a 36 mile journey.

The quality of water on the Thief River has been listed on the 303(d) impairment list for mercury, high turbidity (>25 NTUs), and low dissolved oxygen (<5mg/l) from Agassiz Pool to its confluence with the Red Lake River. Total Maximum Daily Load studies for the Thief River are being geared up to begin, expecting to start in 2010.

Clearwater River

The river originates at the confluence of Lower Long Lake and an unnamed lake in northern Mahnomen County. It begins as a ditch and flows northwesterly for approximately 146 river miles and enters the Red Lake River in the City of Red Lake Falls. The Clearwater River passes through a portion of Mahnomen, Clearwater, Beltrami, Pennington, Polk, and Red Lake Counties. The majority of the Clearwater River lies within Clearwater and Red Lake counties. A small reach goes through less than two township sections in Hickory Township. The river travels through an area

dominated by forests in Clearwater County to an area dominated by agriculture.

The quality of water on the Clearwater River has been listed on the 303(d) impairment list for mercury, high fecal coliform, and low dissolved oxygen (<5mg/l). Total Maximum Daily Load studies for the Clearwater River are currently occurring with an expected completion date of 2010.

Black River

The Black River begins as small drainage in northwestern Pennington County. The portion within the County is mostly channelized. It begins its meandering journey to meet the Red Lake River west of Red Lake Falls.

The quality of water on the Black River has been listed on the 303(d) impairment list for High turbidity (>25 NTUs), and low dissolved oxygen (<5mg/l). Total Maximum Daily Load studies for the river will hopefully take place during the lifespan of this plan.

Drainages

The county has an extensive network of legal drainage ditches which began in 1911. Figure 8. Due to the flat topography, adequate drainage is imperative to economically sustain agriculture. These drainages serve as an outlet for private field ditches, they typically have low gradient and low velocities except during spring thaw and in high storm/rain events when significant and fast flow can be observed. Potential problems with the systems include sedimentation, erosion, and flooding. Increasing ditch capacity, maintaining and improving ditches using BMPs will help improve water quality by decreasing sediment and associated nutrients from entering the river.

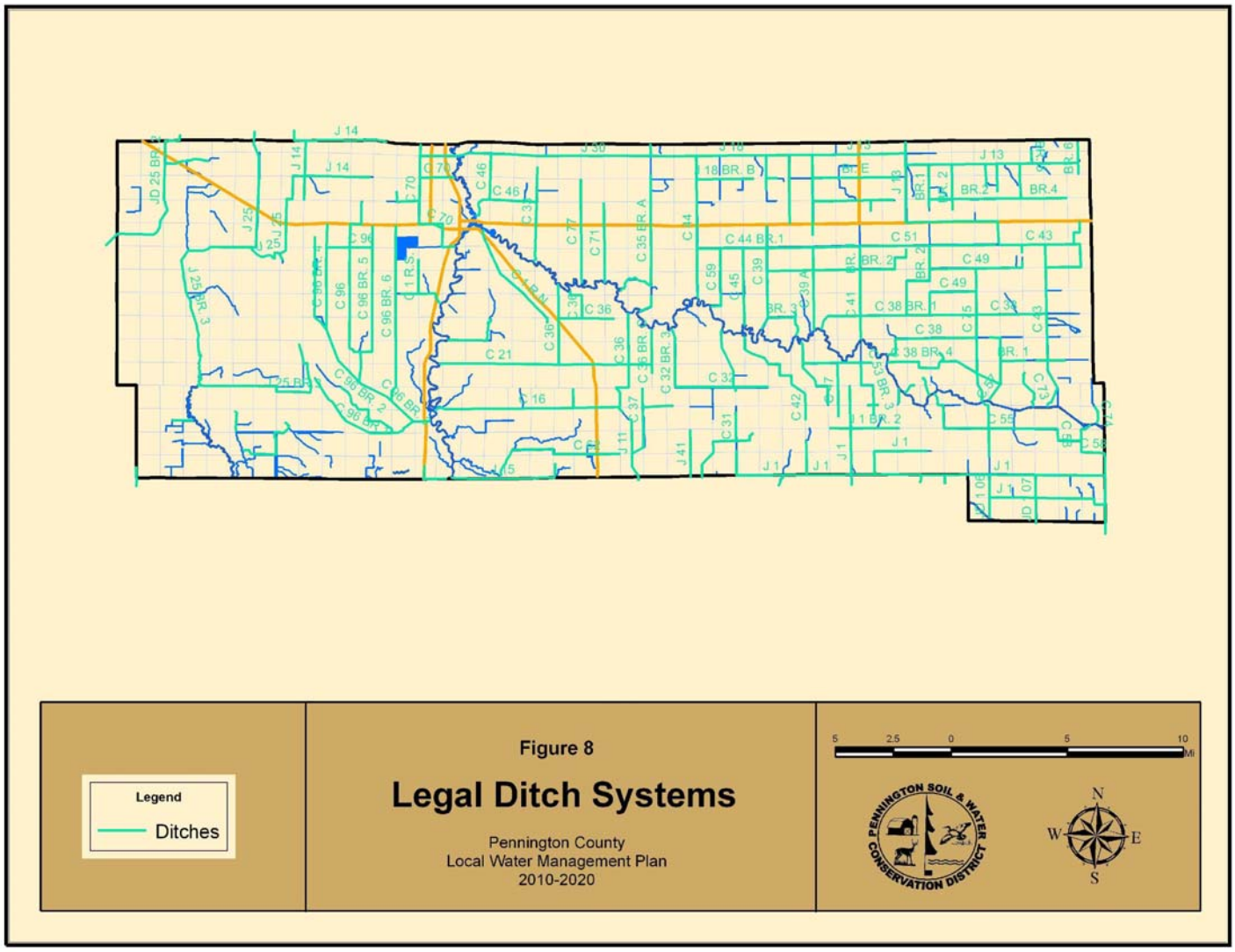


Table 1
Ditch Authority

Ditch	Administer
JD 1	County & Watershed (RLWD)
JD 11	County & Watershed (RLWD)
JD 13	County & Watershed
JD 14	Watershed
JD 15	County & Watershed
JD 18	County & Watershed
JD 30	County & Watershed
JD 31	County & Watershed
JD 60	County & Watershed
JD 25-2	Watershed
JD 41	
JD 30 Branch A	County & Watershed
CD 1 Rocksbury	County
CD 1 Rocksbury/SA	County
CD 16	County
CD 21	County
CD 31	
CD 32	County
CD 33	County
CD 35	County
CD 36	County
CD 37	County
CD 38	County
CD 39	County
CD 41	County
CD 42	County
CD 43	County
CD 44	County
CD 45	County
CD 46	County
CD 47	County
CD 49	County
CD 51	County
CD 53	County
CD 55	County
CD 57	County
CD 58	County
CD 59	County
CD 62	County
CD 70	County
CD 71	County
CD 73	County
CD 74	County
CD 75	County
CD 77	County
CD 96	County
CD 109 -1	Watershed
CD 109-2	Watershed
CD 122- 0,1	Watershed
CD 122 -2	Watershed
Red Lake River	RLWD
Clearwater River	RLWD
Challenger Ditch	RLWD

Wetlands

Wetlands account for a small amount of surface water in the County. Wetlands that used to make up a large portion of the County are small and well distributed throughout the county. The most common wetland type in the County is wet prairie; however numerous other wetland types can be found including rare calcareous fens located along the beach ridges.

The State Wetlands Conservation Act (WCA) and the federal farm program have served to prohibit wetland loss or degradation in the state. The number of wetlands in the county has risen slightly due primarily to CRP. Many producers chose to plug ditches and temporarily restore wetlands on their fields as a conservation practice. There is a concern that mercury may pose a threat to water quality in restored wetlands since USGS research has shown mercury levels rise in new impoundments.

The USFWS is responsible for the National Wetlands Inventory (NWI) efforts in northwestern Minnesota. NWI is to be used as a general indicator of wetland type, location, and distribution. Figure 9. It is not to be used as a precise locator of wetland boundaries, for site specific planning or management, or for regulatory purposes. Figure 11b

It is thought that wetlands may attenuate flood flows, improve water quality by removing sediment and nutrients, and provide habitat for fish and wildlife. Local data, obtained over the last four years at the outflow of Goose Lake, indicate low turbidity and TSS even during periods of heavy precipitation.

Table 2

Calcareous Fens in Pennington County

Pennington County		**Location**		
Calcareous Fen Site Name	**Fen ID no.**	**Township**	**Range**	**Section(s)**
Sanders Fen North	14301	T153N	R44W	WNE07, EWSE07
Sanders Fen South	14297	T153N	R44W	SE18, NE19
Norden 18	34586	T154N	R44W	SESW18

Pursuant to the provisions of *Minnesota Statutes*, section 103G.223, the above described lands contain calcareous fens as defined in *Minnesota Rules*, part 8420.1020. Additional sites may be added to this list as new calcareous fens are discovered and existing sites may be removed from the list if it is determined that the wetland no longer meets the definition of a calcareous fen. Future revisions to the list will be published in the *State Register*.

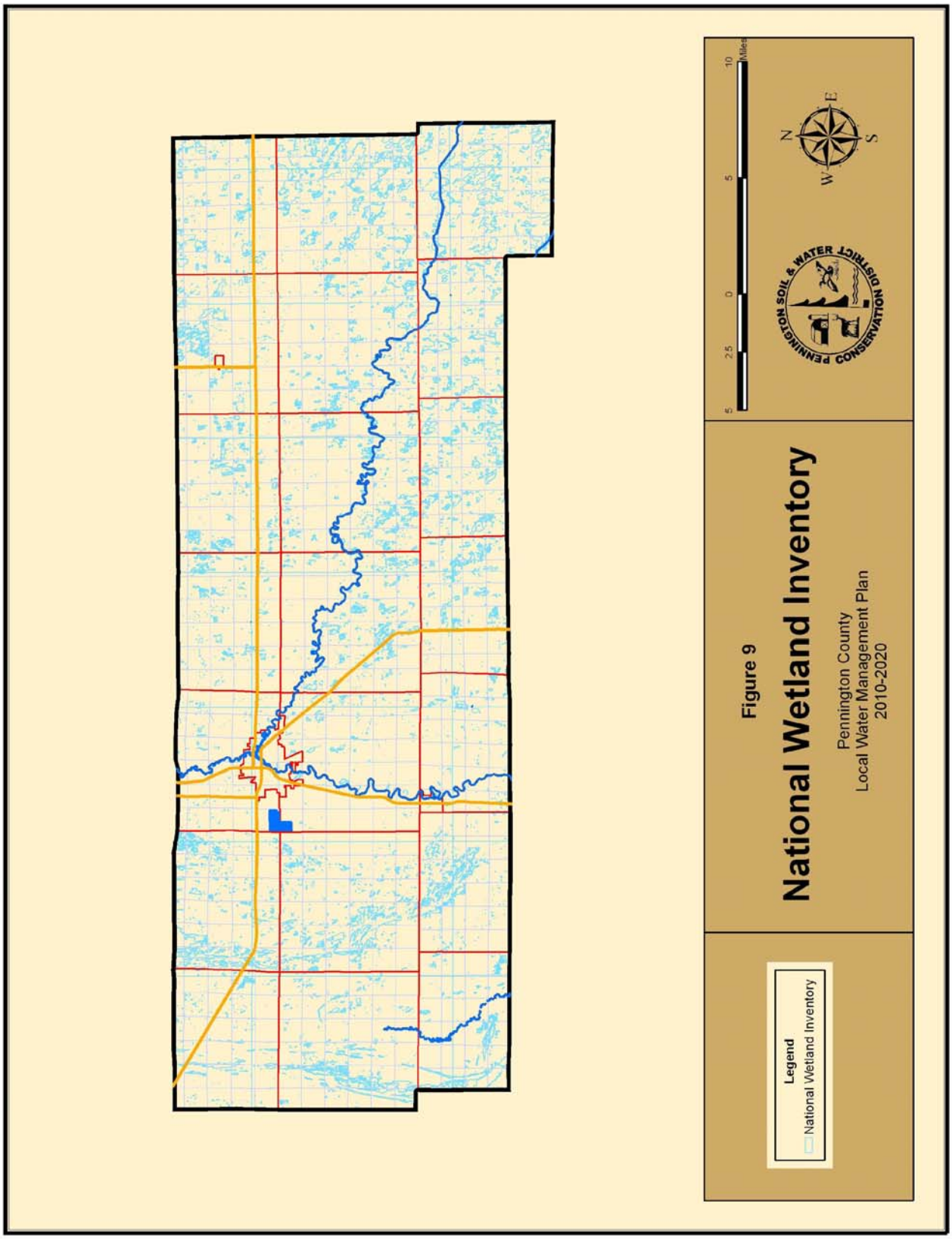


Figure 9
National Wetland Inventory
Pennington County
Local Water Management Plan
2010-2020
Legend
National Wetland Inventory
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
N
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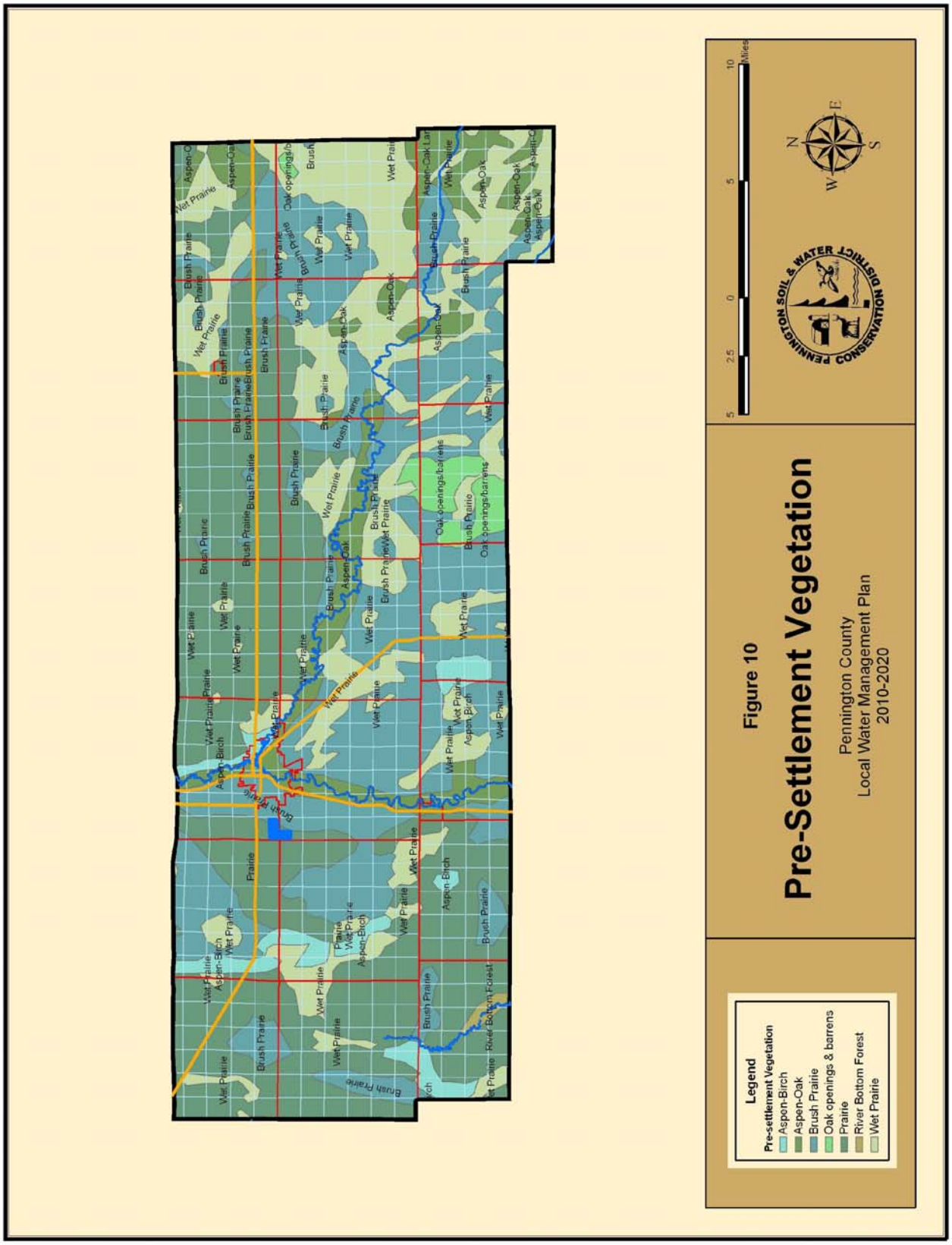
Miles


Legend
Pre-settlement Vegetation
Aspen-Birch
Aspen-Oak
Brush Prairie
Oak openings & barrens
Prairie
River Bottom Forest
Wet Prairie
Figure 10
Pre-Settlement Vegetation
Pennington County
Local Water Management Plan
2010-2020
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
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Miles

Surface Water Quality

The County's surface waters have been impacted by human development over time. In 1896, a series of rapids in the Thief River were converted to a waterfall by a dam. This dam drastically altered the hydrology of the river. In 1911 extensive drainage of the County began. At that time less than 1/3 of the County was suitable for crop production. Today over 3/4 of the County is suitable for agriculture mainly in part to this drainage infrastructure.

Today surface water uses include public water supply, livestock, industry, recreation, drainage and irrigation for the city and wildrice production. Current land use and development continue to have an impact on the quality of these resources. Sources of pollution include sediment, urban runoff, animal holding/management areas, and septic systems. Contamination of surface waters by these pollutants results in a decrease in dissolved oxygen, habitat and biodiversity, and an increase in sedimentation, and turbidity.

Section 303 (d) of the Federal Clean Water Act (CWA) requires States to adopt water quality standards to protect the nation's water. If these standards are frequently exceeded, the water body is categorized as either "fully supporting", "partially supporting" or "not supporting" for that use. Uses include swimming, fishing, irrigation, or industrial purposes. They are identified as impaired if they do not meet these water quality standards.

There is currently a reach in each of the rivers in the County that is deemed impaired. Impairments in the county include mercury, dissolved oxygen, turbidity and fecal coliforms. See Table 1, pg 30.

All of the river reaches in the County have mercury impairments. Sources of mercury occur from coal-burning, petroleum refining and combustion and natural sources such as volcanoes and the flooding of organic soils. Mercury TMDL's arise for the safe human consumption of fish.

Fish and aquatic organisms require oxygen levels above 5 mg/L. Maintaining a healthy ecosystem cannot occur if levels of 3 mg/L occur for a prolonged period.
Oxygen levels fluctuate throughout water columns and throughout the year. Degradation of organic material, such as aquatic plants and algae can cause a decline of oxygen. Oxygen depletion can occur from chemical reactions, the time of year, and temperature; warmer water holds less oxygen than cooler water. Reaches with dissolved oxygen impairments include the Thief, Black and Clearwater Rivers. Figure 11, pg 29.

In water quality monitoring, fecal coliform and *E.coli* are used as indicator organisms. If fecal matter is entering the water system there is a potential for other harmful contaminates to be present. The main sources of these bacteria are from animal and human wastes. Potential sources include feedlot and manure runoff, urban runoff, wildlife, failing septic systems, and communities with inadequate wastewater treatment.

E. coli, a sub group of fecal coliforms, is present in the water when fecal coliforms are present. *E. coli* is currently monitored as the bacteriological standard, replacing the fecal coliform standard set by the MPCA.

Turbidity impairments are the most common and main threat to the surface water quality in this portion of the state. It can be attributed to non-point sources such as failing septic systems, agricultural runoff of fertilizers, feedlot runoff, and wind and water erosion. The sediment entering the streams and lakes originate from upland erosion, stream bank erosion, drainage ditch erosion, and gully and wind erosion.

A map of the impaired waters of Pennington County can be found in Figure 11.

Every two years the MPCA is required to identify these impairments. They release a document, referred to as The Impaired Waters List, of lakes and streams that are not meeting their designated uses because of a pollutant. For each pollutant that causes a water body or water course to fail water quality standards, the CWA requires the State to conduct a Total Maximum Daily Load (TMDL) study, which identifies all point and non point sources of pollution. Additional water quality sampling including biological sampling and computer modeling such as the Soil and Water Assessment Tool (SWAT), determine how much each pollutant source must reduce its contributions to assure the standard is met. The MPCA has set pollutant reduction goals and implement measures to correct or meet reduction goals and restore waters.

It is a priority to identify issues, enhance, educate and inform with regards to the quality of the surface waters for the protection of public health, safety, economy and aesthetics. Land use decisions, both agricultural and urban have the potential to contribute pollutants to surface water resources. Since the majority of the area is dedicated to farming, major pollutants that could potentially result include sediment, nutrients (phosphorous and nitrogen), and pesticides. Ways to prevent pollution from entering water courses include leaving a filter or buffer strip, using conservation tillage practices such as no till, leaving a residue cover, planting cover crops, field and farmstead windbreaks, grassed waterways, erosion control structures, plus many more BMPs. Urban development also affects the water resources. Education on urban BMPs and stormwater control such as: rain gardens, stormwater ponds, reduction of fertilizer to lawns, and construction BMPs will be addressed and promoted in this plan.

Focus areas that will be addressed in this plan include the following: the reduction of sedimentation in the Thief and Red Lake River Watersheds with priority given to the minor watersheds supplying the Thief River Falls Reservoir; addressing surface water quality through the enforcement of existing regulations and programs and the establishment of new programs; and working with landowners and government entities to educate and assist landowners to install projects that improve or protect water quality.

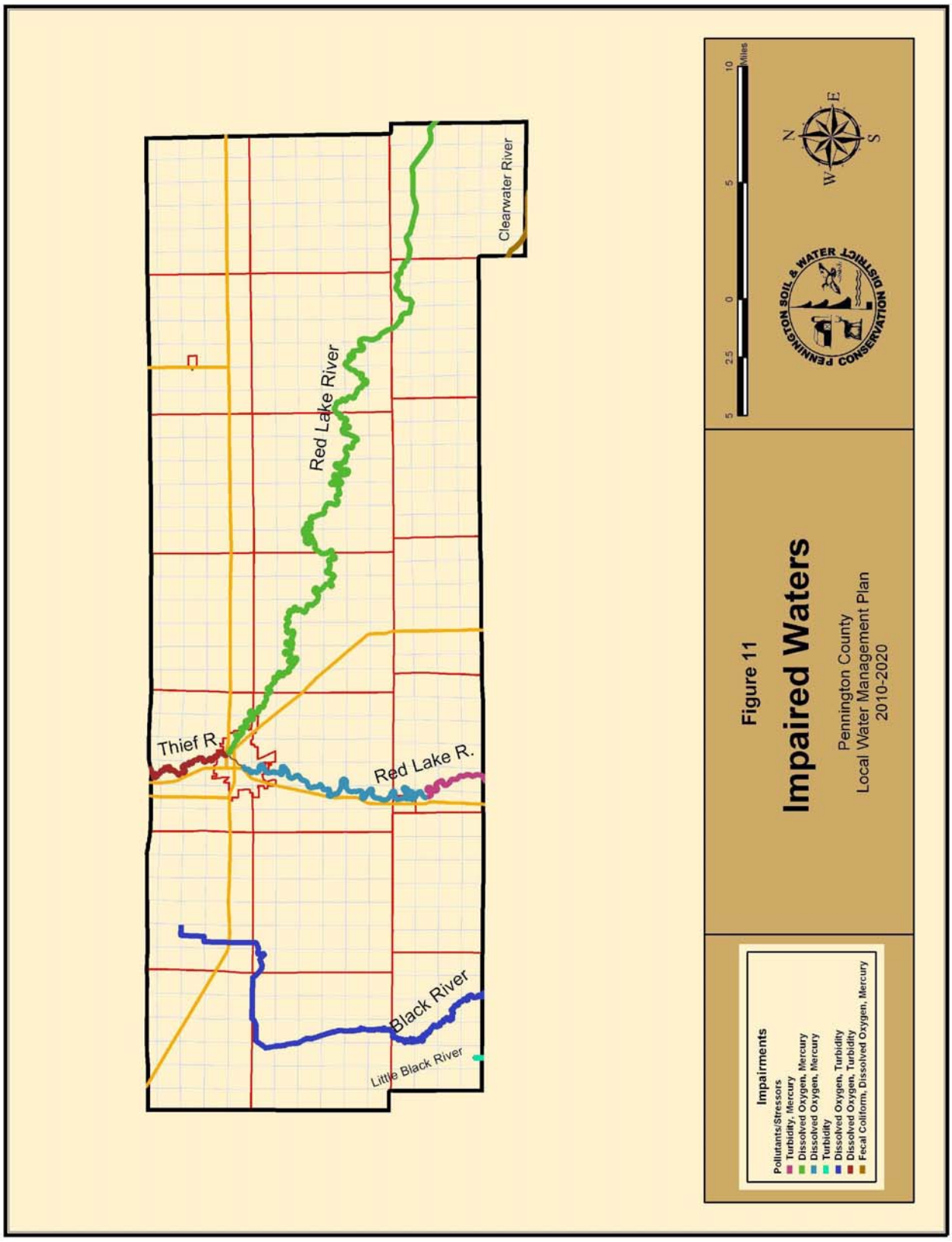
Clearwater River
Red Lake River
Thief R.
Red Lake R.
Black River
Little Black River
Figure 11
Impaired Waters
Pennington County
Local Water Management Plan
2010-2020
Impairments
Pollutants/Stressors
Turbidity, Mercury
Dissolved Oxygen, Mercury
Dissolved Oxygen, Mercury
Turbidity
Dissolved Oxygen, Turbidity
Dissolved Oxygen, Turbidity
Fecal Coliform, Dissolved Oxygen, Mercury
10
5
0
2.5
5
Miles
N
E
S
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

Table 3

Impaired Waters
303 (d) List of Impaired Waters

Reach	Assessment ID#	Affected Use	Pollutant/Stressor	Category [Ω]
Black River Headwaters to Little Black River	09020303-530	Aquatic Life	Dissolved Oxygen and Turbidity	5A
Little Black River to Red Lake River	09020303-529	Aquatic Life	Turbidity	2
Red Lake River Headwaters to Thief River	09020303-508	Aquatic Life Aquatic Consumption	Dissolved Oxygen Mercury	4A
Thief River to Thief River Dam	09020303-509	Aquatic Life Aquatic Consumption	Dissolved Oxygen Mercury	4A
Thief River Dam to unnamed Creek	09020303-513	Aquatic Life Aquatic Consumption	Dissolved Oxygen Mercury	4A
Unnamed creek to Clearwater River	09020303-504	Aquatic Life Aquatic Consumption	Turbidity Mercury	5B
Thief River Agassiz pool to Red Lake River	09020304-501	Aquatic Life	Dissolved Oxygen and Turbidity	5A
Clearwater River Ruffy Brook to Lost River	09020305-510	Aquatic Life Aquatic Consumption	Fecal Coliform and Dissolved Oxygen Mercury	5B

[Ω]:See explanation of "Category" Assessments on following page.

Stream Assessments

EPA Consolidation Assessment and Listing Methodology (CALM) integrates 305(b) and 303(d) TMDL list. The five categories are:

Category 1: All designated uses are meeting water quality standards

Category 2: Some uses are meeting water quality standards and there are insufficient data to assess other uses.

Category 3: There are insufficient data to assess any uses.

Category 4: At least one use is impaired, but a TMDL is not required at this time.

- **4A**: Impaired, but a TMDL study has been approved by EPA
- **4B**: Impaired, but a TMDL study is not required because water quality standards are expected to be met in the near future
- **4C**: Impaired, but a TMDL study is not required because the impairment is not caused by a pollutant
- **4D**: An assessment unit impairment is due to natural conditions with only insignificant anthropogenic influence.

Category 5: At least one use is impaired and a TMDL is required

- **5A:** Impaired by multiple pollutants and no TMDL study plans are approved by EPA.
- **5B**: Impaired by multiple pollutants and at least one TMDL study plan is approved by EPA
- **5C:** Impaired by one pollutant and no TMDL study plan is approved by EPA.

Reduction of sedimentation in the Thief and Red Lake River Watersheds, with priority given to the minor watersheds supplying the Thief River Falls Reservoir.

Sedimentation into water resources in Pennington County is a concern. The problem may have occurred in the reaches over the past 100 years due to land use changes and alterations to drainage, impacting and degrading them over time. The movement of soil by water and wind causes sedimentation in water courses throughout the County where vegetative cover is inadequate to slow and hold the water. Water erosion can occur during spring thaw and rain events when overland flooding occurs and water runs into streams and drainage ditches.

Erosion also occurs when the velocity of the channel scours stream and ditch banks. Previous local studies have identified eroding streambanks on the Thief River as a major contributor to the sediment load in the city reservoir. This produces both a quantity and quality problem. Excessive sediment deposited in the reservoir decreases the capacity. That poses many new problems and hazards for fishing habitat/spawning, navigation, and other recreation. Sediment may also affect the quality of water. More information about the reservoir will be discussed in Priority Concern 3.

Addressing surface water quality through the enforcement of existing regulations, existing programs and new programs.

Water quality concerns arise from a variety of areas such as existing and potential impacts of development, impacts of drainage, maintaining a safe drinking water supply, industrial, recreational and agricultural needs along with fish and wildlife habitat.

By enforcing existing regulation and helping landowners to comply and understand these rules will result in better land use actions. Programs to assist landowners with BMPs will be addressed and new programs will be developed.

Working with landowners and government entities to educate and assist to get projects on the ground to improve or protect water quality

Government entities and landowners will work together to improve and protect the quality of surface water. Natural resource agencies will provide technical and financial assistance to landowners that apply BMPs on their land. Conservation practices that prevent soil erosion and reduce stormwater runoff will help decrease sedimentation and other water quality problems. Programs such as State Cost-Share, Environmental Quality Incentive Program, Conservation Stewardship Program, Conservation Reserve Enhancement Program, Conservation Security Program, Reinvest in Minnesota, State Revolving Loan Fund, Clean Water Fund etc. will be accessible.

This plan will address the following Objectives related to this concern:

Reduce the Extent of Turbidity and Sedimentation in the Thief and Red Lake River Watersheds.

- Improve and protect surface water with the reduction of water and wind erosion by assisting landowners and government entities.
- Work with the County and Watershed Districts to identify problem reaches and to ensure Watershed, County, Township, and private drainage systems adequately address drainage needs to support agriculture without threatening water quality.

Address Surface Water Quality and Work to Protect and Improve the Resource Through the Enforcement of Existing Regulations, use of Existing Programs and Development of New Programs.

- Monitor the quality of surface water in Pennington.
- Assist landowners with compliance of the County Shoreland, Sewage and Wastewater Treatment, and Floodplain Ordinances to help protect water resources.

Work with Landowners and Entities (Local, State and Federal) for the Protection of Surface Waters.

- Educate the public about water and soil stewardship and encourage BMPs.
- Coordinate and cooperate with other agencies and jurisdiction on plans and projects
- Address Federal List 303 (d) Impaired waters by actively participating in the development and implementation of Total Maximum Daily Load (TMDL) plans for impaired waters of Pennington County.

Priority Concern 1: Protection and Improvement of Surface Water Quality

GOAL

Reduce the Extent of Turbidity and Sedimentation in the Thief River and Red Lake River
(PROIRITY GIVEN TO THE MINOR WATERSHEDS WITHIN THE THIEF RIVER FALLS DRINKING WATER SUPPLY MANAGEMENT AREA)

Objective A:

Assist Landowners and Government Entities with the Reduction of Water and Wind Erosion

New Actions:

1. Work with government entities to investigate possible sources of the sediment in the Thief River Falls reservoir.
   Responsibility: Lead: All Partners: RLWD, SWCD, others
   Timeline: 2010-2020
   Priority: Minor watersheds of the TRF DWSMA

2. Seek funding and conduct the Jerome Street Group streambank restoration project.
   Responsibility: Lead: SWCD Partners: RLWD
   Timeline: 2010
   Priority: Red Lake River

3. Cooperate with the Red Lake Watershed District on the installation of a stormwater runoff pond in the City of Thief River Falls.
   Responsibility: Lead: RLWD Partners: SWCD, City of TRF
   Timeline: 2015-2020
   Priority: DWSMA

4. Promote the District tree matting program; install approximately 35,000 feet of the fabric for erosion control, weed control and moisture each year.
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: County-Wide

5. Plant 1 mile of living snowfence in a high priority area designated by the MNDOT yearly.
   Responsibility: Lead: SWCD Partners: NRCS, MN DOT
   Timeline: 2010-2020
   Priority: MN DOT designated areas

6. Utilize the Native Buffer Cost-share Program to establish diverse native vegetation buffers.
   Responsibility: Lead: SWCD Partners: BWSR
   Timeline: 2010-2015
   Priority: Riparian and ditch buffers in the DWSMA

7. Install a Rain Garden to reduce stormwater runoff in the city of Thief River Falls, or St. Hilaire.
   Responsibility: Lead: SWCD
   Partners: RLWD, U of M Extension, Master gardeners
   Timeline: 2011-2012
   Priority: City of TRF

8. Educate and encourage landowners to plant rain gardens on their property by hosting a demo workshop.
   Responsibility: Lead: SWCD
   Partners: RLWD, U of M Extension, Master gardeners
   Timeline: 2012 & 2017
   Priority: County -Wide

9. Seek funding and prepare for additional streambank restoration projects.
   Responsibility: Lead: SWCD Partners: RLWD, DNR
   Timeline: 2010-2020
   Priority: Thief and Red Lake River Watersheds

Ongoing Actions:

1. Provide technical assistance and cost share opportunities to landowners to apply BMPs to protect water quality.
   Responsibility: Lead: All
   Partners: SWCD, RLWD, DNR, SWCD
   Timeline: 2010-2020
   Priority: County -Wide

2. Continue to develop implementation initiatives from Non-Point Source (NPS) problems ascertained by the Comprehensive River Basin Study.
   Responsibility: Lead: All Partners: SWCD, WD, others
   Timeline: 2010-2020
   Priority: County -Wide

3. Continue working with the State Revolving Fund Loan Program to provide low interest lows for BMPs.
   Responsibility: Lead: SWCD Partners: MDA
   Timeline: 2010-2020
   Priority: County -Wide

4. Cooperate with other agencies on projects to reduce sedimentation.
   Responsibility: Lead: All
   Partners: SWCD, WD, NRCS, BWSR, others
   Timeline: 2010-2020
   Priority: County-Wide

5. Install at least 2 grade stabilization structures a year.
   Responsibility: Lead: SWCD Partners: NRCS, RLWD
   Timeline: 2010-2020
   Priority: DWSMA

6. Work with landowners to install 10 side-water inlets a year.
   Responsibility: Lead: SWCD Partners: NRCS, County, RLWD
   Timeline: 2010-2020
   Priority: DWSMA

7. Create an average of 2 miles of buffers at least 1 rod in width along watercourses each year. Strive to place a 50 foot rod on buffers along public waters
   Responsibility: Lead: SWCD Partners: NRCS, County, RLWD
   Timeline: 2010-2020
   Priority: DWSMA

8. Promote and implement water quality and erosion control practices through CSP, EQIP, State Cost-Share and general conservation technical assistance.
   Responsibility: Lead: SWCD, NRCS
   Partners: County, RLWD
   Timeline: 2010-2020
   Priority: County-Wide

9. Plant or renovate at least 2 miles of field windbreak each year
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: County-Wide

10. Provide information on WRP and RIM programs, encourage land to be placed in these programs.
    Responsibility: Lead: SWCD, NRCS
    Timeline: 2010-2020
    Priority: Drained and altered wetlands and buffers

11. Educate the public and promote water quality and erosion control through newsletters, news releases and State Revolving Fund Loan Program.
    Responsibility: Lead: SWCD
    Partners: NRCS, County, RLWD
    Timeline: 2010-2020
    Priority: County-Wide

12. Meet with the City of Thief River Falls and Pennington County officials for inspection of erosion areas for possible repair.
    Responsibility: Lead: SWCD
    Partners: County, City of TRF, RLWD, NRCS,
    Timeline: Meet in 2011, 2013, 2015, 2017, 2020
    Priority: County-Wide

13. Plant or renovate an average of 10 farmstead windbreaks each year.
    Responsibility: Lead: SWCD Partners: NRCS
    Timeline: 2010-2020
    Priority: County-Wide

14. If requested, conduct a Conservation Tillage Transect Survey for the County.
    Responsibility: Lead: SWCD Partners: NRCS, County, U of M
    Timeline: 2010-2020
    Priority: County-Wide

15. Encourage stormwater management controls during construction in shoreland areas to reduce sediment loading and flow to surface waters
    Responsibility: Lead: SWCD
    Partners: County, DNR, City of TRF, others
    Timeline: 2010-2020
    Priority: DWSMA

Objective B:

Work with the County and Watershed Districts to Identify Problem Reaches and to ensure Watershed, County, Township, and Private Drainage Systems Adequately Address Drainage Needs to Support Agriculture without Threatening Water Quality.

