

**WILKIN COUNTY  
LOCAL WATER MANAGEMENT PLAN  
2008-2017**

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## EXECUTIVE SUMMARY

This Local Water Management Plan (LWMP) update is the third update to the original plan approved by the Board of Water and Soil Resources (BWSR) in 1990. The first two updates to the original plan were approved by the BWSR in 1995 and 2002 respectively. This plan update will be effective through the year 2017.

Wilkin County is located on the western edge of Minnesota, bordering North Dakota. Wilkin County encompasses 751 square miles, and includes twenty-two townships and nine cities. According to the 2000 census, the population of the county was 7,138 and was estimated to be 6811 in 2005. Breckenridge, located in the west-central part of the county is the county seat with a population of 3559 (2000 census) and is recognized as the headwaters of the Red River of the North. The Otter Tail River and the Bois de Sioux River join in Breckenridge to form the Red River of the North.

The climate in Wilkin County is continental with warm summers and cold winters with a summer average temperature of sixty-eight degrees and a winter average temperature of nine degrees. Average annual precipitation is between 20 – 23 inches. About 75 percent of the annual precipitation occurs between May and September.

The major land use in Wilkin County is cropland (92%). The majority of the county is in the lacustrine plain of Glacial Lake Agassiz (94%). This region is nearly level, with slopes of 0-2 percent. The northeastern part of the county is mostly hilly having slopes ranging from 3-6 percent, and exceeding 40 percent in a few places. 75% of the soils in Wilkin County are poorly drained and have very slow to medium infiltration rates. Water does not rapidly penetrate these soils and moves slowly through them once absorbed. These soils do, however, retain moisture well during periods of desiccation. In the eastern part of the county, soils developed along the beach ridge areas of glacial lake Agassiz are generally coarser and are moderate to well drained.

Two watershed districts have jurisdiction within Wilkin County. The Bois de Sioux Watershed District (BdSWD) covers approximately the southern one-third of the county and was established in 1988. The total land area of the district comprises about 1,435 square miles. The watershed lies within the counties of Grant, Otter Tail, Stevens, Big Stone, Traverse, and Wilkin. The Bois de Sioux Watershed District revised its Watershed Management Plan in 2003.

The Buffalo-Red River Watershed District (BRRWD) was originally established in 1964 and was expanded in 1976 due to a major flooding event that occurred in the summer of 1975. The total land area of the Buffalo-Red River Watershed District is about 1,379 square miles. The Buffalo-Red River Watershed District is

currently in the process of revising its watershed management plan. Wilkin County will take an active role in the watershed district planning process. Once the watershed management plan is complete Wilkin County will incorporate the Buffalo-Red River Watershed Management Plan priorities into this plan.

Wilkin County has turned the jurisdiction of all legal ditches in those two areas of the county over to each of the Watershed Districts. The remaining legal ditches in the county remain under the jurisdiction of Wilkin County.

## **PURPOSE OF THE LOCAL WATER MANAGEMENT PLAN FOR WILKIN COUNTY**

The purposes of the Local Water Management Plan for Wilkin County are;

1. To identify existing and potential problems or opportunities for protection, management and development of water resources and land resources in the county.
2. To develop and implement a plan of action to promote sound hydrologic management of water and related land resources in the county.
3. To work toward effective environmental protection and management of water and land resources in the county.

Based on their understanding of existing conditions and issues, county officials will decide what water resources within the county need to be protected and/or enhanced and by what means.

Wilkin County is aware that all counties must develop their own means for managing local water resources. Failure to do so will result in the loss of local opportunities to make intelligent, choices about improving the local water resources within the county.

Wilkin County recognizes that a well-developed comprehensive water plan should integrate local initiatives with state and federal programs whenever possible. This is evident in the fact that Wilkin County has incorporated the Wilkin Soil and Water Conservation District (SWCD) Comprehensive Plan, the Bois de Sioux Watershed District Watershed Management Plan and will incorporate the Buffalo-Red River Watershed District Watershed Management Plan into this document. The Otter Tail River Watershed Management Plan will also be incorporated into this plan as well as the Lower Otter Tail River TMDL Implementation Plan. This integration allows more efficient management of all programs for protection of water resources and the general environment.

## **ADMINISTRATION OF THE WILKIN COUNTY LOCAL WATER MANAGEMENT PLAN**

The administration of the Wilkin County Local Water Management Plan has been the responsibility of the Wilkin County Environmental Office. The Board of Water and Soils Resources approved the first generation “Water Plan” in 1990. There have been two plan updates that were approved by the Board of Water and Soil Resources in 1995 and 2003 respectively. This revised Wilkin County Local Water Management Plan will cover a ten-year period from 2008 to 2017 with an implementation plan covering five-year increments (2008 to 2012), and a revised implementation plan covering (2013 to 2017).

## **WILKIN COUNTY ENVIRONMENTAL ADVISORY COMMITTEE**

The Wilkin County Environmental Advisory Committee has reviewed and studied all available information in the development of this updated plan. The Environmental Advisory Committee is a combination of the Citizen Committee, which consists of individuals representing different sectors of Wilkin County and the Technical Committee consisting of individuals representing federal, state and local agencies.

The following individuals were involved in the updating of this plan.

### Citizen Committee Members

Gerald Nordick (citizen)	John Blaufuss(County Commissioner)
Kurt Krueger (citizen)	Lyle Hovland (County Commissioner)
Bob Westfall (citizen)	Robert Roach (Watershed District)
Ross Aigner (SWCD)	Roger Ellefson (Watershed District)

### Technical Committee Members

Don Bajumpaa (SWCD)	Steve Cole/Julie Reberg (NRCS)
Jon Roeschlein (Watershed District)	Jack Frederick (MPCA)
Pete Waller (BWSR)	Bruce Albright (Watershed District)
Terry Lejcher (DNR Waters)	Mike Howe (MN Dept. of Health)
Bruce Poppel (County Environmental Officer)	

## **CONSISTENCY WITH OTHER LOCAL STATE AND REGIONAL PLANS**

Wilkin County has solicited copies of plans and controls from adjacent counties, and watershed districts for review and consistency of their plans as it may relate to Wilkin County’s Local Water Management Plan. Based on review of these plans Wilkin County’s Local Water Management Plan is consistent with those plans and supports the goals and objectives included in the plans. Wilkin County has reviewed the Red River Basin Flood Damage Reduction Work Group Agreement, the Red River Basin Water Quality Plan and Lower Otter Tail TMDL Implementation Plan for consistency and supports the goals and objectives included in these plans.

## **RECOMMENDATIONS TO OTHER PLANS AND OFFICIAL CONTROLS**

1. Purchase long-term easements on retiring CRP contracts.
2. Minnesota Geological Service and Minnesota DNR to conduct an intensive groundwater study in RRV and/or the effects on water supply due to the increase in potential construction of renewable fuel processing plants.
3. The Minnesota Department of Agriculture to provide better education on the effects of the off target application of herbicide and the potential effects on surface water quality due to increased sediment and turbidity.
4. The State Legislature and State Agencies allocate more funding to local units of government for the establishment of best management practices to protect water resources in the state.
5. The Minnesota Pollution Control Agency to establish turbidity impairment standard based on the ecoregions in the state.

## **PRIORITY CONCERNS**

The Wilkin County Local Water Plan Advisory Committee has identified the following priority concerns. These concerns were selected through public meetings and state agency input.

### Water Quality Concerns

Wilkin County does not have an abundance of surface water resources. Lake Breckenridge, the only lake in the county, has experienced significant degradation of water quality over the past 40 years. There are 210 miles of rivers and streams and 305 miles of county drainage ditches that make up the majority of the surface water present in Wilkin County. Very few wetlands are left in the county. They are typically located in the northeastern portion of the county in the upland areas. There is a large wetland complex located in the north central part of the county. This area is known as Manston Slough. It is located in the floor of the Red River Valley and is predominately under public ownership. There is a state designated trout stream (Lawndale Creek) located in the northern portion of the county. The Otter Tail River, Red River of the North, the Bois de Sioux River, the Rabbit River, Whiskey Creek and the South Branch of the Buffalo River are listed as impaired. Turbidity, aquatic impairment (Fish), and low dissolved oxygen are the primary impairments listed for these surface waters.

Wilkin County and Wilkin SWCD have been actively involved in gathering water quality data and assisted in developing the Lower Otter Tail TMDL Implementation Plan. It was approved in February 2007 and is hereby incorporated into this plan. In 2007, Wilkin County and Wilkin SWCD secured Clean Water Legacy funding to help restore water quality in the Lower Otter Tail watershed. They also partnered with Clay SWCD and received a Clean Water Legacy grant to protect and improve water quality in the Wolverton Creek and the South Branch of Buffalo River Watershed areas.

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

- Actively participate in the development and implementation of Total Maximum Daily Load (TMDL) plans for impaired waters of Wilkin County.
- Continue the development of our comprehensive database for surface water using a Geographic Information System (GIS).
- Reduce the extent of turbidity impairment in the Lower Otter Tail Watershed by 2010 with Clean Water Legacy Funding.
- Encourage proper land use practices to protect surface water resources.
- Protect and improve water quality in the Wolverton Creek Watershed.

Estimate Potential Cost: \$1,478,625

## Erosion Concerns

Over 90 percent of the soils in Wilkin County are classified as potentially erodible by wind. During late fall, winter, and early spring, constant winds cause unprotected soils to erode. Displaced topsoil fills road ditches, and legal and field drainage systems, resulting in tremendous ditch maintenance expenses and excessive sediment entering surface waters. Serious wind erosion reduces the productivity of cropland and leads to increased production costs. The geology and topography of the landscape, in addition to the predominance of open cultivated land, creates a challenge for agricultural producers and resource managers alike to prevent soil erosion. Due to the efficient use of drainage equipment used in the production of agriculture crops in the county, water erosion is becoming a growing problem. The use of this drainage equipment allows run-off from these fields to happen very quickly and carry a large amount of sediment into legal ditches and ultimately into the rivers and other surface waters.