New Actions:

1. Seek funding for ditch and culvert inventories.
    Responsibility: Lead: All Partners: County, RLWD, SWCD
    Timeline: 2010-2020
    Priority: County-Wide

2. Inventory legal ditch outlets and natural waterway outlets into the Red Lake River and install grade stabilization structures as needed.
    Responsibility: Lead: All Partners: County, RLWD
    Timeline: 2010-2020
    Priority: Red Lake River Watershed

3. Encourage right-of-way buffer seeding.

Responsibility: Lead: All Partners: County, RLWD
Timeline: 2010-2020
Priority: County-Wide

4. Update the County Drainage records as part of the Drainage Record Modernization Grant.
   Responsibility: Lead: County Hwy Dept
   Partners: BWSR, SWCD
   Timeline: 2010-2015
   Priority: County-Wide

5. Encourage one Ditch System Administrator
   Responsibility: Lead: County, WD Partners: SWCD
   Timeline: 2010-2020
   Priority: County-Wide

Ongoing Actions:

1. Meet with the County Engineer and Watershed District periodically for inspection of drainage systems for possible cleanouts and repair of any erosion problems.
   Responsibility: Lead: All Partners: SWCD, County, RLWD
   Timeline: Meet in 2011, 2013, 2015, 2017, 2020
   Priority: County-Wide

2. Promote critical area seeding on ditch side slopes.
   Responsibility: Lead: All Partners: County, RLWD
   Timeline: 2010-2020
   Priority: DWSMA, Thief & Red Lake River Watersheds

3. Encourage establishment of 4:1 side slopes and seeding of all ditches after cleaning.
   Responsibility: Lead: All Partners: County, RLWD
   Timeline: 2010-2020
   Priority: County-Wide

4. Install ditch buffers through State and Federal Programs.
   Responsibility: Lead: SWCD, NRCS
   Partners: RLWD, County
   Timeline: 2010-2020
   Priority: DWSMA, Thief & Red Lake River Watersheds

5. Review the Critical Area Erosion Control Policy with the Pennington County Highway Department.
   Responsibility: Lead: SWCD Partners: County
   Timeline: 2012
   Priority: County-Wide

GOAL

Address Surface Water Quality and Work to Protect and Improve the Resource Through the Enforcement of Existing Regulations, Use of Existing Programs and Development of New Programs.

Objective A:
Monitor the Quality of Surface Water in Pennington County.

New Actions:

1. Monitor three sites; Judicial Ditch 30, County Ditch 70 and County Ditch 21 as part of a Surface Water Assessment Grant.
   Responsibility: Lead: SWCD Partners: MPCA
   Timeline: 2010
   Priority: Thief and Red Lake River Watersheds

2. As part of a Surface Water Assessment Grant monitor County Ditch 96 for numerous parameters and monitor the Thief and Red Lake Rivers for Total Chloride.
   Responsibility: Lead: SWCD Partners: MPCA
   Timeline: 2010-2011
   Priority: Thief and Red Lake River Watersheds

3. Seek funding and establish continuous monitoring.
   Responsibility: Lead: All Partners: SWCD, RLWD
   Timeline: 2010-2020
   Priority: Black River, downstream of TRF dam

4. Seek funding and establish monitoring at the outlet of a city storm sewer.
   Responsibility: Lead: SWCD Partners: City of TRF, RLWD
   Timeline: 2014-2019
   Priority: Upstream intake

Ongoing Actions:

1. May through October, monthly monitor the nine established water quality sites(Figure 29, Appendix B7)for the following parameters:

Field	Laboratory
Air temperature	Ammonia
Conductivity	Chemical Oxygen
Dissolved Oxygen	Demand
pH	Nitrate + Nitrite
Total Dissolved Solids	Ortho Phosphorus
Turbidity	Total Kjeldahl Nitrogen
Transparency	Total Phosphorous
Water Temperature	Total Organic Carbon
Weather Conditions	Total Suspended Solids
Stream Level	*E.coli* Bacteria
Field Observations	

   Responsibility: Lead: SWCD Partners: County
   Timeline: 2010-2020
   Priority: Thief, Red Lake, Clearwater, and Black Rivers, Goose Lake

2. Seek funding opportunities to update and expand data collection and monitoring sites. Encouraging volunteer monitoring will be included.
   Responsibility: Lead: All Partners: SWCD, RLWD
   Timeline: 2010-2020
   Priority: County-Wide

3. Coordinate, track and analyze water monitoring for the entire County. Update and expand water quality databases. Annually submit data to MPCA's STORET. Enter data into the River Watch database.
   Responsibility: Lead: SWCD Partners: RLWD
   Timeline: 2010-2020
   Priority: County-Wide

4. Seek funding and assist in the planning and implementation of TMDL studies.
   Responsibility: Lead: RLWD Partners: All
   Timeline: 2010-2020
   Priority: Thief, Red Lake and Black Rivers

5. Seek funding and encourage the development for biological monitoring and habitat assessments.
   Responsibility: Lead: All Partners: SWCD, RLWD
   Timeline: 2010-2020
   Priority: Thief, Red Lake and Black Rivers

6. Encourage development of staff gages and hydrologic monitoring at water quality sites for development of parameters loads.
   Responsibility: Lead: RLWD Partners: SWCD
   Timeline: 2010-2020
   Priority: Thief, Red Lake and Black Rivers

Objective B:

Assist Landowners with Compliance of the County Shoreland, Sewage and Wastewater Treatment and Floodplain Ordinances to Help Protect Water Resources.

New Actions:

1. Revise the County Sewage and Wastewater Treatment Ordinance.
   Responsibility: Lead: SWCD Partners: County, MPCA
   Timeline: Implemented by 2011
   Priority: County-Wide

2. Revise the County Shoreland Ordinance to incorporate the revised "Minnesota Shoreland Rules: Standards for Lake and River Conservation". Work with agencies to establish an updated setback requirement.
   Responsibility: Lead: SWCD Partners: County, DNR
   Timeline: 2011-2015
   Priority: County-Wide

Ongoing Actions:

1. Conduct site visits for permitting Shoreland, SSTS and Floodplain activities.
   Responsibility: Lead: SWCD Partners: DNR
   Timeline: 2010-2020
   Priority: County-Wide

2. Administer the Shoreland Ordinance, issue permits for proposed activities in the shoreland such as building, SSTS installation and repair, additions, shoreland alterations, stairways, docks, etc.

Responsibility: Lead: SWCD Partners: County, DNR
Timeline: 2010-2020
Priority: County-Wide

3. Administer the County Sewage and Wastewater Treatment Ordinance. Conduct site visits, perform soil verifications, issue permits, investigate complaints and enforce violations.
   Responsibility: Lead: SWCD Partners: County, MPCA
   Timeline: 2010-2020
   Priority: County-Wide

4. Assist landowners with the compliance of the Floodplain Ordinance.
   Responsibility: Lead: SWCD Partners: DNR
   Timeline: 2010-2020
   Priority: County-Wide

GOAL

Work with Landowners and Entities (Local, State and Federal) for the Protection of Surface Waters

Objective A:

Educate the public about water and soil stewardship and encourage BMPs.

New Actions:

1. Conduct a workshop on septic system care and maintenance for landowners
   Responsibility: Lead: SWCD Partners: U of M Extension
   Timeline: 2013-2015
   Priority: County-Wide

2. Provide a public educational program for surface water protection.
   Responsibility: Lead: SWCD
   Partners: Watershed Districts, MPCA
   Timeline: 2017
   Priority: County-Wide

3. Assist landowners with Forest Stewardship Plans.
   Responsibility: Lead: DNR Partners: SWCD, others
   Timeline: 2010-2020
   Priority: County-Wide

4. Host workshops on Forest Stewardship.
   Responsibility: Lead: SWCD Partners: DNR, others
   Timeline: 2013 & 2018
   Priority: County-Wide

Ongoing Actions:

1. Encourage installation of buffer strips and grassed filter strips
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: Erosion prone areas; ditches, shoreland, slopes, highly erodible soils

2. Promote planting wind breaks, shelterbelts and living snow fences to reduce blowing and drifting snow and erosion.
   Responsibility: Lead: SWCD
   Partners: DOT, Hwy Department, NRCS, DNR
   Timeline: 2010-2020
   Priority: County-Wide

3. Encourage and promote conservation tillage to reduce sediment loading to surface waters.
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: County-Wide

4. Encourage and promote Best Management Practices (BMPs) to deal with stormwater management.
   Responsibility: Lead: SWCD Partners:
   Timeline: County-Wide
   Priority: City of Thief River Falls

5. Provide technical assistance and education to feedlot owners to comply with the county feedlot ordinance and on proper feedlot management such as manure storage and application.
   Responsibility: Lead: U of M Extension
   Partners: NRCS, SWCD, MDA
   Timeline: 2010-2020
   Priority: County-Wide

6. Actively promote and market federal/state/local conservation programs to targeted landowners and help prepare them for eligibility in programs such as WHIP and EQIP.
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: County-Wide

7. Educate landowners about tile drainage.
   Responsibility: Lead: Watershed Districts
   Partners: SWCD, NRCS
   Timeline: 2010-2020
   Priority: County-Wide

8. Work with livestock producers to implement watering systems including wells, pipelines, fountains, etc.
   Responsibility: Lead: All
   Partners: NRCS, SWCD, U of M Extension
   Timeline: 2010-2020
   Priority: County-Wide

Objective B:

Coordinate and cooperate with other agencies and jurisdictions on plans and projects

Ongoing Actions:

1. Encourage conservation practices to reduce erosion and improve water quality such as state cost share, Clean Water Legacy, CRP, EQIP and etc.
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: DWSMA

2. Search for programs and funding for projects that reduce erosion and improve water quality.
   Responsibility: Lead: All Partners: SWCD, NRCS, WDs
   Timeline: 2010-2020
   Priority: County-Wide

3. Participate in the Red River Basin Water Quality Team meeting to discuss implementation of the Red River Basin Water Quality Plan and to address current local issues.
   Responsibility: Lead: All
   Partners: SWCD, RLWD, MPCA, others
   Timeline: 2010-2020
   Priority: County-Wide

4. Encourage River Watch participation by area schools.
   Responsibility: Lead: RLWD
   Partners: RRBWMB, SWCD
   Timeline: 2010-2020
   Priority: County-Wide

5. Request feedlot cost-share or EQIP funds to assist feedlot operators with MPCA compliance.
   Responsibility: Lead: All
   Partners: NRCS, SWCD, U of M Ext
   Timeline: 2010-2020
   Priority: County-Wide

6. Utilize the Emergency Response Plan to minimize damage from accidents or spills.
   Responsibility: Lead: All Partners: All
   Timeline: 2010-2020
   Priority: County-Wide

7. Assist FSA with promotion and implementation of conservation programs.
   Responsibility: Lead: FSA Partners: NRCS, SWCD
   Timeline: 2010-2020
   Priority: County-Wide

8. Complete Farm Program compliance status reviews and assist landowners with conservation plan development.
   Responsibility: Lead: All Partners: FSA, NRCS, SWCD
   Timeline: 2010-2020
   Priority: County-Wide

9. Design tree plans for CCRP, WHIP and EQIP contracts. Other tree plans will be designed as requested.
   Responsibility: Lead: SWCD Partners: NRCS
   Timeline: 2010-2020
   Priority: County-Wide

10. Work with state, county and township officials to determine high priority snow management areas along public transportation routes.
    Responsibility: Lead: County Partners: MNDOT, SWCD, others
    Timeline: 2010-2020
    Priority: County-Wide

11. Provide surveying assistance to RRVCSA engineer for projects to protect water quality.
    Responsibility: Lead: RRVCSA Partners: SWCD
    Timeline: 2010-2020
    Priority: County-Wide

12. Secure funds through Pennington County and the WRAC for projects that improve water quality.
    Responsibility: Lead: SWCD Partners: County, BWSR
    Timeline: 2010-2020
    Priority: County-Wide

Objective C:

Address Federal List 303 (d) Impaired waters by Actively Participating in the Development and Implementation of Total Maximum Daily Load (TMDL) Plans for Impaired Waters For Impaired Waters of Pennington County

New Actions :

1. Provide technical assistance and best professional judgment during TMDL planning process; identifying sources, serving on TEP and identifying programs for implementation.

Responsibility: Lead: RLWD Partners: SWCD, MPCA, others
Timeline: 2010-2020
Priority: County-Wide

2. Request the MPCA to conduct TMDL plans of impairments on a watershed basis.
Responsibility: Lead: RLWD Partners: SWCD
Timeline: 2010-2020
Priority: County-Wide

3. Serve on Technical Advisory committee and participate in Stakeholder Process during the development of TMDL studies for impairments of surface waters wholly or partially located in the County including the Thief River Watershed Project, Red Lake River Watershed Project and TMDL Studies that may occur on the Black River.
Responsibility: Lead: RLWD Partners: SWCD, MPCA, others
Timeline: 2010-2020
Priority: County-Wide

4. Serve in a leadership or co-leadership role during the development of implementation plans and protection plans that result from TMDL and Watershed Studies. Provide technical assistance including conservation programs and specific projects to help solve impairment problems and increase protection of unimpaired reaches within the County.
Responsibility: Lead: RLWD and/or SWCD Partners: MPCA, SWCD
Timeline: 2010-2020
Priority: County-Wide

Priority Concern 2: Flood Damage Reduction

Pennington County is located in the Red River Basin which is prone to flooding. Historically, many parts of the valley experience significant problems with spring and summer floods. Although the County doesn't flood as bad as other parts of the valley, we still experience detrimental damage to property both public and private. It is a priority for this plan to address flood damage reduction.

Flooding problems result from the flat topography and hydrological nature of the County and the complexity in containment by natural and artificial drainage systems. Since the spring flood of 1997, Flood Damage Reduction (FDR) has received a lot of publicity. Cooperation between government entities and landowners has resulted to reduce flood damage. Improvements have been made by communities and resource agencies to deal with flood damage and reduction; however there is room for improvement.

Natural drainage is uncommon in the County, resulting in the extensive drainage systems which were constructed in the early 1900's. These ditches are typically oriented perpendicular to the Thief and Red Lake Rivers. This drainage infrastructure is the economic base providing for agriculture, industry, residential development, streets, roads, airports and railroads throughout the County.

Historically, the largest and most damaging floods occurred in the valley in 1826, 1950, 1966, 1979, 1997 and 2009. The worse flood was the 1826 flood. It is believed to be the greatest flood in the Red River Valley in the last 200 years. Records state that the 1826 flood occurred due to several factors: (1) the fall of 1825 was extremely wet and most of the lakes and wetlands were overflowing, (2) a major snowstorm occurred in late fall, (3) a cold, snowy winter permitted an exceptionally deep snow pack to develop over much of the Red River Basin, and (4) the coldest estimated March-April mean temperature.

The flood of 1997 was the worst flood in more than 100 years. Freezing temperatures from a late-spring blizzard caused a layer of ice to form over the flooding waters. However, the 1997 flood caused more property damage, loss of life and disruption than any of the preceding floods within the valley. A map of the 100 year floodplain of the major rivers in Pennington County can be found on page 51, Figure 12.

There have been a lot of land use changes that affect flooding potential and the extent it will occur. The native landscape consisted of wetlands and prairie grasses. These ecosystems absorbed and stored water. Today the development of ditches, channelized river sections, crop production, poor land use decisions, floodplain encroachment, stormwater issues, urban drainage, and the increase of impervious surfaces all affect the degree of flooding.

Flooding occurs due to runoff timing and volume. It can take place by two different means; overland and overbank. Overland flooding occurs most often in the spring in this region when water runs off fields. After the accelerated snowmelt when the soils are frozen and unable to absorb water, ditches and culverts are commonly plugged with

snow, ice or debris. Thus, ditches fill and water makes it way over land crossing roads and or the next field, causing damage such as washouts, gullies, soil loss etc.

Overland flooding can also occur anytime after a heavy rainfall. This type of flooding affects a much smaller area, but the economic affect is just as detrimental. It can occur when stormwater makes it way down the path of least resistance, the nearest drainage. Problems occur when soils are saturated to capacity or when it rains at a rate that water doesn't have time to infiltrate the ground or can't infiltrate due to impervious surfaces.

Overbank flooding occurs most commonly during spring thaw when snow melts and river channels are still frozen or slowed from debris and ice jams. This results in the water moving up the floodplain and beyond. Ice jams and water releases from up stream impoundments may increase flooding. This has been an issue for those living down stream of the dam on the Red Lake River.

Flooding and flood related damages have, and will continue to plague the valley. Factors that affect the degree of flooding include topography, land use, soil type, weather, installed flood reduction projects, natural enhancement efforts, etc. Common Flood Damage Reduction practices in the valley include establishing impoundments, levees, dikes, restoring wetlands, and waterways. Participation in conservation practices, or Best Management Practices (BMPs) include increasing crop residues, planting trees and native grasses, installing side water inlets, grade stabilization projects, restoring and preserving wetlands, buffering rivers and ditches, etc.

Pennington County does not have any impoundments, but we do have many BMPs established. There is an established RIM contract, grassed waterways, side water inlets and approximately 70,000 acres of CRP. Wetlands that once covered the landscape provided the opportunity to absorb water. This plan promotes no net loss of the remaining wetlands and encourages wetland restorations for the benefit of increasing water storage, providing filtration of sediment and pollutants, and increasing wildlife habitat.

The use of tile drainage has just begun in the county. Research by the University of Minnesota found tiling reduces flooding because water infiltrates the tile instead of running off the fields. Tile removes excess soil moisture creating a buffer for excessive rains that doesn't exist on non-tiled soils. The County Highway Department issues permits for discharging tiles into judicial and county road ditches.

It is a priority to focus on flood damage reduction by working with landowners and government entities and by maintaining adequate drainage systems.

Working with landowners and government entities for the reduction of flood damage.

Preventing floods will be achieved by the promotion and installation of flood control practices that reduce flooding and flood damage. We will form partnerships with agencies to get projects done by applying for funding, assisting in implementation etc.

Maintaining adequate drainage systems.

Adequately maintaining drainages is a huge factor when addressing flood reduction. Drainage systems designed for proper capacity, sediment and erosion control, and flooding greatly reduces the potential of problems and future maintenance. Management of public ditches in Pennington County falls under the jurisdiction of the County and Watershed District. They are responsible for cleanouts, repairs and inspections. This plan hopes to ensure that County, Township, Watershed, and private ditch systems adequately address the drainage needs to support agricultural activities without negatively impacting water quality, other natural resources and those downstream.

Work with Landowners and Entities (Local, State, and Federal) for the Reduction of Flood Damage

- Educate the public about flooding, encourage BMPs and provide technical assistance to implement projects
- Coordinate and cooperate with other agencies and jurisdictions on plans and projects to reduce damage by floods
- Identify Natural Resource Enhancement (NRE) opportunities

Maintain Adequate Drainage Systems

- Ensure drainages; County, Township, Watershed, and private ditch systems address needs to support agricultural activities without negatively affecting water quality, natural resources and landowners downstream as a result of poor maintenance or flooding.

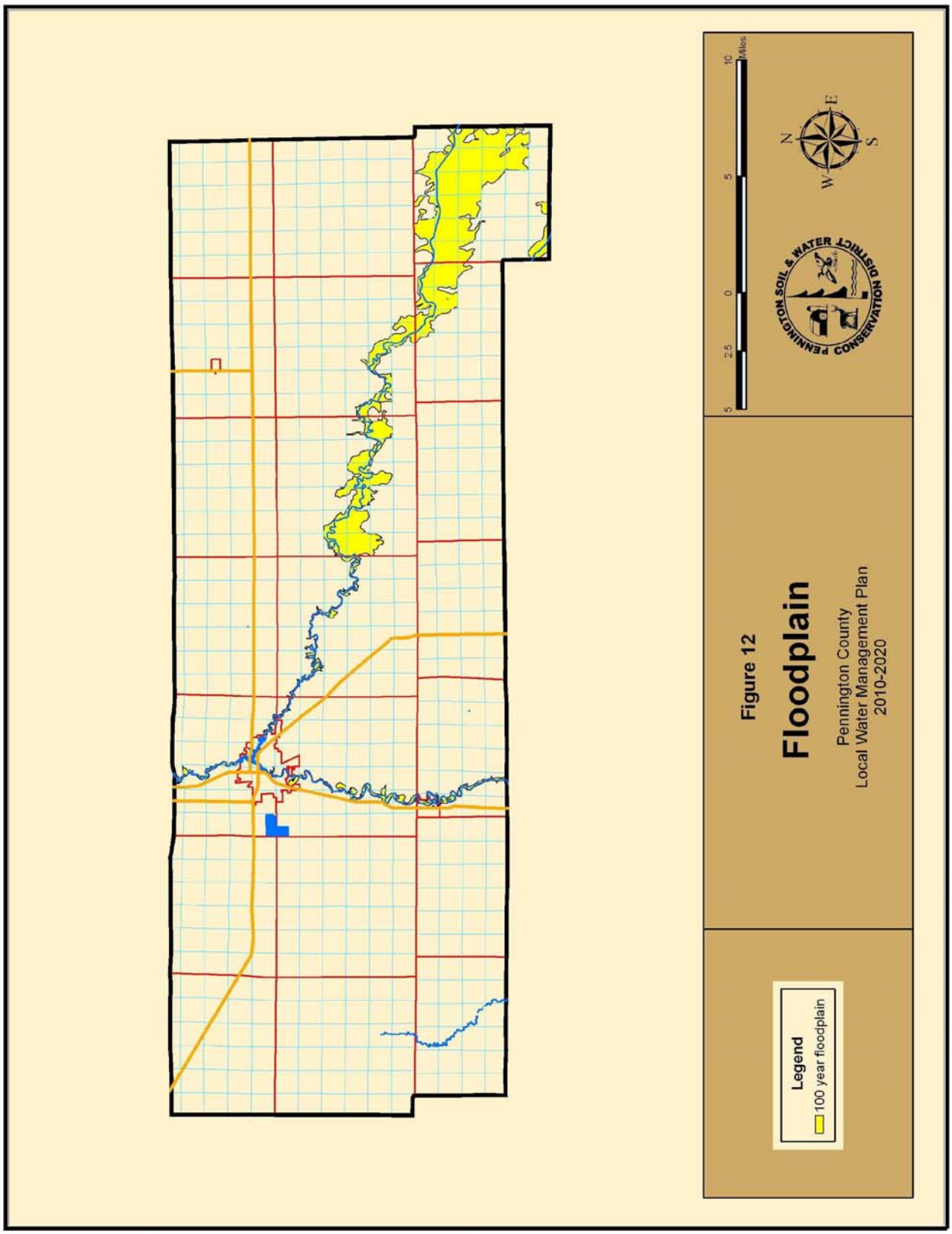
Figure 12
Floodplain
Pennington County
Local Water Management Plan
2010-2020
Legend
100 year floodplain
Miles
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PENNINGTON SOIL & WATER CONSERVATION DISTRICT

GOAL

Work with Landowners and Entities (Local, State, and Federal) for the Reduction of Flood Damage

Objective A:

Educate the public about flooding and provide technical and financial assistance when needed

New Actions:

1. Provide assistance to landowners requesting FEMA floodplain maps; assist with map production and deciphering the floodplain boundaries.
Responsibility: Lead: SWCD Partners: DNR
Timeline: 2010-2020
Priority: County-Wide

2. Encourage landowners to control run-off from their lands with the use of buffer strips, side water inlets and dikes to ditches and waterways.
Responsibility: Lead: SWCD
Partners: DNR, NRCS, SWCD, others
Timeline: 2010-2020
Priority: County-Wide

3. Gather and provide information to the public on what they can do to prevent flooding on an individual basis.
Responsibility: Lead: SWCD Partners: WDs, NRCS, others
Timeline: 2010-2020
Priority: County-Wide

4. Through information and education encourage landowners to reduce impervious surfaces within the shoreland and urban areas.
Responsibility: Lead: SWCD Partners: WDs, NRCS, others
Timeline: 2010-2020
Priority: County-Wide

5. Educate contractors and landowners to ensure that storm water runoff issues are addressed in any new development within the shoreland.
Responsibility: Lead: SWCD Partners: DNR, others
Timeline: 2010-2020
Priority: County-Wide

6. Promote the use of rain gardens and other best management practices that reduce runoff rates in urban areas.
Responsibility: Lead: SWCD Partners: RLWD, U of M Extension
Timeline: 2010-2020
Priority: City of TRF and St. Hilaire

Ongoing Actions:

1. Assist landowners with compliance of the floodplain ordinance. Administer the ordinance by permitting for building to the Regulatory Flood Protection elevation, adding or removing fill or soil, etc.
Responsibility: Lead: SWCD Partners: DNR, Hwy. Dept, WDs
Timeline: 2010-2020
Priority: County-Wide

2. Educate landowners on the pros and cons of tile drainage.
Responsibility: Lead: Watershed Districts
Partners: SWCD, NRCS
Timeline: 2010-2020
Priority: County-Wide

3. Encourage participation in programs such as RIM, WRP, CRP, Native Buffer Program and CREP to convert environmentally sensitive cropland to native vegetation in order to increase floodwater storage.
Responsibility: Lead: All Partners: NRCS, SWCD
Timeline: 2010-2020
Priority: County-Wide

4. Assist landowners with technical and financial assistance to reduce flood damage through the use of conservation practices. Such as buffer strips, side water inlets, grade stabilizations, etc.
Responsibility: Lead: All Partners: SWCD, NRCS, WDs
Timeline: 2010-2020
Priority: County-Wide

Objective B:

Coordinate and cooperate with other agencies and jurisdictions on plans and implementing projects to reduce damages by flooding

New Actions:

1. Work with ditch authorities to improve ditch management and maintenance.
Responsibility: Lead: All Partners: RLWD, County, SWCD
Timeline: 2010-2020

Priority: County-Wide

2. Encourage coordination of water releases from upstream impoundments.
Responsibility: Lead: All
Partners: USFWS, DNR, RLWD, ACOE
Timeline: 2010-2020
Priority: Upstream of the TRF Dam

3. Support and encourage the update of FEMA maps to reflect more accurate floodplain boundaries.
Responsibility: Lead: RLWD Partners: DNR, SWCD
Timeline: 2010-2015
Priority: County-Wide

4. Cooperate with State and Federal agencies to resolve floodplain mapping inconsistencies between counties
Responsibility: Lead: All Partners: RLWD, DNR, SWCD, others
Timeline: 2010-2020
Priority: Floodplain Areas

5. Assist the City of Thief River Falls and St. Hilaire with the establishment of flood protection plans and projects.
Responsibility: Lead: SWCD
Partners: City of TRF and St. Hilaire, others
Timeline: 2010-2020
Priority: City of TRF and St. Hilaire

6. Work to obtain funding for Drainage Record Modernization to preserve and modernize legal ditch records in the County.
Responsibility: Lead: Hwy. Dept Partners: SWCD, RLWD
Timeline: 2010-2015
Priority: County-Wide

7. Support and or assist the RLWD stream gage recording to be used for predicting flood events and for modeling stream flow
Responsibility: Lead: RLWD Partners: SWCD, others
Timeline: 2010-2020
Priority: County-Wide

8. Interview township officers to determine where flooding consistently occurs in their township and correlate with soils data, past floodplain data, and new floodplain data to create maps of “flood prone areas” in the county and provide these maps to the County Board and landowners.
Responsibility: Lead: SWCD
Partners: Townships, County, RLWD
Timeline: 2010 &2016

Priority: County-Wide

9. Consider issues of conflict and concern with Flood Damage Reduction efforts including; the conflict in culvert sizing between fish passage and flow velocity, the perceived inconsistent use of roads as temporary floodwater control structures and the affects of tiling on water quality and water quantity.
Partners: All
Responsibility: Lead: All
Partners: DNR, SWCD, RLWD, others
Timeline: 2010-2020
Priority: County-Wide

On-going Actions:

1. Encourage floodwater retention structures to reduce potential flooding where possible with a local control structure management plan.
Responsibility: Lead: RLWD Partners: SWCD
Timeline: 2010-2020
Priority: County-Wide

2. Serve on the County Technical Evaluation Panel for WCA issues.
Responsibility: Lead: SWCD Partners: County, BWSR, others
Timeline: 2010-2020
Priority: County-Wide

3. Work with RLWD as they implement the Flood Damage Reduction Agreement.
Partners: RLWD, SWCD
Responsibility: Lead: SWCD Partners: DNR
Timeline: 2010-2020
Priority: County-Wide

4. Serve as members on FDR workgroups as requested.
Responsibility: Lead: All
Partners: RLWD, SWCD, DNR, others
Timeline: 2010-2020
Priority: County-Wide

5. Work with RLWD to encourage dikes, water diversions, impoundments and grade stabilization projects.
Responsibility: Lead: RLWD Partners: SWCD, NRCS
Timeline: 2010-2020
Priority: County-Wide

6. Support the Middle Snake Tamarack Watershed District and the Red Lake Watershed District in the development and implementation of their revised watershed management plans.

Responsibility: Lead: MSTWD &RLWD Partners: others
Timeline: 2010-2020
Priority: County-Wide

7. Search for programs and funding for flood reduction projects.
Partners: All
Responsibility: Lead: SWCD Partners: DNR
Timeline: 2010-2020
Priority: County-Wide

8. Work to have a sufficient emergency management plan for flood events.
Responsibility: Lead: All
Partners: Cities, County, RLWD, others
Timeline: 2010-2020
Priority: County-Wide

9. Utilize flood control storage when designing erosion control structures, multi-purpose dams, and wetland restorations.
Responsibility: Lead: All
Partners: SWCD, Hwy Dept, DNR, RLWD
Timeline: 2010-2020
Priority: County-Wide

10. Promote flood control practices such as retention ponds, dams in critical areas, diversions and other water control structures to provide more orderly control of runoff.
Responsibility: Lead: RLWD Partners: SWCD, NRCS, others
Timeline: 2010-2020
Priority: County-Wide

Objective C:

Identify and implement Natural Resource Enhancement (NRE) opportunities

New Actions:

1. Conduct an inventory of natural resource enhancement opportunities including wetland restorations, sediment basins, buffer strips, etc.
Responsibility: Lead: SWCD Partners: NRCS, RLWD, DNR
Timeline: 2010-2020
Priority: County-Wide

2. Determine locations in the county where beaver dams affect the movement of water and find the funds to remove dams and reduce beaver populations if necessary.
Responsibility: Lead: All Partners: SWCD, RLWD, County

Timeline: 2010-2020
Priority: County-Wide

3. Increase grassland and wetland habitats within the river corridors of the Thief, Black and Red Lake Rivers. Utilizing programs such as EQIP, Red River Valley Set-a-Side, CCRP, RIM, CREP, WRP, Native Buffer Program.
Responsibility: Lead: All Partners: SWCD, NRCS, RLWD
Timeline: 2010-2020
Priority: Corridors of the Thief, Black and Red Lake Rivers

4. Develop new conservation practices to keep drifting snow from filling in and plugging ditch systems
Responsibility: Lead: All Partners: SWCD, NRCS, RLWD
Timeline: 2010-2020
Priority: County-Wide

On-going Actions:

1. Monitor tiling to determine potential FDR issues and to gather information.
Responsibility: Lead: RLWD Partners: SWCD
Timeline: 2010-2020
Priority: County-Wide

2. Protect existing wetlands through the Wetlands Conservation Act to retain existing water storage, provide filtration of sediment and pollutants, and maintain wildlife habitat.
Responsibility: Lead: SWCD Partners: All others
Timeline: 2010-2020
Priority: County-Wide

3. Promote the use of buffer strips; to reduce runoff, erosion, and sedimentation.
Responsibility: Lead: SWCD & NRCS
Partners: DNR, RLWD, County, others
Timeline: 2010-2020
Priority: County-Wide

4. Provide technical assistance to landowners regarding WCA issues.
Responsibility: Lead: SWCD Partners: BWSR, DNR, others
Timeline: 2010-2020
Priority: County-Wide

5. Administer WCA to reduce the loss of wetlands and encourage wetland restoration.
Responsibility: Lead: SWCD Partners: BWSR, DNR, others
Timeline: 2010-2020
Priority: County-Wide

GOAL

Maintain Adequate Drainage Systems

Objective A:

Ensure drainages; County, Township, Watershed, and private ditch systems address needs to support farming without negatively affecting water quality, natural resources and landowners downstream as result of poor maintenance or flooding.

New Actions:

1. Educate landowners on the proper operation and maintenance of ditches by holding a ditch maintenance workshop
Responsibility: Lead: SWCD Partners: NRCS, Hwy Dept, RLWD
Timeline: 2017
Priority: County Wide

2. Assist landowners with correcting drainage outlet problems, such as cleaning outlet ditches, calculating adequate culvert size, etc.
Responsibility: Lead: County Partners: SWCD, DNR, RLWD
Timeline: 2010-2020
Priority: County-Wide

3. Define to what extent drainage ditch systems should be maintained.
Responsibility: Lead: All
Partners: SWCD, Hwy Dept, DNR, RLWD, others
Timeline: 2010-2020
Priority: County-Wide

4. Seek funding to inventory road and ditch authority culverts in the County.
Responsibility: Lead: County Partners: SWCD, DNR, WDs
Timeline: 2010-2020
Priority: County-Wide

Ongoing Actions:

1. Establish and enforce one rod grassed buffers strip on either side of new and improved county ditches.
Responsibility: Lead: County Partners: SWCD, WDs, NRCS
Timeline: 2010-2020
Priority: County-Wide

2. Work with the County and Watershed District to ensure ditches are being designed and properly maintained on a regular basis.
   Responsibility: Lead: County & WDs Partners: SWCD, others
   Timeline: 2010-2020
   Priority: County-Wide

Priority Concern 3: Protect the County's Drinking Water Sources.

Pennington County citizens depend on both surface and ground water as drinking water sources. The city of Thief River Falls depends on the municipal dam on the Red Lake River to provide their drinking water. Other communities in the County and rural citizens depend on private and public groundwater wells as their water source. It is a top priority to maintain a viable drinking source for public consumption. Protecting the drinking water for the majority of citizens within Pennington County is a wise and relatively inexpensive investment for the community's future.

In an effort to provide water fit for domestic consumption the 1996 amendments to the Federal Safe Drinking Water Act requires that the Minnesota Department of Health (MDH) produce source water assessments for all of Minnesota's public water systems and to make assessment results available to the public. A Source Water Assessment is a document produced by MDH staff and is intended to provide basic information to public water suppliers and the general public regarding where their drinking water comes from, and the degree to which it may be impacted by potential sources of contamination. The goal of source water protection is to prevent contaminants from entering the source; this is more economical and effective then treating water that is currently contaminated. Source Water Assessments specifically include; the status of a public water system's source water protection plan, a description of the water source(s) used by the public water system, a determination of the susceptibility of the water sources to contamination, and a list of contaminants of concern for the water source(s) and potential contaminant sources that could impact the water supply. The MDH has completed Source Water Assessments for all of the approximately 7,000 public water systems in the state. Twenty one (21) assessments have been completed in Pennington County. Figure 13 & Table 4. These assessments focus on the source of water, rather than the finished water supplied to the public at their taps. This water may be treated to protect or improve its quality before it reaches the consumer.