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

- Establish best management practices on all lands in the county and use enforcement tools as necessary.

- Cooperate with local agencies to inventory streams and rivers for stream bank stabilization needs

Estimate Potential Cost: \$6,245,000

## Flood Damage Reduction Concerns

Historically there have been significant problems with spring and summer flood events in Wilkin County. This flooding has caused considerable damage to public and private property. Much of the flooding problem relates to the geophysical and hydrological nature of the county and the difficulty in containment by natural and artificial drainage systems. Since the spring flood of '97, Flood Damage Reduction (FDR) has received a lot of publicity. The cooperation of counties, watershed districts, state and federal agencies and other local agencies are critical in the reduction of flood damage. The establishment of impoundments, levees and the restoration of wetlands and watercourses can reduce the flooding impact and improve water quality. Extensive drainage systems were constructed in the early 1900's and again in the 1940's and 1950's to enhance natural drainage of prime heavy soils. These ditches are typically oriented in an east-west direction, perpendicular to the Red River of the North. Without the constructed drainage system, agriculture would not be the economic base of the Red River Valley and Wilkin County. Considering the topography of Wilkin County, drainage problems are most prevalent in the western portion of the County where natural drainage does not convey water completely enough

during accelerated snowmelt in the spring and/or heavy rainfall to mitigate crop and infrastructure damage

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

- Assist the Bois de Sioux Watershed District in the implementation of FDR and NRE practices.

- Identify Natural Resources Enhance (NRE) opportunities for FDR project's proposed by the BdSWD and BRRWD Project Teams.

- Investigate issues that conflict with FDR.

- Install structures to reduce flood damages in the county.

Estimate Potential Cost: \$27,225,000

### Natural Resource Protection Concerns

Wilkin County was, at one time, prime habitat for both waterfowl and upland birds. Most of the fish and wildlife habitat in the county has been lost due to land use changes, drainage and channel modifications. Presently less than five percent of Wilkin County is considered wildlife habitat areas which consists of conservation lands and riparian habitat. The overall lack of grassland and wetland habitats limits upland and waterfowl wildlife populations. However the establishment of wildlife habitat can aid in reducing wind and water erosion and improve water quality. Due to the high commodity prices it is expected that Wilkin County will lose most, if not all, of its Conservation Reserve Program (CRP) acres to cropland in the next 5 years. We need to find way to encourage landowners to reenroll this land into some type of land retirement program. This land use change will not only reduce wildlife habitat in the county but also will increase the likelihood of wind and water erosion.

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

- Promote the establishment of wildlife habitat in Wilkin County.

- Protect existing wildlife habitat with best management practices.

Estimate Potential Cost: \$13,615,000

## Groundwater Concerns

Wilkin County does not have abundant groundwater resources. Most known groundwater resources are in buried drift aquifers which have not been well defined or mapped. Recharge areas and the degree of interconnection of the aquifers are not well known. There is little irrigation in the county. Recharge for major aquifers in Wilkin County occurs primarily through precipitation and in surficial aquifers in the hummocky moraine region of western Otter Tail County and Southern Becker County. The Buffalo Aquifer, a primary aquifer for both Wilkin and Clay Counties is thought to recharge in northern Wilkin County. The Wahpeton Buried Valley (WBV) Aquifer is a long, narrow, and relatively thick deposit of sand and gravel that exists along the Minnesota/North Dakota border just north of the cities of Wahpeton (North Dakota) and Breckenridge (Minnesota). This aquifer is the primary municipal water source for the cities of Breckenridge and Wahpeton. Cargill and Minn-Dak Farmers Cooperative holds industrial appropriation permits from the aquifer for corn processing and sugar beet processing respectively. The potential sources for recharge to the aquifer are the Red River and adjacent confining aquifers.

The WBV aquifer is the most important source of groundwater in this area where aquifers tend to be small and limited in extent. It is an essential resource for industrial, municipal, and domestic use.

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

Protect county groundwater resources from contamination.

Estimate Potential Cost: \$ 120,000

## **SURFACE WATER QUALITY**

Wilkin County does not have an abundance of surface water resources. Lake Breckenridge, the only lake in the county, has experienced significant degradation of water quality over the past 40 years. There are 210 miles of rivers and streams, and 305 miles of drainage ditches that make up the majority of the surface water present in Wilkin County. Very few wetlands are left in the county. They are typically located in the northeastern portion of the county in the upland areas. There is a state designated trout stream located in the northern portion of the county. Most issues relating to existing or potential degradation of surface water resources can be traced to land use. Given the fact that a majority of the land area is dedicated to farming, agricultural activities have the greatest potential to contribute pollutants to surface water resources. Major pollutants would likely include sediment, nutrients (phosphorous and nitrogen), and pesticides. Urban areas also have the potential to contaminate surface waters. Pollutants include treated effluent, coliform bacteria, organics, pesticides, and fertilizers. Additional sources of contamination can occur with storm water runoff. Pesticides are also a potential concern for water quality. Although used extensively in the Red River Valley, only small amounts have been detected in streams. However, the use of some herbicides has created a concern over the off target application of this pesticide. Citizens have observed areas along legal ditches and county road right-of-ways that have been over sprayed with herbicides that have killed the vegetative cover and may result in additional sediment entering surface waters. It is believed that most agricultural producers do not realize the impact on water quality they are creating. Education will be a key component to educate these producers on the effects of their actions. Wilkin County's water resources are classified for a variety of uses including; habitat for fish and wildlife, drinking water supplies, sources of recreation, agriculture or industrial water, and navigation. The Minnesota Pollution control Agency (MPCA) sets specific water quality standards for these uses. If these standards are frequently exceeded, the water body is either fully supporting, partially supporting or not supporting for that use. A map of the impaired waters of Wilkin County can be found in the appendix. The Otter Tail River, Red River of the North, the Bois de Sioux River, the Rabbit River, Whiskey Creek and the South Branch of the Buffalo River are listed as impaired. Turbidity, primarily caused by excess sediment suspended in the water, is the most prevalent impairment. Sources of pollution include sediment, urban runoff, animal holding/management areas, and septic systems. Contamination of surface waters by these pollutants results in decreased dissolved oxygen, habitat and biodiversity, and increases in sedimentation, and turbidity. Sedimentation is the primary concern for Wilkin County's streams and rivers. Streams and rivers throughout the County may have been impacted and degraded by increased sedimentation over the past 100 years due to land use changes and alterations to drainage patterns.

On-site sewage treatment systems pose another potential source for surface water impacts. These systems are in use throughout the county and if not properly installed or maintained can have a direct impact on the quality of surface

water and groundwater. Improperly installed and operated systems that discharge to the surface are considered to be “imminent public health threats” and need to be addressed through the County Sewage Treatment Ordinance. Wilkin County with the assistance of the Wilkin SWCD have been in the process for the past 3 years to inventory all households in the county to determine if their septic system is a public health threat. There are approximately 912 rural households in 22 townships served by a septic system in the county and 165 households located in five unsewered communities. At the end of 2007 we have inventoried 447 of 912 households located in rural areas and 104 of the 165 households in unsewered communities will have been inventoried. Of the 5 unsewered communities, one unsewered community has decided to do nothing and leave it to the homeowners, one unsewered community has received USDA funding to construct a community based solution, and three unsewered communities are working towards a community solution. The Wilkin County Environmental Office and the University of Minnesota Extension Service are assisting these three communities. Since 2004 Wilkin County requires that all property transfers must conduct a compliance inspection on septic systems and upgrade them if so required.

## **GOAL 1: Address the Federal List of 303(d) Impaired Waters within Wilkin County.**

### **OBJECTIVE A.**

**Actively participate in the development and implementation of Total Maximum Daily Load (TMDL) plans for impaired waters of Wilkin County.**

#### **Actions:**

1. Assist all Federal, State, and Local Agencies with the development of TMDL studies and implementation plans.
2. Wilkin County and Wilkin SWCD will provide technical assistance and best professional judgment during TMDL planning process.
3. Request the MPCA to conduct TMDL plans of impairments on a sub watershed basis not on a “reach” of the watercourse.

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### **OBJECTIVE B.**

**Continue the development of our comprehensive database for surface water using a Geographic Information System (GIS).**

#### **Actions:**

1. Inventory and map all conservation program contracts and easements present within these watersheds.
2. Inventory septic systems in these watersheds to determine if they are an “imminent public health threat”.
3. Using GPS, inventory erosion sites along and adjacent to all waterways and county ditches for potential erosion protection practices.

4. Establish a River Watch program in the Otter Tail and Red River of the North Headwaters watersheds.
5. Monitor water quality from pattern tile and develop local controls that require permits for the installation in the Red River of the North and Otter Tail River watershed areas.
6. Assist in the development of LIDAR Mapping in the Red River Valley

**OBJECTIVE C. Reduce the extent of turbidity impairment in the Lower Otter Tail Watershed by 2010 with Clean Water Legacy Funding.**

Actions:

1. Establish 750 acres of no-till in watershed.
2. Establish 2,250 acres of minimum tillage in watershed.
3. Establish 15 miles of field and farmstead windbreaks in watershed.
4. Establish 190 acres of buffer strips along 47 miles of the Otter Tail River and its tributaries.
5. Install bio-fiber rolls in 10 field ditches to evaluate their effectiveness in controlling sedimentation.
6. Establish 27 stream jetties to protect 3,200 feet of critically eroding stream banks.
7. Stabilize the outlet of J.D. Ditch 2 with riprap drop structures and side inlet structures.
8. Install 100+ side inlet structures and dikes adjacent to and in county ditches 3, 4 and 4A to prevent ephemeral/gully erosion.

**GOAL 2: Protect And Improve The Quality Of Surface Water In Wilkin County**

**OBJECTIVE A. Encourage proper land use practices to protect surface water resources.**

Actions:

1. On a sub-watershed basis, contact landowners and farm operators about conservation programs and the establishment of BMP's on their land.
2. Enforce Wilkin County Shore land Ordinance in regards to grass buffer strips.
3. Establish a Soil Loss Ordinance using a "phased in" approach to address sediment from field surface ditches.
4. Establish a permitting system for tile drainage in the Otter Tail and Red River of the North Headwaters watersheds.
5. Assist the MPCA with the protection of surface water from storm water runoff from constructions sites.
6. Assist unsewered communities with development and management of a community sewer system.

7. Continue the inventory of septic systems and identify systems that are imminent threat to public health.
8. Educate landowners about the implications of off target application of pesticides.
9. Encourage landowners to seed unprotected soils after drainage work.
10. Inventory legal ditch outlets and natural waterway outlets into the Red River of the North and install grade stabilization structures as needed.

**Objective B. Protect and improve water quality in the Wolverton Creek Watershed.**

Actions:

1. Establish 5 miles of field and farmstead windbreaks in watershed.
2. Install 20 side inlet structures in county ditches to prevent ephemeral/gully erosion.
3. Establish 110 acres of buffer strips along 7.4 miles of the Wolverton Creek and its tributaries.
4. Install bio-fiber rolls in 20 field ditches to evaluate their effectiveness in controlling sedimentation.
5. Stabilize 1.5 miles of the Wolverton Creek outlet with riprap drop structures and side inlet structures.

## **EROSION**

Over 90 percent of the soils in Wilkin County are classified as potentially erodible by wind. During late fall, winter, and early spring, constant winds cause unprotected soils to erode. Displaced topsoil fills road ditches, legal and field drainage systems, resulting in tremendous ditch maintenance expenses and sediment entering surface waters. Serious wind erosion reduces the productivity of cropland and leads to increased production costs. There are many general land use practices in Wilkin County that have the potential to impact surface water quality, but soil erosion from the landscape is the leading cause of sedimentation of Wilkin County's surface waters. The geology and topography of the landscape, in addition to the predominance of open cultivated land, creates a challenge for agricultural producers and resource managers alike to prevent soil erosion.

There are several conservation practices that can be established to reduce the effects of cropland erosion. Conservation tillage, specifically no-till and mulch till, is the best available means of reducing erosion on a "field scale". In addition, establishing stream bank buffer strips, and promoting field windbreak establishment, restoring wetlands, and changes in tillage practices can reduce the amount of sediment entering surface waters and road ditches. Further, these practices will enhance the soil quality of a finite resource.

Establishment of riparian buffer strips or grass filter strips along watercourses has been a priority of Wilkin County's water plan for a number of years. Due to the availability of Continuous Conservation Reserve Program (CCRP) and other conservation easement programs that provide funding for buffer strips, the possibility for enrollment is much improved.

The Lower Otter Tail River (LOTR) Watershed has been identified to be impaired for turbidity. In February of 2007, Wilkin County, Wilkin SWCD and MPCA developed a TMDL implementation plan on how water resource managers would achieve the 25 NTU standard for turbidity. It was estimated that a 17 percent annual reduction in sediment load is needed for the LOTR to meet the 25 NTU water quality standard for turbidity. Wilkin County and Wilkin SWCD secured a Clean Water Legacy grant in 2007 to begin the implementation of Best Management Practices (BMP) to meet this standard. It is estimated that the BMP's outlined in the grant application will result in a reduction of 2,645 tons of soil from reaching the main stem of the Otter Tail River.

The Watershed Districts have also been active in enforcing the existing State 103E drainage law regarding installation and maintenance of one-rod (16.5 feet) grass buffer strips along new or improved public ditches and reassessed public ditches. However, there is room for improvement in establishing and maintaining these buffers. Another means of controlling sediment delivery to public drainage ditches is to require the establishment of grassed filter strips for field inlets into

public ditches. Enforcing drainage law in regards to grass buffers is fruitless if field inlets allow sediment delivery on a regular basis.

As the expansion of developed areas occurs, there exists the potential for increased erosion off of construction sites. Storm water management is becoming an issue that needs greater attention. Wilkin County must work collaboratively with communities to focus on the issue of urban storm water management in addition to addressing rural erosion issues.

## **GOAL 1: Reduce Wind Erosion in Wilkin County.**

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### **OBJECTIVE A. Establish Best Management Practices on all lands in the county and use enforcement tools as necessary.**

1. Establish 18 miles of living snow fences to control blowing and drifting snow and to reduce soil erosion by wind.
2. Establish a Soil Loss Ordinance using a “phased in” approach by 2012.
3. Promote the continuation of all local, state and federal conservation programs
4. Encourage planting of field windbreaks, at least 2 rows per mile where possible, at the discretion of the landowner
5. Increase field windbreak plantings in the county by 25 miles in the next 5 years.
6. Assist landowners with their tree maintenance by providing weed badgering, and tree fabric programs.
7. Provide Wilkin County landowners information regarding state and federal programs that protect against wind erosion.
8. Promote the use of cover crops in farming practices that use “round-up ready” crop hybrids to reduce wind erosion.
9. Assist landowners in the restoration of old windbreaks.

## **GOAL 2: Reduce Water Erosion in Wilkin County.**

### **OBJECTIVE A. Cooperate with local agencies to inventory streams and rivers for stream bank stabilization needs**

#### **Actions:**

1. Utilize existing stream survey information to determine the need for stream bank stabilization
2. GPS locations where stream bank stabilization and side inlet structures are needed.
3. Educate landowners on the benefits of stream barbs for stream bank stabilization.

## FLOOD DAMAGE REDUCTION

Historically there have been significant problems with spring and summer flood events in Wilkin County. This flooding has caused considerable damage to public and private property. Much of the flooding problem relates to geophysical and hydrological nature of the county and the difficulty in containment by natural and artificial drainage systems. Since the spring flood of '97, Flood Damage Reduction (FDR) has received a lot of publicity. The cooperation of counties, watershed districts, state and federal agencies and other local agencies are critical in the reduction of flood damage. The establishment of impoundments, levees and the restoration of wetlands and watercourses can reduce the flooding impact and improve water quality. The restoration of riparian areas will reduce the amount of runoff during a flood event. The change of infiltration is increased as land is converted from crop production to a conservation cover (grasses). In terms of percent reduction in summer runoff for a 3.5 inch, 24-hour rainfall, converting cropland to conservation cover will result in a 60 percent reduction (from 1.3 inches to 0.5 inches). Living snow fences can reduce the amount of snow that accumulates in a drainage ditch and in return allows snow melt water to move more easily in these ditches reducing the amount of over land flooding. The Wilkin SWCD has identified over 16 miles of potential snow fence sites in Wilkin County. The construction of an Otter Tail River Diversion around the City of Breckenridge has reduced flood damages during flood events. During the spring of 2005 Breckenridge recorded the third highest river crest, but experienced little or no flood damage due to the newly constructed river diversion and other flood damage reductions measures implemented since 1997.

Although natural drainage occurs in Wilkin County, extensive drainage systems were constructed in the early 1900's and again in the 1940's and 1950's to enhance natural drainage of prime heavy soils. These ditches are typically oriented in an east-west direction, perpendicular to the Red River of the North. Without the constructed drainage system, agriculture would not be the economic base of the Red River Valley and Wilkin County. Such systems provide drainage for agriculture, industry, residential development, streets, roads, airports and railroads. Considering the topography of Wilkin County, drainage problems are most prevalent in the western portion of the County where natural drainage does not convey water completely enough during accelerated snowmelt in the spring and/or heavy rainfall to mitigate crop and infrastructure damage. The first consideration determining the productivity capacity of tillable land has been its natural drainage or access to constructed drainage. Where drainage systems are not present or are not maintained, crop damage is likely and the regional economy can be negatively impacted.

Management of public ditches in Wilkin County falls under each of the t watershed districts jurisdiction. Wilkin County manages the public ditches that are not under the jurisdiction of either of the watershed districts. All three entities have jurisdiction over all improvements to existing public ditch projects and new

public ditch projects as well. Such projects are assessed to those landowners who benefit, or whose land experiences an increase in market value, due to the project. Adequate drainage system design includes proper sediment and erosion control, which reduces future maintenance. New public ditch projects must comply with federal and state laws to better reflect the values and priorities of society and address the physical, biological and chemical integrity of the affected area.

## **GOAL 1: Commit To The FDR Process And Practice Establishment.**

### **OBJECTIVE A. Assist the Bois de Sioux Watershed District in the implementation of FDR and NRE practices.**

#### **Actions:**

1. Create an additional 5,000 acre-feet of floodwater storage in the South Fork Rabbit River watershed.
2. Create an additional 20,000 acre-feet of storage in the Rabbit River Watershed.
3. Restore 4 wetland basins per year, totaling 320 acres of wetland habitat and another 100 acres of upland buffer habitat in the Rabbit River Watershed.
4. Increase grassland and wetland habitats within the river corridors of the Lower Rabbit and Bois de Sioux rivers.
5. Develop rehabilitation plan(s) for channelized river and stream reaches.
6. Work with USACE to review the operating plan for the White Rock Dam and encourage changes to create a healthier flow regime for aquatic life, including downstream water quality improvements for domestic use, if changes could be made that do not affect the ability of Mud Lake to provide quality waterfowl habitat.
7. Consider the downstream impacts upon users of that drinking water intake, namely Fargo-Moorhead.