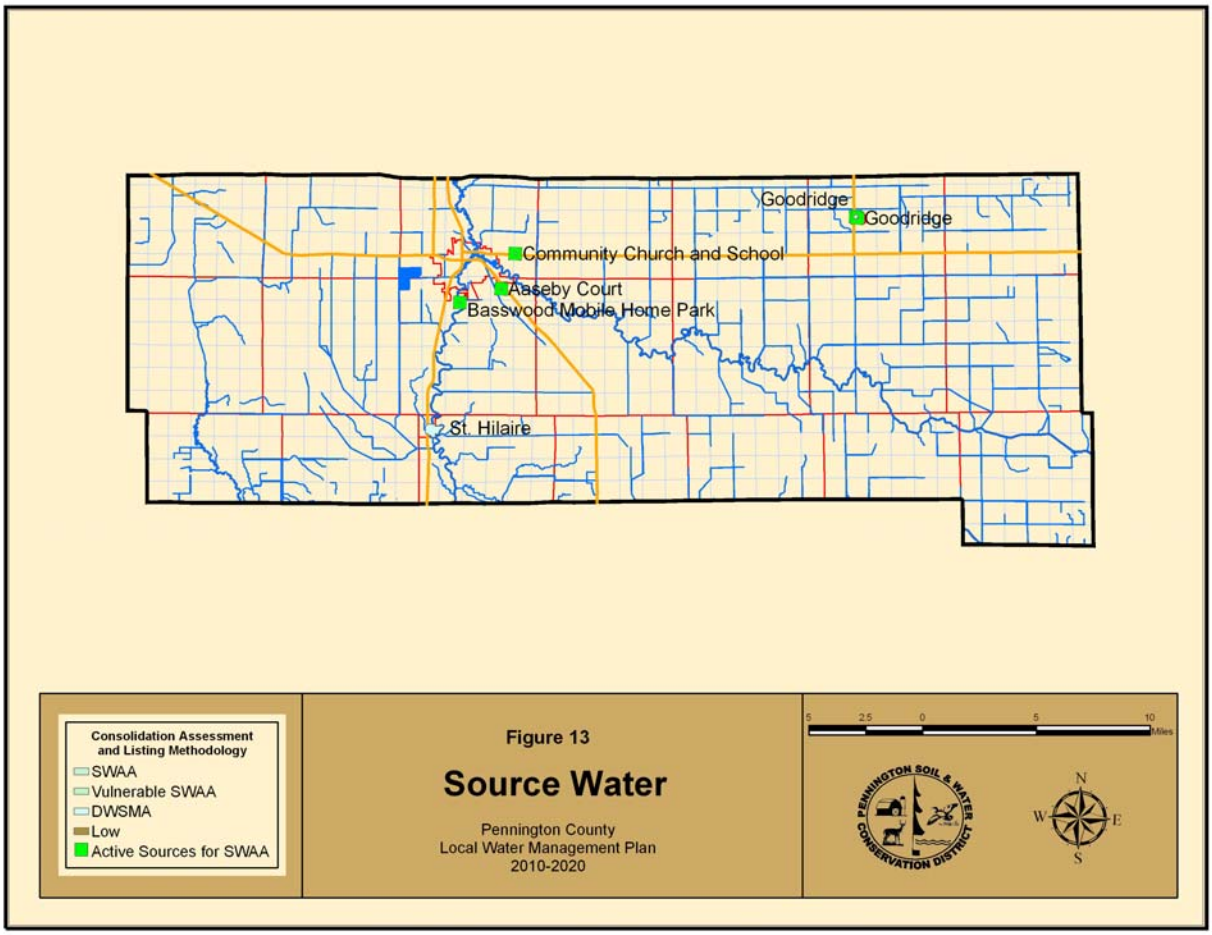
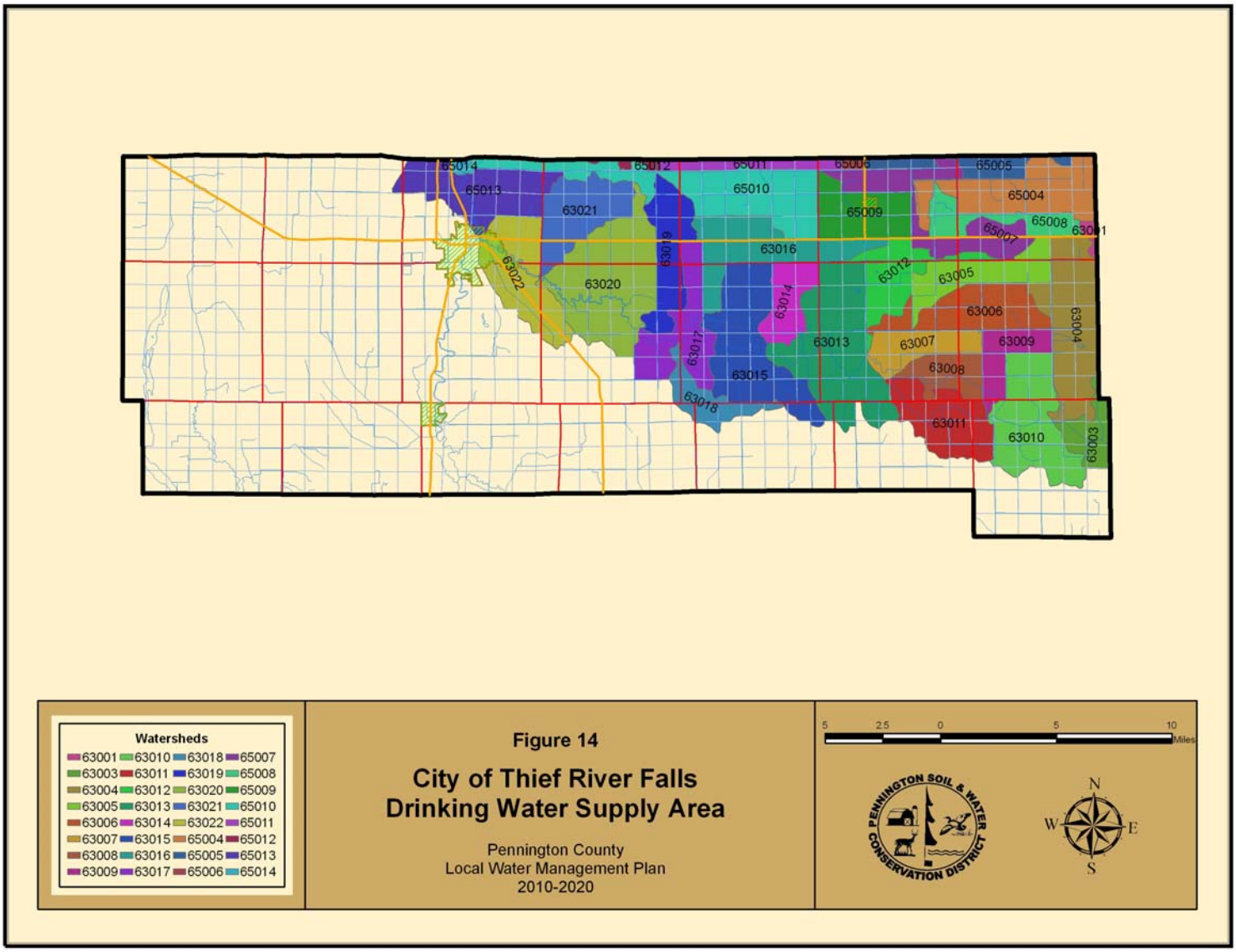


Table 4
Source Water Protection- Assessment Plans

Name	ID	Assessment Plan	Aquifer Sensitivity	Nearest city
Aaseby Court	1570005	-	Low	Thief River Falls
Basswood Mobile Home Park	1570004	-	Low	Thief River Falls
Bethany Lutheran Church	5570115	completed	Low	Goodridge
Black River Lutheran Church	5570021	completed	High	Red Lake Falls
Carpenter's Corner	5570023	completed	Low	Thief River Falls
Community Church and School	5570103	-	Low	Thief River Falls
Country Estates Mobile Home Park	1570006	-	High	Thief River Falls
Ebenezer Lutheran Church	5570113	completed	Low	Plummer
Ekelund Lutheran Church	5570116	completed	Low	Goodridge
Galaxy Twin Theater	5570118	completed	High	Thief River Falls
Goodridge	1570001	-	Low	Goodrige
Kruse Inn	5570031	completed	High	St. Hilaire
Oak Park Lutheran Church	5570013	completed	High	Trail
Oak Ridge Lutheran Church	5570119	completed	Low	Thief River Falls
Petro Pumper	5570117	completed	Low	Thief River Falls
St. Hilaire	1570002	completed	High	St. Hilaire
St. Pauli's Lutheran Church	5570037	completed	Low	St. Hilaire
Thief River Falls	1570003	completed	-	Thief River Falls
Thief River Falls Golf Club	5570101	completed	Low	Thief River Falls

Surface Water as a Drinking Source

The city of Thief River Falls utilizes a municipal dam on the Red Lake River to obtain its' water supply. The dam was first constructed in 1895 for the use of a lumber mill. The existing municipal dam was constructed in 1947 which creates a reservoir of 135 acres. The water intake line is located on the east side of the Red Lake River in Thief River Falls, upstream of the dam and approximately one mile downstream from its confluence with the Thief River. The watershed for the Red Lake River above the city's water intake is approximately 3450 square miles. Figure 14 below. The major tributary is the Thief River. The typical draw from the river by the Thief River Falls Water Department is 1.5 - 2 million gallons per day, with the plant rated to a 3 million gallon per day capacity. Current storage capacity is approximately 4.75 million gallons, which is adequate for 2-3 days use.



The protection of surface water intakes is not required by law, but many communities that rely on surface waters voluntary develop protection plans. They are very similar to Wellhead Protection Plan. The Minnesota Department of Health has developed a source water plan for city of Thief River Falls. In determining the sensitivity of source water, the physical properties of the geologic setting or landscape within the watershed must be considered. The last glaciations shaped a very flat landscape over much of the watershed area supplying water to the city of Thief River Falls. As a result, the area has been identified as prone to substantial flooding. In addition, extensive ditching has substantially altered natural flows. The concentration of contaminants and their movement to the public water supply system are attenuated by the significant quantity and rate of flow within the Red Lake River. In times of drought the flows can diminish to a point where this dilution effect is compromised. However, the reservoir does provide settling of contaminants during low flow. The variability of flow accents variability of water chemistry and contaminants. A dam at the outlet of Lower Red Lake does moderate this variability. Seasonal changes also influence the sensitivity of the river to contamination. Other factors influencing the sensitivity of a surface water body include topography, hydrology, geology, vegetation and the distribution of various soil types within the sub-watersheds of the Red Lake River. This surface water based drinking water system is highly susceptible to potential contaminants entering the public water supply at a level that may result in an adverse human health impact. The closer the source of contamination is to the intake, the greater the impact on the quality of the water used by the city of Thief River Falls.

The source water assessment area for the city of Thief River Falls includes three distinct nested areas. The inner-emergency response area is designated to help the city of Thief River Falls address contaminant releases which present an immediate (acute) health concern to water users. This geographic area is defined by the amount of time the city of Thief River Falls needs to be notified, shut off the surface water intake and a “buffer” to accommodate unanticipated delays in notification and shut down. The outer source water management area is designated to protect water users from long-term (chronic) effects related to low levels of chemical contamination or the periodic presence of contaminants at low levels in the surface water used by the city of Thief River Falls. Also, this area should protect users from contaminants such as pathogens which may be 1) usually found at treatable levels in the source water and, 2) occasionally present an acute health concern under certain conditions, such as the low stage of the Red Lake River. The entire watershed is designated to provide the water supplier with a broad perspective in which to prioritize specific types of lands uses that may impact the water quality of the source water used by them. The inner-emergency response area includes areas along both the Red Lake River and the Thief River. The area can be described as beginning at the public water supply intake and following sub-watershed boundaries easterly along the Red Lake River on the south side of the river to the Kratka Bridge, which is approximately 22 miles upstream. The boundary then heads northeasterly, following sub-watershed boundaries and ditches for both the Red Lake River and the Thief River, including the east end of Judicial Ditch No. 13/18 and extending due north along Highway 89 until its intersection with County Ditch 27. From there the boundary goes

westerly, following drainage ditches and sub-watershed boundaries to the Thief River, traveling northwesterly to State Highway 32 and turning southerly and traveling back to the intake in Thief River Falls. Outer boundaries were adjusted slightly to accommodate ditching along the river. It is important to note that the emergency response capability is heightened because there is a direct control between the City of Thief River Falls Law Enforcement Center and the water treatment plant's water intake shut-off valve. The outer source water management area can be described as the Red Lake River Watershed upstream of the intake to the river's outlet from Red Lake, and the Thief River Watershed westerly of a line following Highways 219 and 89 from south to north. The third area is the entire watershed, as shown in Figure 2, and is called the Red Lake Major Sub-Basin. The Red Lake Major Sub-Basin includes the Red Lake River Watershed upstream of the intake, the Thief River Watershed, and the Upper and Lower Red Lake Watershed.

Possible sources of contamination to surface water intakes include; stormwater discharge sites, cropland sediment runoff, streambank erosion, transportation corridors, failing septic systems etc. A major contaminate the City of Thief River Falls deals with is high sediment loads coming from the Thief River and settling into the reservoir. This adversely affects the quality of water for human consumption. In an effort to maintain the water source, the City had to dredge the reservoir from 1966 to 1969 then again in 1999 to 2000 for the total cost of $1,048,685. The projected lifespan of the dredging was estimated to be 25-30 years, but the reservoir has since been filling at an alarming rate. Sediment deposition has reduced the storage volume of the reservoir by approximate 20%. A report on Erosion, Sedimentation, and Sediment Yields for the Thief and Red Lake Rivers Basin published by the NRCS in 1996 addressed the Thief River Falls Reservoir watershed. In the study they discovered that the reservoir receives 19,800 tons of sediment each year. The study also determined that the Thief River streambanks that are eroding make up 65% of the total erosion, 60% of that is severe. This study lead to further investigation with the Thief River Watershed Sediment Investigation (TRWSI) Project which is intended to diagnose the impact of hydrologic modifications and human activities affecting the natural factors influencing Thief River Watershed water quality.

Another problem the city has been faced with has been hydrogen sulfide gas (H_2S) problems. Under certain winter conditions hydrogen sulfide gas (H_2S) is transported by the rivers giving foul odors as the water is discharged through the gates and powerhouse of the municipal dam. Hydrogen sulfide gas at low levels is irritating to the eyes, nose and throat. High concentrations can cause unconsciousness, respiratory paralysis, and even death. Additional costs are required to treat the water for the public water supply. Volatilization, not releasing anoxic water from reservoirs while the Thief River is ice-covered, and aeration of reservoir discharge, are all ways to reduce H_2S. A study done in March of 1996 revealed that water samples have highest concentrations downstream of the shallow reservoir. They also found concentrations in the Red Lake River above the mouth of the Thief River. Mixing by the Thief River provides significant dilution. The dam is located near the center of Thief River Falls so numerous complaints and a public nuisance results in the hydrogen sulfide odor. It is important to note that hydrogen sulfide problems are common in municipal, industrial and agriculture facilities. Many

technologies have been developed and implement to control the problem. Discontinuing all overwinter pool draw downs would address the problem in Thief River Falls.

There is a need within this watershed to develop an awareness of the value of a healthy river system. As with any river system, it is important for people to realize that what they do to the river (increasing flow or pollutants) affects other people located downstream, including an entire city of people in Thief River Falls that relies on water from the Red Lake and Thief Rivers for their drinking water supply. Protecting this source was identified as an important resource within the region that needs to be recognized and protected.

Groundwater based Drinking Water

The remainder of Pennington County's citizens depend on groundwater for drinking water. Wellhead protection efforts by public water suppliers need to be developed. Private wells also need protection from potential contaminant sources. Education and assistance will be addressed in this plan.

Adequate water supplies are needed for domestic, municipal, industrial, agricultural, fish and wildlife, recreation, power, and navigation. Major concerns for the contamination of groundwater can come in many forms including bacteria, nitrate, arsenic, and other chemicals (fertilizers, pesticides, etc.). Groundwater can become contaminated through gravel mining, unsealed or improperly constructed wells, industrial development, major highways, petroleum pipelines, railroads, wastewater treatment discharges, failing onsite sewage treatment system, land use on sensitive groundwater areas, feedlots and manure storage areas.

Drift aquifers are the most well known groundwater resource in the county. These have not been intensely studied; however, a study completed by the USGS in 1996 was conducted to better understand the availability and quality of water from drift aquifers in Pennington, Marshall, Polk and Red Lake counties. They determined that recharge of the aquifers occurs primarily through precipitation which peculates down to the saturated zone. Most recharge occurs in spring from snowmelt and rainfall, when groundwater demands by growing vegetation are minimal, allowing precipitation to soak through to the water table. There is generally little recharge during the active growing season. Recharge is also more rapid in unconfined aquifers. Recharge rates can be determined by observation wells within the county. Recharge rates to the unconfined aquifers range from 8-9 inches per year.

The flow of groundwater was also studied. The USGS figures that water enters the drift aquifers by infiltration or precipitation and underflow from the east. Water moves predominantly from east to west in the aquifers. Discharge from groundwater includes streams and wetlands in the county. The Red River of the North is a regional discharge area. Substantial discharge occurs in wetlands especially in eastern Pennington County also in wetlands that border the beach ridge. Withdrawals from domestic rural and residential make up a small amount of withdrawn water, livestock is slight, and irrigation is minimal.

Drift aquifers include both confined and unconfined aquifers. Unconfined drift aquifers are generally limited to scattered surficial sand and gravel beach deposits from by Glacial Lake Agassiz. These are susceptible to land-surface contamination. They are also extremely important for they may be significant sources of recharge for the underlying confined aquifers. Little is known about the confined aquifers interbedded within the glacial deposits. The beach ridge aquifer in Pennington County underlies a beach ridge that is about 10 miles in length and 1 mile wide. It is less complex than other ridges in neighboring counties because there are no partially confined aquifers. Also the

unconfined aquifer is connected to an underlying uppermost confined aquifer in the northern part of the ridge.

Aquifers in glacial deposits are important for the county. Well yields generally are 5-10 gal/min and are sufficient for rural domestic and livestock use. Confined aquifers consist of sand and gravel deposits that are bounded above by confining units of till or lake deposits. These clay layers protect the county's confined aquifers which are the most extensively used aquifers for drinking water wells. The practically impervious clay protects the aquifers from surface contamination moving downward into them. It also serves as a barrier to rapid recharge of these aquifers from surface infiltration.

Groundwater chemistry in Pennington County is generally good, most of the water is considered to be hard water that consists primarily of calcium carbonate and calcium magnesium water types. Groundwater quality in the County is monitored by numerous means. All municipal and public wells are tested at least annually for nitrates and monthly for bacteria. Many households in the county have had water tested to determine if their water meets or exceeds the MDH threshold for drinking water standards. Since 1999 the Pennington SWCD has held annual Well Water Testing Clinics to test homeowner's wells for nitrates and bacteria for a minimal fee. The USGS tested for nitrates during their 1996 study, they found that of the 6 wells tested in the county 2 (along the beach ridge) had nitrate present, one with an extremely high report. The Minnesota Department of Agriculture (MDA) also tests the observation wells in the county for nitrates and pesticides on a yearly basis. Results are documented in Appendix B1.

The purpose of the observation well program is to collect baseline data on ground water level fluctuations and trends. Since 1944, DNR Waters has managed a statewide network of water level observation wells (obwells). Data from these wells are used to assess ground water resources, determine long term trends, interpret impacts of pumping and climate, plan for water conservation, evaluate water conflicts, and otherwise manage the water resource. The Pennington Soil and Water Conservation District under contract with DNR Waters, measures the wells monthly and reports the readings to DNR Waters.

There are seven observation wells in the county that are monitored monthly (excluding January and February). The wells are located on the beach ridges in unconfined surficial sand and gravel aquifers. Figure 15. The wells are monitored for static water level and are found to react quickly to rainfall events. The following table contains specific information about the wells:

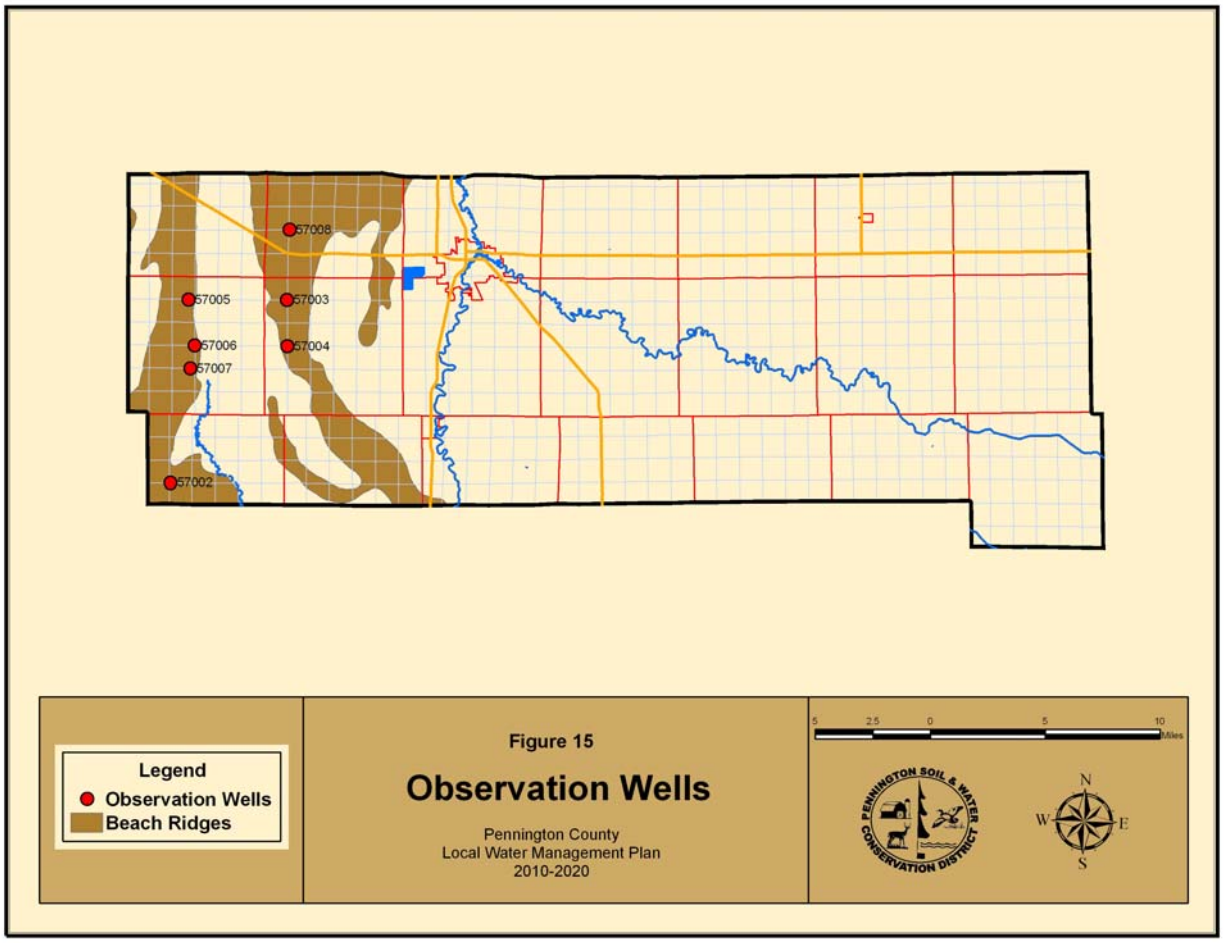


Table 5
MN DNR Observation Wells in Pennington County

Geographic Indicator	Well Number / Unique Number	Aquifer	Completed	Depth (feet)	Average Yearly Water Level
152, 45, 17	57002 / 244116	QWTAQWTA	5/14/92	22	10.88
153, 44, 06	57003 / 244122	QWTAQWTA	5/6/92	13	4.57
153, 44, 20	57004 / 244121	QWTAQWTA	5/8/92	19	6.44
153, 45, 09	57005 / 244119	QWTAQWTA	5/12/92	17.8	12.25
153, 45, 21	57006 / 244117	QWTAQWTA	5/19/92	22	12.83
153, 45, 28	57007 / 244114	QWTAQWTA	5/13/92	22	14.99
154, 44, 19	57008 / 24120	QWTAQWTA	5/5/92	12	11.53

The sand and gravel unconfined surficial beach ridge aquifers located in the western portion of Pennington County have the highest potential for contamination from land use. Saturated thicknesses of these aquifers range from 0 to 30 feet with well yields from 12 to 123 gallons per minute. Recharge is predominantly from precipitation that percolates downward. Recharge rates range from 8 to 9 inches per year.

A hydrograph of each observation well containing data from 1995 to 2009 is contained in Appendix B1.

Minnesota Department of Agriculture (MDA) is the lead state agency for the presence of pesticides and fertilizers. Pesticides are chemicals that include herbicides (to manage weeds), insecticides (to manage insects), fungicides (to manage certain diseases), and disinfectants (to manage germs and bacteria). Pesticide contamination in private wells can be the result of homeowner activity (e.g., on-site septic systems, improper disposal of chemicals, poor well location or construction), or be the result of land use and other activities near or far from the well. Each year they test a number of wells in the region for a broad group of pesticides, fertilizers and nitrates. In 2007 Pennington SWCD tested 4 of the 7 observation wells for bacterial contamination and nitrates, our result indicted some high total bacteria levels, nitrates were below MDH thresholds. See Appendix B1 for groundwater monitoring results.

There is no state agency program or office that is required to conduct routine sampling or analysis of Minnesota's private drinking water wells for any type of contamination, including pesticides. Public drinking water supplies, however, are required by state and federal agencies to routinely test for several pesticides under Minnesota's implementation of the Safe Drinking Water Act. The Minnesota Department of Health (MDH), however, recommends testing private wells for nitrate because of the potential health risks it posses to infants (blue baby syndrome). Nitrate and nitrite are naturally occurring sources of pollution and can be found in groundwater, although high nitrate levels are usually due to human activities. Human introduced nitrate-nitrite enters environment from fertilizer, sewage, and human or farm animal waste. In agricultural settings, risks of potential contamination can be reduced by proper nutrient management and manure storage. The MDH has developed nitrate-nitrogen probability maps for several counties in Minnesota. These maps can help with state and local water quality planning efforts. Pennington County has not yet been mapped. Contaminated groundwater can also impact irrigated crops, livestock, and surface waters.

Source water protection was developed to prevent contaminants from entering public drinking water sources. The MN Department of Health has a Source Water Protection Program which includes Well Head Protection (WHP) and the protection of surface water intakes. The Wellhead Protection Program is designed to protect public water supply wells. A plan is developed and a "capture zone" for the well is developed for managing potential contamination sources within the Drinking Water Supply Area (DWSMA). A DWSMA is a geographic area, which includes the well head protection area that is protected and managed by the WHP plan. Wellhead Protection is required by law, as stated in the MN Groundwater Protection Act and the federal Safe Drinking Water Act.

Wellhead protection is a method developed by the MDH to prevent well contamination by managing potential contaminant sources within a well's recharge area. Wellhead protection plans have now been completed for St. Hilaire. The MDH requires these municipalities to complete wellhead protection plans because of their vulnerability rating. The vulnerability assessments must address three components: 1) geologic sensitivity, 2)

well construction, maintenance, and use, and 3) water chemistry and isotopic composition (age dating). Wells classified as “moderately vulnerable” must manage all point source contamination risks and address land use activities that threaten the aquifer. The citizens that depend on ground water for drinking water will benefit if public water suppliers develop and implement Wellhead Protection Plans.

It is important to note that a "source water assessment" and a “wellhead protection plan” are two different documents, with separate and distinct purposes. A Source Water Assessment is a document produced by MDH staff and is intended to provide basic information to public water suppliers and the general public regarding where their drinking water comes from, and the degree to which it may be impacted by potential sources of contamination. Source water assessment can aid a water system in its wellhead protection planning process and provides an update of the system's progress in source water protection. Source water assessments are produced by MDH, while the wellhead protection plan is developed by the water system and its wellhead protection planning team. (MDH) See Figure 13 and Table 4 on page 61.

Contaminated wells are typically shallow wells in unconfined surficial aquifers on or near the bridge ridges. May of these wells are being abandoned, sealed and replaced by deeper, less susceptible wells.

The County continues to offer financial incentives to help landowners properly seal unused wells to protect the ground water supply. On average, about twelve wells are cost shared each year. Many others are sealed without assistance.

Priority Concern 3: Protect the County's Drinking Water Sources.

GOAL

Source Water Protection for the City of Thief River Falls

Objective A:

Address high sediment volumes affecting the reservoir for Thief River Falls.

Priority Thief River north of town and area near intake

New Actions:

1. Support the Marshall County Water Plan and the RLWD with their monitoring within the Thief River watershed.
   Responsibility: Lead: All Partners: SWCD, DNR, WDs
   Timeline: 2010-2020
   Priority: TRF DWMSA

2. Support the 1C Reclassification for the Thief River
   Responsibility: Lead: MPCA
   Partners: SWCD, DNR, WDs, others
   Timeline: 2010-2020
   Priority: TRF DWMSA

3. Focus inspection and enforcement of the county Floodplain, Shoreland and SSTS ordinances with the watershed of the reservoir.
   Responsibility: Lead: SWCD Partners: SWCD, DNR, WDs
   Timeline: 2010-2020
   Priority: TRF DWMSA

4. Seek funding for source water protection and the protection of surface water intakes.
   Responsibility: Lead: All
   Partners: MDH, MPCA,SWCD, RLWD, others
   Timeline: 2010-2020
   Priority: TRF DWMSA

Ongoing Actions:

1. Work with government entities to investigate possible sources of the sediment and seek to understand sources of sediment being deposited into the Thief River Reservoir.
   Responsibility: Lead: All
   Partners: SWCD, DNR, RLWD, others
   Timeline: 2010-2020
   Priority: TRF DWMSA

2. Support and assist with the TMDL process and intensive monitoring as requested.
   Responsibility: Lead: RLWD Partners: SWCD, DNR
   Timeline: 2010-2020
   Priority: TRF DWMSA

3. Promote farming and construction BMPs within the watershed.
   Responsibility: Lead: All Partners: SWCD, NRCS
   Timeline: 2010-2020
   Priority: TRF DWMSA

4. Support the Source Water Assessment Plan for the city of Thief River Falls.
   Responsibility: Lead: City of TRF
   Partners: SWCD, MDH, DNR, WDs, others
   Timeline: 2010-2020
   Priority: TRF DWMSA

5. Provide technical and financial assistance for installation of streambank stabilization projects, buffer strips, windbreaks, living snow fences, grade stabilization structures, and other practices to reduce erosion and sedimentation.
   Responsibility: Lead: SWCD, NRCS, RLWD
   Partners: DNR, others
   Timeline: 2010-2020
   Priority: TRF DWMSA

6. Provide AgBMP low interest loans for conservation tillage equipment.
   Responsibility: Lead: SWCD Partners: MDA
   Timeline: 2010-2020
   Priority: TRF DWMSA

Objective B:

Address high hydrogen sulfide within the reservoir for Thief River Falls

Priority north and south the dam

New Actions:

1. Encourgae the city not to release anoxic water from the reservoir while the rivers are ice-covered.
   Responsibility: Lead: City of TRF Partners: SWCD, DNR, WDs
   Timeline: 2010-2020
   Priority: Reservior

2. Encourgae volatilization of waters upstream.
   Responsibility: Lead: All
   Partners: City of TRF, SWCD, DNR, WDs, Agassiz NWR,
   Timeline: 2010-2020
   Priority: Upstream Reservior

Objective C:

Educate citizens about the importance of source water protection

Ongoing Actions:

1. Education youth at water festivals, outdoor education days, daycamps, etc on the importance of viable drinking sources.
   Responsibility: Lead: All
   Partners: SWCD, DNR, WDs, MDH, others
   Timeline: 2010-2020
   Priority: County-Wide

2. Through mailings, newspaper articles, and workshops educate landowners, producers, contractors, etc on the Shoreland, Floodplain, Feedlot, and Sewage and Wastewater ordinances that are in place and why they are important for water quality and drinking water.
   Responsibility: Lead: SWCD Partners: County, DNR, WDs
   Timeline: 2010-2020
   Priority: County-Wide

GOAL

Protect Groundwater Based Drinking Water Sources within the County

Objective A:

Promote the Well Sealing Program

Ongoing Actions:

1. Seal 8 abandoned wells utilizing 50 percent cost-share provided by EQIP and State Cost-share Program funds.
   Responsibility: Lead: SWCD Partners: County, NRCS
   Timeline: 2010-2020
   Priority: County-Wide

Objective B:

Participate and support groundwater monitoring

New Actions:

1. Work with Department of Agriculture to acquire water quality data results from the observation wells and to acquire information on nitrate sensitive areas.
   Responsibility: Lead: SWCD Partners: MDA
   Timeline: 2010-2020
   Priority: Beach Ridges

2. Work with U of M Water Resource Center to install monitoring wells within the county to determine the movement and depth to the groundwater table for the purpose of treating septic system effluent.
   Responsibility: Lead: SWCD Partners: U of M, County
   Timeline: 2010-2020
   Priority: County-Wide

Ongoing Actions:

1. Monitor water levels in seven DNR observation wells and submit monthly reports to the DNR.
   Responsibility: Lead: SWCD Partners: DNR
   Timeline: 2010-2020
   Priority: Beach Ridges

2. Maintain County Well Inventory for bored and sealed wells.
   Responsibility: Lead: SWCD Partners: MDH
   Timeline: 2010-2020
   Priority: County-Wide

3. Maintain Rainfall Monitoring Program and submit reports to State Climatologist. We will strive to have one monitor per township.
   Responsibility: Lead: SWCD Partners: others
   Timeline: 2010-2020
   Priority: County-Wide, one per township

Objective: C

Work with landowners and entities (Local, State and Federal) for the protection of groundwater

New Actions:

1. Assist the community of Goodridge with developing a wellhead protection plans.
   Responsibility: Lead: SWCD Partners: City, MDH
   Timeline: 2015
   Priority: City of Goodridge

2. Work with community and noncommunity public water suppliers in development and implementation of wellhead protection activities and plans.
   Responsibility: Lead: SWCD Partners: MDH
   Timeline: One a year
   Priority: County-Wide

3. Seek funding and prepare for an inventory of Subsurface Sewage Treatment Systems along the Thief River on Dewey Avenue.
   Responsibility: Lead: SWCD Partners: County, MPCA
   Timeline: 2010-2020
   Priority: Dewey Ave

4. Update the Sewage and Waste Water Ordinance to include the new MPCA rules.
   Responsibility: Lead: SWCD Partners: County, MPCA
   Timeline: 2011
   Priority: County-Wide

5. Seek funding to inventory failing and non compliant systems in shoreland, floodplain and DWSMA areas.
   Responsibility: Lead: SWCD Partners: County, MPCA
   Timeline: 2010-2020
   Priority: Shoreland, Floodplain, DWSMA

6. Support the development of monitoring for naturally occurring arsenic in the county.
   Responsibility: Lead: SWCD Partners: USGS, MDH
   Timeline: 2010-2020
   Priority: County-Wide

Ongoing Actions:

1. Provide public information on how and where to get wells tested, types of tests available, maximum allowable limits on groundwater and drinking water contaminants, and what do if a well is contaminated.
   Responsibility: Lead: MDH, SWCD Partners: others
   Timeline: 2010-2020
   Priority: County-Wide

2. Assist county residents with an annual well water testing clinic, providing 50% cost share to test for nitrates and bacteria. Also provide technical assistance regarding results and provide each landowner with the MN Department of Health Well Owner's Manual. Offer iron, hardness and pH tests as requested. Keep an inventory of results.
   Responsibility: Lead: SWCD Partners: County
   Timeline: 2010-2020
   Priority: County-Wide

3. Support the Wellhead Protection plan for the City of St. Hilaire.
   Responsibility: Lead: All Partners: SWCD, MDH, others
   Timeline: 2010-2020
   Priority: St. Hilaire

4. Offer AgBMP loans to repair and replace septic systems.
   Responsibility: Lead: SWCD Partners: MDA
   Timeline: 2010-2020
   Priority: County-Wide

5. Administer the county ISTS ordinance to insure proper design, installation and inspections and assist landowners with bringing their systems into compliance.
   Responsibility: Lead: SWCD Partners: County, MPCA
   Timeline: 2010-2020
   Priority: County-Wide

6. Consider wellhead protection areas when making land use decisions.
   Responsibility: Lead: All
   Partners: SWCD, DNR, WDs, others
   Timeline: 2010-2020
   Priority: County-Wide

7. Support the County Feedlot and Solid Waste Programs.
   Responsibility: Lead: All
   Partners: SWCD, DNR, WDs, others
   Timeline: 2010-2020
   Priority: County-Wide

8. Assist state and federal agencies with any research on the groundwater resources in the County.
   Responsibility: Lead: SWCD Partners: USGS, others
   Timeline: 2010-2020
   Priority: County-Wide

9. Encourage landowners to restore wetlands to recharge groundwater
   Responsibility: Lead: SWCD Partners: NRCS, DNR, WDs
   Timeline: 2010-2020
   Priority: County-Wide