**OBJECTIVE B. Identify Natural Resource Enhancement (NRE) opportunities for FDR projects proposed by the BdSWD and BRRWD Project Teams**

**Actions:**

1. Inventory project areas for natural resource enhancement opportunities including wetland restorations, sediment basins, buffer strips, etc.
2. Develop acreage goals for each based on results of inventories

**OBJECTIVE C. Investigate issues that conflict with FDR**

**Actions:**

1. Recommend that long-range planning documents restrict structural development within established 100-year floodplains.
2. Track pattern tiling to determine potential FDR issues and need for information gathering.
3. Inventory locations in the county where beaver dams counteract efficient movement of floodwater.
4. Secure funding to remove dams and reduce beaver populations in these locations.
5. Cooperate with State and Federal agencies to resolve floodplain mapping inconsistencies between counties.

## **GOAL 2: Control Surficial Runoff And Reduce Flood Damages In Wilkin County.**

### **Objective A: Install structures to reduce flood damages in the county.**

1. Continue the support and implementation of the memorandum of understanding that the County's and SWCD's have established in the Otter Tail Watershed for the development of a watershed management plan.
2. Assist the City of Breckenridge in their flood protection plans and projects.
3. Support Buffalo Red River and Bois de Sioux Watershed Districts in the development and implementation of their revised watershed management plans.
4. Wilkin County will begin the strict enforcement of its shore land ordinance as it relates to the requirement of buffer/filter beginning in 2010.
5. Enforce the Wilkin County Floodplain Ordinance
6. Assist in the development of LIDAR Mapping in the Red River Valley.
7. Conduct a hydrologic/hydraulic study for the Otter Tail Watershed
8. Investigate establishment of a water management structure / ordinance for the Lower Otter Tail and Red River Headwaters watershed areas of Wilkin County.
9. Assist the Buffalo-Red WD in the development of floodwater storage and water quality enhancements of Deerhorn Creek upstream of the levee project.
10. Assist the Buffalo-Red WD in the investigation and establishment of levees and NRE enhancements along the South Branch of Buffalo from Hwy 9 downstream to the county line.
11. Encourage landowners to control run-off from their lands with the use of buffer strips, side inlets and dikes into and adjacent to ditches and waterways.
12. Restore channelized reaches of the Otter Tail River to natural meanders.
13. Complete the BWSR 2005 Public Drainage Ditch Bufferstrip questionnaire for the area of the county that Wilkin County has jurisdiction of legal ditches.
14. Wilkin County ditch authority to complete legal ditch buffer strip annual report as required in 103E.067.
15. Develop a method to preserve and modernize legal ditch records in Wilkin County.
16. Assist BRRWD in the Manston Slough FDR project.

## NATURAL RESOURCE PROTECTION

Wilkin County was, at one time, prime habitat for both waterfowl and upland birds. Most of the fish and wildlife habitat in the county has been lost due to land use changes, drainage and channel modifications. Presently less than five percent of Wilkin County is considered wildlife habitat areas, which consists of conservation lands and riparian habitat. The overall lack of grassland and wetland habitats limits upland and waterfowl wildlife populations, however the establishment of wildlife habitat can aid in reducing wind and water erosion and improving water quality. The potential to significantly improve fish and wildlife habitat is high. In particular, buffering waterways can provide wildlife a corridor to move from historical wintering areas to other isolated wildlife habitat areas in the county. Several of the rivers and streams in the county may provide spawning and nursery habitat for several fish species but channel modifications and hydrologic conditions may limit these opportunities to a short period during the spring.

Stream connectivity or streams free of barriers, is critical to the life cycle of native fish species in the Red River Basin. Today spawning habits found in the headwaters tributaries of the Red River are separated from the mainstream by water control structures. Low head dams prevent fish passage and alter natural fluvial processes in streams and rivers. These structures also present a major public safety issue for drowning. Over the past ten years three dams located in Wilkin County have been modified or removed to allow for fish passage. The Christine dam on the Red River of the North located in the northern portion of Wilkin County has not yet been modified or removed to allow for fish passage.

According to the Minnesota DNR, streams are among the most greatly impacted ecosystems in Minnesota. Degraded streams contribute to degraded water quality, erosion and sediment movement, loss of aquatic and shore land habitat, and the amount and timing of water flow. Streams and rivers that are restored to a pattern and profile similar to their natural condition will improve fish and wildlife habitat, water quality, and water availability, while reducing erosion and downstream flooding.

There are approximately seven miles of state designated trout stream located in the northern portion of the county that is currently supporting a population of native Brook Trout. Wilkin County, Wilkin SWCD, Buffalo-Red River Watershed District and the DNR have been working on restoring 1.5 miles of the stream back to its original channel. The original channel was cut off forty years ago with the construction of a county drainage ditch.

Due to the high commodity prices it is expected that Wilkin County will lose most, if not all, of its Conservation Reserve Program (CRP) acres to cropland in the

next 5 years. We need to find way to encourage landowners to reenroll this land into some type of land retirement program. This land use change will not only reduce wildlife habitat in the county but also will increase the likelihood of wind and water erosion.

According to the Wilkin County assessors office there are 635 acres of wetlands, 1127 acres of RIM Easements, 2329 acres of Wetland Reserve Program (WRP), 5782 acres of DNR owned property, 2432 acres of U. S. Fish and Wildlife property and 2,836 acres of Nature Conservancy property in Wilkin County. The Minnesota County Biological Survey identifies 8,733 acres of native prairie in Wilkin County.

In the spring of 2007, 500 male greater prairie chickens were surveyed on booming grounds in Wilkin County.

## **GOAL 1: Increase Wildlife Habitat By 1000 Acres In The Next 10 Years And Protect The Existing Habitat With Best Management Practices In Wilkin County.**

### **Objective A. Promote the establishment of wildlife habitat in Wilkin County.**

1. Develop and promote a program for habitat establishment and management by working with local and state wildlife organizations.
2. Restore 300 acres of drained wetlands adjacent to established wildlife areas
3. Promote the use of nonproductive agricultural land to be used as wildlife habitat.
4. Assist state and local wildlife organizations in the promotion and development of wildlife habitat and reestablish native grasses on existing public wildlife land.
5. Encourage the Wilkin County Highway Department to establish native grasses in road right-of-ways on 4 miles of county road grading projects.
6. Improve riverine fish habitat with the removal of dams and protecting stream bank erosion.
7. Establish 18 miles of Living Snow Fences.
8. Provide a wildlife corridor along the South Branch of Buffalo River and along county ditch 40 and 44 watersheds through the use of buffer strips.
9. Assist the DNR in the development of an implementation plan to reconnect oxbows in the channelized portion of the lower Otter Tail River.
10. Assist the DNR and BRRWD to retro fit the Christine Dam located on the Red River to allow for fish passage.
11. Assist the DNR and BRRWD in the implementation of reconstructing the natural waterway of ditch 40 to establish better trout habitat.

**Objective B. Protect existing wildlife habitat with best management practices.**

1. Cooperate with the native grassland owners to identify native grasslands and protect these areas to avoid the integration of exotic and invasive species into these grasslands
2. Encourage landowners to refrain from mowing roads ditches until August first.
3. Create a buffer area around natural and wildlife areas to prevent residential development.
4. Encourage State and federal agencies and legislatures to continue long-term land retirement programs.
5. Encourage landowners to enroll their native prairie lands into the Landowner Incentive Program, Native Prairie Bank Program, Native Prairie Tax Exemption Program and the USDA Grassland Reserve Program.
6. Educate landowners about the implications of spray drift (particularly roundup) onto grasslands.
7. Encourage the use of biological control for pest management on grasslands and wildlife areas.
8. SWCD to confer with DNR in the selection and planting of non-invasive trees species adjacent to wildlife areas.

## **GROUNDWATER**

Adequate water supplies are needed for domestic, municipal, industrial, agricultural, fish and wildlife, recreation, power, and navigation. The competing demands include withdrawal for public water supplies, domestic uses, irrigation, industrial processing or power production, and maintaining adequate stream flows and lake levels for recreation, fish and wildlife habitat and aesthetics. Wilkin County does not have abundant groundwater resources. Most known groundwater resources are in buried drift aquifers that have not been well defined or mapped. Recharge areas and the degree of interconnection of the aquifers are not well known. There is little irrigation in the county but what there is, has caused some minimal problems in the past. Most irrigation occurs in areas of sandy soil where the aquifers are rapidly recharged. These aquifers are also very susceptible to contamination. Groundwater recharge in Wilkin County occurs primarily through precipitation and primarily in surficial aquifers in the hummocky moraine region of western Otter Tail County and Southern Becker County.

The Buffalo Aquifer, a primary aquifer for both Wilkin and Clay Counties is an elongated aquifer beginning in northern Wilkin County and extending north into Clay County just east of the city of Moorhead. It is thought to recharge in the Manston Slough area of Wilkin County. Most recharge occurs in spring from snowmelt and rainfall, when groundwater demands by growing vegetation are minimal, allow precipitation to soak through to the water table. There is generally little recharge during the active growing season.

The Wahpeton Buried Valley (WBV) aquifer is a long, narrow, and relatively thick deposit of sand and gravel that exists along the Minnesota/North Dakota border just north of the cities of Wahpeton (North Dakota) and Breckenridge (Minnesota). The WBV aquifer is approximately 16 miles long and a mile wide with a northwest-southeast orientation. Most of the aquifer exists in North Dakota. The Minnesota portion of the aquifer probably does not extend southeast of Breckenridge. The main portion of the aquifer ranges from 70 to 250 feet in thickness. The main portion of the aquifer was probably deposited in a tunnel valley, which is a large sub-glacial drainage feature that formed near the receding edge of a Pleistocene glacial ice lobe. Subsequent advances and recessions of glacial ice after the deposition of the WBV deposit left this sand and gravel buried by approximately 80 to 130 feet of clayey glacial till. This fine grained material helps protect the aquifer from surface infiltration of contaminants but also limits aquifer recharge. Smaller sand and gravel deposits created by later glaciations exist locally within this overlying clayey glacial till material. These small, shallow overlying sand and gravel deposits are locally connected to the main portion of the aquifer and may help provide some recharge to the WBV aquifer.