Objective D:

Educate citizens on preserving groundwater resources and quality

New Actions:

1. Map out, using GIS, locations of nitrate contamination around the county.
   Responsibility: Lead: SWCD Partners: County, MDH
   Timeline: 2010-2020
   Priority: County-Wide

2. With the discontinuation of the Dead Livestock Collection Program work with RC&D and other agencies to find means of proper disposal of carcasses.
   Responsibility: Lead: RC&D Partners: SWCD, NRCS
   Timeline: 2010-2020
   Priority: County-Wide

3. Map out, using GIS, locations of sealed wells around the county.
   Responsibility: Lead: SWCD Partners: County, MDH
   Timeline: 2010-2020
   Priority: County-Wide

Ongoing Actions:

1. Continue to promote public education on maintaining our groundwater resources through the Water Festival, which will reach over 400 fourth grade students annually, and other educational events.
   Responsibility: Lead: SWCD Partners: NRCS, DNR, WDs
   Timeline: 2010-2020
   Priority: County-Wide

2. Promote the importance of water conservation. Educate and encourage the public to use water efficient plumbing fixtures and appliances. Promote the use of rain barrels.
   Responsibility: Lead: SWCD
   Partners: NRCS, DNR, WDs, RC&D, others
   Timeline: 2010-2020
   Priority: County-Wide

3. Educate local officials and landowners on the benefits of reclaiming abandoned gravel pits to protect groundwater recharge areas.
   Responsibility: Lead: DNR, SWCD
   Partners: WDs, UDGS, others
   Timeline: 2010-2020
   Priority: County-Wide

4. Educate public with brochures/newsletters/newspaper articles etc. on local ordnances and how they relate to the quality of groundwater based drinking water.
   Responsibility: Lead: SWCD Partners: others
   Timeline: 2010-2020
   Priority: County-Wide

IV. Implementation Schedule

Years 2010 to 2020

Priority 1: Protection and Improvement of Surface Water Quality					
Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
Goal: **Reduce the Extent of Turbidity and Sedimentation in the Thief River and Red Lake River**					
Objective A**: Assist Landowners and Government Entities with the Reduction of Water and Wind Erosion**					
New Actions					
1. Work with government entities to investigate possible sources of the sediment in the Thief River Falls reservoir.	All	$50,000	Staff, Grants	2010-2020	Minor watersheds of the TRF DWSMA
2. Seek funding and conduct the Jerome Street Group streambank restoration project	SWCD, RLWD	$100,000	State Cost Share, Watershed	2010	Red Lake River
3. Cooperate with the Red Lake Watershed District on the installation of a stormwater runoff pond in the City of Thief River Falls.	RLWD, SWCD, City of TRF	$50,000	Watershed, Grant	2015-2020	DWSMA
4. Promote the District tree matting program; install approximately 35,000 feet of the fabric for erosion control, weed control and moisture each year.	SWCD, NRCS	$20,000 /year	State Cost Share, EQIP, WHIP, CCRP	2010-2020	County Wide
5. Plant 1 mile of living snowfence in a high priority area designated by the MNDOT yearly.	SWCD, MN DOT	$5,000 /year	MN DOT, State Cost Share, CCRP	2010-2020	MN DOT designated areas
6. Utilize the Native Buffer cost-share program to establish diverse native vegetation buffers.	SWCD, BWSR	$7,500 /year	Native Buffer Cost Share Program	2010-2015	Riparian and ditch buffers

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
7. Install a Rain Garden to reduce stormwater runoff in the city of Thief River Falls, or St. Hilaire.	SWCD, RLWD, U of M Extension, Master Gardener Club	$10,000 each	Grants, County, City, Staff	2011-2012	City of TRF
8. Educate and encourage landowners to plant rain gardens on their property by hosting a demo workshop.	SWCD, RLWD, U of M Extension, Master Gardener Club	$1,000 /year	Staff, NRBG, Grants	2012 & 2017	County Wide
9. Seek funding and prepare for additional streambank restoration projects.	SWCD, RLWD, DNR	$100,000	Grants, State Cost Share, Clean Water Fund	2010-2020	Thief and Red Lake River Watersheds
Ongoing Actions					
1. Provide technical assistance and cost share opportunities to landowners to apply BMPs to protect water quality.	SWCD, RLWD, DNR,	$50,000 /year	Staff, NRBG, County, State and Federal cost share programs	2010-2020	County Wide
2. Continue to develop implementation initiatives from Non-Point Source (NPS) problems ascertained by the Comprehensive River Basin Study.	SWCD, others	Unknown	Staff	2010-2020	County Wide
3. Continue working with the State Revolving Fund Loan Program to provide low interest lows for BMPs.	SWCD, MDA	$100,000 /year	State Revolving Fund Loan Program	2010-2020	County Wide
4. Cooperate with other agencies on projects to reduce sedimentation.	All	Unknown	Staff, State and Federal Programs, Grants	2010-2020	County Wide
5. Install at least 2 grade stabilization structures a year.	SWCD, NRCS, RLWD	$30,000 /year	State Cost Share, EQIP, CWF	2010-2020	DWSMA

Actions	Responsible Agencies	Costs	Potential Funding Sources	Schedule	Focus Area
6. Work with landowners to install 10 side-water inlets a year.	SWCD, NRCS, RLWD, County	$10,000 /year	State Cost Share, EQIP, County, CCRP	2010-2020	DWSMA
7. Create an average of 2 miles of buffers at least 1 rod in width along watercourses each year. Strive to place a 50 foot rod on buffers along public waters	SWCD, NRCS, County, RLWD	$1,200 /year	Native Buffer Cost Share program, State and Federal Programs, County	2010-2020	DWSMA
8. Promote and implement water quality and erosion control practices through CSP,CCRP, EQIP, State Cost-Share and general conservation technical assistance.	SWCD, NRCS, County, RLWD	$5,000	State and Federal Programs, Staff	2010-2020	County Wide
9. Plant or renovate at least 2 miles of field windbreak each year.	SWCD, NRCS	$5,000	State and Federal Programs,	2010-2020	County Wide
10. Provide information on WRP and RIM programs, encourage land to be placed in these programs.	SWCD, NRCS	$5,000	Staff, State and Federal Programs	2010-2020	Drained/ altered wetlands and buffers
11. Educate the public and promote water quality and erosion control through newsletters, news releases and State Revolving Fund Loan Program.	SWCD, County, NRCS, Watershed Districts	$5,000	NRBG, Staff, Grants	2010-2020	County Wide
12. Meet with the City of Thief River Falls and Pennington County officials for inspection of erosion areas for possible repair.	County, City of TRF, SWCD	$100 /year	Staff	2011,2013, 2015,2017, 2020	County Wide
13. Plant or renovate an average of 10 farmstead windbreaks each year.	SWCD, NRCS	$10,000	State and Federal Programs, Staff	2010-2020	County Wide

Actions	Responsible Agencies	Costs	Potential Funding Sources	Schedule	Focus Area
14. If requested, conduct a Conservation Tillage Transect Survey for the County.	SWCD, County, NRCS	$1,500	U of M	When requested	County Wide
15. Encourage stormwater management controls during construction in shoreland areas to reduce sediment loading and flow to surface waters	SWCD, MPCA	$5,000	Staff, State and Federal Programs,	2010-2020	DWSMA
Objective B: **Work with the County and Watershed Districts to Identify Problem Reaches and to ensure Watershed, County, Township, and Private Drainage Systems Adequately Address Drainage Needs to Support Agriculture without Threatening Water Quality.**					
New Actions					
1. Seek funding for ditch and culvert inventories.	County, SWCD	$100,000	Grants, MCC	2010-2020	County Wide
2. Inventory legal ditch outlets and natural waterway outlets into the Red Lake River and install grade stabilization structures as needed.	SWCD, County, RLWD	$100,000	Grants	2010-2020	Red Lake River
3. Encourage right-of-way buffer seeding.	County, SWCD	$1000	Staff	2010-2020	DWSMA
4. Update the County Drainage records as part of the Drainage Record Modernization Grant.	County, SWCD	$20,000	Drainage Record Modernization Grant, other Grants	2010-2015	County Wide
5. Encourage one Ditch System Administrator	County, Watershed Districts	Unknown	County, Watershed Districts	2010-2020	County Wide

Actions	Responsible Agencies	Costs	Potential Funding Sources	Schedule	Focus Area
Ongoing Actions					
1. Meet with the County Engineer and Watershed District periodically for inspection of drainage systems for possible cleanouts and repair of any erosion problems.	County, Watershed Districts, SWCD	$100	Staff	2011,2013, 2015,2017, 2020	County Wide
2. Promote critical area seeding on ditch side slopes.	County, Watershed Districts, SWCD	$5,000	County, Watershed Districts, Grants	2010-2020	DWSMA, Thief & Red Lake River Watersheds
3. Encourage establishment of 4:1 side slopes and seeding of all ditches after cleaning.	County, Watershed Districts	$50,000	County, Watershed Districts, Grants	2010-2020	County Wide
4. Install ditch buffers through State and Federal Programs.	NRCS, SWCD, County, Watershed Districts	$100,000	State and Federal Programs	2010-2020	DWSMA, Thief & Red Lake River Watersheds
5. Review the Critical Area Erosion Control Policy with the Pennington County Highway Department.	County, SWCD	$100	Staff	2012	County Wide
Goal: **Address Surface Water Quality and Work to Protect and Improve the Resource Through the Enforcement of Existing Regulations, Use of Existing Programs and Development of New Programs.**					
Objective A: **Monitor the Quality of Surface Water in Pennington County.**					
New Actions					
1. Monitor three sites; Judicial Ditch 30, County Ditch 70 and County Ditch 21 as part of a Surface Water Assessment Grant.	SWCD	$25,931	SWAG	2010	Thief & Red Lake River Watersheds

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
2. As part of a Surface Water Assessment Grant monitor County Ditch 96 for numerous parameters and monitor the Thief and Red Lake Rivers for Total Chloride.	SWCD	$11,839	SWAG	2011	Thief & Red Lake River Watersheds
3. Seek funding and establish continuous monitoring.	SWCD, RLWD	$50,000	Grants	2010-2020	Black River, below TRF dam
4. Seek funding and establish monitoring at the outlet of a city storm sewer.	SWCD, RLWD	$20,000	Grant	2014-2019	Upstream intake
Ongoing Actions					
1. May through October, monthly monitor the nine established water quality sites.	SWCD	$8,000	NRBG	2010-2020	County Wide
2. Seek funding opportunities to update and expand data collection and monitoring sites. Encouraging volunteer monitoring will be included.	SWCD, RLWD	$20,000	Grants, Staff	2010-2020	County Wide
3. Coordinate, track and analyze water monitoring for the entire County. Update and expand water quality databases. Annually submit data to MPCA's STORET. Enter data into the River Watch database.	SWCD	$5,000	NRBG	2010-2020	County Wide
4. Seek funding and assist in the planning and implementation of TMDL studies	Watershed Districts, SWCD, MPCA	Unknown	Grants	2010-2020	Thief, Red Lake and Black Rivers

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
5. Seek funding and encourage the development for biological monitoring and habitat assessments.	Watershed Districts, SWCD, MPCA	$20,000	Grants	2010-2020	Thief, Red Lake and Black Rivers
6. Encourage development of staff gages and hydrologic monitoring at water quality sites for development of parameters loads.	Watershed Districts, SWCD, MPCA, USGS	$20,000	Grants	2010-2020	Thief, Red Lake and Black Rivers
Objective B: **Assist Landowners with Compliance of the County Shoreland, Sewage and Wastewater Treatment and Floodplain Ordinances to Help Protect Water Resources.**					
New Actions					
1. Revise the County Sewage and Wastewater Treatment Ordinance.	SWCD, County, MPCA	$10,000	NRBG, Staff	2011	County Wide
2. Revise the County Shoreland Ordinance to incorporate the revised "Minnesota Shoreland Rules: Standards for Lake and River Conservation". Work with agencies to establish an updated setback requirement.	SWCD, County, DNR	$5,000	NRBG, Staff, County	2011-2015	County Wide
Ongoing Actions					
1. Conduct site visits for permitting Shoreland, SSTS, and Floodplain activities	SWCD	$1,000 /year	NRBG, Staff, County	2010-2020	County Wide
2. Administer the Shoreland Ordinance, issue permits for proposed activities in the shoreland such as building, SSTS installation and repair, additions, shoreland alterations, stairways, docks, etc.	SWCD	$3,000 /year	NRBG, Staff, County	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
3. Administer the County Sewage and Wastewater Treatment Ordinance. Conduct site visits, perform soil verifications, issue permits, investigate complaints and enforce violations.	SWCD	$10,000 /year	NRBG, MPCA,	2010-2020	County Wide
4. Assist landowners with the compliance of the Floodplain Ordinance.	SWCD	$1,000 /year	NRBG, Staff, County	2010-2020	County Wide
Goal: **Work with Landowners and Entities (Local, State and Federal) for the Protection of Surface Waters**					
Objective A: **Educate the public about water and soil stewardship and encourage BMPs.**					
New Actions					
1. Conduct a workshop on septic system care and maintenance for landowners	SWCD, U of M Extension	$2,000	Grants, NRBG, Staff, County	2013-2015	County Wide
2. Provide a public educational program for surface water protection.	SWCD, Watershed Districts, MPCA	$5,000	Grants, Staff, NRBG	2017	County Wide
3. Assist landowners with Forest Stewardship Plans.	SWCD, DNR	$500 /year	Staff	2010-2020	County Wide
4. Host workshops on Forest Stewardship.	SWCD, DNR	$3,500	Grants, Staff	2013 & 2018	County Wide
Ongoing Actions					
1. Encourage installation of buffer strips and grassed filter strips	SWCD, Watershed Districts, NRCS	$5,000 /year	Staff, State and Federal Programs	2010-2020	County Wide
2. Promote planting wind breaks, shelterbelts and living snow fences to reduce blowing and drifting snow and erosion.	SWCD, NRCS	$5,000 /year	Staff, County, State and Federal Programs	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
3. Encourage and promote conservation tillage to reduce sediment loading to surface waters.	NRCS, SWCD	$500 /year	Staff	2010-2020	TRF, County Wide
4. Encourage and promote Best Management Practices (BMPs) to deal with stormwater management.	All	$500 /year	Staff	2010-2020	County Wide
5. Provide technical assistance and education to feedlot owners to comply with the county feedlot ordinance and on proper feedlot management such as manure storage and application.	U of M Extension, NRCS, MPCA	$15,000 /year	NRBG, County, Staff, State and Federal Programs	2010-2020	County Wide
6. Actively promote and market federal/state/local conservation programs to targeted landowners and help prepare them for eligibility in programs such as WHIP and EQIP.	All	$1,000 /year	Staff, State and Federal Programs	2010-2020	County Wide
7. Educate landowners about tile drainage.	NRCS, Watershed Districts, SWCD	$100 /year	Staff	2010-2020	County Wide
8. Work with livestock producers to implement watering systems including wells, pipelines, fountains, etc.	NRCS, SWCD, U of M Extension	$100,000	Staff, State and Federal Programs	2010-2020	County Wide
Objective B: **Coordinate and cooperate with other agencies and jurisdictions on plans and projects**					
Ongoing Actions					
1. Encourage conservation practices to reduce erosion and improve water quality such as state cost share, Clean Water Legacy, CRP, EQIP and etc.	NRCS, SWCD,	$500 /year	Staff, State and Federal Programs	2010-2020	DWSMA

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
2. Search for programs and funding for projects that reduce erosion and improve water quality.	NRCS, Watershed Districts, SWCD	Unknown	Staff, State and Federal Programs, Grants	2010-2020	County Wide
3. Participate in the Red River Basin Water Quality Team meeting to discuss implementation of the Red River Basin Water Quality Plan and to address current local issues.	SWCD, RLWD, MPCA, DNR, others	Unknown	Staff	2010-2020	County Wide
4. Encourage River Watch participation by area schools.	Watershed Districts, SWCD	$1,000	Staff	2010-2020	County Wide
5. Request feedlot cost-share or EQIP funds to assist feedlot operators with MPCA compliance.	NRCS, SWCD, U of M Extension	$5,000	Staff, EQIP	2010-2020	County Wide
6. Utilize the Emergency Response Plan to minimize damage from accidents or spills.	All	Unknown	Staff	2010-2020	County Wide
7. Assist FSA with promotion and implementation of conservation programs.	NRCS, FSA	Unknown	Federal Programs	2010-2020	County Wide
8. Complete Farm Program compliance status reviews and assist landowners with conservation plan development	NRCS, FSA	Unknown	Staff, Federal Programs	2010-2020	County Wide
9. Design tree plans for CCRP, WHIP and EQIP contracts. Other tree plans will be designed as requested.	SWCD, NRCS	$2,000 /year	Contribution Agreement	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
10. Work with State, County and Township officials to determine high priority snow management areas along public transportation routes.	SWCD, MN DOT, County, Township	$10,000	Staff, Grants	2010-2020	County Wide
11. Provide surveying assistance to RRVCSA engineer for projects to protect water quality.	SWCD	$10,000	Staff	2010-2020	County Wide
12. Secure funds through Pennington County and the WRAC for projects that improve water quality.	SWCD, County	$21,000	NRBG, County	2010-2020	County Wide
Objective C: **Address Federal List 303 (d) Impaired waters by Actively Participating in the Development and Implementation of Total Maximum Daily Load (TMDL) Plans for Impaired Waters For Impaired Waters of Pennington County**					
New Actions					
1. Provide technical assistance and best professional judgment during TMDL planning process; identifying sources, serving on TEP and identifying programs for implementation.	Watershed Districts, SWCD, MPCA	$20,000	MPCA, Staff, Grants	2010-2020	County Wide
2. Request the MPCA to conduct TMDL plans of impairments on a watershed basis.	RLWD, SWCD	Unknown	Staff	2010-2020	County Wide

Priority 2: Flood Damage Reduction					
Actions	Primary Responsibility	Cost	Potential Funding Sources	Duration	Watershed
Goal: **Work with Landowners and Entities (Local, State, and Federal) for the Reduction of Flood Damage**					
Objective A: **Educate the public about flooding and provide technical and financial assistance when needed**					
New Actions					
1. Provide assistance to landowners requesting FEMA floodplain maps; assist with map production and deciphering the floodplain boundaries.	SWCD, County	$1,000	NRBG, County	2010-2020	County Wide
2. Encourage landowners to control run-off from their lands with the use of buffer strips, side water inlets and dikes to ditches and waterways.	SWCD, Watershed Districts, NRCS, others	$1,000	Staff	2010-2020	County Wide
3. Gather and provide information to the public on what they can do to prevent flooding on an individual basis.	SWCD, Watershed Districts, NRCS, others	$1,000	Staff	2010-2020	County Wide
4. Through information and education encourage landowners to reduce impervious surfaces within the shoreland and urban areas.	SWCD, Watershed Districts, NRCS, others	$5,000	Staff	2010-2020	County Wide
5. Educate contractors and landowners to ensure that storm water runoff issues are addressed in any new development within the shoreland.	SWCD, others	$1,000	Staff	2010-2020	County Wide
6. Promote the use of rain gardens and other best management practices that reduce runoff rates in urban areas.	SWCD, Watershed District, U of M Extension,	$1,000	Staff	2010-2020	City of TRF, St. Hilaire

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
Ongoing Actions					
1. Assist landowners with compliance of the floodplain ordinance. Administer the ordinance by permitting for building to the Regulatory Flood Protection elevation, adding or removing fill or soil, etc.	SWCD, County, DNR	$3,000	NRBG, County	2010-2020	County Wide
2. Educate landowners on the pros and cons of tile drainage.	NRCS, Watershed Districts, SWCD	$100	Staff	2010-2020	County Wide
3. Encourage participation in programs such as RIM, WRP, CRP, Native Buffer Program and CREP to convert environmentally sensitive cropland to native vegetation in order to increase floodwater storage.	NRCS, SWCD	$1,000	Staff, State and Federal programs	2010-2020	County Wide
4. Assist landowners with technical and financial assistance to reduce flood damage through the use of conservation practices. Such as buffer strips, side water inlets, grade stabilizations, etc.	SWCD, NRCS, Watershed Districts	$100,000	Staff, State and Federal Programs, Grants	2010-2020	County Wide
Objective B: **Coordinate and cooperate with other agencies and jurisdictions on plans and implementing projects to reduce damages by flooding**					
New Actions					
1. Work with ditch authorities to improve ditch management and maintenance.	SWCD, County, Watershed Districts	$5000	Staff, Grants	2010-2020	County Wide
2. Encourage coordination of water releases from upstream impoundments.	Agassiz Refuge, City of TRF, Corp of Eng	$500	Staff	2010-2020	North of the TRF Dam

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
3. Support and encourage the update of FEMA maps to reflect more accurate floodplain boundaries.	RLWD, DNR, SWCD, FEMA	$80,000	Grants	2010-2015	County Wide
4. Cooperate with State and Federal agencies to resolve floodplain mapping inconsistencies between counties	All	Unknown	Staff	2010-2020	Floodplain Areas
5. Assist the City of Thief River Falls and St. Hilaire with the establishment of flood protection plans and projects.	City of TRF and St. Hilaire, SWCD, DNR, MPCA, others	Unknown	Cities of TRF and St. Hilaire, County, Grants	2010-2020	City of TRF and St. Hilaire
6. Work to obtain funding for Drainage Record Modernization to preserve and modernize legal ditch records in the County.	County, BWSR, SWCD	$20,000	Drainage Record Modernization Grant, other Grants	2010-2015	County Wide
7. Support and or assist the RLWD stream gage recording to be used for predicting flood events and for modeling stream flow	RLWD, SWCD, others	Unknown	Staff, County, Grants	2010-2020	County Wide
8. Interview township officers to determine where flooding consistently occurs in their township and correlate with soils data, past floodplain data, and new floodplain data to create maps of “flood prone areas” in the county and provide these maps to the County Board and landowners.	SWCD, Watershed Districts, Townships	$5,000	Staff	2012, 2016	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
9. Consider issues of conflict and concern with Flood Damage Reduction efforts including; the conflict in culvert sizing between fish passage and flow velocity, the perceived inconsistent use of roads as temporary floodwater control structures and the affects of tiling on water quality and water quantity.	All	Unknown	Staff	2010-2020	County Wide
Ongoing Actions					
1. Encourage floodwater retention structures to reduce potential flooding where possible with a local control structure management plan.	RWLD, SWCD	$100,000	State Programs, Grants	2010-2020	County Wide
2. Serve on the County Technical Evaluation Panel for WCA issues.	SWCD, County, BWSR, others	$5,000	Staff	2010-2020	County Wide
3. Work with RLWD as they implement the Flood Damage Reduction Agreement.	RLWD, others	Unknown	Staff	2010-2020	County Wide
4. Serve as members on FDR workgroups as requested.	All	Unknown	Staff	2010-2020	County Wide
5. Work with RLWD to encourage dikes, water diversions, impoundments and grade stabilization projects.	RLWD, SWCD, NRCS, others	$5,000	Staff, State and Federal Programs	2010-2020	County Wide
6. Support the Middle Snake Tamarack Watershed District and the Red Lake Watershed District in the development and implementation of their revised watershed management plans.	Watershed Districts, SWCD, others	Unknown	Staff	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
7. Search for programs and funding for flood reduction projects.	All	$100,000	Staff, Grants	2010-2020	County Wide
8. Work to have a sufficient emergency management plan for flood events.	All	Unknown	Staff	2010-2020	County Wide
9. Utilize flood control storage when designing erosion control structures, multi-purpose dams, and wetland restorations.	Watershed Districts, SWCD, NRCS	$50,000	County, State and Federal Programs, Grants	2010-2020	County Wide
10. Promote flood control practices such as retention ponds, dams in critical areas, diversions and other water control structures to provide more orderly control of runoff.	Watershed Districts, SWCD, others	Unknown	County, State, Grants	2010-2020	County Wide
Objective C: **Identify and implement Natural Resource Enhancement (NRE) opportunities**					
New Actions					
1. Conduct an inventory of natural resource enhancement opportunities including wetland restorations, sediment basins, buffer strips, etc.	SWCD, County	$25,000	Staff, Grants	2010-2020	County Wide
2. Determine locations in the county where beaver dams affect the movement of water and find the funds to remove dams and reduce beaver populations if necessary.	SWCD, Watershed Districts	$5,000	Staff, Grants	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
3. Increase grassland and wetland habitats within the river corridors of the Thief, Black and Red Lake River. Utilizing programs such as EQIP, Red River Valley Set-a-Side, CCRP, RIM, CREP, WRP, Native Buffer Program.	SWCD, NRCS	Unknown	State and Federal Programs	2010-2020	County Wide
4. Develop new conservation practices to keep drifting snow from filling in and plugging ditch systems	County, SWCD	$5,000	Staff, Grants	2010-2020	County Wide
Ongoing Actions					
1. Monitor tiling to determine potential FDR issues and to gather information.	Watershed Districts, SWCD	Unknown	Staff, Grants	2010-2020	County Wide
2. Protect existing wetlands through the Wetlands Conservation Act to retain existing water storage, provide filtration of sediment and pollutants, and maintain wildlife habitat.	All	Unknown	State Programs	2010-2020	County Wide
3. Administer WCA to reduce the loss of wetlands and encourage wetland restoration.	SWCD	$20,000	NRBG	2010-2020	County Wide
4. Promote the use of buffer strips; to reduce runoff, erosion, and sedimentation.	SWCD, NRCS, County	$5000	Staff, State and Federal Programs	2010-2020	County Wide
5. Provide technical assistance to landowners regarding WCA issues.	SWCD	$10,000 /year	NRBG	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
Goal: **Maintain Adequate Drainage Systems**					
Objective A: **Ensure drainages; County, Township, Watershed, and private ditch systems address needs to support farming without negatively affecting water quality, natural resources and landowners downstream as result of poor maintenance or flooding.**					
New Actions					
1. Educate landowners on the proper operation and maintenance of ditches by holding a ditch maintenance workshop	SWCD, County	$5000	Staff, County, Grant	2017	County Wide
2. Assist landowners with correcting drainage outlet problems, such as cleaning outlet ditches, calculating adequate culvert size, etc.	SWCD, County	$1,000	Staff	2010-2020	County Wide
3. Define to what extent drainage ditch systems should be maintained.	All	Unknown	Staff	2010-2020	County Wide
4. Seek funding to inventory road and ditch authority culverts in the County.	County, SWCD	$100,000	Staff, County, State and Federal Programs	2010-2020	County Wide
Ongoing Actions					
1. Establish and enforce one rod grassed buffers strip on either side of new and improved County ditches.	County, SWCD	$100,000	Staff, County, State and Federal Programs	2010-2020	County Wide
2. Work with the County and Watershed District to ensure ditches are being designed and properly maintained on a regular basis.	County, WDs, SWCD	$5,000	Staff	2010-2020	County Wide

Priority 3: Protect the County's Drinking Water Sources.					
Actions	Primary Responsibility	Cost	Potential Funding Sources	Duration	Watershed
Goal: **Source Water Protection for the City of Thief River Falls.**					
Objective A: **Address high sediment volumes affecting the reservoir for Thief River Falls.**					
New Actions					
1. Support the Marshall County Water Plan and the RLWD with their monitoring within the Thief River watershed.	RLWD, Counties, SWCD	Unknown	Staff	2010-2020	DWSMA
2. Support the 1C Reclassification for the Thief River	All	Unknown	Grants, Staff, City, County	2010-2020	DWSMA
3. Focus inspection and enforcement of the county Floodplain, Shoreland and SSTS ordinances within the watershed of the reservoir.	SWCD	$3,000 /year	NRBG	2010-2020	DWSMA
4. Seek funding for source water protection and the protection of surface water intakes.	MPCA, MDH, SWCD, others	$5,000	Staff, Grants	2010-2020	DWSMA
Ongoing Actions					
1. Work with government entities to investigate possible sources of the sediment and seek to understand sources of sediment being deposited into the Thief River Reservoir.	All	Unknown	Staff	2010-2020	DWSMA
2. Support and assist with the TMDL process and intensive monitoring as requested.	All	Unknown	Staff, Grants	2010-2020	DWSMA
3. Promote farming and construction BMPs within the watershed.	SWCD, NRCS	$5,000	Staff	2010-2020	DWSMA

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
4. Support the Source Water Assessment Plan for the city of Thief River Falls	TRF, MDH, SWCD, others	Unknown	Staff	2010-2020	DWSMA
5. Provide technical and financial assistance for installation of streambank stabilization projects, buffer strips, windbreaks, living snow fences, grade stabilization structures, and other practices to reduce erosion and sedimentation.	SWCD, others	$100,000	State and Federal Programs, Grants	2010-2020	DWSMA
6. Provide AgBMP low interest loans for conservation tillage equipment.	SWCD, MDA	$100,000	Revolving Loan Program	2010-2020	DWSMA
Objective B: **Address high hydrogen sulfide within the reservoir for Thief River Falls**					
New Actions					
1. Encourage the Agassiz NWR and the city of TRF not to release anoxic water from the reservoir while the rivers are ice-covered	City of TRF, SWCD, Agassiz NWR, RLWD, others	Unknown	Staff	2010-2020	Reservoir
2. Encourage volatilization of waters upstream.	SWCD, RLWD, Agassiz NWR	Unknown	Staff, Grants	2010-2020	Upstream Reservoir
Objective C: **Educate citizens about the importance of source water protection**					
Ongoing Actions					
1. Education youth at water festivals, outdoor education days, daycamps, etc on the importance of viable drinking sources.	All	$50,00	Staff	2010-2020	County Wide
2. Through mailings, newspaper articles, and workshops educate landowners, producers, contractors, etc on the Shoreland, Floodplain, Feedlot, and Sewage and Wastewater ordinances that are in place and why they are important for water quality and drinking water.	SWCD	$2,000 /year	NRBG	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
Goal: **Protect Groundwater Based Drinking Water Sources within the County**					
Objective A**: Promote the Well Sealing Program**					
Ongoing Actions					
1. Seal 8 abandoned wells utilizing 50 percent cost-share provided by EQIP and State Cost-share Program funds.	SWCD	$2,500 /year	State and Federal Programs	2010-2020	County Wide
Objective B**: Participate and support groundwater monitoring**					
New Actions					
1. Work with Department of Agriculture to acquire water quality data results from the observation wells and to acquire information on nitrate sensitive areas.	SWCD, MDA	$500	Staff	2010-2020	Beach Ridges
2. Work with U of M Water Resource Center to install monitoring wells within the county to determine the movement and depth to the groundwater table for the purpose of treating septic system effluent.	SWCD, U of M	$20,000	U of M, Grants, County	2010-2020	County Wide
Ongoing Actions					
1. Monitor water levels in seven DNR observation wells and submit monthly reports to the DNR.	SWCD, DNR	$800	DNR	2010-2020	Beach Ridges
2. Maintain County Well Inventory for bored and sealed wells.	SWCD	$500 /year	Staff, NRBG	2010-2020	County Wide
3. Maintain Rainfall Monitoring Program and submit reports to State Climatologist. We will strive to have one monitor per township.	SWCD	$5,000	Staff	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
Objective C**: Work with landowners and entities (Local, State and Federal) for the protection of groundwater**					
New Actions					
1. Assist the community of Goodridge with developing a wellhead protection plans.	City of Goodridge, SWCD, MDH	$1000	NRBG, MDH,	2015	City of Goodridge
2. Work with community and non-community public water suppliers in development and implementation of wellhead protection activities and plans.	SWCD, MDH	$1000 /year	NRBG	One a year	County Wide
3. Seek funding and prepare for an inventory of Subsurface Sewage Treatment Systems along the Thief River on Dewey Avenue.	SWCD	$20,000	Grants, County	2010-2020	Dewey Ave
4. Update the Sewage and Waste Water Ordinance to include the new MPCA rules.	SWCD	$10,000	NRBG	2011	County Wide
5. Seek funding to inventory failing and non compliant systems in shoreland, floodplain and DWSMA areas. Look for funding to assist with replacing these systems	SWCD, County, MPCA	$100,000	Grants	2010-2020	Shoreland, Floodplain, DWSMA
6. Support the development of monitoring for naturally occurring arsenic in the county.	USGS, MDH, SWCD, others	Unknown	Grants	2010-2020	County Wide
Ongoing Actions					
1. Provide public information on how and where to get wells tested, types of tests available, maximum allowable limits on groundwater and drinking water contaminants, and what do if a well is contaminated.	MDH, SWCD	Unknown	Staff	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
2. Assist county residents with an annual well water testing clinic, providing 50% cost share to test for nitrates and bacteria. Also provide technical assistance regarding results and provide each landowner with the MN Department of Health Well Owner's Manual. Offer iron, hardness and pH tests as requested. Keep an inventory of results.	SWCD, County	$700 /year	County, NRBG	2010-2020	County Wide
3. Support the Wellhead Protection plan for the City of St. Hilaire.	City, others	Unknown	Staff	2010-2020	St. Hilaire
4. Offer AgBMP loans to repair and replace septic systems.	SWCD, MHA	$100,000	Revolving Loan Fund	2010-2020	County Wide
5. Administer the county SSTS ordinance to insure proper design, installation and inspections and assist landowners with bringing their systems into compliance.	SWCD, County, MPCA	$10,000	NRBF	2010-2020	County Wide
6. Consider wellhead protection areas when making land use decisions.	All	Unknown	Staff	2010-2020	County Wide
7. Support the County Feedlot and Solid Waste Programs.	County, U of M Extension, SWCD, NRCS, MPCA, others	Unknown	Staff	2010-2020	County Wide
8. Assist state and federal agencies with any research on the groundwater resources in the County.	USGS, others	Unknown	Staff, Grants	2010-2020	County Wide
9. Encourage landowners to restore wetlands to recharge groundwater.	SWCD, NRCS, others	$5,000	Staff	2010-2020	County Wide

Actions	Responsible Agencies	Cost	Potential Funding Sources	Schedule	Focus Area
Objective D**: Educate citizens on preserving groundwater resources and quality**					
New Actions					
1. Map out, using GPS, locations of nitrate contamination around the county.	SWCD, MDH	$10,000	Staff, Grants	2010-2020	County Wide
2. With the discontinuation of the Dead Livestock Collection Program work with RC&D and other agencies to find means of proper disposal of carcasses.	RC&D, NRCS, SWCD, others	Unknown	Staff	2010-2020	County Wide
3. Map out, using GPS, locations of sealed wells around the county.	SWCD	$10,000	Staff, County, Grants	2010-2020	County Wide
Ongoing Actions					
1. Continue to promote public education on maintaining our groundwater resources through the Water Festival, which will reach over 400 fourth grade students annually, and other educational events.	SWCD, NRCS, Watershed Districts, DNR, MPCA, others	$2,500 /year	Staff	2010-2020	County Wide
2. Promote the importance of water conservation. Educate and encourage the public to use water efficient plumbing fixtures and appliances. Promote the use of rain barrels.	All	$1,500 /year	Staff	2010-2020	County Wide
3. Educate local officials and landowners on the benefits of reclaiming abandoned gravel pits to protect groundwater recharge areas.	SWCD, DNR,	$1,000	Staff	2010-2020	County Wide
6. Educate public with brochures/ newsletter/ newspaper articles etc. on local ordnances and how they relate to the quality of groundwater based drinking water.	SWCD, NRCS	$1,000	NRBG, County	2010-2020	County Wide

Appendix A

Accomplishments of the Water Plan

Surface Water

- Enhanced surface water protection by establishing a multi-county river monitoring program and obtaining grant money to expand monitoring.
- Enhanced surface water protection and erosion control by constructing riverbank stabilization projects.
- Enhanced surface water protection by establishing buffer strips.
- Enhanced surface water quality by providing 50% cost share for a dead animal pick-up.
- Conducted a level II/III feedlot inventory.
- Concluded monitoring and laboratory work for a three-year sediment study.
- Accepted delegation of selected feedlot responsibilities.

Ground Water

- Enhanced ground water protection by providing 50% cost share to seal abandoned wells.
- Enhanced ground water protection by establishing an annual nitrate and bacteria clinic for drinking water wells.
- Completed a well inventory in the six beach ridge townships of the county for a better understanding of ground water susceptibility to contamination related to land use in shallow ground water aquifers.
- Assisted the City of St. Hilaire with preliminary steps in the development of a wellhead protection plan to enhance ground water quality.
- Enhanced ground water protection by measuring observation wells.
- Enhanced ground water protection by conducting a study of the impact of standard trench ISTS in various soil types.
- Enhanced ground water protection by collecting nitrate data for the DNR observation wells.
- Maintain a database of abandoned and drilled wells within the County.