This aquifer is the primary municipal water source for the cities of Breckenridge and Wahpeton. Cargill and Minn-Dak Farmers Cooperative hold industrial

appropriation permits from the aquifer for corn processing and sugar beet processing. The potential sources for recharge to the aquifer are the Red River and adjacent confining aquifers.

The WBV aquifer is the most important source of groundwater in this area where aquifers tend to be small and limited in extent. It is an essential resource for industrial, municipal, and domestic use.

Natural groundwater chemistry in Wilkin County is generally good, consisting primarily of calcium magnesium bicarbonate and calcium magnesium bicarbonate sulfate water types. Most groundwater in the county is considered to be hard water. Groundwater quality in Wilkin County is monitored in a number of ways. All municipal wells are tested regularly at least annually for nitrates and monthly for bacteria. Many households in the county have had water tested to determine if there water meets or exceeds the MDH threshold for drinking water standards.

Since 1944, DNR Waters has managed a statewide network of water level observation wells. 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. Wilkin SWCD monitors 11 observation wells for the Minnesota DNR. The wells are located throughout the county. Locations include: one by the Rabbit River near the Bois de Sioux River, one just north of Breckenridge along the Red River, and nine in the northern part of the county. The water level on 10 of the wells is recorded on a monthly basis from March through November. The other well is monitored only in April and October. The readings are sent to Minnesota DNR Waters, where the results are posted on their website, which is accessible to the general public.

Major concerns for the contamination of groundwater include gravel mining, improperly sealed abandoned wells, industrial development, major highways, petroleum pipelines, railroads, sewage lagoons, and land use on sensitive groundwater areas. As a result of the mandates of the Federal Safe Drinking Water Act (SWDA) and Minnesota Groundwater Protection Act (1989), public water supply wells need to have a wellhead protection plan (WHP) delineating areas of enhanced protection for wells.

The northern part of the county is listed as a source water assessment area by the City of Moorhead

The Bureau of Land Management's Final Report of the Red River Valley Water Supply Project, predicts that the Red River Valley is facing a potential water supply crisis. Studies predict that the present water supplies would be inadequate during a severe drought similar to the one that occurred in the Red

River Valley during the 1930's. This report studied several alternatives to provide adequate water supplies to the Red River Valley. Two of these alternatives could have potential impact on Wilkin County. The first is to establish well fields in the Pelican River Aquifer and the Otter Tail Outwash Aquifer and pipe this water to the Fargo-Moorhead communities. This may have an impact on the groundwater and surface water supplies to Wilkin County. Most of Wilkin County's groundwater recharge occurs in Otter Tail County. The second alternative would develop new well fields in the Southeastern North Dakota and pipe the water to the Red River near Wahpeton, ND as a delivery component to the water users of the Red River Valley.

## **Goal 1: Preserve Groundwater Quality/Quantity**

### **Objective A. Protect county groundwater resources from contamination**

1. Encourage the MSGS and DNR to better define the southern limits and recharge areas of the Buffalo aquifer.
2. Provide citizens water well test kits to monitor their water well for coliform bacteria and nitrates.
3. Assist the City of Breckenridge and other municipalities in the county in developing their wellhead protection plan for their public water supplies.
4. Assist the city of Moorhead in the development and implementation of their source water protection plan.
5. Work with landowners to protect gravel pits from pollution contamination.
6. Provide a county wide well sealing cost share program.
7. Assist state and federal agencies with any research on the availability of additional groundwater resources in Wilkin County.
8. Support the development of monitoring for naturally occurring arsenic in the county.
9. Investigate the need for a cost share program for the abandonment and reclamation of animal waste pits.
10. Encourage landowners to restore wetlands to recharge groundwater.

## **ONGOING PROJECTS AND INITIATIVES**

There are several ongoing projects and initiatives in Wilkin County that have not been well defined in this plan since they are outlined in detail in their own individual plan or ordinance.

Solid waste plan

Zoning Ordinance

Shore land Ordinance

Floodplain Ordinance

Wetland Conservation Act

Education is an important component in the achievement of all of the goals and objectives outlined in this plan. In the past, Wilkin County, Wilkin SWCD and University of Minnesota Extension service has provided a strong educational program to educate the public about the benefits of protecting our natural resources in Wilkin County. Education of the public on the values of our natural resources in Wilkin County will continue to be a challenge/priority over the next 10 years of this plan.

Working partnerships are a very important component in the achievement of goal and objectives of this plan. Wilkin County is committed to continue to build working partnerships with citizens, private organizations and other government agencies to achieve the goals and objectives of this Local Water Management Plan.

## IMPLEMENTATION SCHEDULE

<b>Priority - Water Quality</b>					
<b>Goal 1 - Address the Federal List of 303(d) Impaired Waters</b>					
<b>Objective A: TMDL development and implementation</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	SWCD, Environmental, BRRWD, BdSWD	N/A	Existing Staff Time	2008 - 2017	County-wide
2	Environmental, SWCD	N/A	Existing Staff Time	2008 - 2017	County-wide
3	SWCD, Environmental, BRRWD, BdSWD	N/A	Existing Staff Time	2008 - 2017	County-wide
<b>Objective B: Development of comprehensive database</b>					
1	SWCD	\$60,000	CWL / Existing Staff	2008-2010	County-wide
2	Environmental	\$60,000	Clean Water Legacy	2008-2010	County-wide
3	Highway, SWCD	\$20,000	Grant / Existing Staff	2008-2010	Otter Tail, Red River
4	SWCD, Environmental	\$5,000	Existing Staff Time	2009	
5	SWCD	\$10,000	Existing Staff Time	2208-2012	Otter Tail, Red River
6	County	\$10,000	County Levy	2008	County-wide
<b>Objective C: Reduce turbidity impairment</b>					
1	SWCD	\$20,000	Clean Water Legacy	2009	Otter Tail
2	SWCD	\$20,000	Clean Water Legacy	2009	Otter Tail
3	SWCD	\$20,000	Clean Water Legacy	2009	Otter Tail
4	SWCD, Environmental	\$95,000	Clean Water Legacy	2009	Otter Tail
5	SWCD, Environmental	\$16,250	Clean Water Legacy	2009	Otter Tail
6	SWCD, Environmental	\$77,625	Clean Water Legacy	2009	Otter Tail
7	SWCD, Environmental, Highway	\$200,000	Clean Water Legacy	2009	Otter Tail
8	SWCD, Environmental, Highway	\$26,000	Clean Water Legacy	2009	Otter Tail

<b>Goal 2 - Protect and Improve Surface Water Quality</b>					
<b>Objective A: Encourage land use practices</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	SWCD	\$200,000	Existing Staff Time	2008-2017	County-wide
2	Environmental	\$120,000	Existing Staff Time	2010-2015	County-wide
3	SWCD, Environmental	\$100,000	Existing Staff Time/Grant	2012-2017	County-wide
4	Environmental	\$20,000	Existing Staff Time	2008-2009	Otter Tail, Red River
5	SWCD, Environmental	\$50,000	Existing Staff Time	2008-2017	County-wide
6	Environmental Extension	\$25,000/yr	Existing/New Staff	2008-2017	County-wide
7	Environmental, SWCD	\$85,000	Existing Staff Time	2008-2010	County-wide
8	Environmental, SWCD	\$5,000	Existing Staff Time	2008-2012	County-wide
9	Environmental, SWCD	\$5,000	Existing Staff Time	2008-2012	County-wide
10	BRRWD, SWCD, Environmental	\$1,000,000	Existing Staff Time	2008-2017	Red River Headwaters
<b>Objective B: Protect Wolverton Creek watershed</b>					
1	SWCD	\$20,000	Clean Water Legacy	2008-2009	Red River Headwaters
2	SWCD, BRRWD	\$25,000	Clean Water Legacy	2008-2009	Red River Headwaters
3	SWCD	\$80,000	Clean Water Legacy	2008-2009	Red River Headwaters
4	SWCD, BRRWD	\$16,250	Clean Water Legacy	2008-2009	Red River Headwaters
5	SWCD	\$87,500	Clean Water Legacy	2008-2009	Red River Headwaters

<b>Priority - Erosion</b>					
<b>Goal: Reduce Wind Erosion in Wilkin County.</b>					
<b>Objective A: Establish BMP's</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	SWCD	\$100,000	CRP MNDOT	2008-2017	County-wide
2	SWCD, Environmental	\$25,000	Existing Staff/Grants	2012-2017	County-wide
3	SWCD, NRCS	\$200,000	Farmbill T/A	2008-2017	County-wide
4	SWCD, NRCS	\$5,000,000	CRP State C/S	2008-2017	County-wide
5	SWCD, NRCS	\$175,000	CRP State C/S	2008-2017	County-wide
6	SWCD	\$100,000	CRP State C/S	2008-2017	County-wide
7	SWCD, NRCS	\$200,000	Farmbill T/A	2008-2017	County-wide
8	SWCD, NRCS	\$200,000	Farmbill T/A	2008-2017	County-wide
9	SWCD, NRCS	\$200,000	State C/S	2008-2017	County-wide
<b>Goal: Reduce streambank and in-stream erosion</b>					
<b>Objective A: Inventory stream and rivers for needs</b>					
1	SWCD	\$10,000	Existing Staff Time	2008-2017	County-wide
2	SWCD	\$25,000	Existing Staff Time	2008-2017	County-wide
3	SWCD, NRCS	\$10,000	Existing Staff Time	2008-2017	County-wide

<b>Priority - Flood Damage Reduction</b>					
<b>Goal: Commit to the FDR process and practice establishment</b>					
<b>Objective A: Assist Bois de Sioux Watershed District</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	BdSWD	5,000,000	FDR, Local, RRWMB	2008-2017	Rabbit
2	BdSWD	20,000,000	FDR, Local, RRWMB	2008-2017	Rabbit
3	BdSWD, SWCD	\$660,000	WRP, WERP	2008-2017	Rabbit
4	BdSWD, SWCD	\$350,000	CRP	2008-2017	Bois de Sioux, Rabbit
5	BdSWD, SWCD	\$875,000	CRP, WRP, RIM	2008-2017	Bois de Sioux, Rabbit
6	BdSWD	N/A	Existing Staff Time	2008-2017	Bois de Sioux, Rabbit
7	BdSWD	N/A	Existing Staff Time	2008-2017	Bois de Sioux, Rabbit
<b>Objective B: Identify Natural Resource Enhancement Opportunities</b>					
1	BdSWD, BRRWD, SWCD	\$50,000	Existing Staff Time	2008-2017	County-wide
2	BdSWD, BRRWD, SWCD	\$10,000	Existing Staff Time	2008-2017	County-wide
<b>Objective C: Investigate issues that conflict with FDR</b>					
1	BdSWD, BRRWD, SWCD	\$25,000	Existing Staff Time	2008-2017	County-wide
2	BdSWD, BRRWD, SWCD	\$20,000	Existing Staff Time	2008-2017	County-wide
3	BdSWD, BRRWD, SWCD	\$20,000	Existing Staff Time	2008-2017	County-wide
4	BdSWD, BRRWD, SWCD	\$100,000	Existing Staff Time	2008-2017	County-wide
5	BRRWD, Environmental, DNR	Unknown	Existing Staff Time	2008-2017	Buffalo

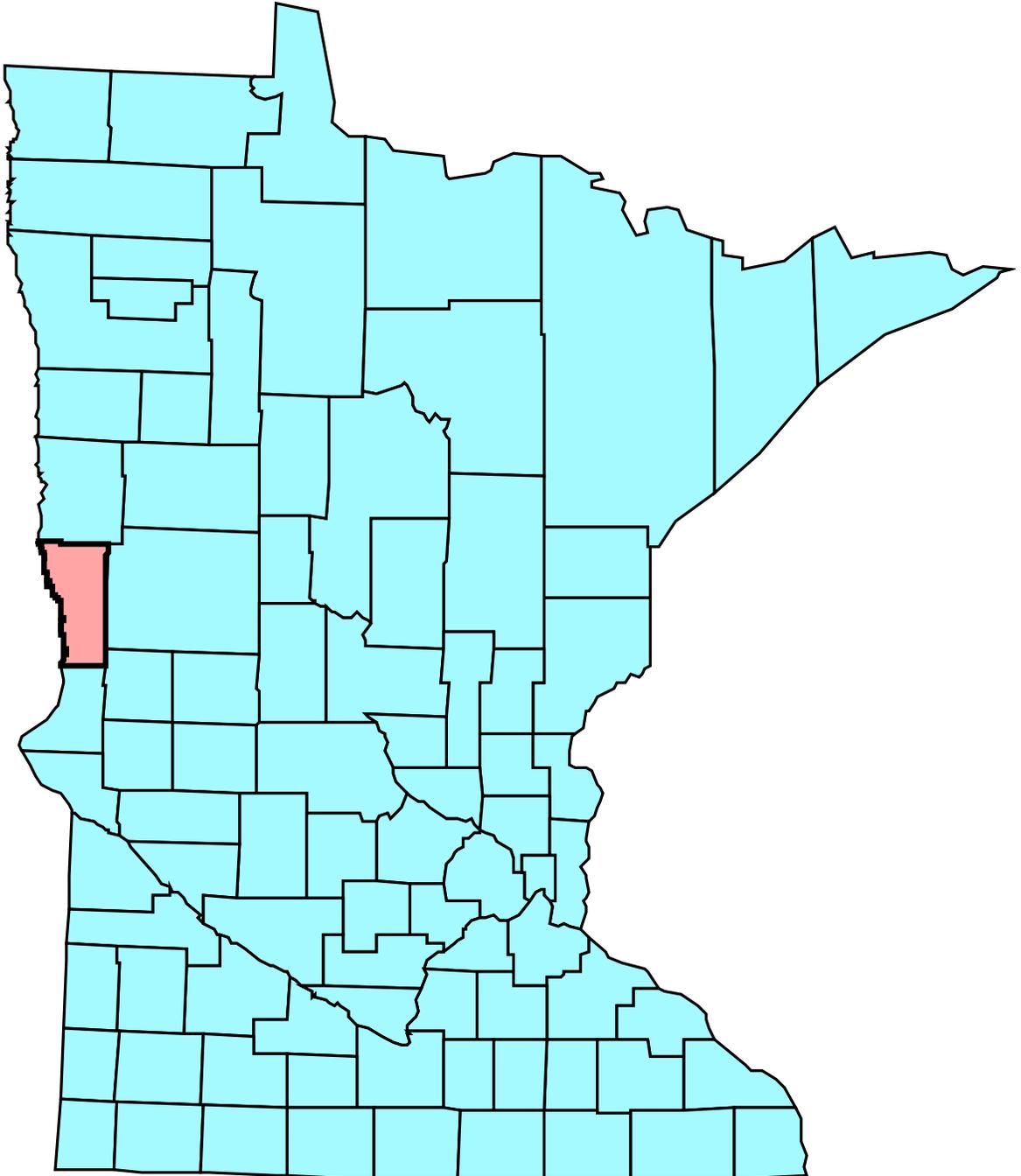
<b>Goal - Control runoff and reduces flood damages</b>					
<b>Objective A: Install structures to reduce flood damages</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	SWCD, Environmental	\$25,000	Existing Staff Time	2008-2017	Otter Tail
2	County Commissioners	Unknown	Existing Staff Time	2008-2017	Bois de Sioux, Otter Tail
3	SWCD, Environmental	\$30,000	Existing Staff Time	2008-2017	Bois de Sioux, Buffalo
4	Environmental	\$100,000	Existing Staff/New Staff	2010-2017	County-wide
5	Environmental	\$10,000	Existing Staff Time	2008-2017	County-wide
6	RRBC	\$5,000	State Bonding	2008-2017	County-wide
7	SWCD, Environmental	\$250,000	Grant / County Levy	2008-2017	Otter Tail
8	SWCD, Environmental, County Commissioners	\$50,000	Existing Staff Time	2008-2017	Otter Tail, Red River
9	BRRWD, SWCD, Environmental	\$10,000	Existing Staff Time	2008-2017	Buffalo
10	BRRWD, SWCD, Environmental	\$10,000	Existing Staff Time	2008-2017	Buffalo
11	SWCD, Environmental	N/A	Existing Staff Time	2008-2017	County-wide
12	SWCD, Environmental, DNR	\$500,000	Bonding / Grant	2008-2017	Otter Tail
13	Ditch Authority	\$5,000	Existing Staff Time	2009	County-wide
14	Ditch Authority	\$5,000	Existing Staff Time	2008-2017	County-wide
15	Ditch Authority	\$30,000	Existing Staff / Grant	2008-2012	County-wide
16	BRRWD, SWCD, Environmental	\$5,000,000	Existing Staff Time	2009	Buffalo

<b>Priority - Natrual Resource Protection</b>					
<b>Goal: Increase wildlife habitat by 1000 acres and protect existing habitat</b>					
<b>Objective A: Promote the estblishment of wildlife habitat</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	SWCD, Environmental	N/A	Existing Staff Time	2008-2017	County-wide
2	SWCD, Environmental	\$300,000	Cost Share	2008-2017	County-wide
3	SWCD, NRCS, Environmental	\$80,000	Existing Staff Time	2008-2017	County-wide
4	SWCD, Environmental, DNR, USFWS	\$80,000	Existing Staff Time	2008-2017	County-wide
5	SWCD, Environmental, Highway	\$80,000	Existing Staff Time	2008-2017	County-wide
6	SWCD, Environmental, DNR	\$250,000	Bonding / Grant	2008-2017	County-wide
7	SWCD	\$75,000	Exisitng Staff/Grants	2008-2017	County-wide
8	BRRWD, SWCD, Environmental	\$5,250,000	CRP, WRP, RIM	2008-2017	Buffalo
9	SWCD, Environmental, DNR	\$7,500,000	ACOE, DNR	2008-2017	Otter Tail
10	BRRWD SWCD, Environmental, DNR	\$500,000	Bonding / Grant	2008-2017	Red River Headwaters
11	BRRWD, SWCD, Environmental, DNR	\$500,000	Bonding / Grant	2010	Buffalo