Erosion

- Enhanced soil erosion control by establishing field windbreaks, living snow fence, and farmstead shelterbelts.
- Enhanced soil erosion control by establishing a revolving loan fund to pay for conservation tillage equipment.
- Participated in the Transect Survey on tillage.

Planning / Ordinances

- Developed a county land use plan.
- Participated in the development of the Red River Basin Water Quality Plan.
- Participated in the Source Water Assessment process for East Grand Forks and Thief River Falls.
- Developed and administered a county ISTS ordinance.
- Administered a county Floodplain ordinance.
- Developed and administered a county Shoreland ordinance.
- Maintained and helped Board of Adjustment meetings as needed.
- Developed and administered a county Feedlot ordinance.
- Administer the Wetland Conservation Act.
- Promote and assist landowners with the AgBMP Loan program.
- Water Plan Administration, implementation and revision.

Education

- Established a NW MN Water Festival for 4th graders.
- Conducted a water plan project tour to showcase water quality projects.
- Conducted a river project tour to showcase water quality projects.
- Established an outdoor environmental education day for 6th graders.
- Encourage and prepare for the participation in the Envirothon with local schools.
- Created a Land Use Guide brochure for county residents.
- Expanded the Rainfall Monitoring Program.
- Hosted a 60th Anniversary Project Tour.
- Host the presentation by the Science Museum of MN to County 5th Graders.
- Annually educate landowners with a newsletter, annual banquet, and various newspaper articles.

Grants

- Constructed a handicapped accessible fishing pier and canoe landing with challenge grant funds to enhance water based recreation opportunities.
- Purchased monitoring equipment with a DNR environmental partners grant to help establish the River Watch Program.
- Obtained Surface Water Assessment Grants to expand our water quality monitoring program.

Appendix B

Supporting Technical Data

B1. Groundwater Sample Results

MDA Pesticide Monitoring Report
21 Pesticides included in the test

ND=Non detectable P=Present

Well 57005	Nitrate nitrogen (mg/l)	Deethlatrazine ug/L	Metolachlor ESA ug/L
9/4/2004	2.1	ND	ND
3/22/2005	2.1	ND	ND
9/24/2005	1.5	ND	ND
9/29/2006	2.3	ND	ND
9/27/2007	1.6	ND	ND
9/29/2008	1.5	P	ND

Well 57008	Nitrate nitrogen (mg/l)	Deethlatrazine	Metolachlor ESA
9/4/2004	ND	ND	ND
3/26/2005	0.5	ND	ND
9/25/2005	0.4	ND	ND
10/6/2005	22.3	ND	0.99
9/26/2006	ND	ND	ND
9/27/2007	ND	ND	ND
9/30/2008	ND	ND	ND

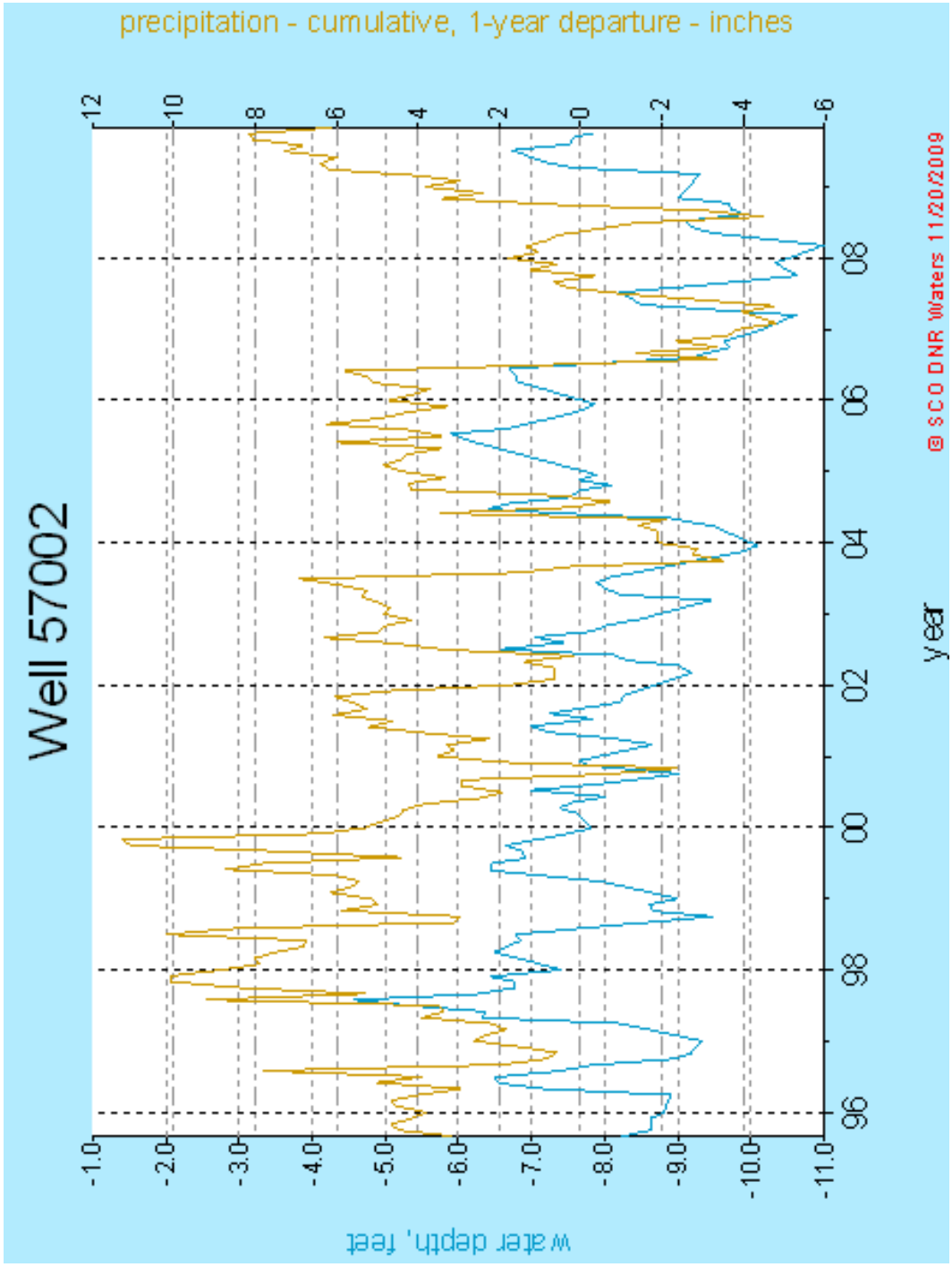
Well 57002	Nitrate nitrogen (mg/l)	Deethlatrazine	Metolachlor ESA
9/4/2004	ND	ND	ND
3/22/2005	ND	ND	ND
9/24/2005	ND	ND	ND
10/2/2006	ND	ND	ND

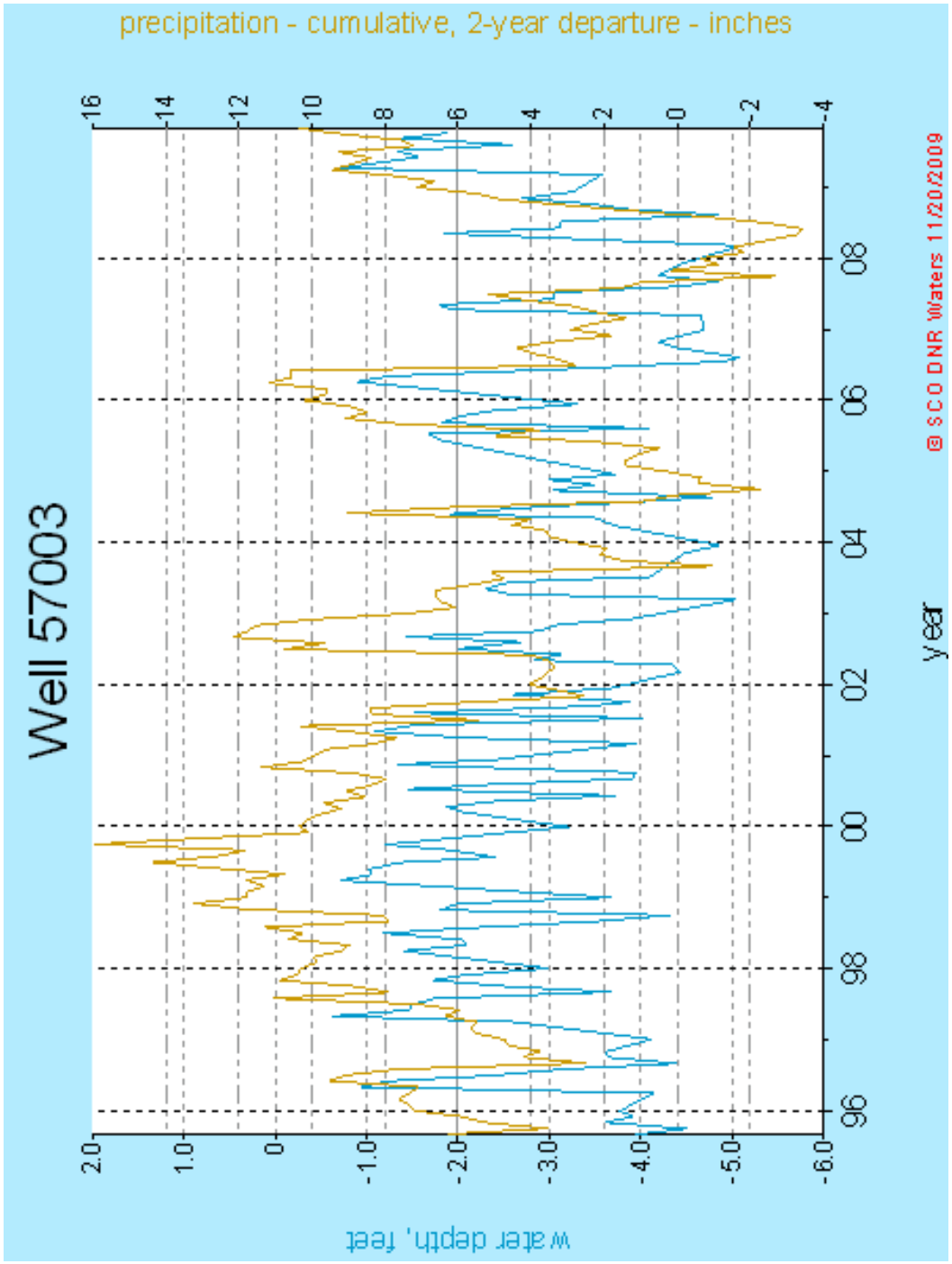
Well 57003	Nitrate nitrogen (mg/l)	Deethlatrazine	Metolachlor ESA
9/4/2004	ND	ND	ND
3/23/2005	ND	ND	ND
9/24/2005	ND	ND	ND
9/29/2006	ND	ND	ND
9/27/2007	ND	ND	ND
9/30/2008	ND	ND	ND

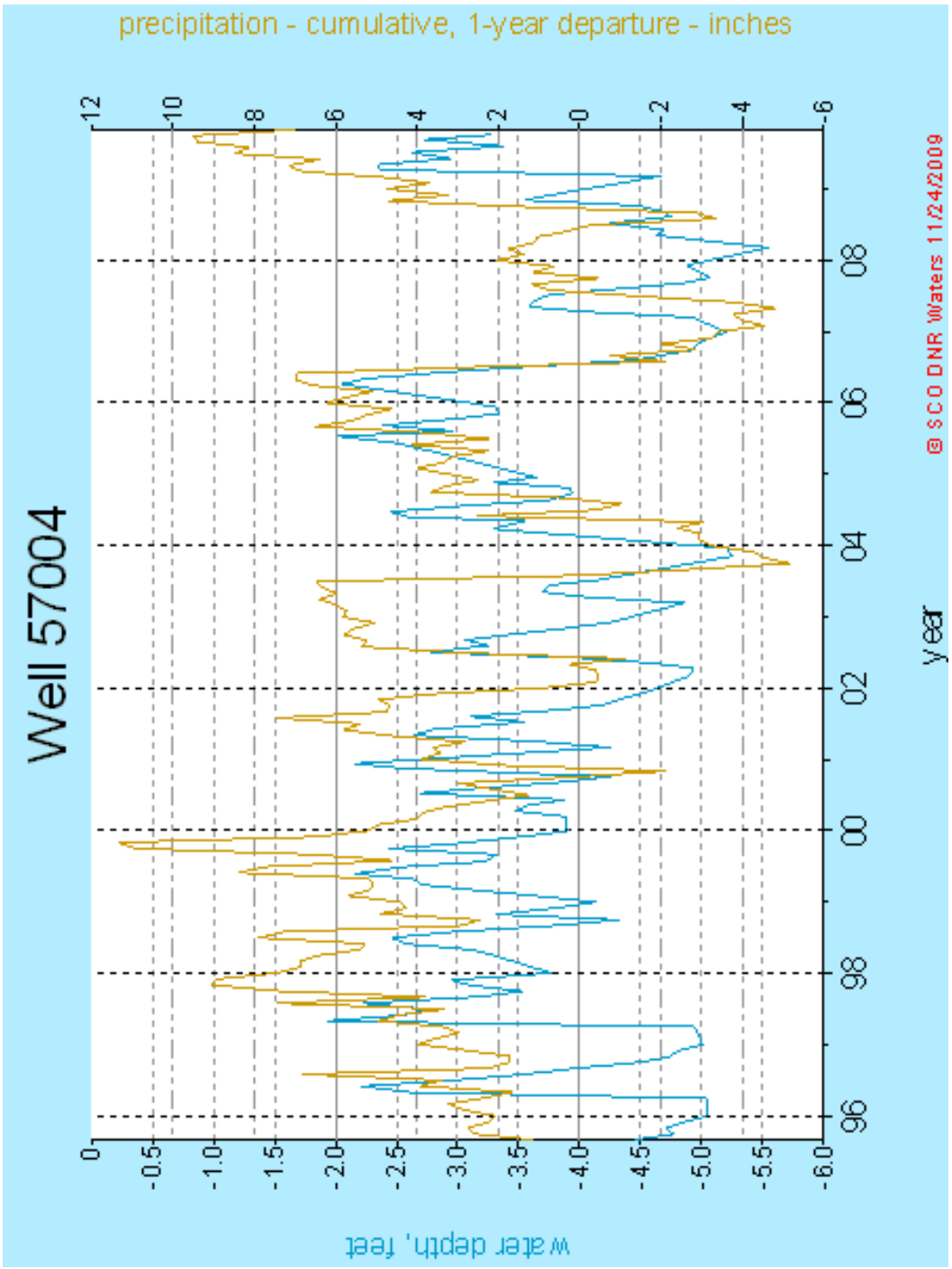
SWCD Observation Wells – 2007 Water Quality Testing Results

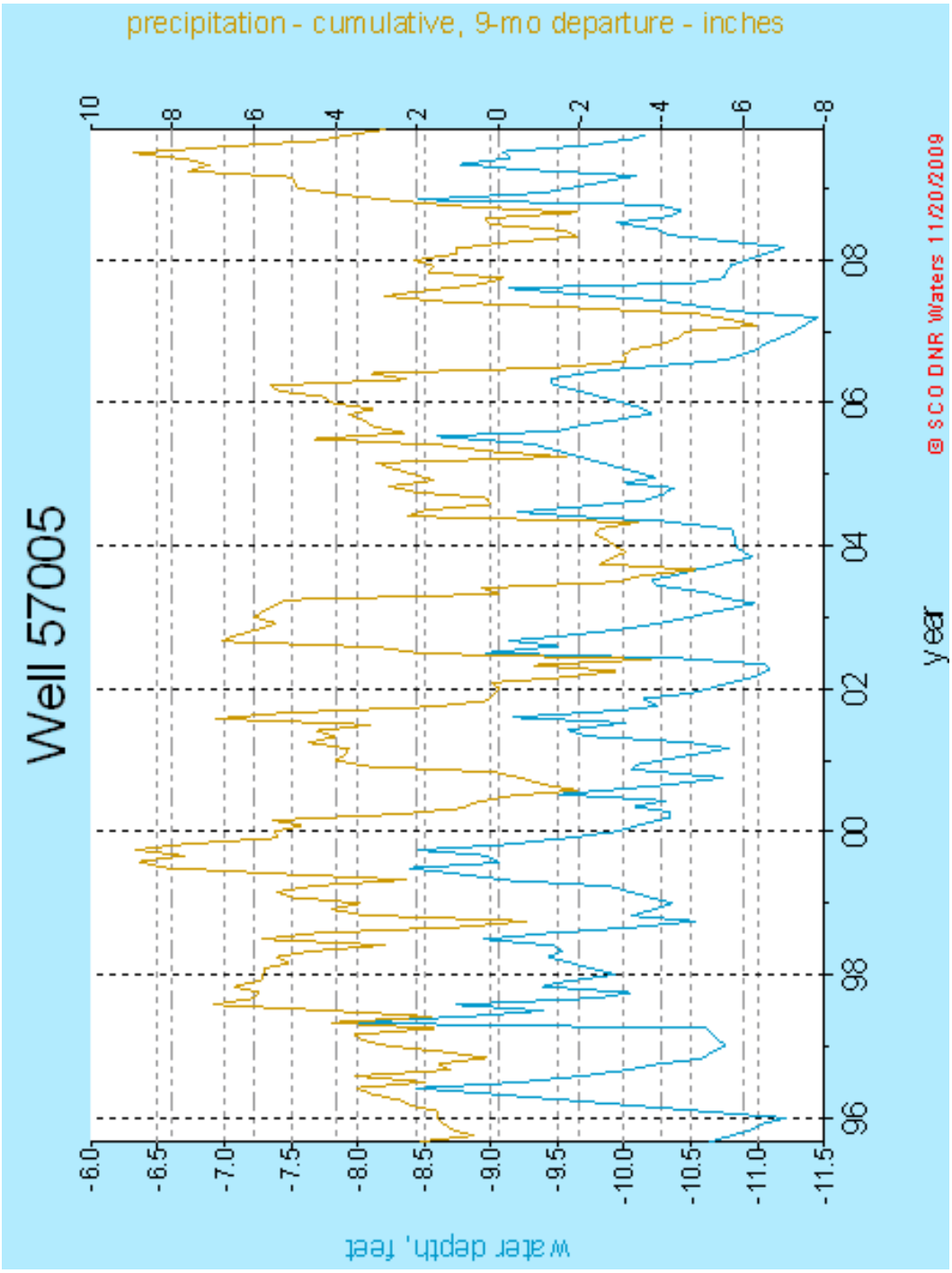
Ob Well	Total Coliform Bacteria	Nitrate/Nitrogen
57005	Absent	1.77 mg/L
57002	Present	<0.03 mg/L
57006	Absent	6.04 mg/L
57007	Absent	<0.75 mg/L

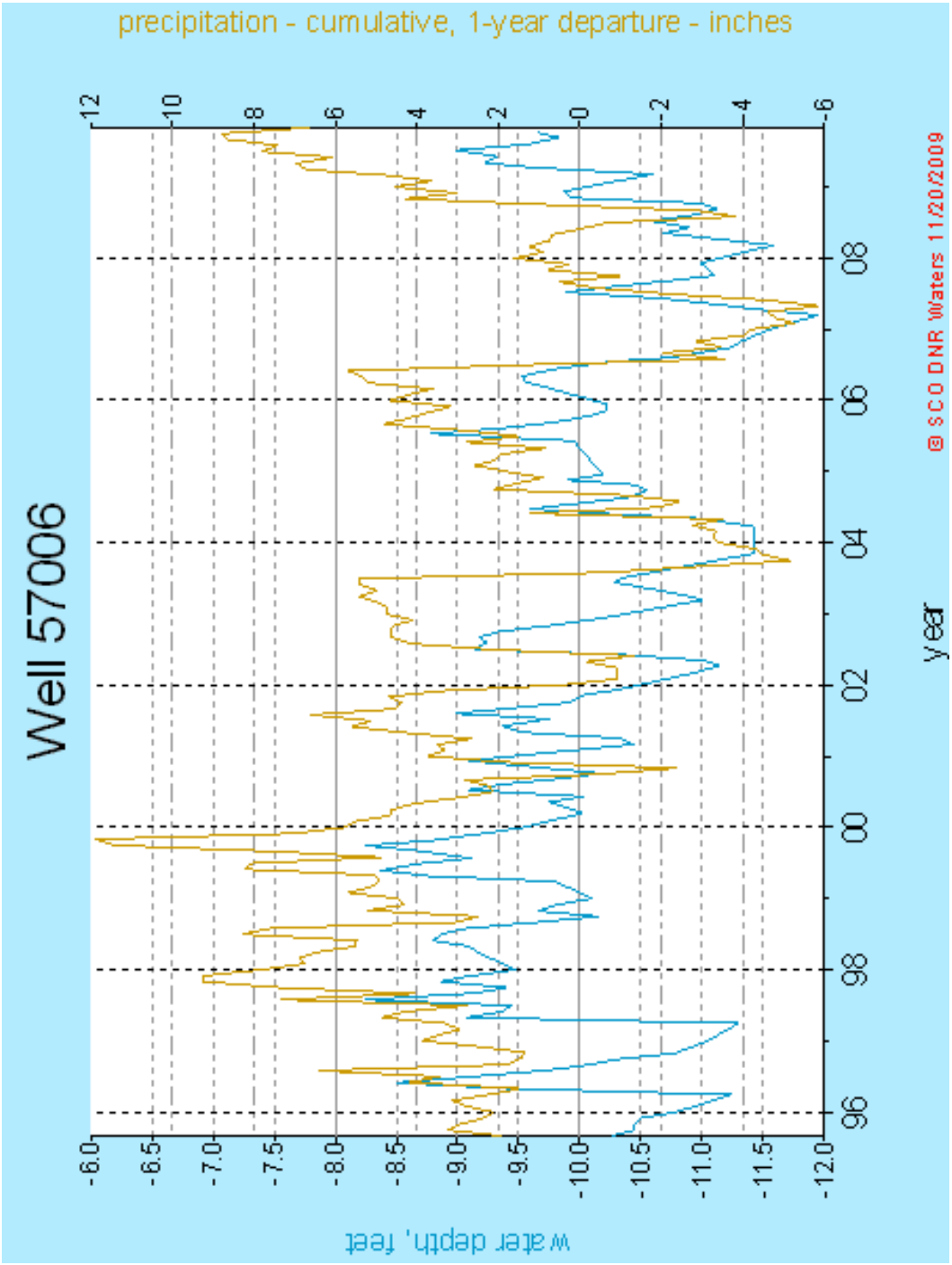
Hydrographs from Observation Wells

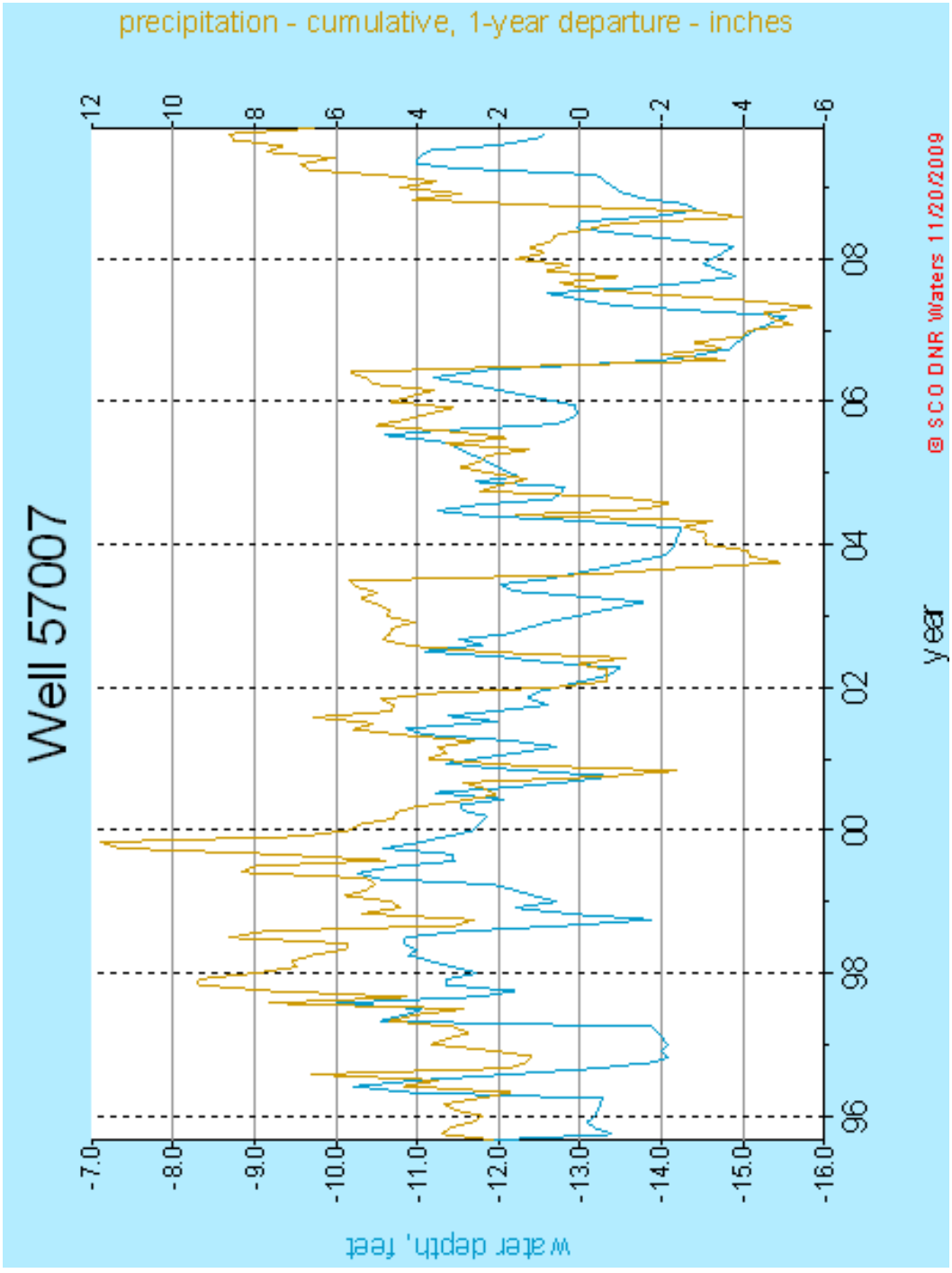


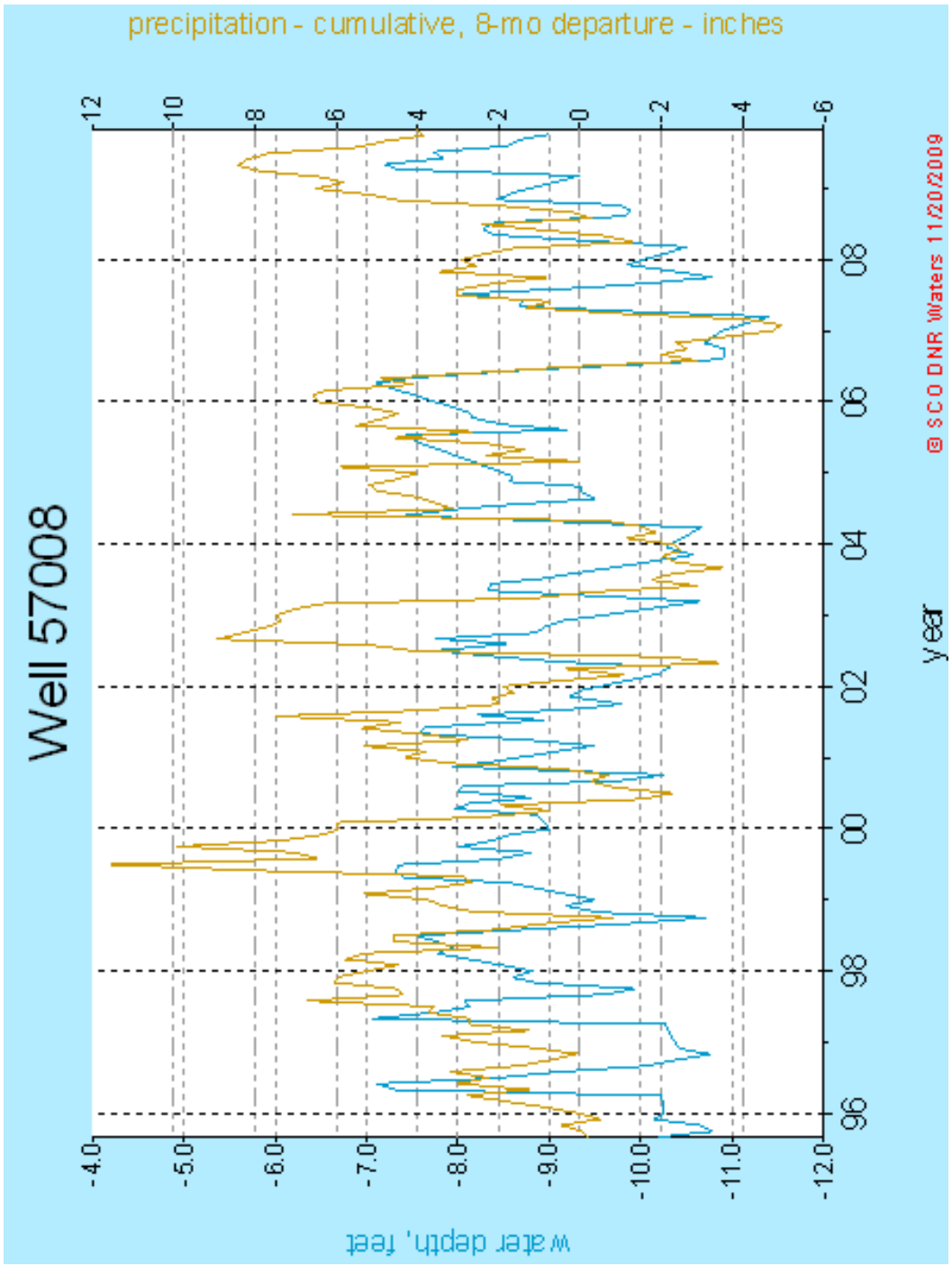

precipitation - cumulative, 2-year departure - inches
Well 57003
water depth, feet
year
© SCO DNR Waters 11/20/2009
16
14
12
10
8
6
4
2
0
-2
-4
2.0
1.0
0
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
96
98
00
02
04
06
08


precipitation - cumulative, 1-year departure - inches
Well 57004
water depth, feet
year
© SCO DNR Waters 11/24/2009
12
10
8
6
4
2
0
-2
-4
-6
0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
-6.0
96
98
00
02
04
06
08


precipitation - cumulative, 9-mo departure - inches
Well 57005
water depth, feet
year
© SCO DNR Waters 11/20/2009
-6.0
-6.5
-7.0
-7.5
-8.0
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
10
8
6
4
2
0
-2
-4
-6
-8
96
98
00
02
04
06
08


precipitation - cumulative, 1-year departure - inches
Well 57006
water depth, feet
year
© SCO DNR Waters 11/20/2009
12
10
8
6
4
2
0
-2
-4
-6
-6.0
-6.5
-7.0
-7.5
-8.0
-8.5
-9.0
-9.5
-10.0
-10.5
-11.0
-11.5
-12.0
96
98
00
02
04
06
08


precipitation - cumulative, 1-year departure - inches
Well 57007
water depth, feet
year
© SCO DNR Waters 11/20/2009
-7.0
-8.0
-9.0
-10.0
-11.0
-12.0
-13.0
-14.0
-15.0
-16.0
12
10
8
6
4
2
0
-2
-4
-6
96
98
00
02
04
06
08


precipitation - cumulative, 8-mo departure - inches
Well 57008
water depth, feet
year
© SCO DNR Waters 11/20/2009
12
10
8
6
4
2
0
-2
-4
-6
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
-11.0
-12.0
96
98
00
02
04
06
08

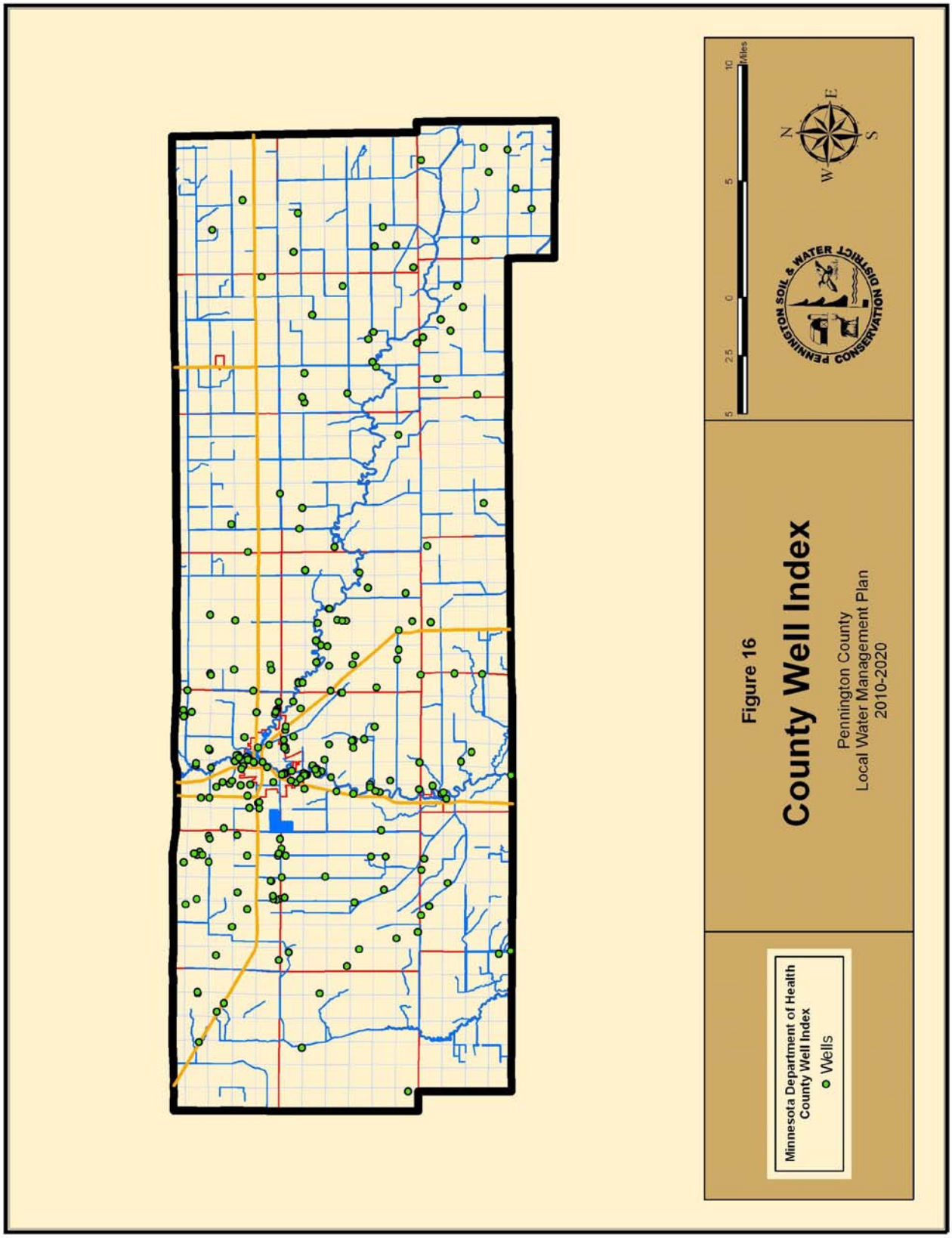


Figure 16
County Well Index
Pennington County
Local Water Management Plan
2010-2020
Minnesota Department of Health
County Well Index
Wells
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
N
E
S
W
0
2.5
5
10
Miles

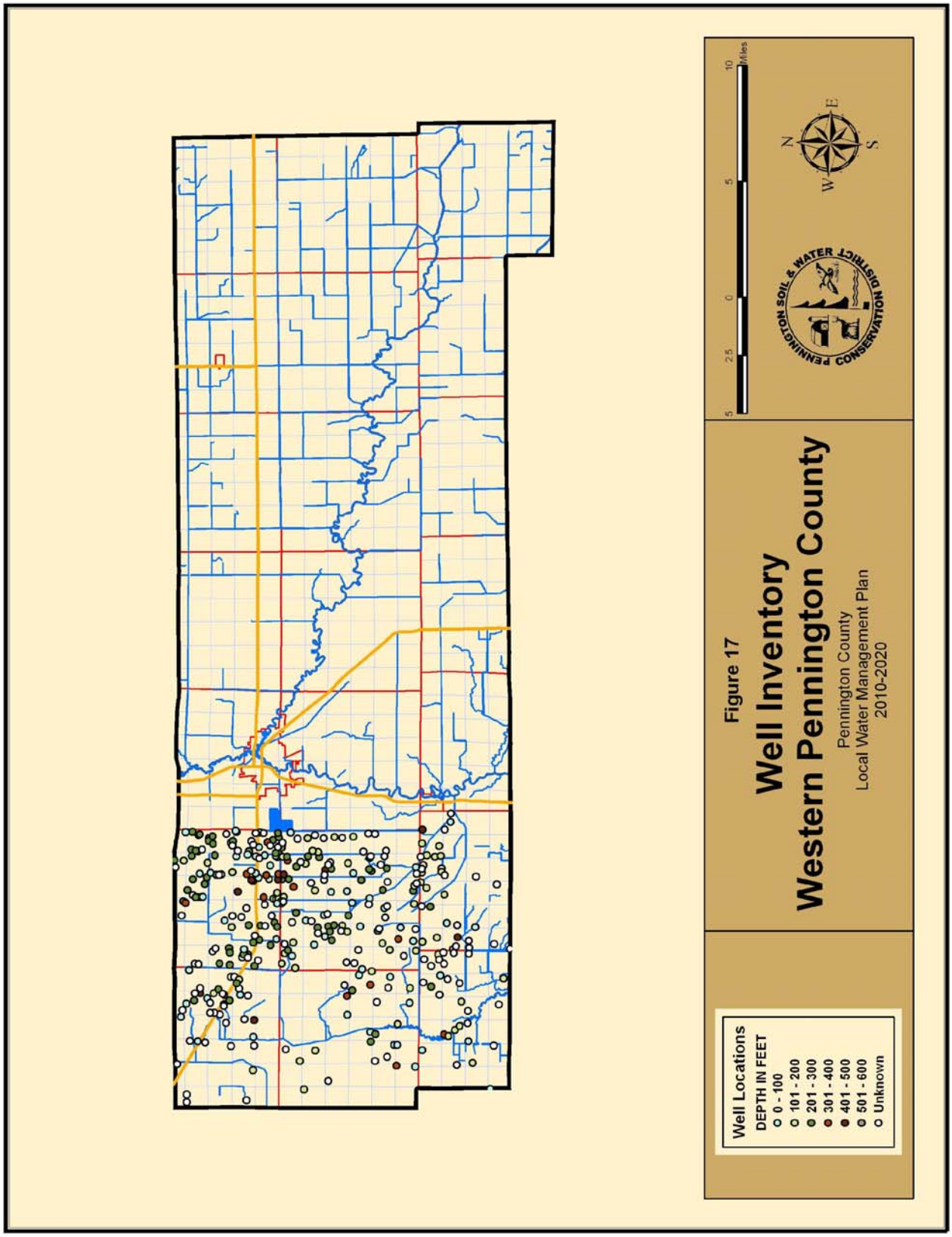
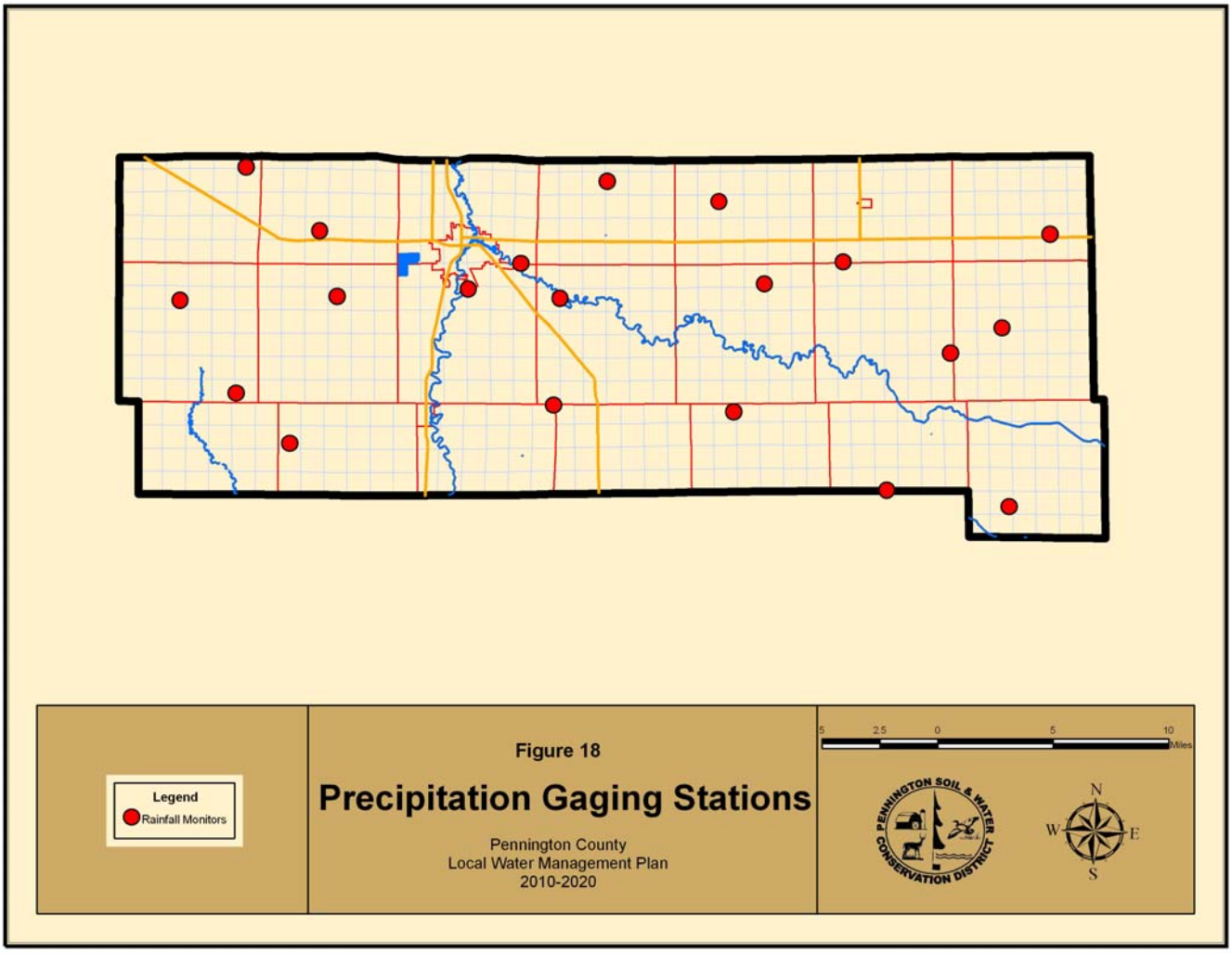


Figure 17
Well Inventory
Western Pennington County
Pennington County
Local Water Management Plan
2010-2020
Well Locations
DEPTH IN FEET
0 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 600
Unknown
5 2.5 0 5 10 Miles
N
W
E
S
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

B2. Precipitation Gauging Stations

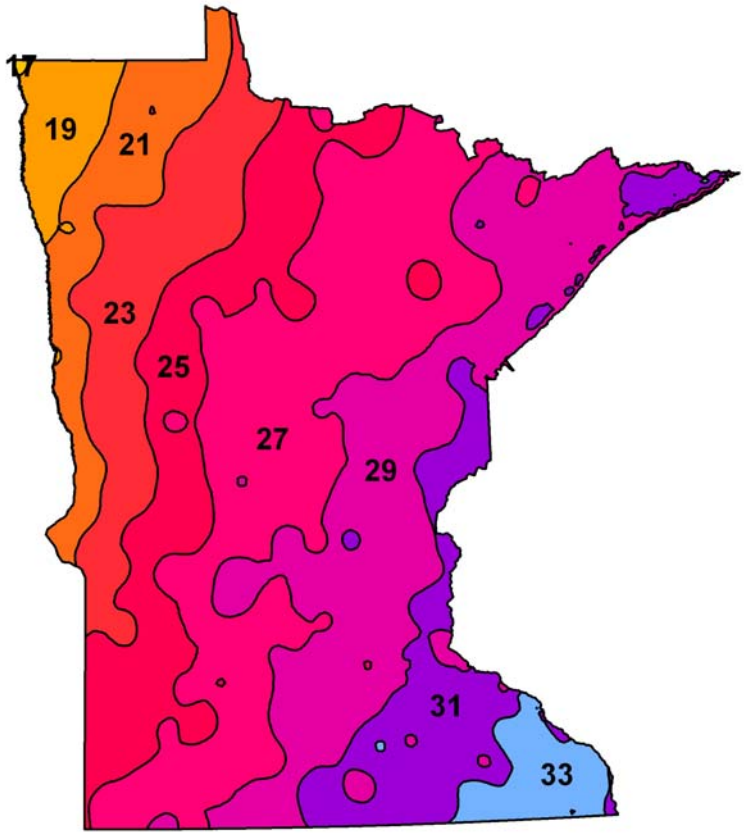
There are 19 precipitation monitoring stations located throughout Pennington County. Most sites are monitored April through October. Five sites are monitored year round.



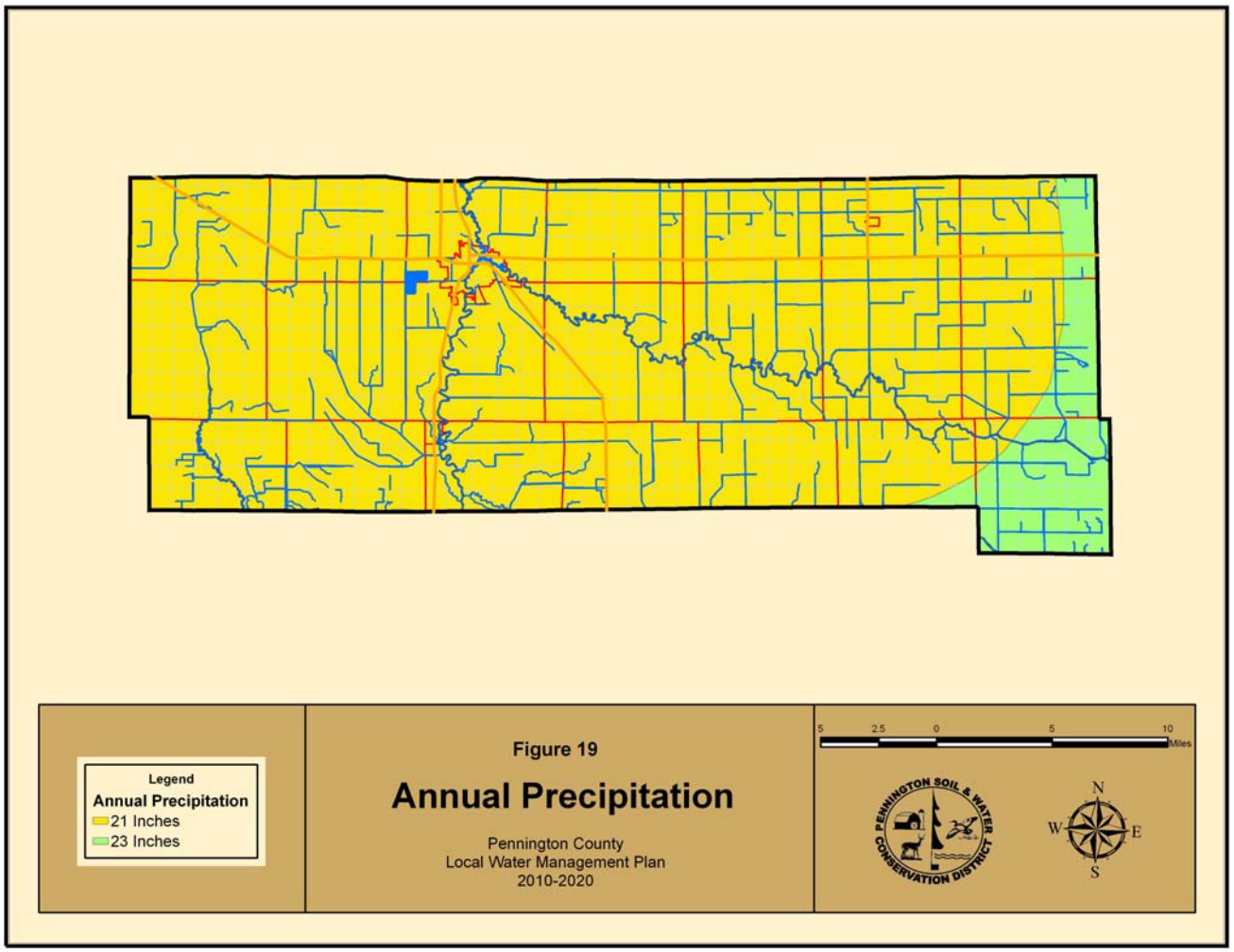
B3. Annual Precipitation

The majority of Pennington County receives an annual precipitation of 20-22 inches. The annual normal precipitation shows a strong gradient across the state. Between the NW and SE corners of the state the differential amounts to 7.53 inches. However between the NE and SE corners the differential is less than two inches.

The strongest precipitation gradient occurs around the Twin Cities area and is largely a topographically induced feature. Of greater importance is a large area of rapid change in precipitation which exists between north-central Minnesota, where the annual normal is 26-27 inches, and then decreases to a minimum of 20-21 inches in the NW corner of the state as well as to the west in the Fargo-Moorhead area.



State wide Map of Minnesota's Average Annual Precipitation (in).



Precipitation May-Sept

The normal growing season precipitation for the state equals nearly 18 inches or about 67 percent of the total for the year. This is very beneficial to Minnesota's vegetation and agriculture. The fact that more than 18 inches is received in north-central Minnesota along the Canadian border (only two inches less than in the southeast along the Iowa border) shows that the Gulf moisture reaches northward. However, with only 14 inches or so received along the North Dakota border it is evident that the "tongue" of moisture from the Gulf is rapidly reduced across western Minnesota. The low precipitation in the northeastern corner of the state is largely due to Lake Superior which is coolest relative to the land in the summer. As a result the lake is more effective in producing fog than precipitation.

B4. General Soils

"The soils in Pennington County formed on a glacial lake plain in mineral and organic material. The soils are mainly dark and range from sand to clay. Figure 20. The native vegetation of Pennington County was mainly tall prairie grasses, wetland reeds, and sedges. Hardwood trees encroached into the county from the east, however, and the soils in the eastern half of the county show the influence of forest vegetation." (Pennington County Soil Survey)

Pennington County soils are produced by natural processes acting through time on material deposited or accumulated by geologic processes. Soils have significant interaction with, and effect on, water resources. Highly erodible soils can contribute sediment to rivers and streams. Conversely, sandy soils with high infiltration and surface permeability characteristics can make significant contributions to aquifer recharge.

A general soils map and a map of highly erodible soils (HEL) are included in this plan. Figure 21. Soils are assigned HEL classification depending on erodibility index, which must be ≥ 8, and the severity of physical or chemical properties of subsurface layers. Actual soil association descriptions are available in the soil survey, which is currently available online at the following link
http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm
The Soil Data Mart is also accessible at http://soildatamart.nrcs.usda.gov/ .

Eroding lands

The following areas of the county have been designated as high priority areas for erosion / sedimentation reduction due to natural features that enhance erosion and sedimentation.

Red Lake River and Thief River drainage area – Erosion from riverbanks is yielding 63% of the reservoir sediment load. Sedimentation in the reservoir decreases capacity that can pose hazards to navigation and lead to flooding. It also impairs fish reproduction, modifies habitat, increases water temperature and algal growth.

Black River drainage area – This is an area prone to erosion / sedimentation because of the combination of sandy soils and steepest slope in the county.

Red Lake River drainage area – This is the drainage area below the reservoir to the Red Lake County line. This area also has highly erosive sandy soils that are subject to extensive wind and water erosion.

Much has been accomplished in the reduction of sediment delivered to water resources. Conservation programs such as CRP, CCRP, and RIM have stabilized many acres in the county. Implementation of Best Management Practices such as, seeding ditches to grass after cleaning, conservation tillage, streambank stabilization projects, and field windbreaks, have also reduced sediment loads.

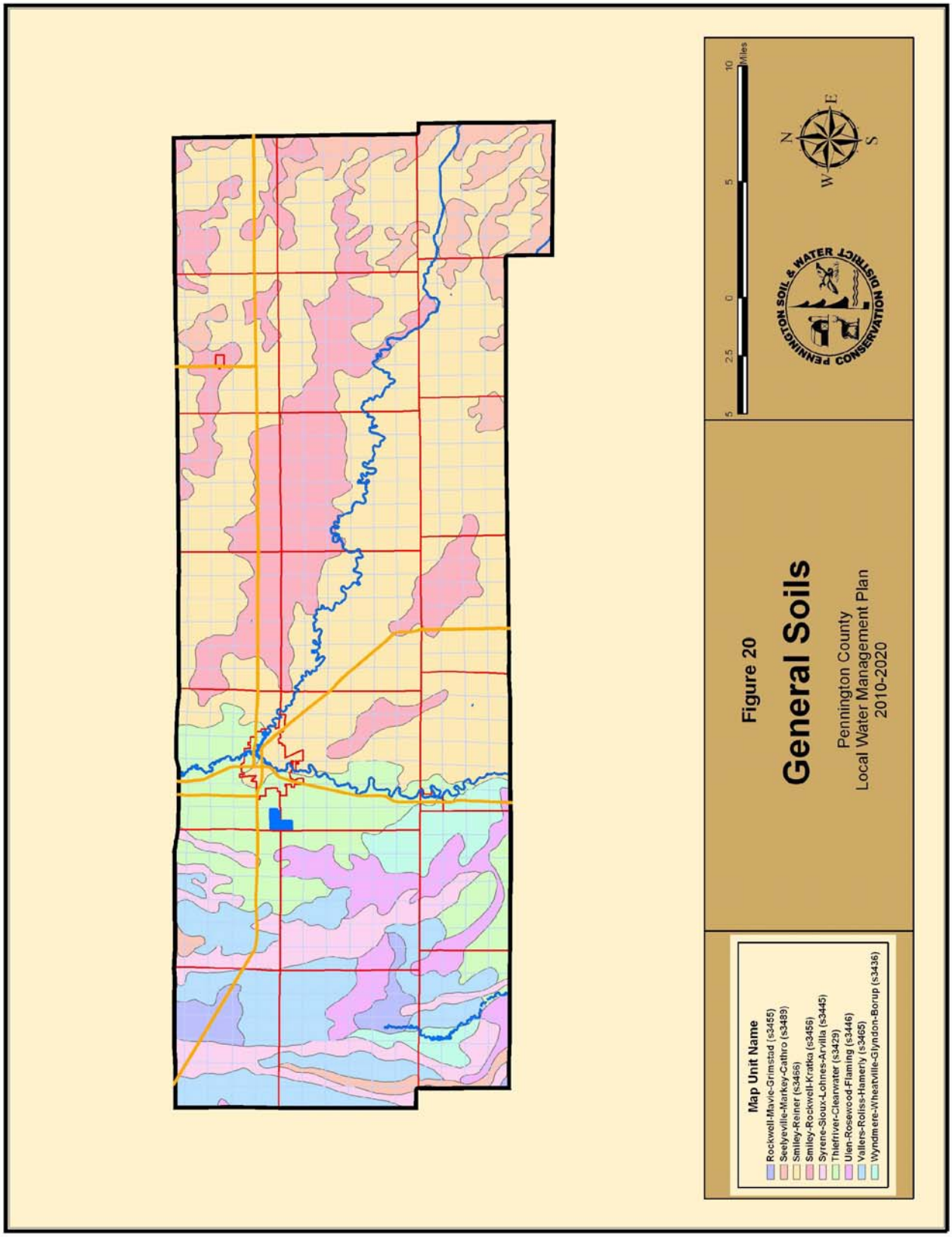


Figure 20
General Soils
Pennington County
Local Water Management Plan
2010-2020
Map Unit Name
Rockwell-Mavie-Grimstad (s3455)
Seelyeville-Markey-Cathro (s3489)
Smiley-Reiner (s3466)
Smiley-Rockwell-Kratka (s3456)
Syrene-Sioux-Lohnes-Arvilla (s3445)
Thiefriver-Clearwater (s3429)
Ulen-Rosewood-Flaming (s3446)
Vallers-Roliss-Hamerly (s3465)
Wyndmere-Wheatville-Glyndon-Borup (s3436)
5 2.5 0 5 10 Miles
N
W
E
S
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

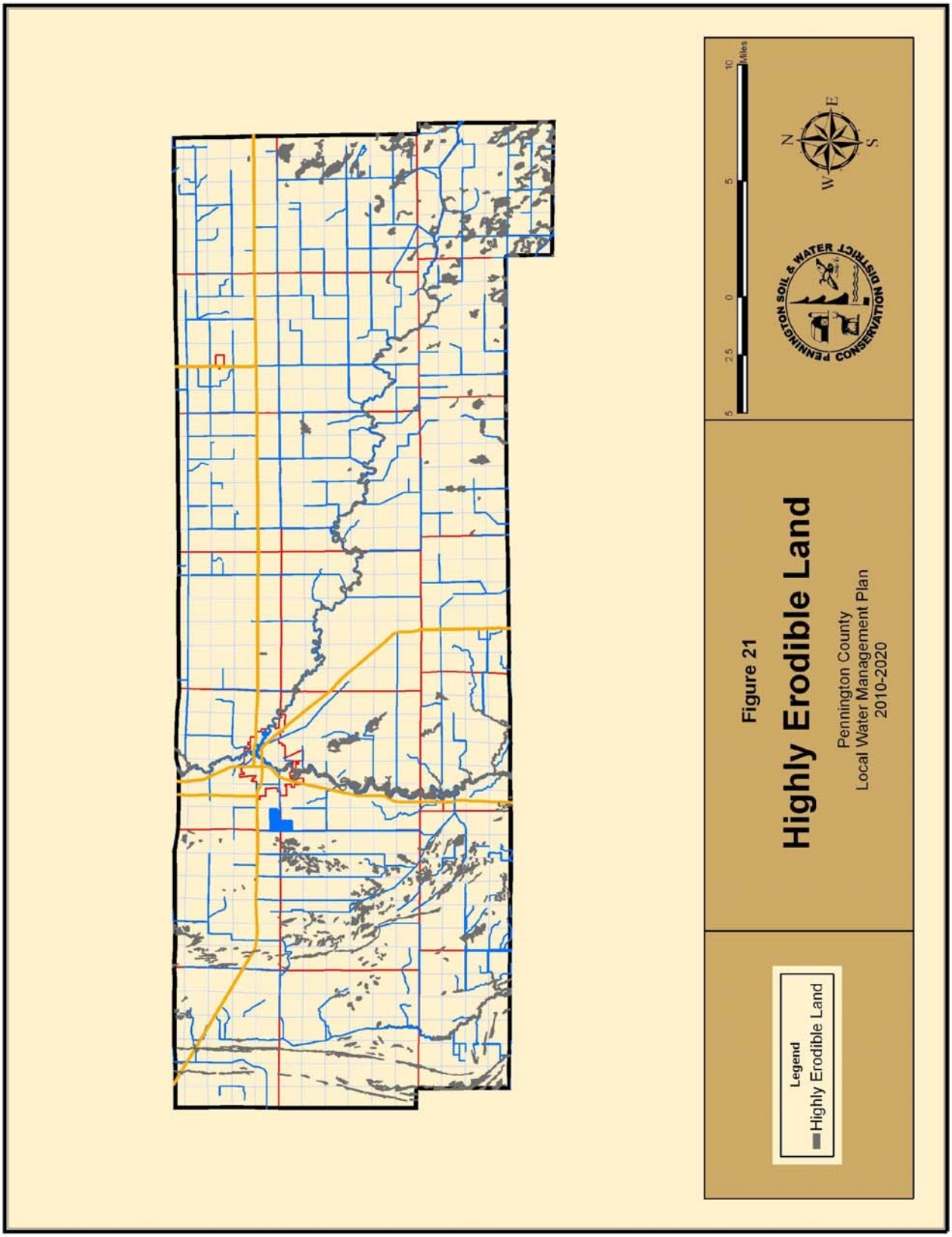


Figure 21
Highly Erodible Land
Pennington County
Local Water Management Plan
2010-2020
Legend
Highly Erodible Land
5 2.5 0 5 10 Miles
N
W
E
S
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

B4. Hydrologic Soil Features

"Hydrologic soil groups" are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soil having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned a duel hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the seconded is for undrained areas.

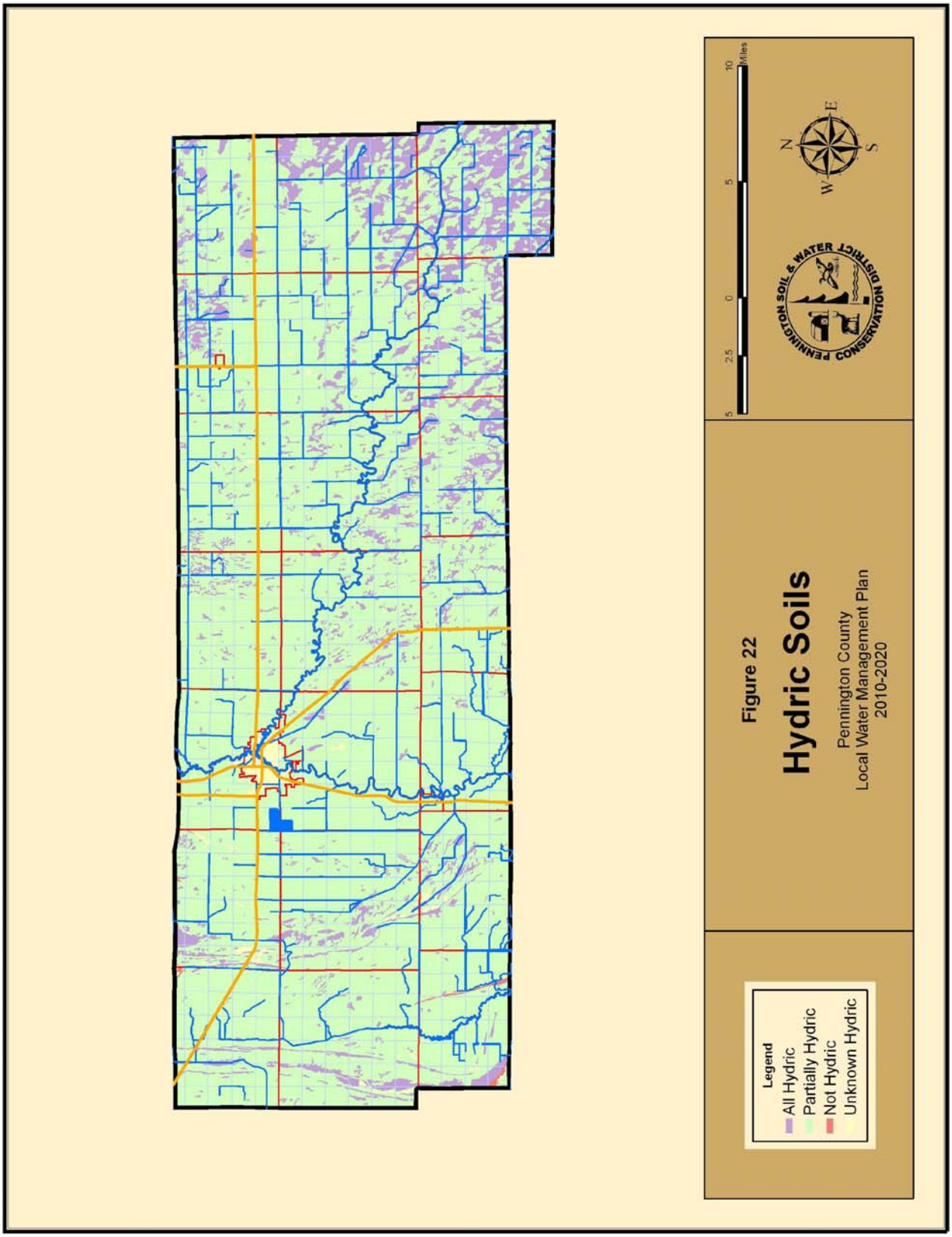
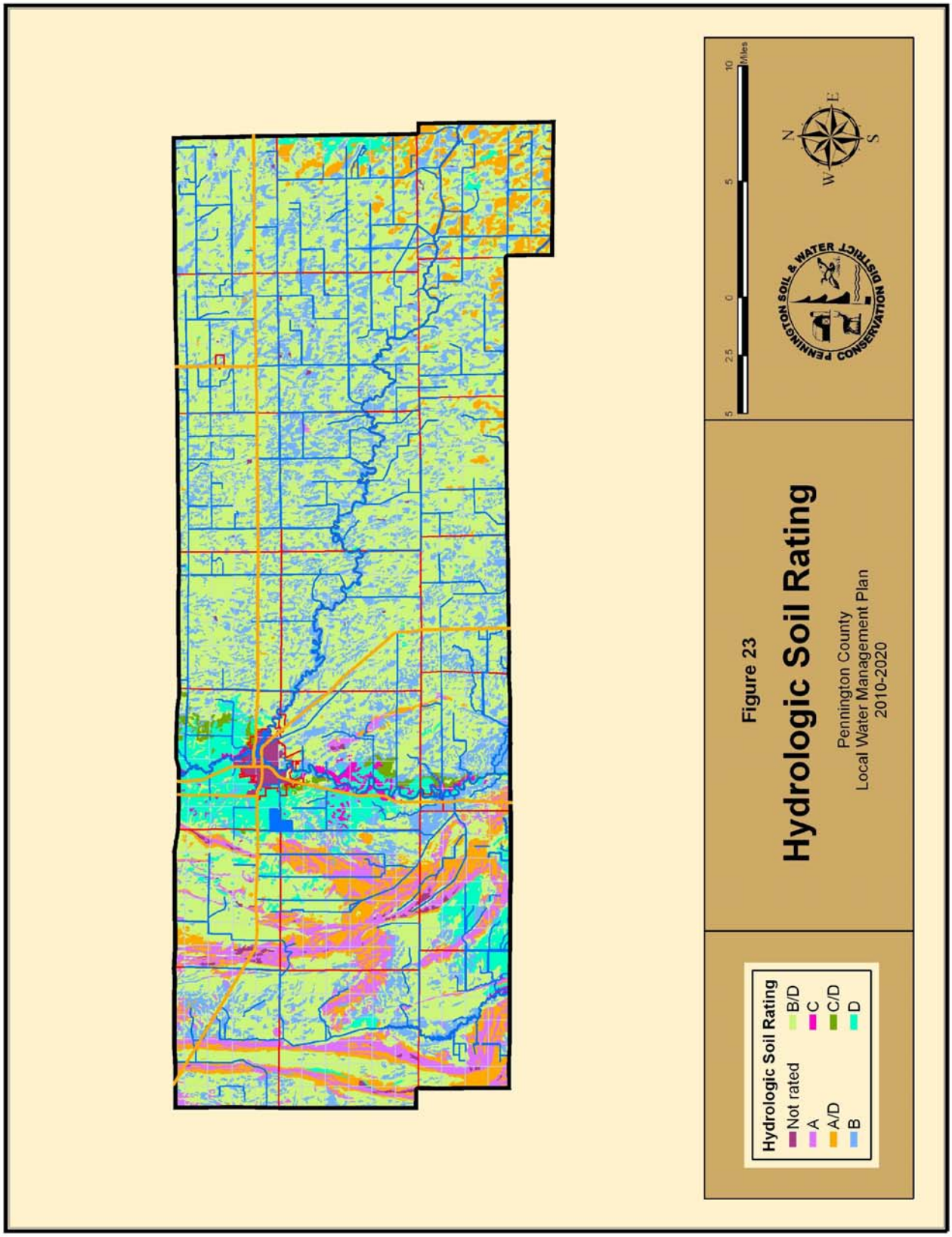
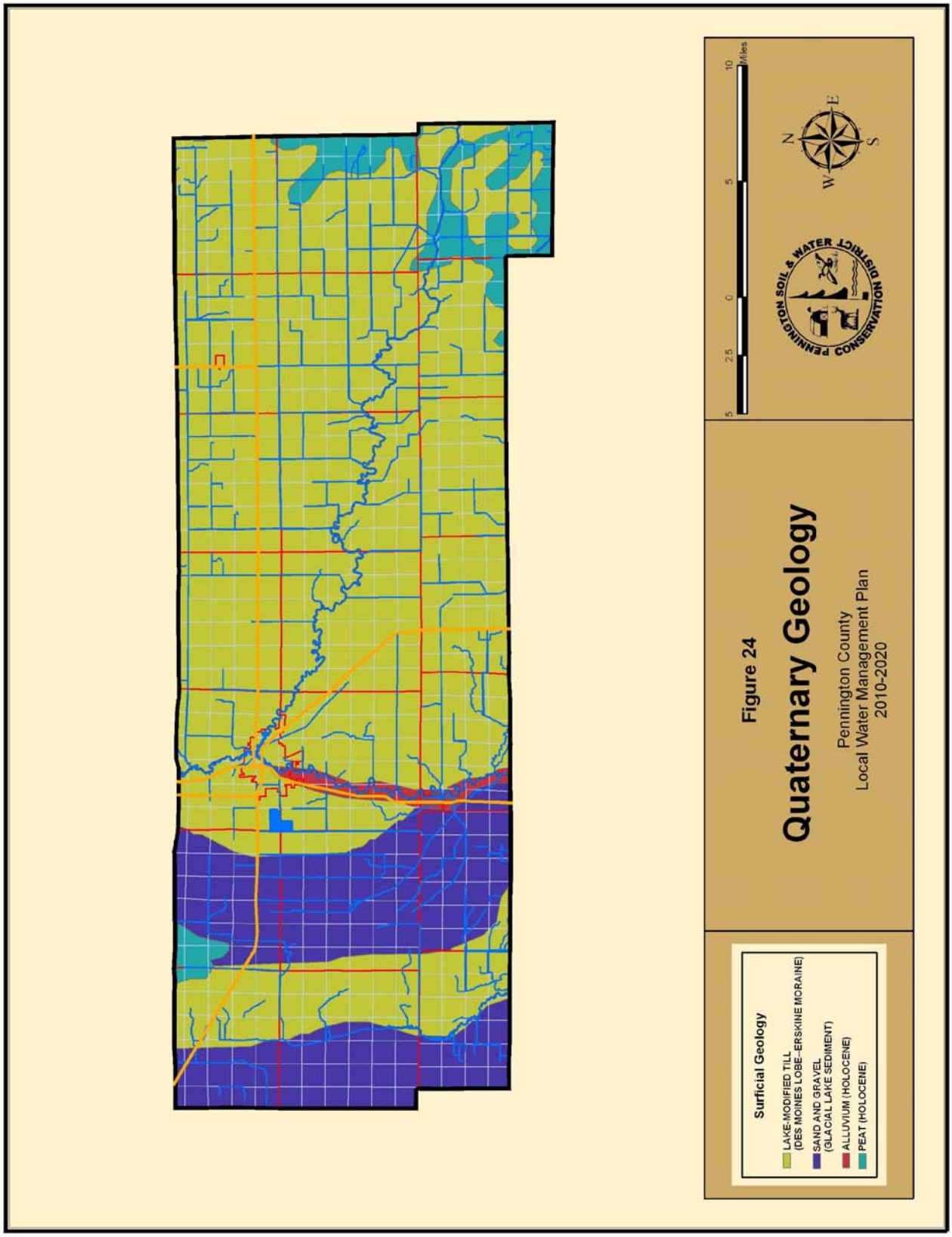


Figure 22
Hydric Soils
Pennington County
Local Water Management Plan
2010-2020
Legend
All Hydric
Partially Hydric
Not Hydric
Unknown Hydric
5 2.5 0 5 10 Miles
N
W
E
S
PENNINGTON SOIL & WATER CONSERVATION DISTRICT


Hydrologic Soil Rating
Not rated
A
A/D
B
B/D
C
C/D
D
Figure 23
Hydrologic Soil Rating
Pennington County
Local Water Management Plan
2010-2020
5
2.5
0
5
10
Miles
N
E
S
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT


Surficial Geology
LAKE-MODIFIED TILL (DES MOINES LOBE--ERSKINE MORAINE)
SAND AND GRAVEL (GLACIAL LAKE SEDIMENT)
ALLUVIUM (HOLOCENE)
PEAT (HOLOCENE)
Figure 24
Quaternary Geology
Pennington County
Local Water Management Plan
2010-2020
5 2.5 0 5 10 Miles
N
E
S
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

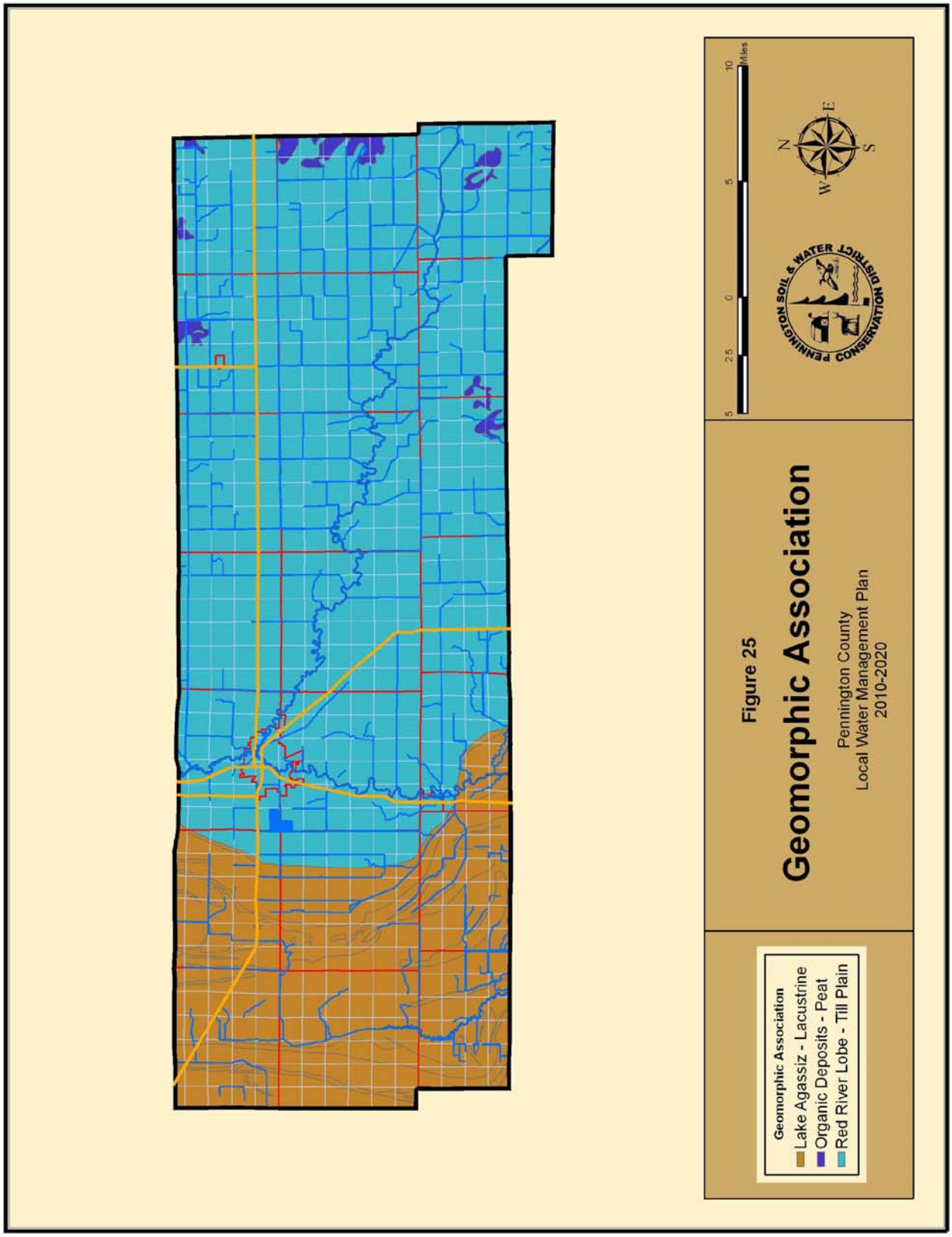


Figure 25
Geomorphic Association
Pennington County
Local Water Management Plan
2010-2020
Geomorphic Association
Lake Agassiz - Lacustrine
Organic Deposits - Peat
Red River Lobe - Till Plain
5 2.5 0 5 10 Miles
N
E
S
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

B5. Topographic Relief

"All of Pennington County has been influenced by the waters of Glacial Lake Agassiz. As the water level of the lake receded, a succession of beach ridges formed, most notably in the western third of the county. A number of small basins also formed. Lacustrine sands, silts, and clays were deposited in these basins. Changing eddies and currents caused the formation of sandbars, which occur throughout the county. Calcareous loam and clay loam glacial till underlies these deposits.