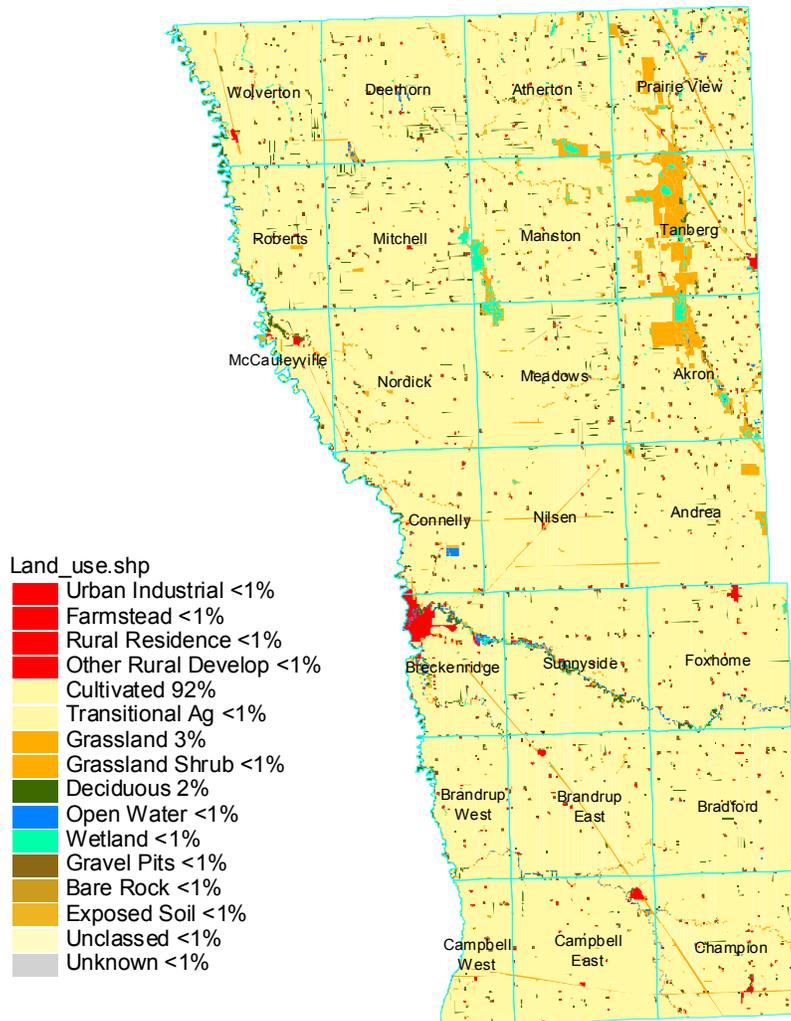
<b>Objective B: Protect existing wildlife habitat with BMP's</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	DNR, SWCD	\$50,000	Existing Staff Time	2008-2017	County-wide
2	DNR, SWCD, Environmental	\$10,000	Existing Staff Time	2008-2017	County-wide
3	Environmental, County Commissioners	N/A	Existing Staff Time	2008-2017	County-wide
4	SWCD, County Commissioners	N/A	Existing Staff Time	2008-2017	County-wide
5	DNR, SWCD, Environmental	N/A	Existing Staff Time	2008-2017	County-wide
6	DNR, SWCD, Environmental	N/A	Existing Staff Time	2008-2017	County-wide
7	DNR, SWCD, Environmental	N/A	Existing Staff Time	2008-2017	County-wide
8	DNR, SWCD	N/A	Existing Staff Time	2008-2017	County-wide

<b>Priority - Groundwater</b>					
<b>Goal: Preserve groundwater quality / quantity</b>					
<b>Objective A: Protect county groundwater resources</b>					
<b>Actions</b>	<b>Primary Responsibility</b>	<b>Cost</b>	<b>Potential Funding Sources</b>	<b>Duration</b>	<b>Watershed</b>
1	Environmental, SWCD, BRRWD	N/A	Existing Staff Time	2008-2017	Buffalo
2	Environmental	N/A	Existing Staff Time	2008-2017	County-wide
3	Environmental	N/A	Existing Staff Time	2008-2017	Red River Headwaters
4	Environmental, SWCD, BRRWD	Unknown	Existing Staff Time	2008-2017	Buffalo
5	Environmental, SWCD	N/A	Existing Staff Time	2008-2017	County-wide
6	Environmental, BRRWD	\$1000/yr	Existing Staff Time	2008-2017	Buffalo
7	Environmental, SWCD	Unknown	Existing Staff Time	2008-2017	County-wide
8	Environmental, SWCD	\$50,000	Existing Staff Time	2008-2017	County-wide
9	Environmental, SWCD	N/A	Existing Staff Time	2008-2017	County-wide
10	Environmental, SWCD	N/A	Existing Staff Time	2008-2017	County-wide