The highest elevation in Pennington County is 1,198 feet above sea level. It is in Reiner Township in the northeastern part of the county. Figure 26. The lowest elevation is 974 feet. It is in Bray Township along the western edge of the county. Elevation change throughout the county is about 212 feet." (Pennington County Soil Survey)

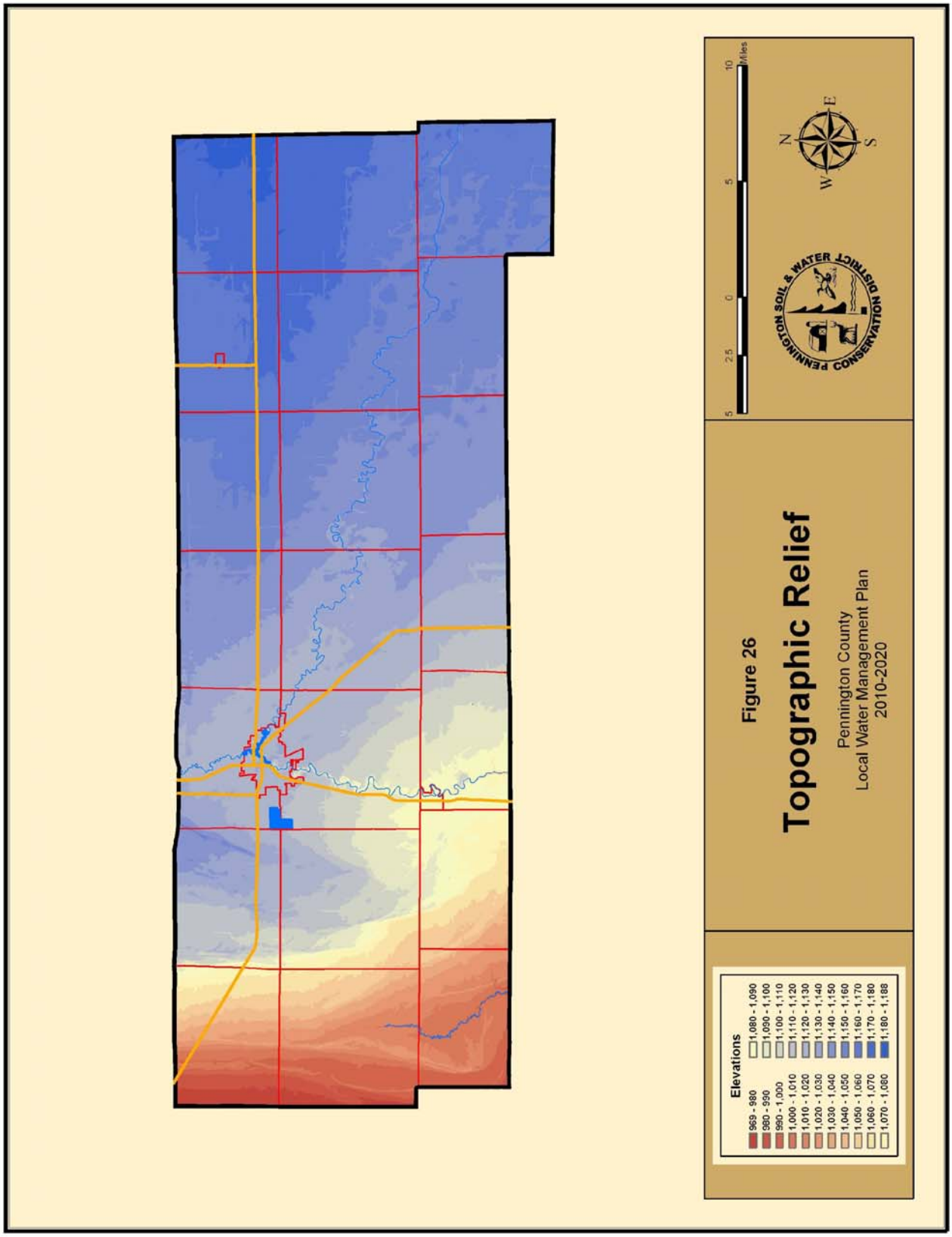
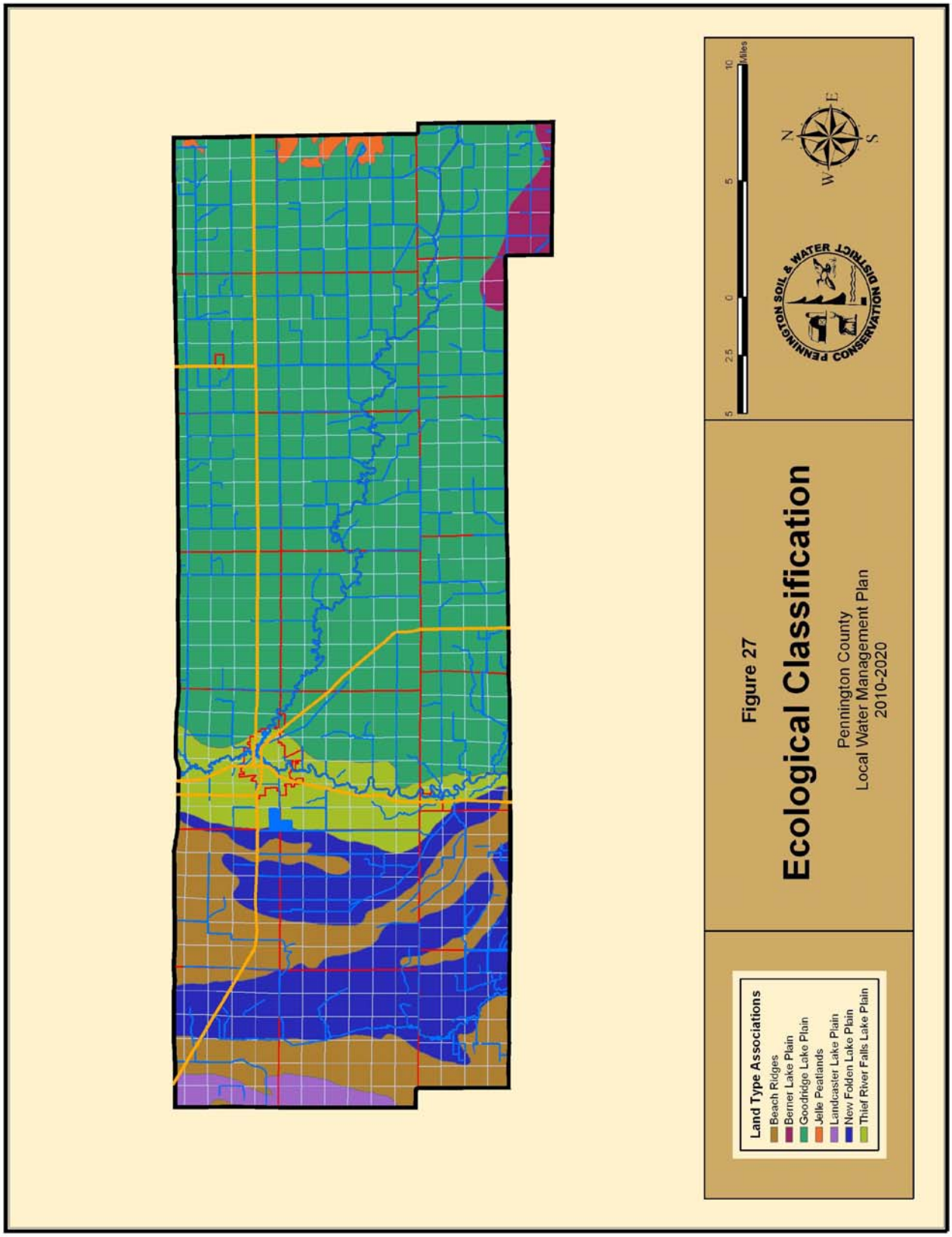
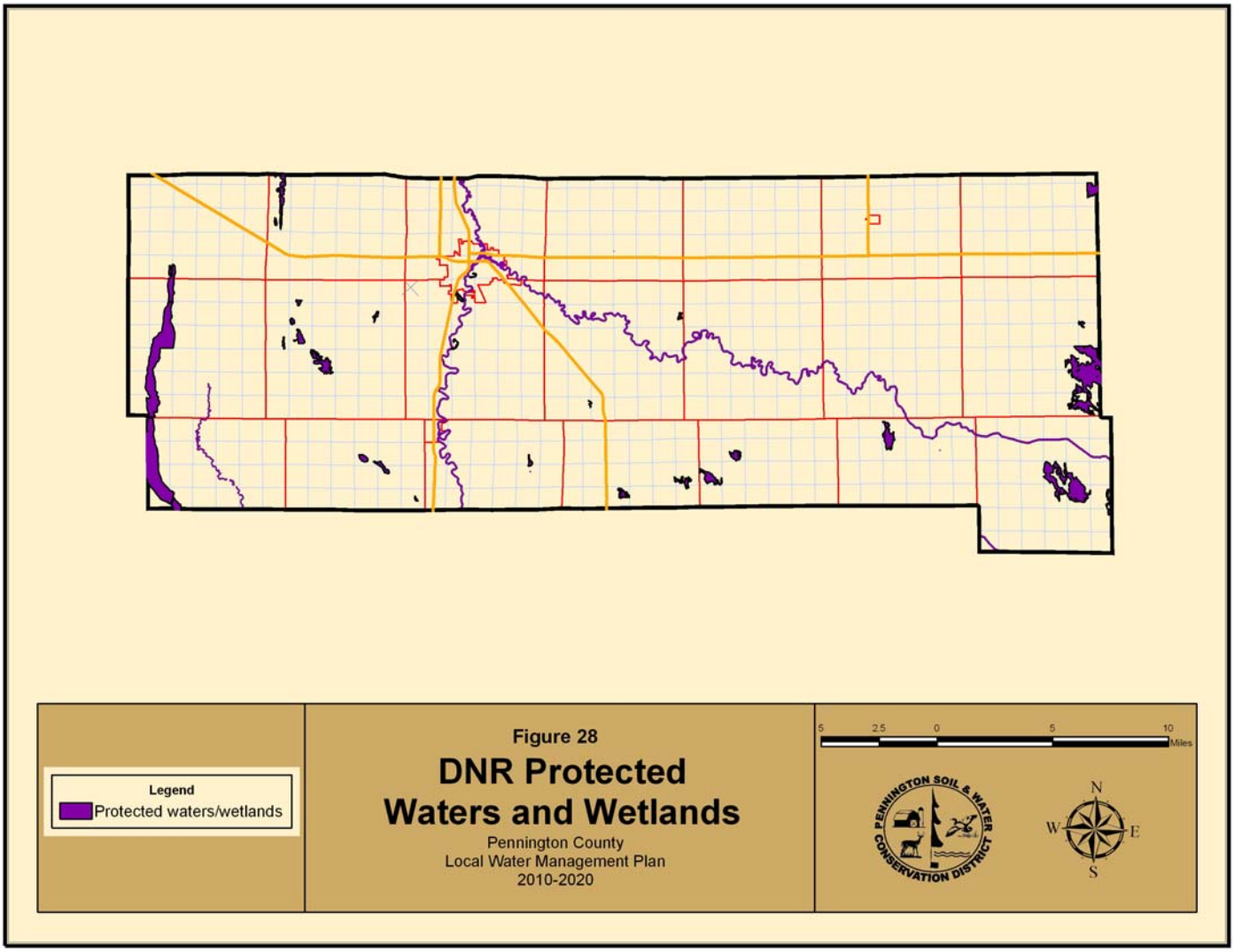


Figure 26
Topographic Relief
Pennington County
Local Water Management Plan
2010-2020
Elevations
969 - 980
980 - 990
990 - 1,000
1,000 - 1,010
1,010 - 1,020
1,020 - 1,030
1,030 - 1,040
1,040 - 1,050
1,050 - 1,060
1,060 - 1,070
1,070 - 1,080
1,080 - 1,090
1,090 - 1,100
1,100 - 1,110
1,110 - 1,120
1,120 - 1,130
1,130 - 1,140
1,140 - 1,150
1,150 - 1,160
1,160 - 1,170
1,170 - 1,180
1,180 - 1,188
5 0 2.5 5 10 Miles
N
S
E
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT


Land Type Associations
Beach Ridges
Berner Lake Plain
Goodridge Lake Plain
Jelle Peatlands
Landcaster Lake Plain
New Folden Lake Plain
Thief River Falls Lake Plain
Figure 27
Ecological Classification
Pennington County
Local Water Management Plan
2010-2020
5 2.5 0 5 10 Miles
N
S
E
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

B6. State Protected Waters

State protected waters are those lakes, wetlands, and streams classified under the Protected Waters Inventory (PWI). Under this classification, certain activities (such as drainage of identified wetlands) are prohibited, and state permits are required for most projects affecting these waters. Figure 28.



The following are protected waters:

Number	Name	Section	Township	Range
57-1	Goose Lake	Various	152, 153	45, 46
57-13	Black River WMA	10	152	44

The following natural and altered natural watercourses are protected waters:

	From			To		
Name	**Section**	**Townshp**	**Range**	**Section**	**Townshp**	**Range**
Red Lake River	13	152	39	20	152	43
Thief River (TR)	9	154	43	27	154	43
Unnamed to TR	10	154	43	16	154	43
Unnamed to RLR	33	153	43	6	152	43
Unnamed to RLR	9	152	43	17	152	43
Unnamed to RLR	8	152	42	14	152	43
Unnamed to RLR	22	152	43	20	152	43
Clearwater River	32	152	39	31	152	39
Black River (BR)	4	152	45	23	152	45
Unnamed to BR	22	154	45	3	153	45
Unnamed to BR	14	152	45	23	152	45

The following are protected wetlands:

Number	Name	Section	Township	Range
57-2	Dunlap Marsh	8	153	44
57-3	Unnamed	7, 18, 19	154	44
57-8	Unnamed	8	153	44
57-14	Unnamed	10, 11, 14	152	44
57-15	Unnamed	24	152	44
57-16	Unnamed	4	152	40
57-17	Unnamed	14, 23	152	39
57-18	Unnamed	15, 22	152	39
57-19	Unnamed	24, 25	152	39
57-21	Unnamed	19	154	44
57-22	Unnamed	33	154	43
57-23	Unnamed	8	152	41
57-24	Unnamed	18, 19	152	41
57-25	Unnamed	13	154	39
57-26	Unnamed	11, 14	152	43
57-27	Unnamed	4	153	43
57-28	Unnamed	11	153	44
57-29	Unnamed	17	153	44
57-30	Unnamed	18, 19	153	44
57-31	Unnamed	20, 21	153	44
57-32	Unnamed	12	153	42
57-33	Unnamed	32, 33	153	42
57-34	Unnamed	13	152	42
57-35	Unnamed	21	152	42
57-38	Unnamed	12, 13	153	39
57-40	Unnamed	16	153	43
57-41	Unnamed	35, 36	153	39
4-392	Unnamed	Various	152, 153	38, 39
45-90	Unnamed	6, 7	154	44

B7. Monitoring Data

In 1998 the SWCD established nine river monitoring sites in the county. Figure 29. There are four sites on the Red Lake River, one site on the Thief River, one site on the Clearwater River, two sites on the Black River, and one site at the outlet of Goose Lake. The sites are located along the rivers to compare water quality coming into and leaving the county.

Samples are collected once a month during ice-free periods. All samples are sent overnight to a certified lab for analysis. Samples are analyzed for common biological, chemical, and nutrient parameters. For the most part, levels fall within the Red River Valley Eco-region norm for those parameters that have norms established.

The RLWD has two monitoring sites in Pennington County that are sampled once each quarter. Both sites are located on the Red Lake River.

Four additional sites; Judicial Ditch 30, and County Ditches 70, 21, & 96 are being monitored at and near their confluence to the river as part of a Surface water Assessment Grant. Two grants were obtained, with duration of two years each. The first will be completed in 2010, the second in 2011.

The full collection of water quality data from these nine monitoring sites, (1998-Present) is on file at the Pennington SWCD office.

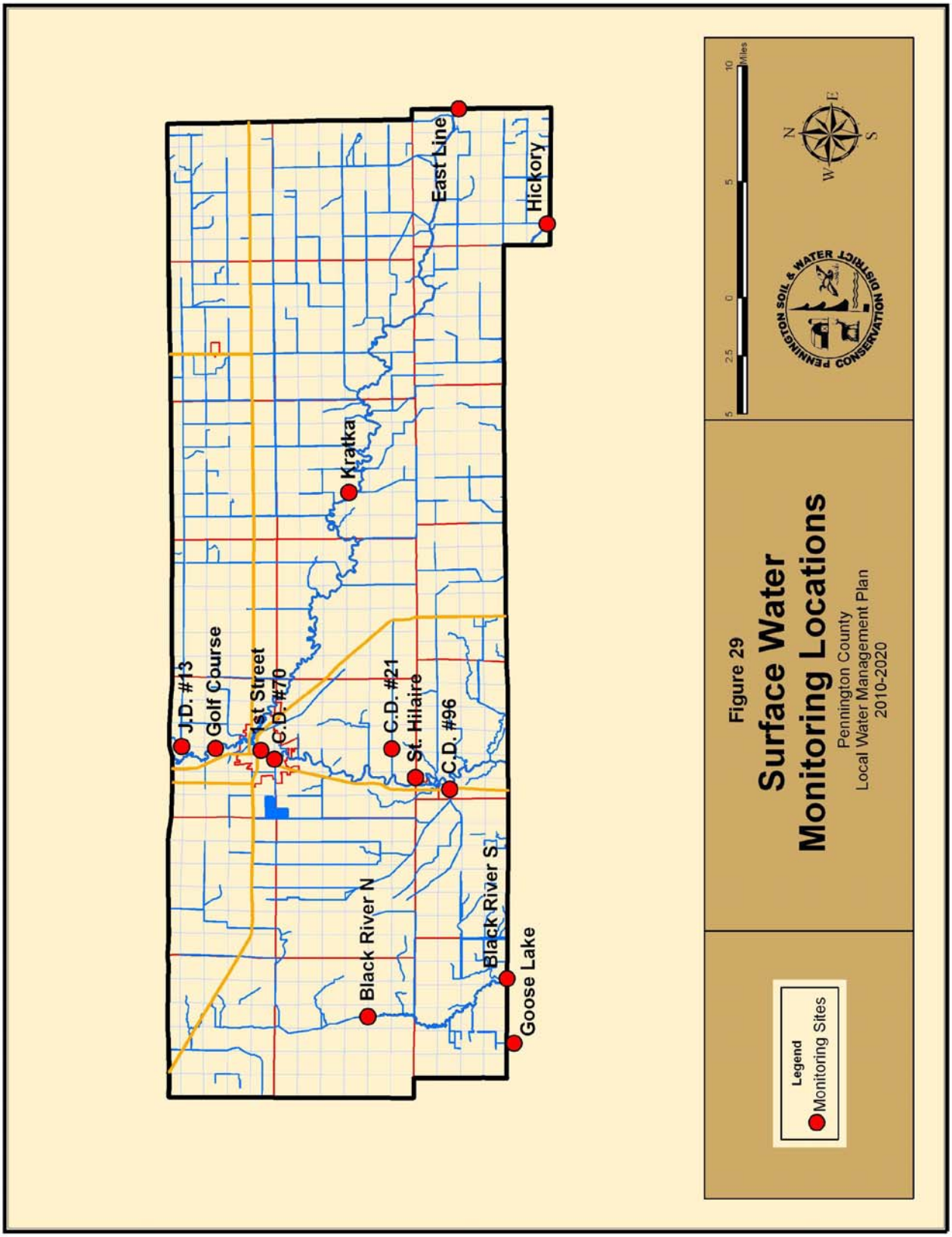
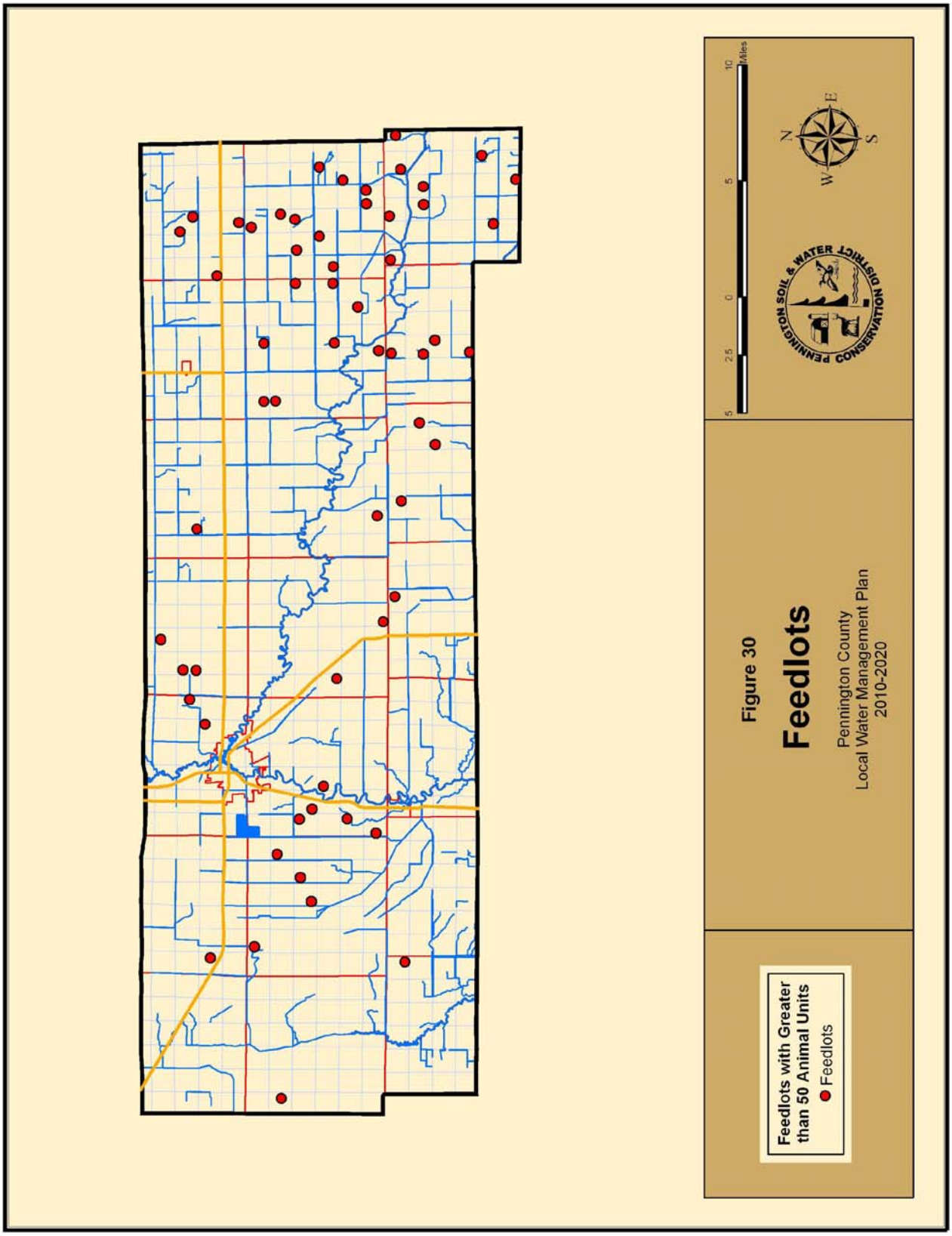


Figure 29
Surface Water Monitoring Locations
Pennington County
Local Water Management Plan
2010-2020
Legend
Monitoring Sites
J.D. #13
Golf Course
1st Street
C.D. #70
C.D. #21
St. Hilaire
C.D. #96
Kratka
East Line
Hickory
Black River N
Black River S
Goose Lake
N
S
E
W
Miles


Feedlots with Greater than 50 Animal Units
Feedlots
Figure 30
Feedlots
Pennington County
Local Water Management Plan
2010-2020
PENNINGTON SOIL & WATER CONSERVATION DISTRICT
N
E
S
W
5
2.5
0
5
10
Miles

B8. Shoreland

Shoreland Ordinances

The following entities have approved Shoreland Ordinances in Pennington County.

The City of Thief River Falls has jurisdiction over all “Urban” segments of the Red Lake and Thief Rivers. Shoreland Officer for the city is the Community Development Director.

Pennington County has jurisdiction over the entire county other than those segments designated as "Urban”. Shoreland Officer for the county is the SWCD Water Plan Coordinator.

Shoreland Classifications

The public waters of Pennington County have been classified below consistent with the criteria found in Minnesota Regulations, Part 6120.3300, and the Protected Waters Inventory (PWI) Map for Pennington County, Minnesota.

Classification	Water body	Legal Description
Natural Environment	Goose Lake	Sect various, T 152, 153 R 45
Urban	Red Lake River	Beg. at the E line of Sect 35, T 154 N, R 43 W, & ending at the S line of Sect 4, T 153 N, R 43 W
Urban	Thief River	Beg. at the N line of SW ¼, Sect 27, T 154 N, R 43 W, and ending at the confluence with the Red Lake River in the S ½, Sect 27
Agricultural	Red Lake River	Sect 13, T 152, R 39 to Sect 20, T 152, R 43
Agricultural	Thief River	Sect 9, T 154, R 43 to Sect 27, T 154, R 43
Agricultural	Clearwater	Sect 32, T 152, R 39 to Sect 31, T 152, R 39

Tributary streams – All protected watercourses in the county shown on the PWI map not given a classification in the table above are considered “tributary”.

There are two shoreland ordinances that are enforced in the county. The county ordinance covers the entire county including the cities of Goodridge and St. Hilaire. The City of Thief River Falls enforces its own ordinance. The county ordinance is a stand-alone document. The city ordinance is incorporated into the city planning and zoning controls. The county and city coordinate updates of their ordinances to ensure seamless coverage and continuity of enforcement.

There is not much new development activity in shoreland areas. There are typically about 10-20 permits issued in the county each year for all types of shoreland activities. Permits are issued for new construction, but many are for additions / expansions or ISTS upgrades / replacements. Pennington County has established a three member Shoreland Board of Adjustment. The purpose of the Board is to hear and decide requests for shoreland variances and settle interpretation questions. DNR Waters works in conjunction with the city and county shoreland officers to help landowners stay in compliance with the ordinances.

B9. Public Water Access

The Public Water Access Program manages over 1500 trailer and carry-in boat accesses on Minnesota's lakes and rivers. These accesses usually remain open 24 hours a day and are patrolled by conservation officers. There is no fee for their use. However, accesses located within a state park require a daily or annual state park sticker. The Public Water Access Program also provides fishing piers and shore fishing sites. Fishing piers and shoreline enhancements are barrier free and are generally operated and maintained by local units of government.

The goal of the Public Water Access Program is to provide free access to Minnesota's lakes and rivers. The program strives to meet the increasing demand on the state's water resources for all boating activities. The Public Water Access Program works year round on acquisition, development, and maintenance of water access sites. Funds to provide public accesses are derived through boat license fees and a portion of gas tax revenues attributed to motor boats. In addition, funding is periodically provided through the Legislative Commission on Minnesota Resources (LCMR) and the State Bonding Program.

There are several boat accesses within the City of Thief River Falls.

- SE of the 8th Street bridge
- NE of the 3rd Street bridge
- Canoe access only SE of the power dam on the Red Lake River

Other accesses in the county are located at:

- Highlanding bridge – Red Lake River
- Neptune bridge – Red Lake River
- Kratka bridge – Red Lake River
- St. Hilaire – Red Lake River
- River Valley bridge – Red Lake River
- Smiley bridge – Red Lake River

In Pennington County there are two fishing pier / platforms on the Thief River Falls reservoir.

- At the confluence of the Thief and Red Lake rivers just south of the 8th Street bridge
- Below the power dam on the Red Lake River

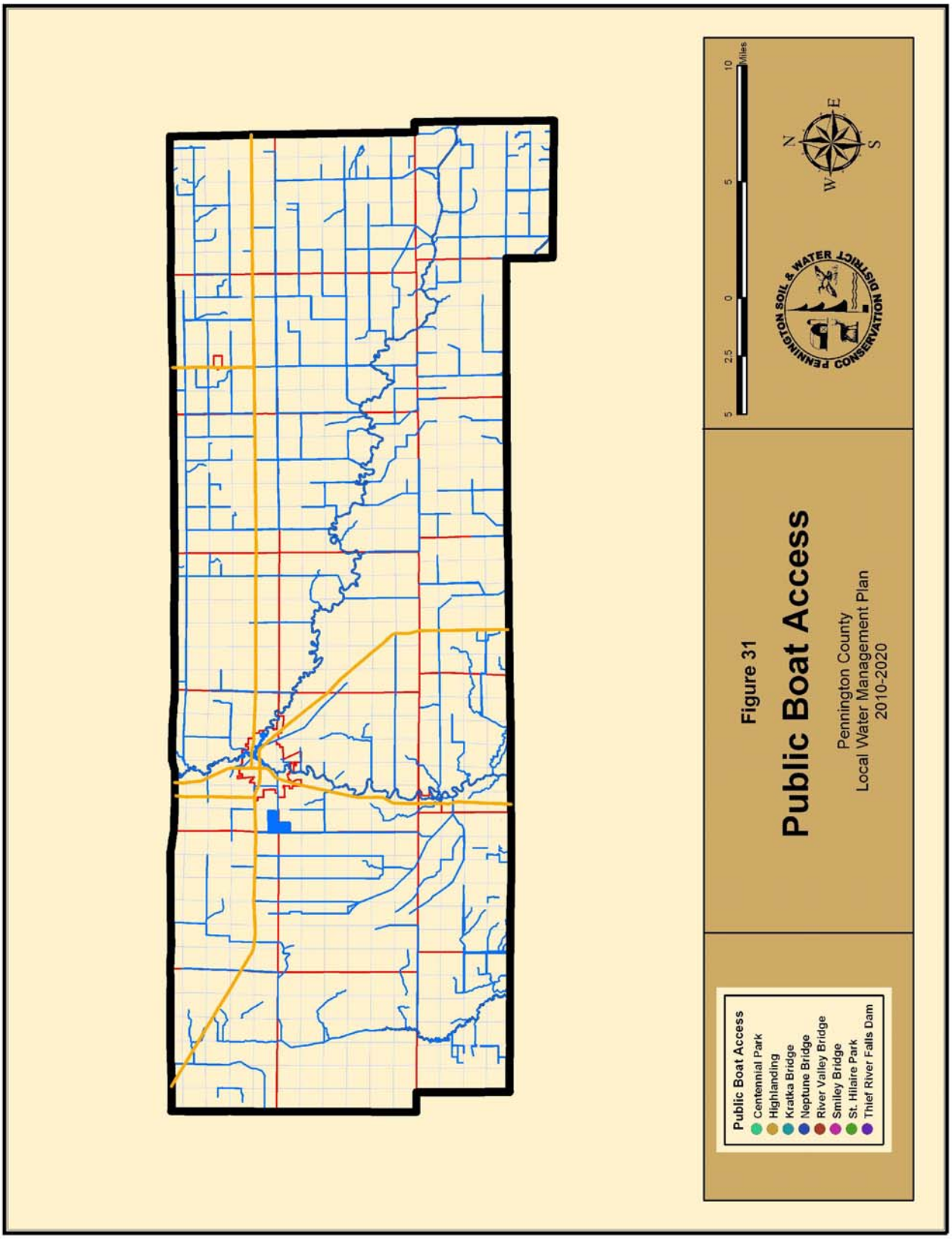


Figure 31
Public Boat Access
Pennington County
Local Water Management Plan
2010-2020
Public Boat Access
Centennial Park
Highlanding
Kratka Bridge
Neptune Bridge
River Valley Bridge
Smiley Bridge
St. Hilaire Park
Thief River Falls Dam
5 2.5 0 5 10 Miles
N
W
E
S
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

B 10. Protected Flows

“Protected flow” is defined as the amount of water required in the watercourse to accommodate instream needs such as water-based recreation, navigation, aesthetics, fish and wildlife habitat, water quality, and needs by downstream higher priority users located in reasonable proximity to the site of appropriation."

Protected flow for "instream needs" has been identified as a significant social and environmental issue. Instream flow protection is addressed in Minnesota Statutes, and permits issued for appropriation of water from streams or lakes may be limited in order to maintain and protect instream uses. Consumptive appropriations are not allowed when flows are below specified low flows.

The Red Lake River has a protected flow of 119 cfs at Crookston in Polk County. This is the minimum flow that will sustain aquatic life and stream integrity.

The Clearwater River has a protected flow of 36 cfs at Plummer.

The Thief River has a protected flow of 0 cfs at Hillyer. The Thief River usually experiences periods of low flow in late summer or early fall because of low precipitation

B 11. Additional Useful Planning Maps

The following three figures have been included in the Water Plan because of their valuable information for future water planning activities in Pennington County.

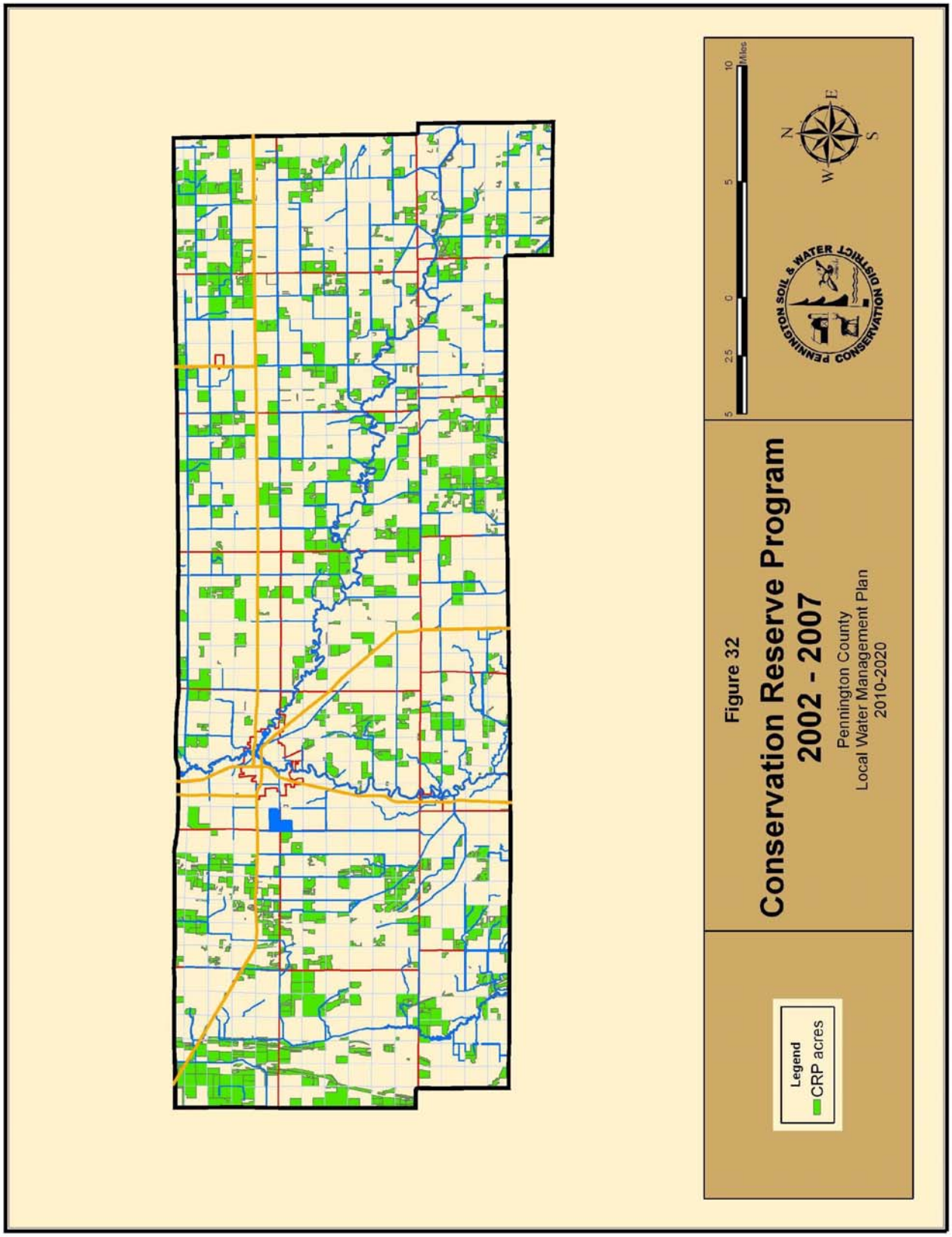
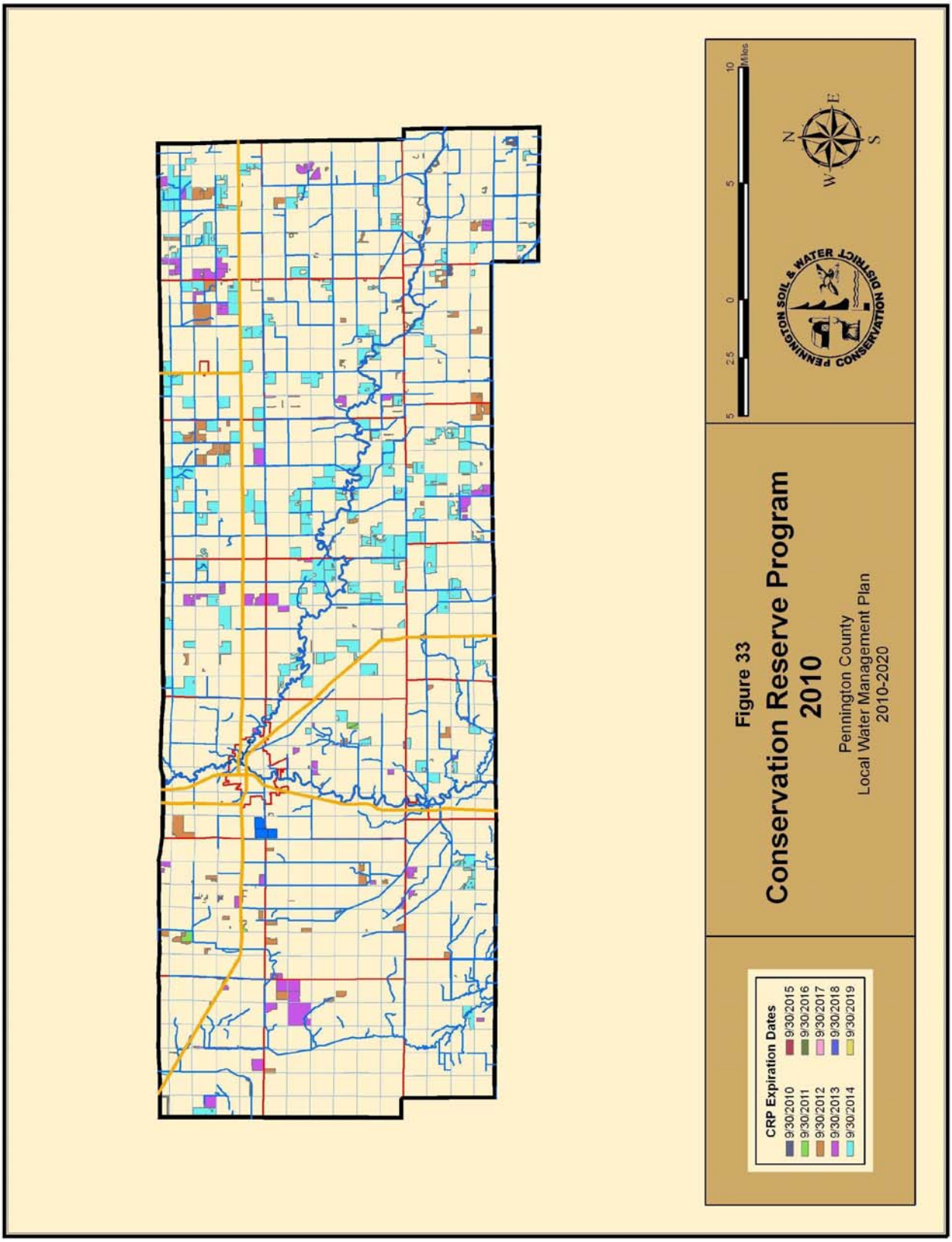


Figure 32
Conservation Reserve Program
2002 - 2007
Pennington County
Local Water Management Plan
2010-2020
Legend
CRP acres
5
2.5
0
5
10
Miles
N
E
S
W
PENNINGTON SOIL & WATER CONSERVATION DISTRICT


CRP Expiration Dates
9/30/2010
9/30/2011
9/30/2012
9/30/2013
9/30/2014
9/30/2015
9/30/2016
9/30/2017
9/30/2018
9/30/2019
Figure 33
Conservation Reserve Program
2010
Pennington County
Local Water Management Plan
2010-2020
5 2.5 0 5 10 Miles
N
W
E
S
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

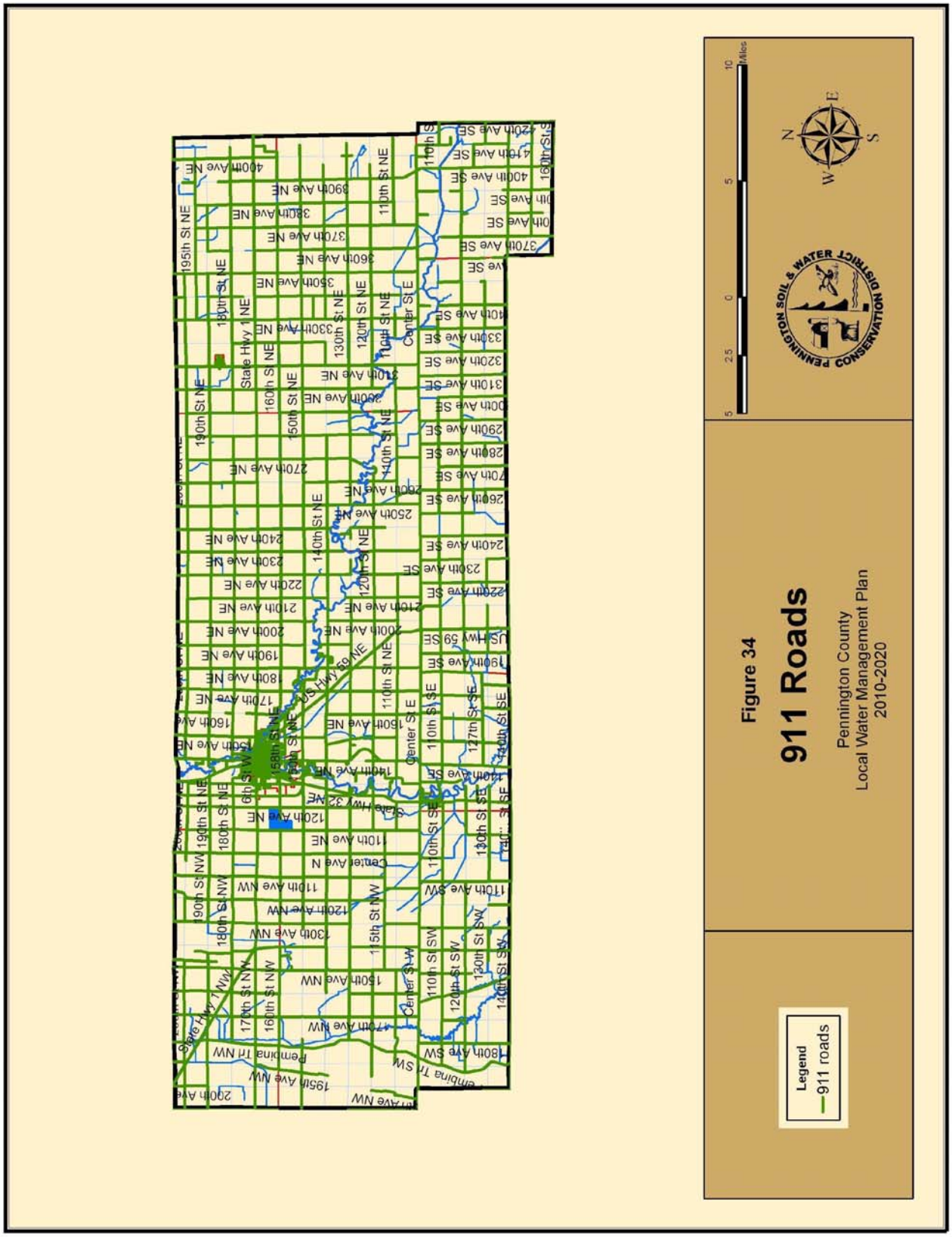


Figure 34
911 Roads
Pennington County
Local Water Management Plan
2010-2020
Legend
911 roads
Miles
PENNINGTON SOIL & WATER CONSERVATION DISTRICT

Appendix C

References

The Land Management Information Center (LMIC)

Red Lake Watershed Fact Sheet

Minnesota Department of Health

Minnesota Department of Health (MDH). 2003. City of Thief River falls Source Water Assessment.

Minnesota Pollution Control Agency

Minnesota Department of Agriculture

Red River Basin Water Quality Team (RRBWQT)

Source Water Assessments

USDA Natural Resources Conservation Service. 1996. Erosion, Sedimentation, and Sediment Yields for the Thief and Red Lake Rivers Basin.

United States Geological Survey (USGS). 1996. Availability and Quality of Water from Glacial-Drift Aquifers in Marshall, Pennington, Polk, and Red Lake Counties, Northwestern Minnesota. WRIR 95-4201

NRCS, Study of Erosion and Sedimentation in the Thief and Red Lake River Watersheds From MPCA website
http://www.pca.state.mn.us/water/basin/redriver/studies.html#nrcs-study

Red Lake Watershed District. 2007. Thief River Watershed Sediment Investigation Work Plan: 2007 – 2009 Clean Water Partnership Project.
http://www.redlakewatershed.org/projects/TRWSIR1.pdf

Red Lake Watershed District. 1999. Hydrogen Sulfide Monitoring Report
http://www.redlakewatershed.org/projects

Johnson, Brent. 1998. Hydrogen Sulfide Problems in Thief River Falls: Causes, Effects and Possible Solutions.

Marshall County Water and Land Office. 2007. Marshall County Local Water Management Plan.

Red River Basin Commission, Flood Damage Reduction Update, Jan 08, www.redriverbasincommision.org

Groshens, Thomas. 2005. Red River Basin Stream Survey Report, Red Lake River Watershed 2004. Minnesota Department of Natural Resources Division of Fish and Wildlife.

Red Lake Watershed District. 1996. RLWD Project #63: 1995 Thief River Falls Reservoir Drawdown Report

Appendix D

Definitions

Conductivity - The measure of the water's ability to conduct an electric current.

Dissolved Oxygen - The amount of gaseous oxygen (O^2) dissolved in water. Oxygen levels below 5.0 mg/l stress aquatic life.

Fecal Coliform Bacteria - The presence of bacteria from the fecal material of mammals. Can pose a potential health risk for individuals exposed to this water. Measured in number of bacteria per 100 milliliters of water.
Failing septic systems and runoff from feedlots are common sources of fecal coliform in water samples.

E. Coli : Escherichia coli, a subgroup of fecal coliform bacteria that is present in the intestinal tracts and feces of warm-blooded animals. It is used as an indicator of the potential presence of pathogens.

Nitrate (NO_3-): The NO3 anion. Nitrate is the most oxidized form of nitrogen and is a form readily used as a nutrient by plants. Elevated levels of nitrates/nitrogen are often caused by over application of fertilizers that leach into waterbodies.

Phosphorus - A key element necessary for plant and animal growth. High levels of phosphate cause algae blooms and excessive plant growth. This may deplete the dissolved oxygen and dense plant may choke waterways.

Total Maximum Daily Loads (TMDLs) – The maximum amount of a pollutant that can be discharged daily into a water resource from all sources in a surrounding area and still allow the water to be used for drinking, irrigation, industrial and recreational purposes.

Transparency - The depth that light will penetrate water

Turbidity - The measurement of the cloudiness of water. These may be caused by organic or inorganic material such as soil erosion, phytoplankton, waste discharge, urban runoff, sediment river bottom, algal growth. Measured in Nephelometric Turbidity Units (NTU), which measures the intensity of light scattered at 90 degrees as a beam of light passes through a water sample.

Appendix E

Record of Public Hearing

THE PENNINGTON COUNTY
COMPREHENSIVE LOCAL WATER PLANNING
PUBLIC HEARING MINUTES

November 24, 2009

Persons present:

Charles Naplin, Chair of Commissioners and WRAC
Bob Carlson, County Commissioner
Don Jenson, County Commissioner
Darryl Tveitbakk, County Commissioner
Oliver "Skip" Swanson, County Commissioner
Ken Olson Auditor
Al Rogalla, Attorney
Rachelle Winter, Water Plan Coordinator
Bryan Malone, District Manager
Scott DeCamp, newspaper reporter

1. **The hearing was held in the Pennington County Commissioners Room. Charles Naplin, Chair of Commissioners, recessed the County Board meeting and called the hearing to order at 6:05 p.m.**

2. Rachelle began the hearing with a brief PowerPoint outlining the purpose, history , funding, and accomplishment of the water plan. She then presented on updating the water plan and highlighted the priority concerns that will be the focus the updated plan. Lastly, Rachelle discussed the tentative timeline for official local adoption of the updated CLWP by the County Board.

3. When the presentation was complete, Rachelle requested comments and questions. A question was asked on the water quality in Pennington County, whether the impairment are a result from the flat topography of the county. Another question asked was what impairment are on the Thief River and had questions of a presence of high fecal coliform on the river. A final question on the enforcement of shoreland variances was asked.

4. **A motion to approve the draft water plan and send it for state review was given by Bob seconded by Skip. All in favor, motion carried.** Meeting adjourned at 6:35 p.m.

Appendix F

Priority Concerns Scoping Document

Pennington County's Priority Concerns Scoping Document 2007

A precursor to

THE PENNINGTON COUNTY LOCAL WATER MANAGEMENT PLAN

INTRODUCTION

1. County Primer

Pennington County is situated among the prairies and farmland of northwestern Minnesota. According to the 2000 Census the county has a population of approximately 13,600 with an expected increase of 0.9%. The city of Thief River Falls sits as the county seat in the northwestern section of the county. It is the largest community in the county with a population of about 9,000. It is also where the Thief River connects to the Red Lake River. Other communities within the county include Goodridge and St. Hilaire. (Figure 1.)

Land Use

Pennington County lies within the Red River of the North Basin Watershed. It is comprised of 395,617.5 acres. The remnants of Glacial Lake Agassiz, which covered the land approximately 15,000 years ago, provide fertile soils which are ideal for agriculture. Agriculture makes up 78.5% of the land use in the county. Other land uses within the county include; 0.9% urban and industrial, 1.02% farmstead and rural residents, 5.6%, grassland, 2.3% grass- deciduous tree/shrub complex, 7.8% deciduous forest, <0.1 coniferous forest, 1.3% wetlands, 2.5% other. Source: The Land Management Information Center (LMIC).

Conservation programs throughout the county have been established to help maintain and improve water quality, wildlife habitat and promote conservation farming practices. The Natural Resources Conservation Service as well as the Soil and Water Conservation District provide many of these programs. The Conservation Reserve Program (CRP) covers 25% of the tillable acres in the county. This program offers buffer strips, filter strips, tree plantings, and wetland restorations. The Wildlife Habitat Incentives Program (WHIP), Environmental Quality Incentives Program (EQIP), Reinvest in Minnesota (RIM) and the Conservation Security Program (CSP) are other conservation programs that are offered in the county.

Red Lake River Watershed

This watershed covers the vast majority of the county; 72.1 % of the 844,147.8 acre watershed is within the county. Most of the development is within the cities of Thief River Falls and St. Hiliare. Shoreland development is rather heavy in and around these cities. Most of the land is privately owned, rural land is intensively farmed for the production of soy beans and wheat. Future developments in and around Thief River Falls will most likely take place with both Digi-Key's and Artic Cat's continuous success. Recreational use of the land in this watershed is becoming more popular. Canoeing, boating, and fishing are very popular activities along the river. There are three state owned wildlife management areas; Jacksnipe, Higinbotham and Pembina which all offer activities for the outdoor enthusiasts such as birding and hiking. It also provides prime

hunting opportunities for deer, geese, grouse and other game. Jacksnipe is located SE of Thief River Falls and is approximately 203 acres. Higinbotham is 984 acres, located just west of St. Hilaire. Pembina WMA is 4,097 acres; about half lies within western Pennington County, the other half is located in Polk County. The Glacial Lake Agassiz Beach ridge runs through the western edge of the county.

Thief River Watershed

The Thief River watershed lies in the north east and north central portion of the county. The watershed has a total of 689,401 acres, 13.1 % is located in Pennington County. The Thief River is a tributary of the Red Lake River; they join in the city of Thief River Falls. There is one wildlife management area in this watershed. Reiner WMA is 122 acres and is located in the north east section of the county. Land in this watershed is farmed for soy beans and wheat. The population is sparse in rural areas, however in and around the city of Thief River Falls population is heavily developed.

Clearwater Watershed

Clearwater watershed is 887,096.2 acres, 9.5% is located in Pennington County along the southwest corner. The area around the watershed has only a few farmsteads. Land use is mostly agricultural and wetlands with rice paddy farms also common. Oriniak is a small 312 acre wildlife management area found in this watershed.

Grand Marais Creek and Snake River Watersheds

Grand Marais Creek and Snake River watersheds cover a very small portion in the western and northwestern section of the county. It is sparsely population with agricultural fields making up the majority of land use. Grand Marais Creek watershed is a 383,436.1 acre watershed, only 3.2 % is within the county. Snake River watershed is 501,919.7 acres; 2.1% is located within county lines in the NW corner of the county.

2. Plan Information

The Pennington County Water Plan originates from a local desire to actively participate in the management of local water resources and from State legislation that identifies the County as a central figure in water resource management. The Comprehensive Local Water Management Act of 1985 (Minnesota Statutes, chapter 110B) allows counties the opportunity to work with the Minnesota Board of Water and Soil Resources (BWSR) in identifying water related problems and priorities which can be addressed through a set of locally based strategies and work plans. The County, upon approval of the Comprehensive Local Water Plan (CLWP), is eligible to receive implementation funding from the state.

Pennington County completed its first CLWP in 1990. This plan established a direction which identified education, information development, ground water protection, surface water protection, solid waste control, erosion prevention, flood reduction, and improved land management as key issues. Funding from BWSR was combined with resources from Local Units of Government (LUGs) the Pennington Soil and Water Conservation

District (SWCD), the Red Lake Watershed District (RLWD), and other agencies to implement a series of programs identified in the CLWP.
The implementation portion of the plan was refined each year. The county has expanded its water resource management role since 1990 by accepting responsibility for shoreland management, feedlot program administration, Wetland Conservation Act (WCA) administration, floodplain administration and Individual Sewage Treatment Systems (ISTS) administration.

The CLWP has been updated twice since it was first completed; once in 1997 and again in 2002. The present update will be the fourth generation of local water management; our current plan expires February of 2008.

The responsibility of administration and coordinating the implementation of the CLWP is the responsibility of the Soil and Water Conservation District's Water Plan Coordinator. Guidance and direction is provided by the Water Resources Advisory Committee (WRAC). The WRAC is a group of individuals from local, state, and federal governments as well as local citizens and interest groups. The WRAC also helps to establish priority concerns, goals, and objectives of the plan, and oversees the implementation of the local plan and projects.

Water Resources Advisory Committee Members

Voting Members
Don Barron, *Member at large*
Hank Hallstrom, *Resident*
Ron Kalinoski, *Red/Thief Reservoir Assn.*
Charles Naplin, *County Board* (Chair)
Ray Olson, *SWCD* (V. Chair)
Tom Wold, *Township Assn.*

Regular Members
Kathy Fillmore, *NRCS*
Mike Flaagan, *Hwy. Dept.*
Corey Hanson, *RLWD*
Rachelle Winter, *Water Plan Coordinator*
Garry Bennett, *DNR-Waters*
Bryan Malone, *SWCD*
Howard Person, *UM Extension*
Arlo Rude, *TRF Public Utilities*
Jim Courneya, *MPCA*
Chad Severts, *BWSR*

LIST OF PRIORTY CONCERNS

Priority Concern 1: Protection and Improvement of Surface Water Quality

Pennington County's surface water resources are the Red Lake River and its tributaries. These tributaries include the Thief River and Clearwater River as well as area streams and wetlands. Uses of the county surface waters include public water supply, irrigation, livestock, industrial, recreational and drainage.

It is a priority to identify issues, enhance, educate and inform with regards to the quality of the surface waters for the protection of public health, safety, economy and aesthetics.

Objective A: Monitor the quality of water in Pennington County.

1. Continue monitoring surface water quality with partnership between the county water planner, Red Lake Watershed District and the Red River Water Management Board. Data will continue to be entered into the EPA's STORET database. This data will help create more accurate data for the assessment and development of the impaired waters list 303(d). Over time, data also provides us with baseline water quality conditions for our area rivers.
2. Update and expand data collection and monitoring. Add winter sampling to our water quality database.

Watershed: First priority is to improve and prohibit further impairments on impaired reaches. Impaired reaches include the Black River impaired for turbidity and DO (Red Lake Watershed), Thief River impaired for turbidity and DO (Thief River Watershed), Clearwater River impaired for turbidity and DO (Clearwater Watershed). Red Lake River impaired on the draft 2008 impaired list (Red Lake Watershed). Second priority is given to all other watersheds and reached within the county.

Objective B: Educate the public about water and soil stewardship and encourage the use of BMPs.

1. Encourage and promote Best Management Practices (BMPs) to reduce sources that contribute to sedimentation, and to reduce erosion. This includes encouraging the creation of buffer strips, windbreaks, living snow fences and using conservation tillage.
2. Encourage and promote Best Management Practices (BMPs) to deal with stormwater management. Highest priority is given to the city of Thief River Falls.
3. Provide AgBMP low interest loans for conservation tillage equipment.
4. Enforce the shoreland ordinance to reduce vegetation clearing, and building too close to river banks.
5. Provide technical and financial assistance for streambank stabilization projects.
6. Provide a public education program for surface water protection.

Watershed: All watersheds a priority

Objective C: Coordinate and cooperate with other agencies and jurisdictions on plans and projects.

1. Encourage proper ditch maintenance, and provide information or assistance when ever necessary for those projects.
2. Encourage conservation practices to reduce erosion through programs such as CRP, EQIP and CREP.
3. Search for programs and funding for projects that reduce erosion and improve water quality.

Watershed: All watersheds a priority

Priority Concern 2: Flood Damage Reduction

The flat topography of Pennington County makes it prone to flooding. In an effort to reduce the flood damage to agricultural land and private property the county has been heavily ditched and drained. This however does not prevent flooding.

Objective A: Educate the public about flooding, and provide assistance whenever needed.

1. Encourage flood prone land to be entered into conservation easement programs.
2. Encourage participation in programs such as CREP II. The program converts environmentally sensitive cropland to native vegetation in order to improve water quality, reduce soil erosion, increase floodwater storage, and provide fish and wildlife habitat.
3. Assist landowners with technical and financial assistance to reduce flooding through the use of conservation practices.
4. Administer floodplain ordinance and permitting in partnership with the SWCD water planner; watershed districts and the County Highway Department.
5. Monitor tile drainage; it may reduce flooding by having water infiltrate to the tile instead of running off fields. Educate landowners on the pros and cons of tile drainage.
6. Administer WCA to reduce the loss of wetlands and encourage wetland restoration. Wetlands help reduce future flood damage by increasing water storage.
7. Search for programs and funding for projects.

Watershed: All watersheds a priority

Objective B: Coordinate and cooperate with other agencies and jurisdictions on plans and projects.

1. Improve ditch management and drainage.
2. Encourage floodwater retention structures to reduce potential flooding where possible with a local control structure management plan.

3. Work with RLWD to encourage dikes, water diversions, impoundments and grade stabilization projects.
4. Encourage coordination of water releases from upstream impoundments.

Watershed: All watersheds a priority

Priority Concern 3: Protect the County's Drinking Water Sources.

Pennington County citizens depend on surface and ground water as a drinking source. The city of Thief River Falls depends on the Thief and Red Lake Rivers as a drinking water source. Rural citizens depend on private and public wells as their water source. It is a top priority to maintain a viable drinking source for public consumption.

Objective A: Surface water drinking sources.

1. Support Source Water Assessment Plan for the city of Thief River Falls.
2. Provide technical and financial assistance for installation of streambank stabilization projects, buffer strips, windbreaks, living snow fences, grade stabilization structures, and other practices to reduce erosion and sedimentation.
3. Provide AgBMP low interest loans for conservation tillage equipment.

Watershed: Thief River and Red Lake River watersheds, highest priority given to just north of Thief River Falls and the Thief River Reservoir.

Objective B: Ground water drinking sources.

1. Address failing and nonconforming septic systems.
2. Provide assistance to those who have questions or concerns on failing or non compliant systems. Act as the regulatory force on complaints.
3. Continue to offer Ag BMP low interest loans to replace failing systems.
4. Administer the county ISTS ordinance to insure proper design, installation and inspection.
5. Update the ISTS ordinance to include the new MPCA rules.
6. Complete an inventory on failing and non compliant systems. High priority will be shoreland and floodplain areas.
7. Seal unused/unsealed wells throughout the county. This can be accomplished through the SWCD cost share program.
8. Continue to monitor the 7 DNR observation wells along the beach ridge. Test four of the wells for the presence of nitrates and total coliform bacteria.
9. Offer annual well water testing clinics for nitrates and bacteria. Offer iron, hardness and pH tests as requested. Keep an inventory of results.
10. Keep the well inventory up to date, tracking sealed and drilled wells in the county.
11. Provide educational information to landowners on groundwater, septic systems and drinking wells.
12. Support the Wellhead Protection Plan for the city of St. Hilaire.
13. Develop a wellhead protection plan for the city of Goodridge.

Watershed: All watersheds are a priority.

PRIORITY CONCERN IDENTIFICATION

On August 8, 2006 the Pennington Board of Commissioners signed a resolution to update the Comprehensive Local Water Management Plan. On April 5, 2007 the WRAC was convened, and the process and plan for updating the CLWP was discussed. A written notice of decision to update, and a request for priority concerns and plans were mailed to representatives of BWSR, DNR, MPCA, MDH, MDA, and EQB. Twenty One Townships, 3 cities, The Red Lake Watershed District, Middle- Snake-Tamarac Rivers Watershed District, 10 surrounding SWCD offices, SWCD Technical Service Area 1, and WRAC members were also sent this notice. The input was received by May 31, 2007; they were given 45 days to respond.

A citizen survey to gather input was developed. The survey asked to rank top resource concerns, and to pick four problems in the county. The survey was available at the Pennington SWCD annual banquet, on the main counter at the SWCD office; it was mailed to 21 township officials, 3 city mayors, 9 churches that participated in soil stewardship, 2 watershed districts, 26 clubs and organizations within the county, and included in 45 miscellaneous mailings. It was also given to our WRAC, and placed on the Pennington SWCD webpage. A press release requesting input was printed in The Times on May 19, 2007.

Local plans were obtained from Marshall County, Polk County, Roseau County, Hubbard County, Ottertail County, Becker County, Kittson County, Red Lake Watershed District 10 Year Plan, Pembina Trail RC&D 5 Year Plan, Red Lake County, Clay County, Itasca County, Clearwater County, Red River Basin Natural Resources Framework Plan, and NW MN Comprehensive Economic Development Strategies.

On June 5, 2007 the Water Resources Advisory Committee convened to review the public input that was received. A total of 30 surveys were returned.
Results were;

Resource issues in rank order;
1. Sourcewater protection
2. Stormwater issues
3. Wellhead protection
4. Flooding
5. Non Point Source Pollution
6. Sedimentation from water
7. Sedimentation from wind
8. TMDLs
9. Wetlands
10. Feedlots
11. Other; ISTS

The top four problems in the county;
1. Stormwater issues
2. Contaminated runoff
3. Declining water clarity
4. Lack of environmental education and developmental pressures

The committee thought more input should be acquired if possible. In effort to gain more input, a different format of the survey was created. Instead of numbering a list of possible problems and issues, it asked the citizen if they felt there are any issues or concerns that should be addressed in the CLWP. This question was included as part of the form for our well water testing clinic. No written comments were placed on the 59 forms returned by those participants.

A public informational meeting was held in conjunction with our WRAC on August 13, 2007. Present were:

Hank Hallstrom, *Resident*
Ron Kalinoski, *Red/Thief Reservoir Assn.*
Charles Naplin, *County Board* (Chair)
Ray Olson, *SWCD* (V. Chair)
Kathy Fillmore, *NRCS*
Mike Flaagan, *Hwy. Dept.*
Corey Hanson, *RLWD*
Rachelle Winter, *Water Plan Coordinator*
Garry Bennett, *DNR-Waters*
Bryan Malone, *SWCD*
Howard Person, *UM Extension*
Arlo Rude, *TRF Public Utilities*
Jim Courneya, *MPCA*
Chad Severts, *BWSR*

Prior to the meeting a list of past accomplishments of the current water plan, submitted comments, and survey results were compiled and sent to the WRAC to review. At the meeting a general list of those concerns were written on the dry erase board. Members then voted on the top three concerns they felt had priority. Votes were tallied to determine the top concerns. Discussion took place and it was decided to combine some concerns. After some discussion, the Priority Concerns for the 2007 CLWP will be;

1. Protection and Improvement of Surface Water Quality
2. Flood Damage Reduction
3. Protect the County's Drinking Water Sources

A meeting was set to review the draft Priority Concerns Scoping Document on Oct. 2, 2007. After review, the PCSD will be sent to the required agencies. The process of writing the CLWP will occur in the months to follow.

Issues identified by letter from lead agencies and interested parties

Board of Water and Soil Resources (BWSR) - Jeff Hrubes
- Erosion and sedimentation
- Surface water quality and flood damage reduction as it relates to development adjacent to riparian areas
- Coordination among water management organizations

Minnesota Department of Health- Beth Kluthe
- Source water protection for city of Thief River Falls
- Protect ground water-based drinking water sources within the county
- Sealing unused, unsealed wells

Minnesota Department of Agriculture- John Hines and Becky Balk
- Agricultural chemical use and potential impacts to unconfined shallow ground water.
- Agricultural chemical use and potential impacts to surface water.
- Manure management and ISTS
- Conservation tillage and drainage

Minnesota Pollution Control Agency- Lisa Thorvig
- Impaired Waters/Total Maximum Daily Loads
- Storm water issues

Minnesota Department of Natural Resources- Doug Franke
- Thief River and Red Lake River water quality

Minnesota Environmental Quality Board
- No comments received

Marshall County Land and Water Office- Jan Kaspari
- Quality of surface water: sedimentation of rivers and storm water runoff
- Protect ground water from pollution from failing septic systems

Marshall- Beltrami SWCD-Cheryl Sistad
- Water quality and sedimentation of Thief River

Middle-Snake-Tamarac Rivers Watershed District- Nick Drees
- Flood damage reduction
- Drainage
- Water quality

Pennington Highway Department-Mike Flaagan
- Protecting drinking water from contamination
- Water quantity
- Erosion prevention

River Falls Township- Dennis Wilkens
- Salvage yards

PRIORITY CONCERN SELECTION

These priorities will be the foundation of the Pennington County Local Water Management Plan for 2008-2013.

The results of the survey and comments from agencies and interest groups were reviewed and utilized by the WRAC to derive the following priority concerns.

1. Protection and Improvement of Surface Water Quality
2. Flood Damage Reduction
3. Protect the County's Drinking Water Sources

PRIORITY CONCERNS NOT ADDRESSED BY THE PLAN

All concerns submitted are considered important, some issues are already being dealt with by government entities, other issues were considered to be not as high of a concern as the priorities chosen. They may become higher concerns for the next water plan revision in 2013. We will work with other agencies, municipalities and associations to address these issues as they arise.
These include, but are not limited to;
Environmental education; adult and youth
Salvage yards
Developmental pressure
Feedlots
Outdoor recreation and tourism

Figure 1. Map of County