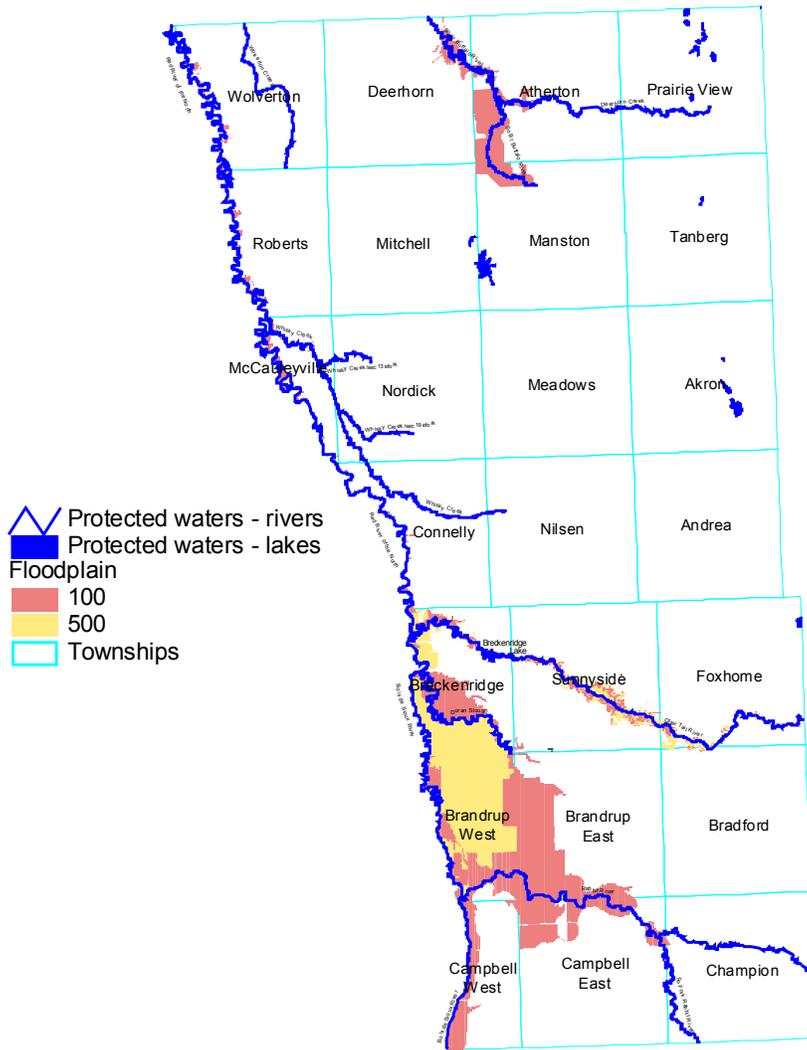
# WILKIN COUNTY LOCATION MAP



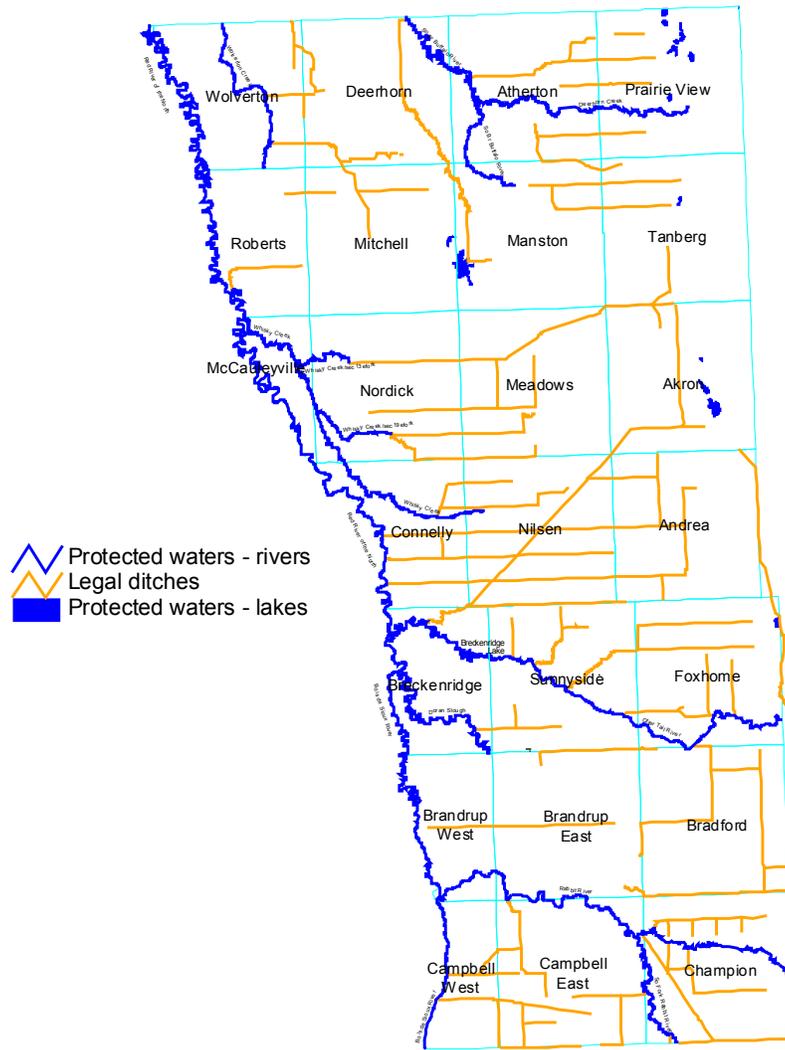
# WILKIN COUNTY LANDUSE



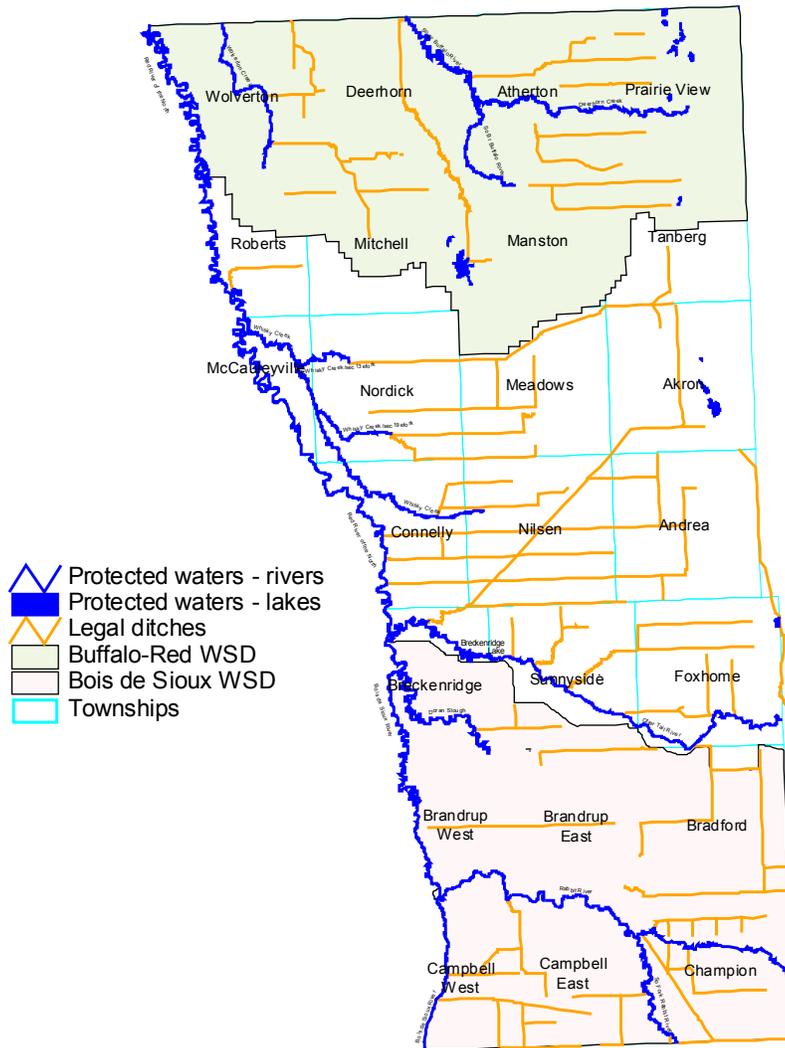
# WILKIN COUNTY FLOODPLAIN

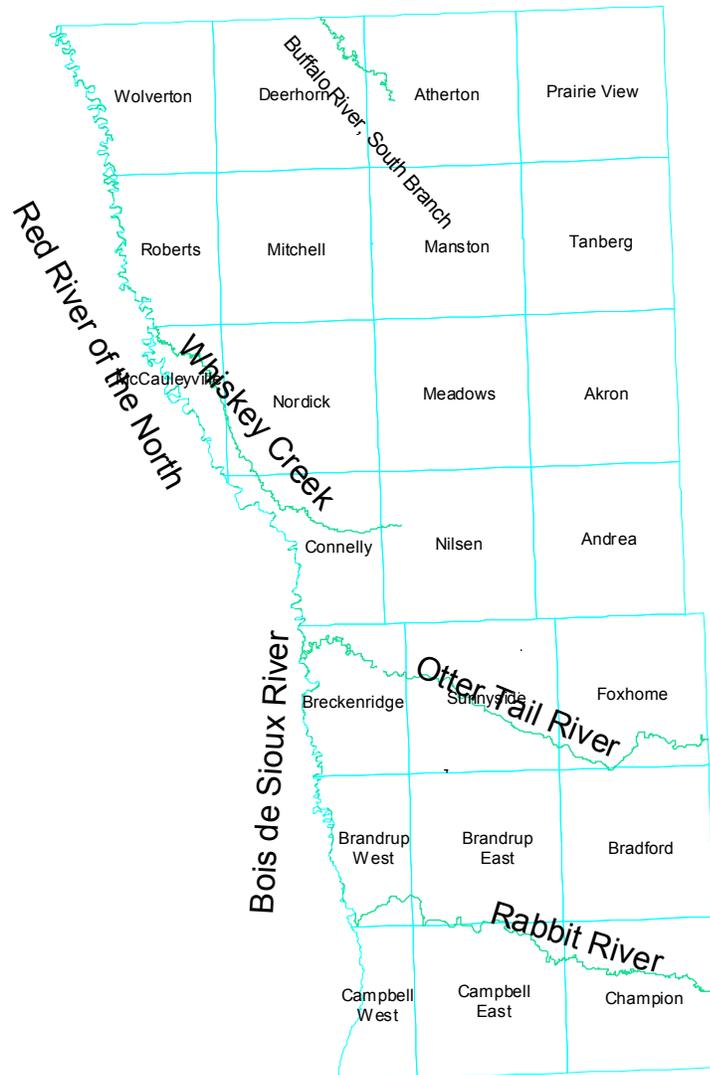


# WILKIN COUNTY SURFACE WATER RESOURCES

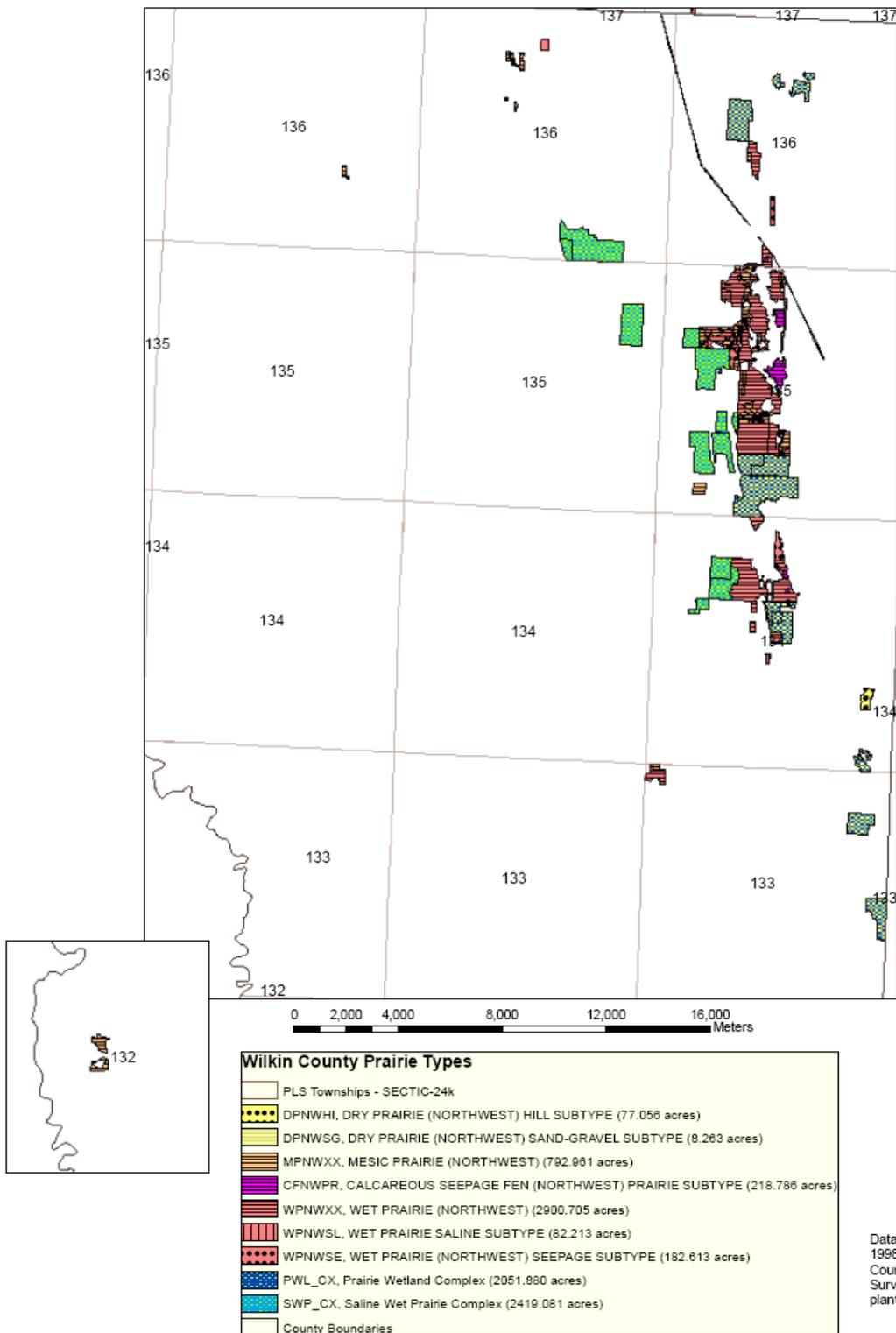


# WATERSHED DISTRICTS





# Wilkin County Native Prairie



## LIST OF FREQUENTLY USED ACRONYMS

**BdSWD** Bois de Sioux Watershed District  
**BRRWD** Buffalo-Red River Watershed District  
**BWSR** Board of Soil and Water Resources  
**CCRP** Continuous Conservation Reserve Program  
**CRP** Conservation Reserve Program  
**DNR** Department of Natural Resources  
**EQIP** Environmental Quality Incentive Program  
**FDR** Flood Damage Reduction  
**GPS** Global Positioning System  
**ISTS** Individual Sewage Treatment System  
**LIDAR** Light Detection and Ranging  
**LOTR** Lower Otter Tail River  
**LWMP** Local Water Management Plan  
**MDH** MN Department of Health  
**MPCA** MN Pollution Control Agency  
**MSGS** Minnesota Geological Survey  
**NRCS** Natural Resources Conservation Service  
**NRE** Natural Resource Enhancement  
**NTU** Nephelometric Turbidity Unit  
**RRBC** Red River Basin Commission  
**SWCD** Soil and Water Conservation District  
**TMDL** Total Maximum Daily Load  
**USFWS** US Fish and Wildlife Service  
**WCA** Wetland Conservation Act  
**WD** Watershed District